REPORT

1961-62

MINISTRY OF STEEL AND HEAVY INDUSTRIES
(Department of Iron & Steel)

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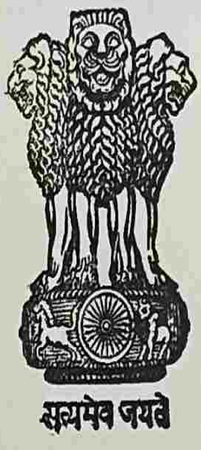

MINISTRY OF STEEL AND HEAVY INDUSTRIES

(Department of Iron & Steel)

CONTENTS

ORGANISATION

The Ministry of Iron and Steel was formed on the 15th June, 1955, and was entrusted with the responsibility of planning and execution of the two steel works at Rourkela and Bhilai and also the administration of the Nahan Foundry Limited. Later it took over from the Ministry of Commerce and Industry the work relating to the Third Steel Plant at Durgapur. In February, 1956, the work of the Mysore Iron and Steel Works was also transferred to this Ministry from the Ministry of Commerce and Industry who took over the administration of the Nahan Foundry Ltd. from this Ministry. Consequent on the re-organisation of the Ministries on 1st April, 1957, the Ministry of Iron and Steel became the Department of Iron and Steel in the Ministry of Steel, Mines and Fuel. With the formation of the Department of Iron and Steel, work relating to the administration of the Iron and Steel (Control) Order, import and export of iron and steel, the establishment of the Iron and Steel Control organisation, the steel projects in the private sector, re-rolling mills and the ferro-alloy industry was transferred to the Department. The Department is also entrusted with the preliminary work in connection with the setting up of a new steel plant at Bokaro in Bihar.

The management of the Rourkela Steel Project was from the beginning, entrusted to the Hindustan Steel Limited but on 1st April, 1957, the work relating to the setting up of steel plants at Bhilai and Durgapur was also transferred to the Company. With the transfer of this work, a number of Officers and staff were transferred to Hindustan Steel. As a result, the Secretariat of the Department of Iron and Steel was considerably reduced and during the year 1961-62, it continued to consist of one Secretary, three Deputy Secretaries, four Under Secretaries, one Officer on Special Duty and 16 Section Officers.

There is only one attached office under the control of the Department at Calcutta with three Regional Offices at Bombay, Madras and Delhi. The head office of the Iron and Steel Control at Calcutta is under the charge of the Iron and Steel Controller who is responsible for the administration of the Iron and Steel (Control) Order 1956 as amended from time to time, issue of licences for the import/export of Iron and Steel, and for the purchase of steel.

With a view to assist the Industries in Northern India requiring iron and steel as raw materials and also to establish a close and

effective liaison between the sponsoring authorities *viz.* Development Commissioner for Small Scale Industries and Development Wing of the Ministry of Commerce and Industry and the Licensing authorities, a Regional Office of the Iron and Steel Controller at Delhi was opened with effect from 1st August, 1961. This office is responsible for issue of import licences as well as customs clearance permits for iron and steel material to the Industries situated in the States of U.P., Punjab and Jammu & Kashmir and also Union Territories of Delhi and Himachal Pradesh. All work relating to the issue of import licences to the Industrial Units borne on the list of Development Wing of the Ministry of Commerce and Industry, which was hitherto dealt with by the Licensing Cell of the Iron & Steel Department, has also been transferred to the Regional Office with effect from the 1st January, 1962.

In order to present a clear picture regarding availability and consumption of iron and steel with special emphasis on matters relating to import and export, production, distribution and also to provide useful information regarding all aspects of the expanding steel industry to the producers and dealers of steel as well as to the consumer and general public, the Iron & Steel Controller has started publishing a monthly bulletin called "Iron & Steel Control Monthly Bulletin from May—1961. This Bulletin includes *inter alia* details of import and export, licences and Customs Celearance permits, particulars about tenders issued by the Controller for the purchase of steel, public notices, circulars and information about changes in the procedure and other important aspects of the control organisation from time to time.

HINDUSTAN STEEL LIMITED

Hindustan Steel Limited was originally formed in December 1953 to construct and manage the Rourkela Steel Plant. Under the agreement with Krupp and Demag the Indian Company was to have an authorised share capital of Rs. 1000 million. The share capital of the company was to be subscribed by Government of India and the German Combine—Indian germeinschaft Krupp Demag-GmbH in the proportion of four to one. The arrangements for the participation of the German firms in the share capital of the company were terminated by mutual agreement towards the end of 1956. As a result of this decision, the Hindustan Steel Limited became a purely Government owned Company.

While Rourkela was under the management of the company from the beginning, planning of two other projects in Bhilai and Durgapur was under the direct control of the Ministry of Iron and Steel until March, 1957. These projects were transferred to Hindustan

Steel Limited from 1st April, 1957. The Articles of Association of the company were suitably amended and the Board of Directors reconstituted. At present the Board consists of eleven members, of whom one is a whole time chairman. There are five other whole time Directors, three are General Managers of Steel Projects, one is the Chairman of another Government of India undertaking and one a non-official.

The authorised capital of the company has recently been increased from Rs. 3,000 million to Rs. 6,000 million. It consists of six million equity shares of Rs. 1000 each of which 3:07 million shares have been fully subscribed upto the end of March, 1962. The Government have also advanced a loan of Rs. 3571:003 million upto the end of March, 1962.

The President appoints the Chairman, all the Directors of the Company as well as the General Managers, Financial Advisers and Chief Accounts Officers.

For the disposal of day to day business, the Board of Directors of Hindustan Steel Limited have set up a Committee of Management consisting of the Chairman, the Director (Construction), Director (Production), Director (Commercial) Director (Personnel) and the Director (Finance) and such of the other Directors as might be available at the Head quarters.

PRODUCTION

The completion of the expansion programmes of the two private sector plants, *viz.* Tata Iron & Steel Co. and Indian Iron & Steel Co. and commissioning of all the units in the Bhilai Steel works had a definite impact on production during 1961. The other two steelworks of Hindustan Steel, *viz.* Rourkela and Durgapur, although running on only two blast furnaces, have also shown a steady increase in production. All these developments have contributed to a larger production of iron and steel during 1961, which was as under:

Production of pig iron for sale

	1960 (Metric tonnes)	1961 (Metric tonnes)
TISCO	8,843	20,822
IISCO	206,183	268,013
Mysore Iron and Steel Works	47,839	12,118
Rourkela	186,700	100,370
Bhilai	389,602	394,442
Durgapur	238,023	313,012
Kalinga	18,643	30,066
Total	1,095,833	1,138,843

PRODUCTION OF FINISHED STEEL

	1960 (Metric tonnes)	1961 (Metric (tonnes)
TISCO		
IISCO	816,318	875,588
Mysore Iron and Steel Works	415,984	563,054
Bhilai	39,886	37,673
Rourkela	7,606	256,558
Durgapur	10,530	145,027
Secondary Producers & Registered Re-rollers	885	49,613
Unregistered Re-rollers	769,850	825,561
	131,457	120,269
Total	2,192,516	2,873,343
Semis Exported	35,894	27,961 (Approx.)
Grand Total	2,228,410	2,901,304

The category-wise breakup of production of finished steel was as under:

PRODUCTION OF FINISHED STEEL BY CATEGORIES

	1960 (Metric Tonnes	1961 (Estimated) (Metric Tonnes)
Heavy Structurals	118,909	230,505
Light & Medium Structurals	235,969	315,483
Spikes	5,390	5,877
Heavy Rails and Fish Plates	146,699	219,311
Light Rails	5,848	11,926
Black Sheets (Plain)	134,878	142,003
Galvd. Sheets (Plain)	21,476	24,146
Galvd. Sheets (Corrugated)	104,119	106,022
Plates	99,543	141,253
Bars and Rods	951,067	1,154,668
Wheels, Tyres and Axles	20,016	21,085
Sleepers	5,908	10,059
Skelp	167,555	170,506
Tinplate	80,636	87,075
Bolts and nuts	13,361	15,344
Rivets	5,029	8,993
Wire (Barbed)	1,022	847
Wire (Misc. & Telegraph)	22,251	51,012

	1960 (Metric Tonnes	1961 (Estimated) (Metric Tonnes)
Wire nails	16,233	16,045
Tool Steel including spring steel	18,624	18,258
Hoops and strips	17,983	85,110
Special Section	..	37,815
Total	2,192,516	2,873,343
Semis Exported	35,894	27,961(Approx.)
Grand Total	2,228,410	2,901,304

DEMAND, AVAILABILITY, IMPORTS, EXPORTS, DISTRIBUTION AND PRICE

Demand.—Though the production in 1961-62 was more than the previous year, the total availability was still short of the demand particularly in respect of sheets, tin plates and galvanised wire. No quota system was in force during the year for categories other than thinner gauge sheets, wire, baling hoops and tinplates. The indents on Producers were, however, routed through the Steel Control. Based on the indents received for relaxed categories and the demands placed by various co-ordinating/sponsoring authorities for quota categories (restricted categories) for purposes of allocation, the total demand during the year 1961-62 was assessed at about 6·2 million tons, as against 5·6 million tons in 1960-61 and 4·1 million tons in 1959-60. The total demand for restricted categories during 1961-62 (sheets and wire) was about 2 million tons. Increase in demand was mostly due to the growth of steel-using industries. The demand for restricted categories was somewhat inflated due to the shortage of supplies.

Availability.—The total availability in 1961-62 was about 4·15 million tons, comprising of indigenous production of about 3·15 million tons and imports of about 1 million tons against the total availability of about 3·2 million tons in 1960 and 2·6 million tons in 1959. The supply position of foundry grade pig iron was not quite satisfactory as the demand had increased to about 1·5 million tons whereas the availability was about 1 million tons only as in the last year.

Distribution.—As in the previous year, the liberalised system of distribution was continued and quotas were allotted only for thinner gauge sheets, wire, baling hoops and tinplates. For other categories consumers were allowed to place indents direct on the Steel

Controller or the stockists without any authorisation or quota certificate. Indents for relaxed categories were generally planned in full but indents for some of the critical categories *viz.*, 5mm and 6mm plates 10 to 14 gauge sheets, 1/4 inch rods and light angles were screened by the Steel Control. This precaution was necessary as the Producers continued to carry large number of outstanding orders for these sections.

During 1960-61 steps were taken to liberalise control over distribution at the Stockists' level. The Controlled Stockholders were permitted to sell relaxed categories to genuine consumers without quota certificates and the Registered Stockists were also allowed to sell 50 per cent of some of the easier sections without any permit. During 1961-62 these concessions were extended further. The Controlled stockists were authorised to sell materials not only to consumers but also to other stockists. Registered Stockists have also been authorised to sell upto 100 per cent of their stock of some of the sections and the list of sections stocks of which they can sell upto 50 per cent without any permit was also enlarged. To handle larger volume of steel more Controlled and Registered Stockholders were appointed. The Controlled Stockholders at present number 214 and Registered Stockholders 1903. The Controlled Stockholders have been allowed to deal in all categories of steel except tinplates and baling hoops for which there are separate stockists. A large number of stockists have also been authorised to handle both tested and untested steel. The quota-wise allocations during last three years were:—

(in '000' tons)

	1959-60	1960-61	1961-62(*)
!Railways & Defence	323	944	48
Industrial Maintenance & Packing	120	95	32
Private Industrial Development Schemes	137	144	12
Government Development Schemes	751	564	41
Steel Processing Industries (Central)	569	645	194
Rehabilitation, Export Reserve, & Export Promotion	70	47	32
Agricultural	325	380	144
States (Non-agricultural), Government Development schemes and Steel Processing Industries	790	1146	167
Small Scale Industries	280	331	127
TOTAL	3365	4296	797

*Only restricted categories—sheets and were in metric tonnes

Scrap.—Steel scrap is generally classified into (a) industrial scrap (b) re-rollable scrap and (c) melting scrap. Scrap is controlled in view of its importance for the economy of the country. The Iron and Steel Controller can declare any factory as 'controlled source'. Such controlled sources cannot dispose of scrap except under the authority or permit issued by the Iron and Steel Controller. The arisings of scrap and defectives from the controlled sources in 1961-62 were about 0:4 million tons. Out of this, about 70,000 tons were available as industrial scrap for distribution to the various States for allocation to actual users.

General.—The Iron and Steel Advisory Council was re-constituted for a further period of two years. Government have also constituted a Standing Committee (Trade) for the steel industry consisting of representative of producers, trade and consumers continuously to study and advise Government on problems, short term as well as long term, relating to the trade in iron and steel

IMPORT AND EXPORT OF STEEL

Import.—Due to the acute shortage of foreign exchange strict control on steel imports was continued in 1961-62. Import licences were issued to actual users only and for categories of steel which were either not produced in the country or produced in limited quantities. In the case of established trade, import licences were confined to a few essential items like tinplates, wire, tool and alloy steel and box strappings.

2. Purchases of steel by Iron & Steel Controller, however, continued both against DLF and from rupee payment countries.

3. **D.L.F.**—A further loan assistance of Rs. 20·52 crores ($43 million Approx.) was made available for the import of steel, in addition to the four Loans already arranged. This had brought the aggregate value of the DLF Loans to $128 million. The New DLF Loan is to be utilised largely for the issue of import licences to actual users. A part of this amount has also been earmarked for procurement by the Iron & Steel Controller.

Against the aggregate value of $85 million made available against the four earlier loans, Ministry of Railways utilised $4·45 million for the import of 40,139 long tons of Railway Steel through the agency of ISM, Washington. Against the remaining amount, orders for the import of 281,065 tons of steel have been placed through tender by the Iron and Steel Controller upto the end of March, 1962. Steel items like strips, plates, wirehoops, strappings, tinplates and tool and alloy steel, which are in short supply in the country are to be imported against DLF Assistance.

4. Imports of steel on barter basis were also continued against exports of pig iron, ingots, blooms, billets, etc. produced by Hindustan Steel Limited as well as against export of scrap and ores etc. For import of steel a quota of 240,000 tons of scrap was made available. Only those categories of steel which are essential to the economy of the country were allowed to be imported.

5. Although the foreign exchange position continued to be difficult, import of tool and alloy steel and special categories of steel which have not yet been indigenously produced in appreciable quantity, was allowed more or less to the extent recommended by the sponsoring authorities. Stainless steel sheets required for utensil manufacture were obtained under barter imports arranged by State Trading Corporation. Import of about 3,000 tons of stainless steel sheets on barter was also arranged during the year. Out of this quantity 250 tons are for meeting the requirements of industries other than utensil manufacture.

The total import of iron and steel during 1961 aggregated to 1,046,809 M. tons as against 941,548 tons in 1959 and 1,144,121 tons in 1960. The category-wise break up of imports in 1961 is given below:

	Quantity in tons	Value in Rs.
Ingots, blooms, slabs, billets, etc.	14,691	10,679,148
Joists, girders, angles sleepers, sections bars and rods	94,837	79,887,318
Plates & Sheets (coated & Uncoated)	*431,134	*355,762,985
Hoops & Strips	37,679	51,209,618
Wire rods & wire coated or not	90,601	77,696,888
Rails and Rail fittings	289,454	132,864,908
Castings & Forgings	21,398	53,664,361
Tool & Alloy steel	58,466	127,393,396
Pig Iron & Sponge Iron	1,642	884,921
Scrap	6,907	4,152,048
	1,046,809	894,195,591
*Includes :		
Tinplate	48,237	48,622,686
Terneplate	213	231,906

Export.—Only such items of steel as could not be utilised in the country were allowed to be exported. Specific ceilings were also fixed for export to neighbouring countries as a special case. In

addition, provision was made for exportable categories of steel to East European Countries with whom India has rupee payment agreements. The exports in 1961 have been as follows:

	(Quantity in metric tonnes)
Pig Iron	98,745
Blooms, billets, slabs, etc., ...	64,696
Finished steel	3,657

The policy of permitting export of only those categories of scrap which could not be used in the country, was followed. In 1961, 320,708 metric tonnes of scrap was exported. A Committee headed by Iron and Steel Controller was also set up to enquire into the entire problems of scrap Industries, including availability of scrap, requirements of users in the country, the systems of distribution, the availability for export, the manner for export etc. The report has been submitted and is at present being examined by the Government.

PRICES

During the year under review, the selling prices of pig iron, tested billets, annealed wire, galvd. wire and jute bailing hoops were increased. With Rourkela Steel Project coming into production new categories like hot rolled strips, cold rolled strips and sheets came into the market. Suitable prices were fixed for these categories. The selling prices of other categories of steel remained unchanged.

The prices referred to above are those at which steel is sold to the consumers. The Steel Works retain a part of the controlled selling price (hence called retention price) and pay the difference to the Equalisation Fund. The five year price structure of retention price came to an end on 31st March, 1960. The new retention prices have therefore to be fixed from 1st April, 1960. A reference on this subject has already been made to the Tariff Commission. The report of the Tariff Commission has just been received and is being examined. Final prices will be fixed on the basis of decisions taken on the Tariff Commission's Report. Meanwhile, provisional retention prices for the different categories of steel payable to the Steel Works have been fixed, subject, however, to adjustment with the Equalisation fund after the final prices are fixed.

10

ROURKELA STEEL PLANT

The Rourkela Steel Plant is situated at the confluence of rivers Koel and Sankh in the Orissa State. It is about 250 miles west of Calcutta on the main Calcutta—Bombay rail route. The Works are designed to make a million tons of steel ingots, to be rolled into flat products like plates and sheets. The process known as the "L. D. Process" is utilised in steel making to the extent of 75% of the capacity. This process results in the release of large quantities of Nitrogen as a bye-product. A fertilizer plant with a capacity of 580,000 tons of nitrolimestone (Nitro-chalk) per year is being put up to utilise this product.

2. The product-mix of the Rourkela Works at the million ton stage will be :

	Tons/year
(*i*) Wide heavy plates 3/16" thicks and above ; maximum width 110′	170,000
Narrow/heavy plates 3/16" thick and above in widths below 60′	30,000
(*ii*) Hot rolled sheets and strips in widths 60′ and below in thickness varying from 16 gauge to 3/16″ .	300,000
(*iii*) Cold rolled sheets and strips 60″ and below in thickness varying from 20 gauge to 12 gauge . . .	170,000
(*iv*) Tinplate 30 to 40 gauge	50,000
TOTAL .	720,000

3. All the units of the plant except 3 lines of the Hot Dip Tinning plant (orders for which were placed late) are complete.

4. A high level Committee appointed by the Government investigated the causes of the breakdown in the Blooming and Slabbing mill in June, 1961 and submitted a report which is under examination of Hindustan Steel Limited. There was another breakdown in this mill on 6-12-1961 when the wobbler and coupling of the top spindle of the blooming and slabbing mill broke bringing the operation of the mill to an immediate standstill. After necessary repairs the mill was recommissioned on 1-1-1962. A Committee has been appointed to investigate the reasons for this breakdown.

5. Production:

Production in 1961-62 was as follows:

Items	Tonnes
Pig iron	429,248
Steel ingots	353,568
Slabs	238,163
Plates	74,235
Hot rolled strips	112,906
Cold rolled sheets	16,142
Tin plate	836
Pipes	36,927

6. Township :

At Rourkela, a modern township is being built in accordance with a master plan which provides for the construction of 20,000 houses for an estimated population of one lakh. Between the steel plant and the township lies the Durgapur range of hills which protects the township from the smoke of the steel plant. The general plan for the township was prepared by M/s. Indien-Gemeinschaft Krupp—Demag GmbH. For the detailed planning of each sector of the township—there will be 20 sectors in all—Hindustan Steel had the services of experienced architects and townplanners. As the first stage in the development of township, Hindustan Steel have taken 7,546 houses for construction. Till the end of March, 1962, 7,148 houses had been completed. Hindustan Steel have built an upto-date 250-bed hospital, health clinics, community centres, hostels for trainees, town hall and library, cinemas and well laid out markets, in the township. The second stage in the development in the construction of 4,000 cheaper type of houses. Out of 2,298 houses taken up for construction, 852 houses had been completed by 31-3-1962.

7. Personnel :

Construction work commenced at Rourkela in 1956. The plant entered the production stage early in 1959. During the year under review construction and production were going on side by side with

more emphasis on production. At the end of financial year 1961-62 staff disposition was as follows :—

	Operation	Construction
1. Officers including Graduate apprentices		
(*a*) Officers	684	113
(*b*) Graduate Apprentices	195	..
2. Staff	7,729	1,102
3. Departmental labour including class IV staff		
(*a*) Departmental labour	181	2,181
(*b*) Class IV staff	6,649	640
4. Contractor's labour	..	6,055
5. Foreigners employed by :		
(*a*) Contractors	9	95
(*b*) Project	152	..

8. The special feature of the Rourkela Steel Plant is the employment of the "L. D. Process" for 75% of the steel making capacity. This process which was developed in Austria consists in blowing Oxygen at very high speeds through a nozzle into molten iron. It has the advantages of lower capital and operation costs and saving in space and ancillary equipment over the conventional processes. An incidental, but more interesting advantage, is the release of large quantities of Nitrogen which can be fixed either in the form of fertilisers or in the form of chemicals. At Rourkela, the Nitrogen is fixed in the form of calcium Ammonium Nitrate (Nitrochalk) which is an important fertiliser.

9. Fertiliser Plant :

The Fertiliser Plant at Rourkela will consist of two-sections, an ammonia producing section and an ammonia processing section. The plant and equipment required for the ammonia producing section has been supplied by M/s. Friedrich Uhde of West Germany. The ammonia processing section is being supplied, erected and commissioned by the Sindri Fertilizers and Chemicals Limited. The plant is expected to get into production during the course of 1962. Till March, 1962, about 8,160 tons (94%) of machinery and equipment in respect of Ammonia Producing Plant were erected. In the Ammonia Processing Section 4,167 tons of machinery and equipment (68%) were erected till 31-3-62.

10. Pipe Plant:

A pipe plant capable of producing monthly 10,000—15,000 tons of electrically welded pipes, depending on the sizes of pipes produced, has been put up at Rourkela. The raw material required for making pipes *viz.* strips is obtained entirely from Rourkela's Steel Works. This plant has supplied about 27,700 tons pipes for the Naharkatiya-Barauni pipeline. This supply alone has saved the country about Rs. 3 crores in foreign exchange.

11. Sales:

During 1961-62, the Rourkela Steel Plant despatched the following quantities of their products to consumers:—

Items	Tonnes
Coke	178,417
Pig iron	54,831
Steel ingots	47,207
Slabs	16,047
Plates	80,608
Hot rolled Strips	46,837
Cold rolled sheets	11,802
Tin plate	369
Pipes	29,303

12. Expansion:

As in the case of Bhilai and Durgapur, Rourkela is to be expanded during the Third-Five-Year-Plan period. The expansion will mainly use the inbuilt facilities already existing, and will increase the ingot production from 1 to 1·8 million tons. The product-mix of the Works after expansion will be:—

Items	(Tons)
1. Wide and Heavy Plates	280,000
2. Hot rolled sheets, narrow light plates and strips	300,000
3. Cold rolled sheets	300,000
4. Hot dipped tinplates	50,000
5. Electrolytic tinplates	100,000
6. Galvanized sheets	160,000
7. Electrical steel sheets	50,000
TOTAL	1,240,000

Tenders received are being evaluated by the Hindustan Steel Limited. Orders for all the plant and equipment are expected to be placed before the end of the year.

BHILAI STEEL PLANT

The picture at Bhilai at the end of 1961-62 is that all the units of the Steel Works for the production of 1 million tons of steel namely three coke oven batteries, three blast furnaces, six open hearth furnaces and four rolling mills, the Sintering Plant besides all the by-product plants and auxiliary units were complete and were put into operation. The Rajhara Iron Ore Mines and the Nandini limestone quarries have also been fully mechanized to meet the requirements of these raw materials for the steel works. The Plant has already achieved the rated capacity of 1 million tons of steel ingots per year.

2. The plant will, from a million tons of ingots, produce about 770,000 tons of finished products as under:

Items	Tons/Year
(*a*) Rails, standard gauge	100,000
(*b*) Rails, narrow gauge	10,000
(*c*) Railway sleeper bars	90,000
(*d*) Standard and broadflanged beams, channels, angles and other light and heavy structural sections (beams with section height upto 24″)	284,000
(*e*) Rounds from 7/8″ to 3″ dia. and squares with sides from 7/8″ to 3″	121,000
(*f*) Flats from 2″to 5″ wide	15,000
	620,000
(*g*) Billets for re-rolling at outside rolling mills from 2″ X2″ to 3″X3″ cross section	150,000
TOTAL	770,000

Pig Iron	300,000
Mettalurgical coke	45,000

3. By-Products.—Besides these the production of following by-products is also designed:

Products	Annual Quantity in tons
Ammonium Sulphate	16,300
Motor fuel	50
Pure benzol	6,240
Pure toluene	1,490
Xylene	500
Solvents	400
Still residues	400
Solvent-naphtha	700
Phenol oil	860
Napthalene oil	2,820
Absorption oil	3,400
Anthracene oil	1,065
Pressed naphthalene, 98·4% grade	1,700
Crude anthracene (centrifuged) 20% grade	890
Crude phenols	800
Pitch	21,680
TOTAL Chemical products	59,295
Combustible mixture for carburization of open-hearth furnace flame	10,000
Coal tar for mould coating	300
Varnish for mould coating	200
TOTAL products for open-hearth plant	10,500
GRAND TOTAL	69,795

4 Production—Production in 1961-62 was as follows:

Item	Tons
Pig Iron	1,000,001
Steel ingots	788,741
Blooms	647,721
Billets	373,277
Rails (Finished)	127,745
Structurals (Finished)	73,007
Merchant products	153,248

5. Township.—A new township called Bhilai Nagar has been built, which would consist of 7,500 houses initially. Besides, 3,200 additional houses are proposed to be built to meet partly the expansion requirements. So far 7,211 quarters have been completed.

289 quarters are at various stages of construction. In addition a hotel with 124 rooms and 32 apartments, a hostel with 120 suites 696 semi-permanent houses and temporary tenements for the construction labour and construction camps have also been constructed.

6. **Personnel.**—There are at present 158 Russion specialists and Experts working in Bhilai in the operation planning group. In all 10,313 persons were employed on construction and 14,734 persons on operation.

A remarkable feature of the Bhilai Steel Plant was that although construction work was done under the supervision of the Soviet Experts, Indian Engineers were associated at all stages of work and they have gained valuable experience. This co-operation enabled the Indian Engineers to pick up, very fast, the latest steel technology and the modern methods of construction, erection and operation of the steel works. Most of the units are being manned by Indian personnel.

7. Mention may be made here of some special features of Bhilai Steel Plant.

(a) *Oxygen blowing.*—In the open health furnaces sprung arch type basic roofs of Chrome Magnesite bricks are used, by which higher temperatures can be attained through the use of oxygen without affecting the brick work. In the initial stage oxygen in open hearth has been restricted to only flame enrichment, but in the expansion programme it is envisaged that oxygen will be blown into the furnace in some way for direct oxidation.

(b) *Increase in Open Hearth Size.*—Recent trend in USSR has been the change in the capacity of open hearth furnaces from 200 tons to 500 and 600 tons which are capable of production rates of over 100 tons per hour. The increase in heat size improves output and also lowers fuel and refractories consuption. The success of large furnaces in USSR encouraged the USSR designers in deciding the installation of 500 tons basic roof furnaces in the expansion programme of Bhilai Steel Works.

(c) *Technique modification.*—The Soviet techniques of flushing of slag from front as well as from the back through two runners in the open hearth has been adopted so as to expedite the process of melting.

(d) *Use of Radio-isotopes.*—The use of cobalt a radio-active material is made to determine the rate of wear of the roof of the furnaces. In the Blast furnace, use of isotope is made to study the rate of descent of ironore and limestone in the charge of blast

furnace. In the Sintering Plant, cobalt is used to ascertain the position of iron ore bunkers, whether these are full or empty as it is difficult to find it out unless one climbs up to the top.

(e) *Production techniques.*—The latest techniques of economic production of pig iron in USSR have been introduced in Bhilai, e.g. use of self fluxing sinter which not only improves performance of the furnace but also utilizes iron ore fines, control of moisture in the blast furnaces, and high top pressure which will be fully utilized later when demand for iron goes up.

8. **Sales.**—Sales from Bhilai during 1961-62, totalled about Rs. 37·95 crores, included Rs. 1·56 crores foreign exchange earned by way of exports. The steel works despatched, more than 3,74,000 tonnes of pig iron, 1,91,000 tons of billets, 1,16,000 tons of rails, 70,000 tons of structurals and 1,34,000 tons of merchant mill products *viz.* angles, rounds and beams. Exports included more than 75,000 tons of pig iron mainly to Pakistan, Japan, Yugoslavia, 6,000 tons of billets mainly to Pakistan. Sale from Bhilai also included 52,000 tonnes of various by-products.

9. **Expansion.**—Under an Agreement dated 12th September, 1959, and Additional Agreement dated 12th February, 1960 the Soviet Government offered necessary credit for the expansion of Bhilai Steel Works to the capacity of 2·5 million tons of steel ingots per year with corresponding expansion of power, ore mining and lime-stone quarrying capacities. The 2·5 million tons of steel ingots a year would result in the following saleable products:—

Rails	500,000 tons
Heavy structural sections . . .	250,000 tons
Merchant sections	500,000 tons
Wire Rods	300,000 tons
Billets	400,000 tons
Pig iron	300,000 tons

The detailed project report for the Expansion of Bhilai was presented by Tyazhpromexport in September, 1961. It was accepted with a few modification in November, 1961.

10. The additional units to be set up under expansion are: three coke oven batteries, two blast furnaces, four open hearth furnaces and a wire mill. The wire mill was specifically provided as the demand in the country for wire rods is increasing. In addition the Sintering Plant, the Blooming Mill, the Rail & Structural Mill, Continuous Billet Mill, the Merchant Mill, Foundry and Roll Turning Shop will be additionally equipped.

11. A general plan has now been drawn for the disposal of the slag. The plan provides for three distinct units;

(i) for slag granulation;

(ii) for manufacture of slag wool and mats for insulation; and

(iii) for manufacture of slabs which will in turn be crushed and sized into aggregate of various sizes for purposes of concrete and other construction.

The three together can process 780,000 tons of slag—the quantity estimated to be available from within the existing three blast furnaces. Of 780,000 tons of slag, 255,000 tons will be processed into granulated slag for cement making. 41,000 tons will be processed into mineral wool and wool products. 4,82,000 tons will be cast into slabs which will then be crushed and sized as aggregate.

12. A contract was signed between Hindustan Steel Limited and Tyazhpromexport on the 9th February, 1962 for the preparation of working drawings, for the supply of equipment material, for deputing Soviet Experts for rendering technical assistance in designing, construction, erection, supervision, adjusting and putting the plants into operation and also for the training of Indian specialists and qualified workers in the Soviet Union. The total C.I.F. cost of the contract is about Rs. 54 crores.

DURGAPUR STEEL PLANT

The construction work that started in Durgapur, West Bengal in 1956, for a million ton steel plant by Indian Steel-Works Construction Company Ltd., London, under a package deal has, almost been completed.

The third coke oven battery was lighted up on 30th January, 1962 and the third blast furnace is likely to go into production in May, 1962. The Wheel and Axle plant has also gone into partial production for Axle and wheels and complete wheel set is expected shortly. All the open hearth furnaces are in operation with the third blast furnace going into production it is expected that full rated production will be available from the plant before 1962-63 comes to a close. The one million ton plant is designed to produce the following finished products in addition to 360,000 tons of pig iron for sale:—

(*a*) Heavy forging blooms	10,000 tons/year
(*b*) Forging blooms	30,000 tons/year
(*c*) Forging billets	60,000 tons/year
(*d*) Billets for re-rolling industry	150,000 tons/year
(*e*) Merchant bar sections	240,000 tons/year
(*f*) Light and Medium Sections	200,000 tons/year
(*g*) Sleepers	60,000 tons/year
(*h*) Wheels and Axles	50,000 tons/year
TOTAL	800,000 tons/year

The coke oven gases are being utilised for production of the bye-products. The following are the bye-product rated capacity:—

Bagged amomnium Sulphate ;		
Crude Tar	57	tons day
Benzene	230	tons/day
Toluene	6,240	gallons
Solvent Naptha	884	gallons
	146	gallons.

Production.—With two out of three Blast Furnaces in production in 1961-62 the production was:—

Items	Tons
Pig Iron	763,787
Steel Ingots	462,638
Blooms & Slabs	426,136
Blllets	305,275
Sleeper Bar	17,572
Sleepers	15,654
Sections	53,413
Merchants	33,774

and the bye-products produced were:—

Crude Tar	37,686
Ammonium Sulphate	10,978
Sulphuric Acid	9,611
Naphthalene	747
Benzene	1383 K.Lt.
Road Tar	690
Xylene	13
Toluene	41

To advise on the better management and operation for the plant services of a team of management consultants from M/s. Urwick Orr & Partners, London, have been obtained under the Colombo Plan.

Township.—The Steel Plant township was designed to have 7,500 houses in the 1st phase and 2,800 houses in the second phase. Till the end of March, 1962, 7,242 residential houses had been built. In addition one hospital, 7 hostels, 4 markets and 4 schools had been built and 67 miles of permanent road had been constructed. Most of the residential houses have been fitted with water and electric connection. Sewerage lines have been drawn in consonance with the requirement of modern city life.

The water supply requirement both for the plant and township is met by the D.V.C. The project has, at present, subsidised transport facilities for the staff and officers and a regular bus service is maintained. The West Bengal Government has been considering, at the request of the Government of India the proposal to take over the bus service.

The project has clubs for both officers and the staff in the Township. It has other recreation facilities and recreational associations have also sprung up within different sectors of the township.

Personnel.—In the year 1961-62 the construction being in the closing phase, the construction personnel were reduced to a great extent. At the end of March, 1962 the project has the following personnel:—

	Construction	Operation	Others
Officers including Graduate Apprentices . .	151	645	168
Staff including clerical	1,307	4,792	1,373
Semi-skilled, unskilled workers including Departmental Labour . . .	1,569	5,020	1086
Contractors' Labour	7,888	..	..
Foreigners employed by :			
(*i*) Project	..	87	..
(*ii*) Contractors	42	..	..
(*iii*) Consultants . . 2 . .	9	..	..

Expansion.—The third five year plan provides for expansion of Durgapur Steel Plant to a capacity of 1·6 million tons of Steel Ingot.

The project report prepared by the Central designs organisation of the Hindustan Steel Ltd., in collaboration with the Indian Steel Works Construction Company Limited, London, has been examined by them in consultation with M/s. Atkins & Partners, London, and recommended for Government approval. The Government is examining the report.

The Project report envisages attaining the following finished product capacity in addition to 300,000 tons of pig iron for sale at the 1·6 million tons stage.

Products	Tons.
Medium & Light Structurals . . .	200,000
Merchants	240,000
Sleepers	75,000
Wheels and Axles	93,00
Fish Plate	11,000
Forging blooms & billets	70,000
Billets forsales	300,000
Skelp	250,000
TOTAL .	1,239,000

The Hindustan Steel has been advised to issue tenders for a few of the items of the expansion plant and equipment, pending approval of the Project Report.

To meet the foreign exchange cost of expansion, which is estimated to be about Rs. 330 million out of the total estimated cost of Rs. 590 millions for the plant and Rs. 60 million for the ancillaries, the Government of U.K. have offered a credit. The details and terms & conditions of the credit are being negotiated. In view of availability of the credit it has been decided to issue limited open tenders in U.K. and India only. The tender papers are mostly ready and are expected to issue in April—September, 1962.

Arrangements for temporary facilities for water supply, electricity site requirements etc. are in hand.

Alloy & Special Steel Plant.—The technical examination of the Project Report submitted by M/s. M. N. Dastur & Co. Ltd., has been completed. M/s. Atlas Steel Ltd., Canada, have been appointed as production advisers. They have examined the Report and suggested some modifications. The changes suggested are being examined.

Tenders for site levelling, boundary wall and shop offices have been received and finalised. Most of the fabrication work will be done in India and the contract is being awarded. Tender papers for most of the items of the plant are ready and expected to issue shortly. It is proposed to invite tenders from 10 countries as may be capable of supplying required plant and equipment and are willing to offer suitable terms of credit. This includes Canada, U.K., Japan, Switzerland, West Germany, U.S.A., France, Austria, Sweden and Italy.

The agreement entered into with M/s. Atlas Steels Ltd., Canada provides for production know-how and training services for erection and operation of the plant. The agreement terminated after a period of 12 years or six years after the date of commercial production in the plant, whichever is earlier.

The overall responsibility work on the plant site is that of the consultant M/s. M. N. Dastur & Co. Hindustan Steel Ltd. is also getting up an Organisation for checking up the progress.

Construction of site office buildings is almost complete. Work on boundary wall shop office building, water treatment plant and overhead tank are in progress.

The major portion of the land required by the project has been made available by the Durgapur Steel Plant, and the West Bengal Government has been approached for the acquisition of the remaining 127 acres required.

Personnel.—Alloy Steel Plant has on its roll now 394 officers and staff including a General Manager, a Chief Engineer and a Project Officer.

Simultaneously the question of training the Engineers has been taken up. 36 Engineers and Graduate apprentices are being trained in India. The agreement with Atlas provides for training of Indian Engineers in their works in Canada and the details are being worked out.

RECRUITMENT AND TRAINING

In accordance with the recommendations of the Training Plan Development Team an overall training programme has been finalised. The Technical Training Institutes are functioning at Rourkela and Bhilai and are training Graduate Apprentices, operatives and skilled workers. Durgapur has also started training scheme for operatives and skilled workers. In-Plant training service has been established in each of the plants to supervise the in-plant training of the different categories of trainees.

The following table will indicate the number of trainees in the Rourkela, Bhilai and Durgapur Technical institutes as on 31-3-1962.

Trainees	Bhilai	Rourkela	Durgapur
Graduate apprentices	83	162	95
Operatives	107	136	101
Skilled workers Artisan trainees	220	576	87
Outsiders	2	10	4
Total	412	884	287

With the functioning of these institutes the majority of the personnel are trained in the steel plants. Engineers are sent abroad only when specialised training is required and if facilities do not exist in India.

The following table will indicate the total number of engineers and operatives so far sent abroad and returned after completion of training as on 31-3-1962.

Country	Engineers		Operaties	
	Sent	Returned	Sent	Returned
U.K	307	283	62	62
U.S.A.	576	576	4	4
U.S.S.R.	409	409	387	387
West Gemrany	128	124	7	7
Australia	83	66	17	10
Canada	1	1	..	..
TOTAL	1,504	1,459	477	470

At present, the following foreign training programmes are in hand:

U.K.—The H.S.L. are yet to train 39 engineers of the Durgapur Steel Project in the United Kingdom under the Colombo Plan. Of these 3 engineers have gone in February 1962.

About 20 engineers of the Coal Washery Project will also be trained in U.K. The first batch of 4 engineers is expected to leave India shortly.

Two engineers of the Durgapur Project were also sent to U.K. for the Works Study Course.

Australia.—The Australia Government have indicated their willingness to train another batch of 24 engineers during 1962 under the Colombo Plan. These engineers are expected to leave India sometime in June, 1962.

France.—Steps are being taken to depute 11 officers to France for training Cost Accountancy, Production Management and Marketing Methods under Indo-French Programme.

Austria.—8 engineers are contemplated to be sent to Austria in two batches for training with Messrs. Vcest in the manufacture of special type of plates for Koyna. The First group of 4 engineers are expected to leave India shortly.

West Germany.—There is possibility of training of 25 Rourkela engineers in West Germany in small batches under the UNTAB Programme. It is not known as to when this will materialise. There is also a proposal to depute 20 to 30 engineers to West Germany for training in Fertiliser Plant.

Canada.—About 100 engineers of Alloy Steel Plant will be sent to Canada for training with Messrs Atlas Steels Ltd., in batches of 35 engineers each.

Through these training programmes and by taking on for operational requirements a large number of suitable constructional personnel, Hindustan Steel Limited have been able to solve to a great extent their technical manpower problem in the field of junior engineers as far as the present phase of these three steel plants is concerned. The shortage of training technical Indian personnel is mainly in the category of senior and middle grade supervisory personnel. This is due to the fact that only a few engineers with the requisite experience were available in the country.

For maintaining the efficiency of operation and maintenance departments of the steel plants and for developing of young Indian

engineers a number of foreign technicians had to be recruited, for all the three steel plants.

Durgapur.—It has been decided to recruit 181 UK technicians for Durgapur Steel Plant. Recruitment of foreign technicians was made through the collaboration of British Iron and Steel Federation. It has now been decided to seek the help of a Consulting Agency, Messrs Urwick, Orr and Partners to recruit technicians from the United Kingdom. 81 UK technicians are in position and the rest are expected to be in position during the current year.

Rourkela.—To improve the efficiency of operation and maintenance of Rourkela Steel Plant, the number of German technicians in that Plant had to be increased. It is proposed to recruit 180 German technicians. 150 are already in position. German firms and German suppliers have agreed to give loans and grants to meet part of the foreign exchange required for these German personnel.

Bhilai.—The number of foreigners working in Bhilai is 158. It is proposed to reduce this number further during the current year as and when Indian Engineers are suitable to replace them.

With a view to provide training at the senior and middle grade supervisory level, the Hindustan Steel Limited have started a Management Training Institute at Ranchi in February, 1962. Officers are trained in the arts of administration human, relations and personnel management in this institute.

COAL WASHERIES

With the limited reserves of metallurgical coals in the country, two measures of conserving these coals were kept in view in locating and designing the new steel works—(1) to wash all metallurgical coals so as to lower the ash content and thereby enrich the coals and (ii) to blend weakly coking or semi coking coals with the fully coking coals of Jharia. In pursuance of this policy, the Hindustan Steel Ltd. was to instal four coal washeries to supply washed coals to the steel plants. These are in addition to the three coal washeries,, Jamadoba, West Bokaro and Lodna, in the private sector and a fourth one put up by the National Coal Development Corporation at Kargali.

2. These four washeries were to be set up at Durgapur, Dugda, Bhojudih and Patherdih. The washery at Durgapur was commissioned in April 1960 and is supplying washed coal to the Durgapur Steel Works.

3. The washery at Dugda is located in the Hazaribagh district of Bihar. About 2·4 million tons of raw coal will be fed into the washery to produce about 1·8 million tons of washed coal per annum. For the design, supply and erection of this washery, HSL concluded a contract in November 1958 with M/S. McNally Pittaburg International Inc. U.S.A. The washery has since been completed and was commissioned in December 1961.

4. The Bhojudih washery which is at present under construction, is located in the Purulia district of West Bengal. About 1·2 million tons of raw coal will be fed into the washery, to produce about 0·9 million tons of washed coal per annum.

On the basis of a Global tender enquiry, HSL placed the contract for the washery with a U.K. Firm M/s. Coppes & Co. (GB) Ltd., London. The cost of the washery including ancillaries is expected to be about Rs. 3·5 crores, of which the foreign exchange is estimated to be about Rs. 1 crore. The civil engineering work are nearing completion, and erection work in several sections is in various stages of progress. The washery is expected to be completed by about the middle of 1962. Side by side the construction of the township, approach roads, schemes for the supply of water and electricity are also in various stages of progress.

5. The Patherdih washery will be located in the Dhanbad district of Bihar. It will have a capacity of 400 tons per hour. About 1·8 million tons of raw coal will be fed into the washery to produce about 1·3 million tons of washed coal per annum. HSL have placed the order for the equipment, machinery and erection of the Patherdih washery with M/s. Roberts and Schaefer Company, Division of Messrs Thomson Startee Company, Inc. Chicago, U.S.A. in June 1961. The construction of temporary residential quarters for housing the staff and labourers is in progress. Schemes for the supply of water for the operation of the washery and for the township have been undertaken. Other preliminary works relating to the erection of plant and equipment are in various stages of progress. The washery is expected to be ready for operation by about the third quarter of 1963.

6. To meet the requirements of the expanded steel industry in the third five year plan, plans for the expansion of the washeries at Dugda and Bhojudih are in hand. The washery at Dugda will be doubled by installing a second coal washing plant with a capacity of 2·4 million tons of raw coal per annum. Tender enquiries have been issued in U.S.A. by the India Supply Mission, Washington, on behalf of HSL. The last date for receipt of the tenders is April

30, 1962. The input capacity of the washery at Bhojudih will be expanded by about 0:8 million tons of raw coal per annum. For installing the additional equipment HSL have placed the contract with the original contractor M/s. Coppes & Co (GB) Ltd., London. Excavation of the foundation for putting up the clean coal bunker, raw coal tippler, and manual unloading arrangements have been undertaken and are in progress.

BOKARO STEEL PLANT

The fourth steel plant at Bokaro which is included in the Third Five Year Plan is designed to have initial capacity of one million tons of steel ingots and 350,000 tons of pig iron. The plant is expected to produce flat products like plates, sheets and strips. Consultations are still going on with the U.S. Agency for International Development on the question of U.S. Finance for Bokaro.

The total area to be acquired for the plant is estimated as 35.840 acres. Out of this only 282·42 acres have been acquired. Bihar State Government have, however, issued orders for handing over the forests and Government Lands to the project. Fixation of ceiling price for private holdings is being pursued with the State Government. Meanwhile, survey of villages in Hazaribagh and Dhanbad Districts is in progress.

It has now been decided that the Hindustan Steel Ltd. should take up construction of Garga Dam for meeting the requirements of water for the construction purposes as well as for one million ton stage of the plant.

Action for purchase in respect of the following has been taken:

(i) Railway Materials.

(ii) Steel Pipes.

(iii) Cement.

(iv) Water supply materials and

(v) Electrical Materials for enabling works and township.

PROGRESS OF CONSTRUCTION

Estimates for permanent township of 500 units of labour quarters, shopping centres have been completed and estimates for construction, equipment enabling works, Construction laboratories have also been completed and are awaiting financial concurrence. Estimates for administrative building, hotels, temporary quarters, office building etc, are also being worked out.

ALLOY STEELS

It is difficult to define alloy steels as there is no universally accepted definition and the variety in such steels is large depending upon the alloying elements and the resultant diversity in mechanical and physical properties. Technically alloy steel is steel which in addition to its common constituents contains other alloying elements added with the object of achieving particular physical properties. The common alloying elements are chromium, nickel, molybdenum, tungsten or vanadium, to which we may add common constituents of steel, such as manganese, silicon, sulphur and phosphorus, when increased beyond normal for a similar purpose. The list of alloying elements does not by any means comprehend the full number of alloying elements in use. For example, cobalt, niobium (columbium) and titanium are quite commonly used. However, when these other elements are used, it is practically always in conjunction with one or more of those mentioned earlier.

It has been estimated that the requirements by the end of the Third Five Year Plan will be somewhat as follows:—

(*i*) Electrcial sheets		110,000 tons
(*ii*) Freecutting steels, spring steels and other alloy steels which do not require specialist equipment .		75,000 tons
(*iii*) Tool steels	42,000	
Constructional steels . . .	100,000	
Stanless s	--50000	
Die and other alloy steels . . .	8,000	200,000 tons
(*iv*) Alloy steel castings . . .		30,000 tons

By the end of the Fourth Five Year Plan, based on the trends of demand, the requirements are likely to be—

(i) Free-cutting steels, spring steels, etc. . . .	150,000 tons
(*ii*) Tool Steels	70,000 tons
(*iii*) Constructional steels	240,000 tons
(*iv*) Stainless steels	70,00 tons
(*v*) Other high grade alloy steels . . .	110,000 tons
(*vi*) Alloy steel castings	50,000 tons

The requirements of the electrical sheets has not been worked out as yet.

At present the production of alloy steels in the country is not very significant. Most of the production is mainly of spring steels and alloy steel castings some special steels for making tools and agricultural implements. Ordnance factories also make available limited quantities of such steels for civil use. Domestic production is nowhere near the demand which itself is rapidly growing for all practical purposes the country depends upon imports.

With a view to meeting the country's requirements of alloy steels, new units have been sanctioned during the last three years. During 1961-62 fifteen new schemes were sanctioned for alloy steels for a total capacity of 261,000 tons. These parties are making arrangements for securing the equipment and for obtaining necessary foreign collaboration. A limited number of schemes sanctioned earlier have started production very recently though the difficulty in importing the equipment on account of foreign exchange difficulties, is the main handicap in early implementation of the schemes. Delivery of the plant in some cases is expected in the next 12-18 months while others are expected to obtain the equipment from within the country as small-sized furnaces are now available.

Of the schemes approved during the year the most important scheme is that of Tatas for an Alloy Steel Plant at Jamshedpur with a total capacity of 49,000 tons a year.

The product-mix will be as under:—

Carbon tool steels	10,000 tons
Direct hardening alloy steel	7,000 tons]
Case hardening steels	2,000 tons
Spring steel (High Grade)	2,000 tons
High Speed and tungsten tool steels	3,000 tons
Other quality alloy and H. C. Steel sheets	5,000 tons
Stainless steels	20,000 tons

Tatas are now negotiating with foreign firms for securing collaboration for the project.

Taking into account the production from the proposed Alloy Steel Plant in the Public Sector at Durgapur and also the contribution of the Ordnance Factories for civilian requirements, capacity

would be created, if all the sanctioned schemes materialise, for the different categories of alloy steels roughly as under:

(*i*) Free-cutting and spring steels	160,000 tons
(*ii*) Tool Steels	54,000 tons
(*iii*) Constructional steels*t*	130,000 tons
(*iv*) Other High Grade Alloy	8,000 tons
(*v*) Alloy Steel Castings	42,000 tons

Licensing of capacity for special steels has been undertaken with Fourth Plan targets in view, as it generally takes more than three to five years for such plants to be installed and achieve significant production.

Stainless steel is not being produced in the country at present and the entire requirements are being met by imports. The requirements of stainless steels by the end of the Third Plan have been estimated at 50,000 tons and by the end of the Fourth Plan at 70,000 tons. By the end of the Fourth Plan, about 54,000 tons of stainless steels are likely to be available from the Alloy Steel Plant at Durgapur and Tatas. Licensing of new units for achieving the Fourth Plan target of 70,000 tons is under consideration.

BOLANI ORES LIMITED

To supply iron ore to Durgapur Steel Plant a new mine is being developed at Bolani in the Gua region of Orissa where ore deposits are extensive and rich. For the development and operation of the mine, a Company called Bolani Ores (Private(Ltd., has been set up in which the Government of India hold 50·5 per cent, and the Orissa Minerals Development Company 49·5 per cent of the shares.

2. The first phase of development to produce one million tons of ore has almost been completed. The supply of ore to Durgapur Steel Plant was started in April, 1960. The estimate for supply of iron ore during 1962 is approximately 1.4 million tons of sized ore against the initial target of one million tons per annum.

3. It has been envisaged that Bolani Ores (P) Ltd. would meet the entire iron ore requirements of the expanded Durgapur Steel Works under the Third Five Year Plan. A firm of mining consultants have prepared a report for expanding the capacity of the mines from one million to two million tons per annum, and at present the report is being examined by Bolani Ores (P) Ltd.

TATAS, INDIAN IRON AND MYSORE IRON & STEEL WORKS

Out of the target of six million tons of ingots steel set for the Second Plan, almost half was to be achieved by the expansion of the 3 integrated steel works, namely, Tata Iron and Steel Co., Jamshedpur, the Indian Iron and Steel Co., Burnpur, and the Mysore Iron and Steel Works, Bhadravati. At the beginning of the Second Plan, these three Works produced about 1·6—1·7 million tons of ingots. During the Second Plan Period, TISCO were to increase their production to 2 million tons of steel ingots (1·5 million tons of finished steel), IISCO to 1 million tons of steel ingots (0·8 million tons of saleable steel) and MISW to 100,000 (from 30,000) tons of steel ingots (85,000 tons of saleable steel). The expansion schemes of TISCO and IISCO have been completed and their production is gathering momentum. The expansion programme of MISW has, however, been delayed and has been taken up during the Third Plan Period. Orders for plant and machinery required for their expansion scheme were placed in November, 1960. The review of the progress made by these three Works is given below:—

Tata Iron and Steel Company.—Of the three plants, the Tata's Plant is the oldest. It is situated at Jamshedpur, 156 miles from Calcutta, on the main Calcutta-Bombay Line. The plant produced its first iron in 1911 and its first steel in 1912. It was gradually built up. By 1939, it had a capacity of about a million tons of ingots, but by the end of the Second World War, production had dropped by nearly 100,000 tons. Owing to the old age of the plant, it became necessary to modernise the plant. The two expansion schemes undertaken by the Company—the Modernisation and Expansion Scheme of 1952 and the Two Million Ton Programme of 1955—were designed not only to modernise the plant but also to double its capacity of a million tons of ingots.

The first expansion scheme of 1952 sought to raise the capacity of the plan from 750,000 tons of finished steel to 931,000 tons by 1958. When this Scheme was undertaken, there were 5 blast furnaces with an annual capacity of about 1·2 million tons of iron and 3 steel melting shops, rolling mills which had a 40" blooming mill and a continuous sheet bar billet mill, a rail and structural mill, sheet mills, a merchant mill, a plate mill, 3 bar mills, a sleeper plant and a wheel, tyre and axle plant. The Scheme undertaken in 1952 included installation of a new coke oven battery, remodelling of the steel melting shop No. 3, improvement of the blooming

mills, soaking pits, plate mill and calcining plant and the installation of a new skelp mill as also the expansion of the steam and Power supply. This Scheme has been completed.

The Second expansion scheme generally known as Two Million Ton Programme was undertaken for the construction of a new coke oven battery, expansion of the existing batteries as also of the boiler and power house installations, expansion of the steel melting shop No. 3 by the addition of two 100-ton open hearth furnaces and a 132 tons coverter, installation of new crushing plant, sintering plant and construction of a new blast furnace, a new 46″ blooming mill complete with soaking pits, sheet bar and billet mill, a new medium and structural mill and a new roll shop. This scheme has also been completed.

The second expansion scheme also included remodelling and modernisation of the steel melting shops, calcining plant, old sheet bar billet mill, old roll and structural mill, merchant mill, construction of ingot mould foundry and the development of the collieries and mines. Tatas also undertook some ancillary works as part of their expansion programme which consisted of ferro manganese plant at Joda, New refractory plant at Belpahar, a ferro sulphate washing plant and a plant for recovery of scrap from slag by Heckett process. These have also been completed.

For implementing the expansion scheme the Government of India have given financial assistance by granting special advance of Rs. 100 million and furnishing a guarantee for two World Bank loans totalling 107:5 million dollars.

Indian Iron and Steel Company.—This Company has 2 plants, one at Kulti and the other at Burnpur. The plant at Kulti consisted of 2 blast furnaces each with a capacity of about 300 tons per day, coke ovens and a large pipe foundry for the manufacture of cast iron pipes. The plant at Burnpur consisted of two blast furnaces each with a capacity of 600 tons a day with steel melting facilities. The rolling mills consisted of a blooming mill, a rail and structural mill, 18" Morgan mill and sheet mills.

With a view to increae their capacity to 0:8 million tons of saleable steel, Indian Iron had also undertaken expansion of their works. The first was undertaken in 1953 and consisted of expansion of mechanisation of the Gua ore mines, installation of 2 coke oven batteries, 2 blast furnaces, expansion of the converter house, installation of a third converter, addition of second shop and 4 soaking pits along with expansion of the finishing departments of the 2 mills and the expansion of ancillary services like water, gas

power and steam. This expansion was expected to raise the production to 700,000 tons of saleable steel and is practically completed.

In 1955, another expansion was undertaken to step up the production of saleable steel upto 800,000 tons and it consisted of addition of two stands to the billet mill and one to the rail and structural mill, a new bar mill, two soaking pits, a new 20,000 K.W. steam turbine generator with necessary boilers and provision of necessary ancillary facilities. This part of the Expansion Programme is also completed.

The Government of India have granted the Company a consolidated loan of Rs. 73·45 million and a special advance of Rs. 101·80 million for their expansion programmes. Two loans from the World Bank totalling 49·20 million dollars have also been guaranteed by the Government of India for financing the expansion schemes.

Mysore Iron and Steel Works Bhadravati.—The Mysore Iron and Steel Works, Bhadravati, was set up in 1923 to manufacture wood-distillation chemical products and at that time it had a small blast furnace for making iron from local ore. By 1936, these Works had facilities to roll about 25,000 tons of steel products and manufacture 8,000 tons of cast iron pipes. In 1938, a cement unit was added to the plant and in 1942, a ferro-silicon plant. From 1946 onwards, efforts have been made to enlarge the plant's capacity and two electric pig iron furnaces have been set up. An additional kiln was subsequently added to the cement unit and the ferro-silicon capacity was increased.

The plant today consists of a small conventional 80-ton blast furnace and 2 electric furnaces with a rated capacity of 100 tons each for making iron, two 25-ton open hearth furnaces, a 20″ roughing mill, a 20—12″ mill to roll round, squares, flats and small angles, and a rod and strip mill. The works have an iron foundry where castings for maintenance, pipes and sleepers are made. The steel foundry and furnaces produce both ferro-manganese and ferro silicon. There is also a small structural fabrication shop and a fire brick and refractories plant. The present annual capacity of the Works is about 30,000 tons. The daily rated capacity of the cement unit is now 260 tons.

In 1955, a firm of technical consultants were deputed to undertake a technical study of the plant and they recommended the installation of adequate steel-making and rolling facilities for

making the plant more economical. During the Second Five Year Plan, the following schemes were undertaken:—

(i) **Cast Iron Spun Pipe Plant.**—This was completed in 1957 with a capacity of 15,000 tons per annum.

(ii) **Sintering Plant.**—The erection of this plant is nearing completion.

(iii) **Expansion of ferro silicon plant.**—Erection of one of the two furnaces has been completed and this has gone into production in December, 1961. The erection of the second furnace is nearing completion.

(iv) **Steel expansion and billet and light structural mill.**—Orders were placed in November, 1960 for supply of plant and equipment. Shipments have already started arriving in India.

(v) **Extension of foundry, electricity and tramways.**—Civil engineering mechanical (structural) engineering and other ancillary works are progressing rapidly. Arrangements are being made to get the quotations for a new electric arc furnace and connected equipment.

Alloy Steel Plant.—The Mysore Government's proposal to set up an alloy steel plant for the manufacture of 15,000 tons per annum of high grade alloy steel bars is under consideration of Government.

The Mysore Government have formed a Corporation under the title of The Mysore Iron and Steel Ltd., which has taken over the management of the Works from 1st April, 1962.

Pig Iron.—Against a target capacity of 1·5 million tons of pig iron envisaged in the Third Plan, it was estimated that the integrated steel works would produce a million tons and the balance of half a million tons would be available from small/medium sized pig iron plants in the private sector. So far a capacity of about 241,000 tons (which includes two medium sized plants each with a capacity of 100,000 tons per annum) has already been licensed, and it is proposed to licence shortly further capacity to cover the gap in the private sector.

Steel Wire.—The existing and projected capacity for the production of steel wire is about 350,000 tons per annum. This together with the capacity of small scale units which are likely to come up, is expected to meet the estimated demand of 400,000 tons based on the Report of the Expert Panel on Wire. There may be scope for licensing further capacity for the manufacture of special types of wire for which there is at present a capacity of 75,000 tons.

Ferro-Manganese.—Against a target of 200,000 tons in the Third Plan, a total capacity of about 256,000 tons has been licensed of which a capacity of about 158,000 tons has been installed.

Production:

Year	Metric Tonnes
1959	60,443
1960	82,218
1961	87,223

A Committee was appointed in November, 1961 to study the various problems of the ferro-manganese industry with special reference to supply of raw-materials, railway freight production cost, export market etc. The Committee held two meetings during the year under report. As it may be necessary to hold one or two meetings more to examine and finalise this study, the Committee is expected to submit its report only by July, 1962.

Ferro-Chrome.—Based on the target fixed for tool, alloy and special steels by the end of Third Plan i.e. 375,000 tons per annum, it is estimated that the demand for ferro-chrome will be about 40/45,000 tons. The capacity licensed so far is about 16,000 tons and the gap will be filled by licensing further units in the field.

Ferro-Silicon.—At present Mysore Iron and Steel Works is the major producer of ferro-silicon in the country. Against a target capacity of 40,000 tons envisaged for the Third Plan period, a capacity of 32,200 tons have been approved so far and further units will be licensed to cover the gap.

The expansion of the ferro-silicon plant for raising the production of Mysore Iron and Steel works to 20,000 tons per annum is nearing completion. The first furnace was installed and commissioned in December, 1961, and the second is nearing completion. So the present requirements of ferro-silicon within the country will be met when these two furnaces are in full production.

Production:

Year	Metric Tonnes
1959	7,629
1960	7,039
1961	9,157

Steel Re-rolling Industry.—In planning the development of the steel industry in the Third Plan, the position of the steel re-rolling industry was reviewed taking into account the demand for sections which could be rolled in re-rolling mills. The review showed that it should be possible to licence about 100,000 tons to 150,000 tons of further capacity in the re-rolling industry in small units to meet local demands. Accordingly, a capacity of 128,600 tons for setting up new re-rolling mills in Assam, Bihar, Gujrat, Kerala, Madras, Madhya Pradesh, Andhra Pradesh, Maharashtra and Jammu and Kashmir has been sanctioned and a further capacity of 15,000 tons each for Mysore and Orissa is proposed to be sanctioned shortly.

Ingots and Billets.—Electric furnaces already sanctioned and those in progress are expected to make available a total of about 200,000 tons of billets a year for the re-rolling industry. The question of permitting further capacity is being considered in the light of the recommendations of the Scrap Investigation Committee Report.

Tinplates.—It is estimated that the requirements of Tinplates by the end of Third Plan period will be about 300/350,000 tons. The capacity so far approved is about 330,000 tons of which the existing capacity is 80,000 tons. The approved capacity so includes the planned capacity of the Rourkela Steel Plant—50,000 tons of hot dip plates and 100,000 tons of electrolytic tinplates.

Production:

Year	Metric Tonnes
1959	68,819
1960	80,050
1961	87,075

Prospects for the future:

During the 2nd Plan period, three new steel plants each of one million ton capacity have been installed in the Public Sector. The ingot capacity of the two steel works at TISCO AND IISCO in the Private Sector has also been doubled.

The overall targets proposed for the iron and steel industry to meet the requirements of pig iron and finished steel, during the Third Plan period are 10·2 million tons of steel ingots capacity and 1·5 million tons of pig iron for sale. Of this the Public Sector is

expected to produce 7 million tons of ingot steel and 1 million tons of pig iron. Private Sector is expected to contribute 3·2 million tons of steel ingots and 0·5 million tons of pig iron. The production in the Public Sector is expected to be achieved by expansion of the existing steel works at Bhilai, Durgapur, Rourkela and Mysore Iron and Steel Works and installation of new steel plant at Bokaro. The expansion of the existing installed capacity would ensure fuller utilisation of the existing installed capacity and hence diminishing cost. The expansion of capacity in the Private Sector is expected to come from installation of scrap based electric furnaces.

Preliminary investigations are being conducted with Neyveli lignite in regard to the process as well as the raw material which can be used in the proposed pig iron plan in Neyveli. Experiments are also being conducted in India and abroad to find out the commercial possibility of utilising iron ore available in different parts of the country with fuel other than the metallurgical coal which is in short supply and is available in the Bengal and Bihar region only.

Formulation of the Fourth Five Year Plan for the iron and steel industry has been taken up.

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GOVERNMENT OF INDIA

MINISTRY OF STEEL & HEAVY INDUSTRIES
(Department of Iron & Steel)

Summary of activities of the Department of Iron and Steel for 1961-62

Organisation.—This Department is entrusted with the work relating to the administration of the Iron and Steel (Control) Order, import and export of iron and steel, the establishment of the Iron and Steel Control Organisation, the steel works in the public and private sectors, re-rolling mills and ferro-alloy industry. It is also responsible for the planning and development of capacity for the production of iron and steel.

There is only one attached office under the administrative control of the Department at Calcutta with three Regional Offices at Bombay, Madras and Delhi. The head-office of the Iron and Steel Control Organization at Calcutta is under the charge of an Iron and Steel Controller who is responsible for the administration of the Iron and Steel (Control) Order 1956, as amended from time to time, issue of licences for the import/export of Iron and Steel, and for the purchase of steel.

HINDUSTAN STEEL LIMITED

The projects entrusted to the Hindustan Steel Limited for construction and operation are the three integrated iron and steel works at Rourkela, Bhilai and Durgapur, the Coal Washeries at Durgapur, Dugda, Bhojudih and Patherdih, the Pipe Plant and Fertilizer Plant at Rourkela and the Alloy and Tool Steel Plant at Durgapur and the preliminary work on the Bokaro Steel Works. It is proposed to erect a Refractory Plant at Bhilai under the 112·5 million rouble credit programme of the U.S.S.R.

The authorised capital of the Company, has recently been increased from Rs. 300 crores to Rs. 600 crores. It consists of sixty lakhs of equity shares of Rs. 1,000 each of which thirty lakhs and seventy thousand shares have been fully subscribed upto the 31st March, 1962. Government of India have also advanced a loan of Rs. 357·10 crores upto the end of March, 1962.

DEMAND AVAILABILITY AND DISTRIBUTION OF IRON AND STEEL.

Demand.—Though the production in 1961 exceeded that of 1960, the total availability was still short of demand particularly in res-

pect of sheet, tin-plates and galvanised wire. The quota system is now in force only in respect of categories like thinner gauge sheet, wire, baling hoops and tin-plates. The indents for all categories on producers were, however, routed through the Steel Control. Based on the indents received for relaxed categories and the demands placed by the various coordinating/sponsoring authorities for restricted categories for purposes of allocation, the total demand during the year 1961-62 was assessed at about 6·2 million tons, as against 5·6 million tons in 1960-61 and 4·1 million tons in 1959-60. The total demand for restricted categories during 1961-62 (sheets and wire) was about 2 million tons. The estimated demand of 6·2 million tons is probably somewhat exaggerated, since there is a natural tendency to inflate the demand for categories in short supply.

Availability.—The total availability in 1961-62 was about 4·15 million tons comprising of indigenous production of about 3·15 million tons and imports of about 1 million tons, against the total availability of about 3·2 million tons in 1960 and 2·6 million tons in 1959.

Distribution.—The liberalisation of distribution has been continued and quotas were allotted only for thinner gauge sheets, wire baling hoops and tin-plates. For other categories consumers were allowed to place indents direct on the Steel Control or on the stockists without any authorisation or quota certificates.

During 1961-62 the controlled stockists were authorised to sell materials not only to consumers but also to other stockists. Registered Stockists have been authorised to sell 100 per cent of some of the sections and the list of sections of which they can sell 50 per cent without any permit has also been amplified. To handle the larger volume of steel more Controlled and Registered Stockholders have been appointed.

During 1961-62, 797,000 metric tonnes of restricted categories of iron and steel items were allocated to different authorities.

The Controlled Stockholders numbered 214 and Registered Stockholders 1903 on 31st March, 1962.

Scrap.—It is estimated that in 1961-62 about 70,000 tons of industrial scrap was available for distribution to the various States for allocation to actual users as against 44,500 tons in 1960-61.

Production of Iron and Steel.—During 1961, the production of finished steel was 2·90 million tonnes as against 2·23 million tonnes in 1960. The production of pig iron for sale reached the figure of

1·14 million tonnes as against 1·09 million tons in 1960. The production of saleable steel and pig iron in the three public sector plants was 0·45 and 0·81 million tonnes respectively in 1961 as against 0·02 and 0·81 million tonnes respectively in 1960.

IMPORT AND EXPORT OF STEEL

Import.—Purchases of steel by Iron and Steel Controller, continued both against Development Loan Fund and from rupee payment countries.

2. **D.L.F.**—A further loan assistance of Rs. 20·52 crores ($ 43 million Approx.) was made available for the import of steel, in addition to the four loans already arranged. This brings the aggregate value of the D.L.F. loans to $ 128 million.

3. Imports of steel on barter basis were also continued against export of pig iron, ingots, blooms, billets etc., produced by Hindustan Steel Limited as well as against export of scrap and ores etc. For import of steel a quota of 240,000 tons of scrap was made available.

4. The total import of iron and steel during 1961 aggregated to 1,046,809 metric tons as against 941,548 tons in 1959 and 1,144,121 tons in 1960.

Export.—Only such items of steel as could not be utilised in the country were allowed to be exported. The exports in 1961 have been of the order of 177,733 metric tonnes. In 1961, 98,745 tons of pig iron, 64,696 tons of semi-finished steel and 3,657 tons of finished steel were exported. The Policy of permitting export of only those categories of scrap which could not be used in the country has been continued. In 1961, about 320,708 metric tons of scrap was exported.

Prices.—During the year under review, the selling prices of pig iron (all grades), tested billets, annealed wire and galvanised wire and Jute Bailing hoops were increased.

The retention prices of steel for the three major producers of steel—Tata Iron and Steel Company Ltd., Indian Iron and Steel Company Ltd. and Hindustan Steel Limited—were fixed for a five year period ending 31st March, 1960. From 1st April, 1960 new retention prices have to be fixed and a reference has also been made to the Tariff Commission in this connection.

DEVELOPMENT IN PRIVATE SECTOR

Pig Iron.—Against the target capacity of 1·5 million tons of pig iron envisaged in the Third Plan, the integrated steel works will be producing a million tons and the balance of half a million tons is expected from small/medium sized pig iron plants in the private sector. So far a capacity of about 241,000 tons (which includes two

medium sized plants each with a capacity of about 100,000 tons per annum) has already been licensed. It is also proposed to license shortly additional capacity to cover the gap in the private sector.

Steel Wire.—The existing and projected capacity for the production of steel wire is about 350,000 tons. This together with the capacity of small scale units which are likely to come up, is expected to meet the estimated demand of 400,000 tons based on the report of the Panel of Experts.

Ferro-manganese.—Against a target of 200,000 tons in the Third Plan, total capacity of about 256,000 tons has been licensed of which a capacity of about 158,000 tons has been installed.

Ferro-chrome.—Based on the target fixed for tool, alloy and special steels by the end of the Third Plan, *i.e.*, 375,000 tons per annum it is estimated that the demand for ferro-chrome will be about 40/45,000 tons. The capacity licensed so far is about 16,000 tons and the gap will be filled by licensing further units in the field.

Ferro-silicon.—At present Mysore Iron and Steel Works is the only producer of ferro-silicon in the country. Against a target capacity of about 40,000 tons envisaged in the Third Plan period, a capacity of 32,200 tons has been approved so far and further units will be licensed not only to cover the gap but after taking into consideration the prospects of exports of ferro-silicon.

Steel Re-rolling Industry.—In planning the development of the steel industry in the Third Plan, the position of the steel re-rolling industry was also reviewed taking into account the demand for sections which could be rolled in such mills. The review brought out that it should be possible to license about 150,000 tons of additional capacity in the re-rolling industry to meet local demands. Necessary licences for establishing the additional capacity of 128,600 tons have already been issued.

Alloy Steel.—Against the requirements of the Third Plan which have been estimated at 415,000 tons a year, 90,000 tons are estimated to be available from the Central Alloy and Tool Steels Plant and Ordnance Factories when they go into production. The present and licensed capacity for special and tool alloy steels including alloy steel castings is of the order of about 110,000 tons. A further capacity of 261,000 tons has been recently licensed, including 20,000 tons per annum for stainless steel.

Ingots and Billets.—Electric furnaces already sanctioned and those in progress are likely to provide a total of about 200,000 tons of billets a year for the re-rolling industry.

Tinplates.—It is estimated that the requirements of tinplates by the end of the Third Plan period will be about 300,000 to 350,000 tons. The capacity so far approved is about 330,000 tons of which the existing capacity is 80,000 tons.

TISCO, IISCO & MISW.—The Tata Iron and Steel Company have completed their 2 million tons programme for the production of 1·5 million tons of saleable steel. The Indian Iron & Steel Company have also completed their expansion programme for the production of 0·8 million tons of saleable steel. The expansion programme of the Mysore Iron and Steel Works for the production of 85,000 tons of steel was undertaken in right earnest towards the end of 1960 when orders were placed for plant and machinery.

Rourkela Steel Project.—The Rourkela Steel Plant designed to produce one million tons of steel ingots to be rolled into 720,000 tons of flat products like plates and sheets, is complete except for a part of the hot dip tinning plant. Iron and Steel production in the Rourkela Steel Plant in 1961-62 has been of the order of 429,248 metric tonnes of Pig Iron, 353,568 metric tonnes of steel ingots and 189,957 metric tonnes of saleable steel. It has been decided to expand the capacity of the Rourkela Steel Plant from 1 million to 1·8 million tons of steel ingots *i.e.* from 720,000 tons to 1,240,000 tons in terms of flat products.

Bhilai Steel Project.—The one-million-ton stage of the plant has been completed. The plant has now embarked on expansion to 2·5 million tons of steel ingots during the Third Five Year Plan. The Bhilai Steel Plant when expanded will produce 1·95 million tons finished steel and 300,000 tons of pig iron. The Iron and Steel production at Bhilai in 1961-62 has been of the order of 1,000,001 metric tonnes of pig iron, 788,741 metric tonnes of steel ingots and 517,288 metric tonnes of saleable steel. The work with regard to expansion has already started and is expected to be finished by 1966.

Durgapur Steel Project.—One million tons of ingot steel to be produced at Durgapur Steel Works will be processed into about 8 lakh tons of saleable steel. The plant will also produce 3·60 lakh tons of pig iron for sale. The construction of the Plant is complete. Coke Oven No. 3 has been lighted up and Blast Furnace No. 3 is also to be blown in shortly. On the Wheel and Axle Plant, the first Axle was made on a trial basis on 1st November, 1961. Production in Durgapur in 1961-62 was of the order of 763,787 metric tonnes of Pig Iron, 462,638 metric tonnes of steel ingots and 359,770 metric tonnes of saleable steel. The programme for expansion to 1·6

million tons of ingot and 300,000 tons of Pig Iron has also been drawn up.

Alloy and Special Steels Plant.—The major portion of the land required for Alloy Steels Project is already available and acquisition proceedings for the remaining are under way. M/s. Atlas Steels of Canada have been appointed as Advisers for Production knowhow and training. Tender specifications have been drawn up and enquiries for various units of the plant are to be issued shortly. The construction of Coke Oven Gas and Oxygen lines from Durgapur Steel Plant to Alloy Steels Plant is in progress.

Bokaro Steel Project.—The fourth Steel Plant at Bokaro which has been included in the Third Five-Year Plan is designed to have an initial capacity of one million tons of steel ingots and 350,000 to 400,000 tons of saleable pig iron with facilities for further expansions. M/s. Dastur & Co. have submitted the preliminary Project Report. The detailed Report is yet to be prepared.

The area required for the Project has been intimated to the State authorities and they have issued orders for handing over the forest and Government lands to the project staff.

Coal Washeries.—Of the three coal washeries to be constructed by the Hindustan Steel Ltd. (Durgapur washery being an integral part of the steelworks), the one at Dugda which is to supply 1·8 million tons of washed coal per year was commissioned on the 29th December, 1961. The Second washery at Bhojudih which will supply about 0·9 million tons of washed coal per year is expected to be completed in the second half of 1962. The third washery at Patherdih is expected to be ready by the end of 1963, and will supply about 1·3 million tons of washed coal per year. It has also been decided to expand the washing capacity at Dugda and Bhojudih. Dugda will be expanded so as to wash about 2·4 million tons of raw coal per year. The input capacity of the washery at Bhojudih will be expanded by about 0·8 million tons of coal per annum.

Training for operation.—On the recommendation of the Training Plan Development Team an overall training programme has been finalised. Well equipped Institutes have been established at all the three steel works of Hindustan Steel Limited for the training of artisan trainees, junior and senior operatives and engineers. About 100 engineers, 200 operatives and 300 artisans are likely to be trained every year in these Institutes. So far 340 Graduate Apprentices, 344 operatives and 883 skilled workers and artisans have been trained in these Institutes. In addition, 16 outsiders were also trained.

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REPORT

1961-62

MINISTRY OF STEEL, MINES AND FUEL
(Department of Mines & Fuel)

REPORT
1961—62

सत्यमेव जयते

MINISTRY OF STEEL, MINES AND FUEL
(Department of Mines & Fuel)

48

CONTENTS

INTRODUCTION

The Ministry of Steel, Mines & Fuel which was constituted on the 17th April, 1957, consisted of two Departments—the Department of Iron & Steel and the Department of Mines & Fuel. This report cover the activities of the Department of Mines & 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 & Fuel, re-designated as Ministry of Mines and Fuel, is given in Appendix I.

CHAPTER I

COAL

Control over production, movement and prices of coal was continued during 1961-62.

2. *Overall production.*—The total coal production in 1960-61 was 54·6 million tonnes. The production in 1961-62 remained almost at the same level, though during the calendar year 1961, the total production stood at 56·4 million tonnes as against 52·61 million tonnes during 1960.

3. *Transport position.*—The daily average wagon loading in the West Bengal/Bihar fields was 4799 wagons in 1961-62 as against 4,482 wagons during 1960-61. In the outlying fields, the daily average loading rose from 1158 wagons in 1960-61 to 1170 wagons in 1961-62. The total despatches of coal by rail were 50·7 million tonnes in 1961-62 as against 46·6 million tonnes moved during 1960-61. 3·79 million tonnes were moved by road during 1961-62 as against 3·38 million tonnes in 1960-61. The Railways have agreed to increase their loading target from 6,535 wagons per day during 1961 to 7271 wagons per day during 1962, inclusive of a 5% cushion. The cushion has been provided to facilitate adjustments where necessary.

4. *Export.*—The exports during 1961-62 were 1·30 million tonnes, as against 1·29 million tonnes during 1960-61.

PUBLIC SECTOR

National Coal Development Corporation Ltd.

5. *Production.*—The Corporation was assigned a target of achieving during the last quarter of the II Plan, viz. January to March, 1961, a rate of production of 13·5 million tons (13·7 million tonnes) per year. This target rate of production was not only achieved, but was, in fact, slightly exceeded, the production during the said quarter having been 34,26,944 tons (34,81,775 tonnes), which gives the annual rate of production of 13·7 million tons (13·9 million tonnes). For achieving this production, the Corporation opened up nine new mines and expanded the output from the 11 old collieries.

Subsequently, however, the production had to be deliberately curtailed. This was principally due to the unusual rise in pithead stocks, which increased to 1·6 million tons on March 31, 1961. Thus, though the total production in March 1961, was 1·3 million tons (1·32 million tonnes),

production in April, 1961 was reduced to 0·49 million tonnes and it went down further to 0·36 million tonnes in June, 1961. Latterly, as pithead stocks got reduced, the production has again started picking up, though not to the level of March, 1961. From January to March, 1962, the production was as following:—

Figures in tonnes

January 1962	6,15,510
February, 1962	5,90,333
March, 1962	6,73,210

However, the N.C.D.C. collieries have the capacity to increase production from its Second Plan projects as soon as the pithead stocks position eases.

The Third Plan target of production allotted to the N.C.D.C. is to achieve by 1965-66 an additional production of 17 million tons a year. In the result, therefore, the Corporation will have to attain during the last year of the Third Plan a level of production of 30·5 million tons a year.

The Corporation has drawn up plans for achieving a total production of a little over 33 million tons during the last year of the Third Plan. The anticipated phased production during the five years of the Third Plan both from the existing as well as from new collieries to be opened, is as under:

1961-62	5·864 million tons.
1962-63	10·613 million tons.
1963-64	18·062 million tons.
1964-65	24·352 million tons.
1965-66	33·634 million tons.

6. *Foreign collaboration.*—The Corporation has entered into agreements with CEKOP, a Polish Mining Organisation, for the development of a colliery at Sudamdih, Jharia with an output of about 2 million tons a year,—out of which a production rate of 0·5 million tons will be achieved within the 3rd Plan.

Messrs. Tiajpromexport, a Russian Organisation with whom agreement was signed for the preparation of project reports for the underground mines at Korba, have furnished plans for two underground mines with a total production of 1·7 million tons. As a sequal to the acceptance of the project reports, yet another agreement for the preparation of detailed drawings and designs for the underground mines has been entered into.

It is proposed to develop a coking coal colliery at Ramgarh with the aid of the Technical Cooperation Mission of the United States, for an

output of 1·5 million tons a year. The assistance of the National Coal Board of U.K. has also been sought for developing a deep shaft mine in Jarangdih/Kathara for an output of 1·5 million tons in the Fourth Plan.

7. *Coal Washing Projects.*

(a) *Kargali Washery.*—This is the first composite type of coal washing plant installed in India and is also the first coal washery in the public sector. The output of washed coal from this Washery steadily increased during the year. The production during 1961 was 10.06 lakh tonnes (9·90 lakh tons) as against 8·65 lakh tonnes (8·51 lakh tons) in 1960 and 7·14 lakh tonnes (7·03 lakh tons) in 1959.

In order to beneficiate coal from the Chalkari Colliery at the Kargali Washery a scheme, at a capital cost of Rs. 1·13 crores, has been drawn up for the expansion of this Washery.

(b) *Other proposed washeries.*—The Corporation has initiated action for setting up two other washeries, one at Kathara for an input of 3 million tons per annum, and the other at Gidi for an input of 2·8 million tons per annum. A contract has already been signed with the U.S.S.R. authorities for the preparation of a detailed project report and working drawings for Kathara Washery, which is expected to be commissioned in 1965. As regards Gidi, CEKOP, is at present designing the washery. The preliminary project report is expected in April, 1962. It is proposed to commission this washery also in 1965. A coking coal washery is proposed at Sudamdih as well, as an integral part of the Sudamdih Colliery Project which will go into full production towards the end of the 4th Plan. Besides these coking coal washeries, two others for beneficiating non-coking coal are proposed—one in Madhya Pradesh to wash coal from the N.C.D.C.'s collieries in Central India, and the other at Singrauli. The latter is likely to be commissioned during the 4th Plan.

8. *Training.*—Five Mining Training Schools are at present functioning under the National Coal Development Corporation. These schools are located at Talcher, Kargali, Kurasia, Giridih and Bhurkunda collieries, and are intended to meet the Corporation's requirements of junior technical personnel for the first three years of the Third Plan. The question of the requirements of junior technical personnel for the subsequent years of the Third Plan, including the requirements for the Fourth Plan, will be reviewed in due course.

The Mining Schools provide for five separate courses of training as follows:—

1. Course I—Fitters, Elec./Mech./Diesel Engines.
2. Course II—Electrical/Mechanical Supervisors.
3. Course III—A—Overmen/Mine Surveyors.
4. Course III—B—Assistant Surveyors.
5. Course IV—Junior Technicians.

Besides the Mining Training Schools, Evening Lecture Centres have been started at 5 places with the idea of training literate coal face workers who are anxious to improve their prospects as Mining Sirdars and Shotfirers.

Three apprentice graduate mining engineers of the Corporation, who were receiving training under the scheme of the National Coal Board in the U.K., completed their training and have returned to India.

Ten apprentice mining engineers of the Corporation, who were sent for practical training in coal mines in France for a period of 8 months under the Indo-French Technical Cooperation Programme, have returned to India after receiving the requisite training. Three Electrical and Mechanical Engineers have also returned to India after receiving training in coal mining in West Germany.

Three Drilling Assistants of the Corporation, who were sent for practical training in drilling, maintenance and repair of machines in Australia under the Colombo Plan, have returned to India after receiving the requisite training.

Six Assistant Excavating Engineers of the Corporation left India on 27-3-62 for training in the repairs and maintenance of various types of excavating equipment in the U.S.A. under the Point Four Programme.

Six Assistant Electrical/Mechanical Engineers of the Corporation have been approved for training in U.K. in the installation and running of coal preparation plants and repairs and maintenance of underground machinery and equipment under the Colombo Plan.

Two Deputy Superintendents of Collieries and two Colliery Managers of the Corporation have been approved for training in stowing in thick and steeply inclined coal seams in France, under the Indo-French Technical Co-operation Programme.

9. *Power Supply*.—In Bihar, the collieries of the Corporation obtain power through the Bihar State Electricity Board, who in their turn receive their power supplies from the D.V.C. The Corporation experienced temporary shortages of power from the Bihar State Electricity Board in June-July 1961, when the D.V.C. imposed restrictions owing to the failure of new turbo sets at Bokaro and Durgapur. In recent months, however, the power supply position in Bihar has been satisfactory.

In Madhya Pradesh, the power supply is derived mainly from thermal stations of the Madhya Pradesh Electricity Board who have made an allotment of 6000 KW to the Corporation. This cannot be fully utlised until the transmission line from Korba to Chirimiri/Bisrampur area is completed. The present indication from the Madhya Pradesh Electricity Board is that the transmission line will be completed by October, 1962.

At present the Corporation has a few diesel generating sets for temporary power supply in Kurasia, Korea and Bisrampur.

In Maharastra, the Corporation has been assured by the State Government that power supply as required by the Corporation will be available for the Umrer and Kamptee projects to be undertaken in that State.

The power supply requirements of the Corporation's collieries in Orissa are met by the Orissa Government, who have allocated 2000 KW from the Hirakud power system. The Corporation is negotiating for an additional 1000 KW to meet its requirements of power at the South Balanda project. Besides this, the Corporation is generating its own power to the extent of 1500 KW to meet the requirements of the Talcher and Deulbera collieries, in that State.

10. *Central Workshop*:—The Central Workshop at Barkakhana was formally declared open on the 30th April, 1961. Eight shops have been fully equipped and are now functioning. During 1961-62, the Workshop manufactured spare parts of the value of Rs. 9 lakhs and fabricated steel structurals of the value of Rs. 8 lakhs, apart from overhauling diesel engines and undertaking other miscellaneous repairs of the value of Rs. 8 lakhs. The Tyre Retreading Shop has started functioning and work of the value of Rs. 1 lakh was undertaken during 1961-62.

Another agreement with the U.S.S.R. authorities for the preparation of working drawings for the three principal shops for the Central Workshop, Korba has been executed. An agreement for the supply of plant and machinery has also been negotiated and approved by the Board.

11. *Machinery and Equipment*.—The total value of plant and machinery ordered by the Corporation upto the end of March, 1962 was Rs. 27.04 crores. Of these, plant and equipment worth Rs. 19.85 crores have been received.

Equipment so far ordered includes, among other items of machinery, two giant draglines with 39 Cu. yds. capacity buckets, the first of its kind in East Asia for use in the Bisrampur Project. Of these, one has already arrived and is under transit to the site. Part shipment of the other dragline has arrived and is under clearance from the docks. It is expected that the complete shipment would be arriving in 3-4 months.

Besides these, two other draglines of smaller capacity, *viz.*, 15 cu. yds. bucket capacity have also been procured. One of them is in operation in Kurasia and the other at South Balanda.

Thirty-three Deep drills for prospecting work in the new areas have been procured and deployed at Sudamdih in Jharia coalfield, and at Churcha and Kathona Blocks in the Sohagpur area.

12. *Civil Construction and Water Supply.*—During 1960-61 the civil construction works taken up by the Corporation were of the value of Rs. 3.2 crores, the bulk of which has been completed. The total value of works to be taken up during 1961-62 was of the value of Rs. 9·13 crores. This includes works carried forward from the previous years and also construction work in the new projects, *viz.* Sudamdih, Ramgarh, Barkakhana, Duman Hill, Surakachhar and Banki Projects.

Filtered water supply arrangements have been made in all the collieries of the Karanpura coalfield. In addition, a filtration plant has also been installed at Kathara. Designs and estimates for further extension in the Karanpura coalfield, Korea, Korba, Karanpura, Kathara and Barkakhana Townships have been drawn up and are at various stages of implementation. A comprehensive water supply scheme for Kargali has been finalised and approved by the Board of Directors. A similar scheme for Karanpura is under preparation.

13. Labour:

(i) *Labour Relations.*—The two-tier system of negotiations introduced last year has worked satisfactorily, resulting in better labour relations and fewer references to the Conciliation Officer. Seven strike notices were received during the year under report, six of which were subsequently withdrawn as a result of direct negotiations between the Unions and the Management. The seventh was jointly referred to arbitration. In spite of the reference of the dispute to arbitration, the Management continued to negotiate with the Union and ultimately succeeded in arriving at an 'out of the Court' settlement. Having succeeded in arriving at such a settlement, the parties filed an agreed memorandum with the Arbitrator who accepted it and published the same as his award. The award has since been implemented.

The report of the Court of Enquiry set up by Government in relation to the coal mining industry and the workmen regarding the abolition of the contract system in the industry, as published by Government, has been implemented by this Corporation.

The recognised unions operating in the N.C.D.C's Collieries served a notice for the termination of the Coal Award in the N.C.D.C's collieries. In connection with the termination notice, a meeting between representatives of the coal industry, workers, and the Ministries of Labour and Steel, Mines and Fuel was convened at Delhi on the 7th March 1962. A decision was taken at this meeting to set up a Wage Board for the coal industry. In view of the decision taken by the tripartite meeting it is expected that the unions which served the notice for the termination of the Coal Awards, will withdraw not only this notice but also the strike notice served along with that.

(ii) *Miners' Quarters.*—The number of Miners' quarters completed upto the end of March, 1961, was 4643. These along with the 2307 Miners' quarters of the approved type available from the pre-Corporation period, made a total of 6950 Miners' quarters. Further, out of the construction programme of 1960-61 yet another 4584 Miners' quarters have been completed, making a total of 11534. With the completion of the remaining 558 pertaining to 1960-61 programme, the total number of Miners' quarters available would be 12092. The programme for 1961-62 is to construct 2323 Miners' quarters more.

(iii) *Medical Facilities.*—In order to cater to the needs of workers and staff, the Corporation runs 23 hospitals, besides 17 sectional dispensaries. A proposal for seetting up a 30—40 bed hospital with provision for specialised treatment in different branches of medicine and surgery to serve the large coal fields, *e.g.*, Kargali-Bokaro, Karanpura and Orissa, is under examination.

Most of the hospitals have been brought upto the standard required by the Coal Mines Welfare Department and during the year under review these have earned a sum of Rs. 75,915·89 nP. as grant-in-aid from the Labour Welfare Fund.

(iv) *Welfare and other amenities.*—Besides providing amenities as stipulated in the Mines Act and Rules, the Corporation has provided canteens in its collieries. In most of the collieries, Clubs/Institutes have been functioning to provide recreational facilities to the workers. To provide financial assistance, both recurring and non-recurring, to such Institutes, a Welfare Fund has been constituted by the Corporation.

Recently the Corporation has sanctioned free electricity to all workers drawing pay upto Rs. 400/- per month. In respect of the employees whose pay is more than Rs. 400/- a concessional rate has been fixed.

In order to give some financial benefit to the family and dependants of deceased workers, the Corporation has introduced a Compassionate Gratuity Scheme. According to this scheme, if a worker dies before retirement and if he was not a member of the Staff Provident Fund. a suitable lump-sum grant will be made available to his dependants and family.

14. Transport:

(a) *Wagon supply position.*—Transport difficulties continued in the Karanpura coalfields and at Kathara. Elsewhere, in the remaining collieries of the NCDC, transport shortage is not particularly acute. In the Karanpura region, of late, there has been some improvement in wagon offerings.

(b) *Railway Sidings.*—Railway sidings for all the Second Plan Projects had been completed before March 1961, except for Sayal and Gidi 'C'. At Sayal, a siding with a capacity for 70 wagons was made available in October 1961. Some minor works still remain to be done including a siding for stores. These works are progressing. At Gidi 'C', a siding for 70 wagons has been completed during the year under review.

As regards the Third Plan Projects, the siding for Korea I is now complete and loading has commenced. Work is also proceeding on the siding for South Balanda in Orissa. The sub-grade work which has to be done by the N.C.D.C. is in progress.

15. *Re-organisation of N.C.D.C.*—As a result of the acceptance of the recommendations contained in the Managing Director's Report on his visit to the U.K., France and West Germany, the collieries of the Corporation have been grouped into six areas. The larger ones, *viz.*, those with a production rate of 5 million tons a year or more, have been put in the charge of Chief Mining Engineers and smaller ones under Joint Chief Mining Engineers. The Korba area which ultimately is meant to be put in the charge of a Joint Chief Mining Engineer has, however, not been separated so far for want of sufficient work. It is intended to separate it when production increases as a result of the Russian-aided Projects going into operation. As a measure of decentralisation of authority, Financial Advisers have also been attached separately to the Chief Mining Engineers/Joint Chief Mining Engineers in charge of Areas.

As a step towards re-organisation of the headquarters, Directorates of Production and Planning have been created with effect from April 1961.

16. *General.*—During the year 1961-62 nine meetings of the Board of Directors were held. The fifth annual general meeting of the Corporation was held on the 30th September, 1961.

A fire broke out in the Gidi Colliery on the 24th May, 1961. Immediate action to meet the fire was taken and the mine was recovered on the 25th July, 1961.

A more serious fire broke out on the 26th May 1961 in the Kurasia Mine in Madhya Pradesh. The recovery operations in the case of this mine are well under way. The bulk of the two roadways have already been recovered. Complete recovery of these roadways is expected by April 1962. Thereafter, drainage of water, removal of noxious gasses and repair of haulage roads will be taken up. This process is expected to be completed by the middle of June 1962, when coal raisings are expected to be resumed.

During the financial year 1960-61, the Corporation provided Rs. 1,15,88,769 as depreciation and after paying Rs. 49,89,758 as interest on

loans from Government, made a net profit of Rs. 1,03,65,645 The financial results for the year 1961-62 will be available by June 1962. In view of the restricted production and the Kurasia fire, however, the profits are not likely to be substantial.

SINGARENI COLLIERIES COMPANY LIMITED

17. The Production of coal from the Singareni Group of mines (Andhra Pradesh) during 1955-56 was 15,26,570 tons. The target set for these collieries was the attainment of 3 million tons (3·048 million tonnes) by 1961-62. The rate of production at 3 million tons per year has already been achieved.

In the course of implementing the Second Plan, these collieries have lost nearly half a million tons output owing to the exhaustion of coal reserves from the older mines. This was made up partly by the intensification of production in the existing mines and also by opening new mines.

18. *Screening Plants.*—Modern coal screening plants to handle the coal output have been erected two at Kothagudium, one at Tandur and one at Mandamari Division. Two more screening plants are being erected, one at Yellandu and the other at Godavari Khani mines. A notable feature of these screening plants is that they have overhead bunkers capable of storing a day's output, which helps in quick turn-round of wagons and also in Sunday loadings.

19. *Supply of Railway wagons.*—The supply of railway wagons during the year was on the whole satisfactory. The Central Railway extended full co-operation in meeting the company's demands of wagons for coal movement.

20. *Housing.*—About 4026 quarters which are under construction are nearing completion. Housing colonies have been laid out with good roads, street lighting, proper drainage and water supply system.

21. *Training.*—In view of the rapid expansion in production to achieve the targets prescribed under the 3rd Plan, arrangements have been made to train a considerable number of apprentices for electrical, mechanical and underground supervisory posts. The number of candidates undergoing training in electrical and mechanical trades is 70. Similarly, the number of candidates undergoing training as apprentices for filling up posts of Deputies, Sirdars, Overmen and Surveyors etc. is 224. The total expenditure that is being incurred annually on the training of apprentices is Rs. 3.00 lakhs approximately.

In addition to the above the Company is providing facilities for imparting practical training to about 175 students every year, as follows—

(1) 24 post-graduates under the Post-Graduate Practical Training Scheme of the Government of India.

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In addition to the above the Company is providing facilities for imparting practical training to about 175 students every year, as follows—

(1) 24 post-graduates under the Post-Graduate Practical Training Scheme of the Government of India.

(2) 50 students from the Kothagudium Mining Institute.

(3) 100 students from various Universities and institutions such as the Banares University, the Andhra University, the Osmania University, the Indian School of Mines, Dhanbad, the Institute of Technology, Kharagpur etc.

These students are given living accommodation free of charge during the period of training in Students' Hostels constructed for the purpose.

Four officers of the Singareni Collieries Company were sent for training in various aspects of coal mining to the U.K. for a period of 3 months under the Colombo Plan.

22. *IIIrd Plan Targets and Central Governments' participation.*—An allocation of Rs. 20 crores has been made for the expansion programme of the Singareni Collieries Company during the Third Plan which envisages an increase of production of about 4 million tons of coal per annum, out of which 1 million tons will be for making up the loss in production from the existing mines. Having regard to the fact that the entire amount needed for the development of the Company in the Third Plan would have to be provided by the Central Government, the future pattern of assistance by the Government of India to the Singareni Collieries Company Ltd., and as a consequence thereof, the extent of the Central Government's interest in the direction of its affairs are under consideration.

PRIVATE SECTOR

23. During 1961-62 the private sector collieries raised about 45.5 million tonnes as against 44.80 million tonnes during 1960-61.

The World Bank have agreed to provide a loan of $35 million (Rs. 17 crores approximate) to the Government of India to enable it to meet the foreign exchange requirements of the private sector of the coal industry during the Third Five-Year Plan. The total target assigned to the private sector during the Third Plan is an additional production of 17 million tons.

24. *Amalgamation of Collieries.*—The Committee set up by the Government in August, 1958 to promote voluntary amalgamation of collieries and adjustment of boundaries continued examination of the proposals in this respect during the year. The total number of proposals approved so far by the Committee is 41. Actual amalgamation has taken place in 23 cases involving 45 collieries.

COAL BOARD

25. The Coal Board was set up under the Coal Mines (Conservation and Safety) Act, 1952 for the purposes of promotion of safety in coal mines

and conservation of coal. The following were the main activities of the Board during the year :—

(i) Protective works on a large scale were undertaken in several mines.

(ii) Financial assistance was granted to collieries for stowing both for safety and for conservation.

(iii) Collieries/seams continued to be graded in accordance with the prescribed specifications. The work of bringing up-to-date the old gradings in the Bengal-Bihar coal-fields has been almost completed.

(iv) The Coal Board agreed to bear half the expenditure during the Third Five Year Plan period on the establishment of the Central Mining Research Station, Dhanbad, subject to a maximum of Rs. 38.75 lakhs. A similar contribution had been made by the Board during the Second Plan period also.

26. A scheme of financial assistance to collieries which are handicapped by the presence of specified adverse factors but whose continuance in production is necessary in the national interest, had been introduced from 1-9-1960. The adverse factors which have been specified by Government for the purpose of assistance under this scheme are—

(i) Gassiness;

(ii) depth of shafts;

(iii) inclination of seams;

(iv) high pumping cost;

(v) thinness of seams; and

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

Assistance under the scheme is restricted to collieries which produce Selected Grade or Grade I coal, except in the case of high transportation cost. The claims are scrutinised by a committee of the Coal Board and assistance is sanctioned by the Board in accordance with the scales laid down by Government. Till the end of March 1962 a sum of approximately Rs. 60 lakhs had been paid by the Board under this scheme.

27. *The Coal Mines Conservation and Safety Act*, 1952.—The Coal Mines (Conservation and Safety) Act, 1952 was amended during May, 1961 so as to raise the ceiling rate of excise duty leviable under the Act from Re. 1/- per ton to Rs. 4/- per ton and to extend the concept of 'safety under the Act to include the safety of railway property situated above the surface of coal mines. The ceiling of excise duty was raised in order to enable the Government to obtain funds for meeting the recurring expenditure on the Central Ropeways scheme and for the payment of subsidy on coal moved by the rail-*cum*-sea route. For the present, the

excise duty has been increased only on account of the subsidy scheme. The current rates of excise duty which were notified w.e.f. 8-6-1961 are as follows :—

	Previous rate of duty.	Revised rate of duty from 8-6-1961.
On coal/soft coke	0·88 nP per ton.	Re. 1·68 per ton
On Hard coke.	0·94 nP per ton.	Rs. 2·52 per ton

28. *Pegging of coal production.*—The scheme of pegging the production of metallurgical coal by fixing ceilings of production for individual collieries which was adopted in 1952 was discontinued from the year 1961.

29. *Grading of coals.*—A committee of technical experts was appointed by the Central Government towards the end of January, 1962 to examine the procedure for the sampling and grading of coal and to advise the Government on steps to be taken for making the procedure adopted by the Coal Board for this purpose, as scientific as possible, consistent with practical and administrative requirements. This Committee has also been asked to examine the question of grading non-coking coals on the basis of calorific value and to suggest steps to be taken in this behalf. The Committee's report is awaited.

30. *Central Sand Stowing and Ropeways Scheme.*—Contracts for one ropeway in Jharia and three ropeways in Raniganj have been awarded. Proposals for the award of contracts for the remaining ropeways namely, a twin bi-cable ropeway and a single ropeway in two different areas of the Jharia field are under consideration. These contracts are also expected to be finalised shortly. According to the present time-schedule, all the ropeways are likely to be fully commissioned during 1964-65. When the ropeways are in operation, an additional quantity of 10.5 million tons of sand per annum is expected to be made available for stowing in coal mines in Jharia and Raniganj. The Central Government has decided to advance the capital cost of the ropeways as a loan to the Coal Board. The operational cost will be met from out of the net proceeds of the excise duty on coal and coke levied under the Coal Mines (Conservation and safety) Act, 1952, which will be slightly enhanced for the purpose.

31. *Coal Prices.*—An increase of 6 nP. per ton in the price of coal was notified in respect of collieries other than those in Assam and Andhra Pradesh w.e.f. 1-6-1961 to compensate the industry for the grant of increments to workers under the provisions of the award of the Arbitrator colliery disputes). The Singareni Colliery Company in Andhra Pradesh also agreed to implement the Arbitrator's award and a price increase of 18 nP. per ton was notified in this regard. With effect from 29-12-1961, all collieries in India were awarded an increase of 25 nP. per ton in the price of coal as a consequence of Government's decision to raise the rates of royalty in respect of pre-1949 leases to 2½ per cent of the F.O.R. price

of coal. After a detailed examination of the present price structure of coking coal, a new grade and price structure for coking coal on the basis of ash content was notified by Government w.e.f. 20-2-1962. In the new structure, there are 12 grades, the highest grade relating to coal with ash content less than 13% and the lowest to coal with ash content exceeding 23% but not exceeding 24%.

32. *Subsidised movement of coal by the rail* cum *sea route.*—In view of the difficulties in the movement of coal by rail, particularly for consumers served in the 'above Moghal-Sarai' direction, it was decided by Government that the movement of coal by coastal shipping to consumers in the southern and western parts of the country should be stepped up to about 2 million tons per annum. On account of certain operational difficulties such as the low draft in the Hooghly river and the non-availability of sufficient number of colliers, this target could not be attained. During the ten months from May, 1961 to February, 1962, a total quantity of 1,240,716 tons of coal was moved by means of the rail-*cum*-sea route to Southern and Western India. Measures to augment the sea-movement of coal so as to attain the prescribed target are under the consideration of Government. It was also decided that since the cost of transport of coal by the rail-*cum*-sea route is more than that by the all-rail route, the approximate difference between the two may be made good to the consumer by means of a subsidy. The subsidy scheme was introduced w.e.f. 1st May, 1961. Under this scheme, an amount almost equal to the difference between the acual cost of transport of the coal from the colliery to the consumption centre and the calculated cost of transport by the all rail route is paid to the consumer as a subsidy. Upto the end of March, 1962, a total amount of Rs. 185 lakhs had been paid as subsidy under this scheme.

THIRD FIVE YEAR PLAN

33. The target for coal production by the end of the Third Plan has been fixed at 97 million tons (98·55 million tonnes), which means an increase of 37 million tons (37.59 million tonnes) over the Second Plan target. The Private Sector has been allocated 17 million tons (17.27 million tonnes) out of this additional production and the Public Sector 20 million tons (20.32 million tonnes)—17 million tons (17.27 million tonnes) to the NCDC and 3 million tons (3·05 million tonnes) to the Singareni Collieries Co.

COAL COUNCIL OF INDIA

34. The Coal Council met in September, 1961, and made suggestions in regard to coordination of the programmes of transport, coal and power, inplant training of technical personnel, and prospecting and drilling of areas from which coal will be raised in the Fourth Plan. A Working Group set up by the Planning Commission has effected the

necessary coordination of the programmes of coal production and trans-
port. The question of supply of power to the coal mining industry dur-
ing the Third Five Year Plan has been examined by a Study Team set up
by the Ministry of Irrigation & Power and its report is awaited. The
question of inplant training of technical personnel is engaging the atten-
tion of the Planning Commission, who are co-ordinating the activities of
various Ministries in this regard. Action on prospecting and drilling of
areas from which coal will be raised in the Fourth Plan is under way.

35. The Coal Council also recommended a study of the possibility of
transportation of coal by pipelines to consumers comparatively near the
coalfields. A sub-committee of the Committee on Transportation is
making a study of this problem.

36. The Council also reviewed the progress of work done by its Com-
mittees. The more important studies made during the period under
report are those by the Production & Preparation Committee. The Com-
mittee drew up a list of new railway lines required for transportation
of coal from new areas in the Third Plan. Information to this effect
has been conveyed to the Railway Board. The Committee has also exa-
mined the requirements of technical personnel and the setting up of
training facilities during the Fourth Five Year Plan.

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 2,50,000 KW, 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 of lignite is 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 continued to manage the affairs of the project during 1961-62.

3. The fifth annual report of the Corporation for the period from 1st April, 1960 to 31st March, 1961, was presented to the Lok Sabha on 5th December, 1961 and to the Rajya Sabha on the 6th December, 1961.

4. The Integrated Project recorded an all round progress during 1961-62. The stages reached by the various component schemes of the Integrated Project are indicated in the following paragraphs.

5. *Mining Scheme.*—Earthmoving operations were continued in the first mine cut with the help of conventional as well as specialised mining machinery. The latter consisted of two 350-litre and two 700-litre bucket wheel excavators, two spreaders and the requisite conveyors. A small strip of the lignite seam was exposed on the 24th August, 1961, at a depth of 180 feet, as part of the sequence of the mine cut and 2,000 tons of lignite has been mined and made available to the Government of Madras for detailed tests in pilot plants in East Germany in connection with proposals for the establishment of a steel plant based on Salem Iron Ore. About 27 million cubic yards of overburden will have to be removed to expose the lignite seam for the mining of 3·5 million tons of lignite per annum. However, for mining the lignite needed for the first and second 50,000 KW units of the thermal power station, about 20 million cubic yards of overburden has to be removed. This has been achieved, the quantity removed till the end of March, 1962, being 22·32 million cubic yards, as against the target of 22·28 million cubic yards, and the lignite needed by the first unit of the power station will be made available as soon as it is required. Under the scheme for the control of ground water, 53 pump wells have been drilled and equipped with pumps. With the wells so far drilled, it is expected that excavation can be carried on till the end of 1962 or early in 1963.

6. Full production, at the targeted rate of 3·5 million tons per annum, is expected to be achieved by the end of 1964, when all the lignite-consuming units of the Integrated Project, namely, the thermal power station, the fertilizer plant and the briquetting and carbonisation plant, would be in operation. Meanwhile, an estimate for the expansion of the mine output from 3·5 million tons to 6 million tons per annum during the Third Five Year Plan period is under consideration. The expansion of the 2,50,000 KW power station to 4,00,000 KW necessitates the expansion of the mining scheme.

7. *Scheme for the generation of Power.*—The thermal power station, which is being set up under the Indo-Soviet 112·5 million Rouble Credit Agreement of the 9th November, 1957, will have five generating sets of 50,000 KW each. The erection work relating to the first 50,000 KW unit is in full swing and it is expected that this unit will be commissioned by the middle of June, 1962. Meanwhile, pre-assembly of parts for the second unit is in progress. The plant and equipment for the third unit have commenced to arrive at site. Most of the thermo-mechanical drawings for units III, IV and V have also been received at Neyveli. The entire power station is expected to be commissioned early in 1964. Currently, technical discussions with Soviet experts are in progress for increasing the power generating capacity at Neyveli from 2,50,000 KW to 4,00,000 KW during the Third Five Year Plan itself, under the Soviet 337·5 million Rouble Credit of 1959.

8. *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. 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. Civil works connected with the scheme are in progress. A few consignments of equipment have been received at Neyveli. The scheme is expected to commence production by December, 1964.

9. *Scheme for Briquetting and Carbonisation.*—Contracts for the supply of the machinery and equipment for the scheme were concluded in March, 1961, with Messrs. Buckau Wolf, a consortium of German firms and the State Electricity Commission of Victoria, Australia. Civil works connected with the scheme are in progress and a part of the equipment for the scheme has already been received at Neyveli.

10. *Clay Washing Plant.*—For utilising the excellent ball and china clay available as part of the overburden at Neyveli, a scheme for the setting up of a clay washing plant at Neyveli has been sanctioned. The plant, which will produce 6,000 tons of washed clay per annum, was commissioned on 30th December, 1961.

66

11. *Total cost of the Integrated Project.*—The present estimated cost of the Integrated Project is Rs. 94 crores. Owing, *inter alia,* to the increase in customs duty and ocean freight in respect of equipment imported for the various schemes as also due to the increase in cost of construction materials, which correspondingly increased the cost of civil works pertaining to the various schemes, the total cost of the Project is now estimated to go up to Rs. 112·67 crores. The revised cost is at present under examination.

12. *Recruitment and Training.*—Recruitment and training of technical staff required for the Project proceeded satisfactorily. Three Civil engineers of the Corporation, who were deputed in September, 1958, for training in the latest methods 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 three years, returned in September, 1961, on completion of their training. In order that the employees of the Corporation may acquire some prior training in the operation and maintenance of boilers and turbines in an existing power station in India before they could be put on the operation of the first unit of the power station, when it is commissioned, fifteen employees of the Corporation, consisting of 3 Executive Engineers, 4 Assistant Executive Engineers|Assistant Engineers, 7 Section Officers and one Chemist were deputed for training in the operation of boilers and auxiliaries in the Basin Bridge Thermal Power House, Madras, for a period of six weeks. Another batch of 15 employees, consisting of 6 Assistant Engineers, 8 Section Officers and one Foreman were deputed for training in the operation and maintenance of high pressure boilers and turbines in the Tata Thermal Power Station at Trombay for a period of four weeks. Some employees were also deputed to the Atomic Energy Establishment, Trombay, for training for a period of two weeks in the use of defect detecting equipment for high pressure welds. The first batch of engineers deputed to Italy and West Germany for training in the design, erection, operation and maintenance of Urea producing plants returned in March, 1961, after completion of training. The second batch of 18 engineers left in August, 1961, for training in West-European countries in the Plant groups supplied and erected by Messrs. Ansaldo of Italy and Messrs, P.B.L. of Germany. 17 Engineers have since returned to Neyveli on completion of training. Meanwhile, training, in batches, of the technical staff required for the fertilizer scheme, at the Sindri Fertilizers and Chemicals and the Fertilizers and Chemicals, Alwaye, was continued. The Assistant Executive Engineer, who was deputed in October, 1960, for training in briquetting and carbonisation of lignite in Australia under the Colombo Plan returned after training in April, 1961. An Assistant Medical Officer of the Corporation was deputed to the U.K. in November, 1961, for training in Orthopaedics for a period of one year. An Accounts Officer and a Cost Accountant were deputed for training

in cost accountancy at the Institute of Cost and Works Accountants at Calcutta for a period of 3 months and $4\frac{1}{2}$ months respectively during the year. A Statistical Investigator was deputed to Calcutta for a period of nine months from 1st August, 1961 for training at the International Statistical Education Centre, Calcutta.

13. *General.*–Out of 26,750 acres of land required for the Project, a total of 11,772 acres was acquired upto the end of March, 1962. Rehabilitation of displaced persons went on side by side with acquisition of land. A total number of 1,367 house sites has been allotted up to the end of March, 1962, to the displaced persons in the three rehabilitation colonies set up by the Corporation. Civic amenities, such as formation of roads, provision of drinking water and street lighting have also been provided in the rehabilitation colonies.

14. During 1961-62, the Corporation undertook construction of residential and non-residential buildings in the Neyveli township at a cost of Rs. 2·47 crores. Up to the end of March, 1962, 4,606 quarters were completed and 388 were nearing completion.

15. Among the various amenities provided to the employees, mention may be made of the main hospital which was completed during the year. There are four Assistant Medical Officers, one Junior Medical Officer and 2 Women Medical Officers, excluding the Chief Medical Officer. There are four Amenities Inspectors and an Assistant Personnel Officer (Amenities). The Employees' Cooperative Stores with its branches, continued to cater satisfactorily to the household requirements of the Project staff. In order to enable the stores to expand its activities, the Corporation sanctioned further loans to it. The Store has repaid a part of the loan previously advanced by the Corporation. The fleet strength of the bus service connecting the temporary colony and the new township was increased progressively from 4 to 15. Two integrated elementary schools were opened during the year, bringing the total number of schools in the new township to five, which include one high school. There is one Middle school and another elementary school in the temporary colony. Free supply of milk to the children of the elementary schools was commenced on 14th November, 1961.

CHAPTER III

MINES AND MINERALS

Production of important minerals.—The production of some of the important minerals during the year, compared to the previous two years was as follows:—

Minerals	Unit or quantity	1959-60	1960-61	1961-62
Iron ore.	'000 Tonnes	8,690	10,992	12,834
Manganese ore . . .	'000 Tonnes	1,185	1,192	1,198
Copper ore	'000 Tonnes	411	423	455
Lead concentrates . . .	Tonnes	6,015	6,423	5,216
Zinc concentrates . . .	Tonnes	9,719	10,041	9,047
Gold	Kilograms	5,277	4,921	4,940

The higher production of iron ore was to meet expanding needs of the steel industry, and exports. In spite of the fall in the export of managanese ore during 1961-62, the production maintained its level due to the higher internal demand for consumption in the domestic ferro-manganese industry. The rise in the production of copper ore was due to the development work carried out by the Indian Copper Corporation in 1960. The output of lead and zinc concentrates was slightly lower due to the fall in the metal content of the ore mined.

2. *Mineral Advisory Board.*—The 9th meeting of the Mineral Advisory Board was held at Bombay on 2nd and 3rd May, 1961.

The fourth meeting of the Mica Sub-committee of the Mineral Advisory Board was held at Ranchi on 20th April, 1961 and the fifth meeeting at Gudur on 6th April, 1962.

3. *National Mineral Development Corporation Ltd.*—During the year, thirteen meetings of the Board of Directors of the Company were held. The Board now consists of nine directors including three non-officials. The 2nd and 3rd Annual General Meetings were held on 20-4-61 and 29-9-61 respectively.

The Corporation was entrusted with the implementation of three more projects in March, 1961, (i) the Khetri Copper Project, (ii) the Bailadila Iron Ore Project and (iii) the Daribo Copper Project. The Kiriburu Iron Ore Project and the Panna Diamond Mining Project had earlier been entrusted to the Company.

4. *Kiriburu Iron Ore Project.*—During 1961-62, attention was mainly directed to the following items of work:

(i) removal of overburden and preparation of mining faces;

(ii) construction work for the installation of the crushing plant, service centre, and water supply works; and

(iii) procurement action for machinery and equipment.

(a) *Removal of overburden and construction works.*—Of the total quantity of 4·2 lakh cubic metres of excavation to be made, approximately 30 per cent of the work had been completed by the end of March, 1962. The civil works for the structures relating to crushing plant are expected to be completed by the end of June, 1962, and the mechanical and electrical works by the end of December, 1962. Excavation for the crushing plant has been completed, and concreting work for the main plant building was in progress. Construction work in the service centre and water supply installations was in progress. Work was in progress on the township to accommodate 500 workers and 100 other staff and their families. About 33 per cent of the work on 514 quarters of E and F types was completed by 31-3-1962.

(b) *Procurement of Plant and Machinery.*—Plant and machinery worth more than Rs. 3 crores required for the project are being procured through the Directorate General of Supplies and Disposals, and are expected to arrive at the project site in course of 1962-63.

(c) *Training Scheme.*—The Training Institute for training operators and junior supervisory and technical personnel started functioning in February 1961 with 20 trainees in the category of operators. The number of trainees will be progressively increased to 40 operators and 10 supervisory personnel including foremen.

5. *Panna Diamond Mining Project.*—On the basis of the prospecting work done by the Corporation in the area covered by the prospecting licence, two project reports were prepared. One of the project reports relates to the mining of Ramkherya area with a target output of 12,500 carats per annum and costing Rs. 46 lakhs. The other report is for mining of Majhgawan area with a target output of 30,000 carats and costing Rs. 90 lakhs. Both the Schemes have been approved by Government and action has been initiated by the Corporation for procurement of machinery and equipment and other preliminary work. It is also

proposed to introduce a second shift in the Majhgawan area for an additional output of 30,000 carats per year.

M/s. John Taylor & Sons, London, have been appointed as Standing Consultants for the project for a period of two years in the first instance.

During prospecting operations, 1011 diamonds weighing 577.61 carats were recovered, of which 331 diamonds weighing 171.4 carats were of industrial quality.

6. *Khetri Copper Project.*—The Corporation appointed a U.S. firm, M/s. Western Knapp Engineering Co., as consultants for the project in May, 1961. The Consultants submitted their project report in January, 1962; it has now been submitted by the Corporation to Government for approval.

A camp office was established to attend to preliminary work. Work on the provision of temporary accommodation to the Consultants has been completed. Arrangements have been made for water supply to the Base Camp. A site for township has been selected and action is being taken to acquire the land required.

7. *Daribo Copper Project.*—The Indian Bureau of Mines continued exploration work in the area, which is expected to be completed by end of 1962.

8. *Bailadila Iron Ore Project.*—The Indian Bureau of Mines has undertaken, on behalf of the Corporation, detailed exploration of the deposits which is expected to be completed about the end of 1962. A camp office has been set up to attend to preliminary work.

9. *Meghahatuburu Project.*—The Corporation, in co-operation with the Indian Bureau of Mines, has undertaken exploration work in the Meghahatuburu area, which is within the Kiriburu leased area, to meet the iron ore requirements of the proposed Bokaro Steel Plant. It is proposed to develop this area for production of 4 to 5 million tons of iron ore per annum, inclusive of all fines.

10. *Reorganisation of the headquarters.*—Consequent on the assignment of more projects to the Corporation, the administrative set up at the headquarters has been reorganised to suit the present needs.

11. *Sikkim Mining Corporation.*—Four meetings of the Board of Directors were held during the year upto 31st March, 1962. The first Annual General meeting of the Corporation was held on 24th August, 1961. During the year, work commenced on the township and most of the buildings were completed and the remaining are likely to be completed soon. The orders for the machinery and equipment required were placed. Some of the machinery has already been received and the rest is likely to be received by the middle of 1962. Production is scheduled to commence from about December, 1962.

12. *Orissa Mining Corporation.*—The shares held by the President of India in the Corporation were transferred in favour of the Governor of Orissa on 27th November, 1961. The Corporation is now fully owned by the State Government.

13. *Utilisation of Iron Ore Fines Committee.*—The interim report of the Committee, on the basis of the studies so far made, is under preparation.

14. *Modification of Mining Leases.*—The Controller of Mining Leases modifies the mining leases granted prior to 25th October, 1949 to bring them in conformity with the existing Act and Rules. Including 167 new cases registered during the period January 1961 to 31st March, 1962, 2917 cases had been registered, of which final orders have been passed in 1381 cases, and 1426 cases were filed as not requiring any modification; 110 cases were pending.

15. *Review applications.*—During the period 1st January, 1961 to 31st March, 1962, 817 review applications were received under Rule 54 of the Mineral Concession Rules, 1960, for revision of the orders passed by the State Governments on applications for grant of mineral concessions as against 231 in 1961. During this period, 783 applications were decided as against 230 applications decided during 1961. The figure 783 includes applications received prior to 1st January, 1961 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 with regard to various matters pertaining to the mining industry.

2. *Mines Control & Conservation of Minerals.*—During the period under review, 892 mines were inspected in the various states with a view to ensuring the systematic development of mineral deposits, the elimination of avoidable waste, promotion of improved methods of mining, etc. The country has been divided into two regions—Southern and Northern—each under a Controller of Mines. There are 3 zonal offices in the Northern region located at Jammu, Ajmer and Calcutta and 2 zonal offices in the Southern region located at Nagpur and Bangalore.

3. *Mineral Exploration (Prospecting), Mining and Drilling.*—Detailed explorations for various minerals were continued. A significant achievement of the Bureau during the period was the discovery of rich deposits of metallurgical coal in the vicinity of the North Karanpura coalfield (Bihar) where more than 50 million tons of such coal reserves were proved.

The details of the investigations under progress, the investigations which were completed and the investigations taken in hand during the period under review are given below:—

Name of the investigation	Total drilling upto the end of March 1962 since commencement (inmetres)	Reserves proved (in million tonnes)
(1)	(2)	(3)
INVESTIGATIONS UNDER PROGRESS		
A Coal		
1. East Bokaro, Bihar.	44,233	358·90
2. Karanpura, (Chano Rikba Block) Bihar. . .	6,401	100·00
3. Ramgarh (Block No. 1 & 2) Bihar. . . .	5,897	19·62
4. West Bokaro (Pundi Loiya Block) Bihar. . .	4,015	..
5. Nichahoma lignite, Jammu & Kashmir. . .	2,085	..

(1)	(2)	(3)
B—Copper Ore		
1. Daribo, Rajasthan	5,051	about 0·5 (of 2·5% Cu)
2. Pratapgarh, Rajasthan.	1,059	..
3. Khetri, Rajasthan.	10,951	28·9 (of 0·8% Cu)
4. Kolihan, Rajasthan	1,572	..
C—Iron Ore		
1. Bailadila, M. P.	..	..
D.—*Tungsten*		
1. Degana, Rajasthan.	1,555	..
E—Apatite		
1. Singhbhum, Bihar.	4,692 (Trenching)	38, 400 tonnes (30% P_2O_5 content)
INVESTIGATIONS COMPLETED		
A—Coal		
1. Korba, M. P.	74,558	361·79
2. Chirimiri (TISCO Block No. 2) M. P.	20,399	67·42
3. Sonhat, M. P.	8,685	28·38
4. Sohagpur (4th and 5th Blocks) M. P.	40,843	87·53
5. Talcher, Orissa	15,679	477·09
6. Karanpura (Bhurkunda Block) Bihar.	16,646	28·21
7. Karanpura (South Bhurkunda Block) Bihar	5,967	38·10
8. East Bokaro (Gobindpur Block) Bihar.	932	3·57
9. Bishrampur, M.P.	20,591	98·50
B—Copper		
1. Gani, Andhra Pradesh	1,472	Results not encouraging
C—Limestone		
1. Morni Hills, Punjab	992	2·2
D—Diamond		
1. Panna, M.P.	1,313	..
E—Iron Ore		
1. Sasangda, Orissa.	728	Results under computation
NEW OPERATIONS/PRELIMINARY SURVEYS TAKEN UP		
A—Coal		
1. Singrauli, M.P.	7,447	407·30
2. Kalakot, Jammu & Kashmir	187	..
3. Kamptee, Maharashtra.	702	..

(1)	(2)	(3)
B—Copper Ore		
1. Jodhawas, Rajasthan	283	..
2. Rakha Mines, Bihar.	..	..
C—Iron Ore		
1. Daitairi, Orissa.	..	..
D—Salt		
1. Drang, H.P.	..	..
E—Gold		
1. Ramagiri.	1,043	..
F—Limestone		
1. Mikir Hills.	217	..

The Mining Division carried out 3,287 metres of driving, cross-cutting, winzing, shaft sinking, etc. In addition 2,899 cu.m. of pitting, trenching, aditing, etc. was done.

The investigations in Bailadila iron ore deposit are being carried out mainly for export purposes to Japan. Sasangda (Meghahatuburu) iron ore deposit in Orissa has been proved for meeting the requirements of the proposed Bokaro Steel Plant. In coal operations the Indian Bureau of Mines has proved 610.03 million tonnes of coal during the year 1961-62 bringing the total reserves of coal proved including all the areas previously investigated to 2212.78 million tonnes.

4. *Mineral Economics.*—Compilation and interpretation of mineral statistics, collection and dissemination of mineral information and scrutiny of mineral concession cases were carried out. Periodical returns and notices received under the Mineral Conservation and Development Rules, 1958, were compiled and processed, and various measures were taken to ensure timely submission of these returns. The annual publications "Mineral Year Book, 1959", List of Mines and Mining Leases (other than coal) as on 1st January, 1960, Mines and Minerals Quarterly Journal and pamphlets on Mineral Prospects in Punjab, Gujarat and Maharashtra and Mineral Wealth of India were published.

5. *Mineral Beneficiation and Technology.*—Apart from carrying out analytical work on a large number of samples, qualitative and quantitative determination of constituents of ores and minerals was carried out. Ore-dressing investigations on the following low grade ores and industrial minerals were conducted :—

1. Low grade chromite, from Chaibasa (Bihar) and Nausahi (Orissa).

2. Copper Ore from Khetri (Rajasthan).
3. Gypsum from Rajasthan.
4. Manganese ore from South Kanara (Mysore) and Kandri, Nagpur (Maharashtra).
5. Kyanite from Mysore.
6. Graphite sillimanite schist from Mysore.
7. Rock Salt from Mandi (Himachal Pradesh).
8. Pyrites from Bihar.
9. Coal from Hazaribagh (Bihar).
10. A few distillation tests with pyrites samples from Amjor (Bihar).

The pilot plant at Nagpur was put into commission and two project investigations were carried out. Tonnage lots of diamondiferous gravel, black and weathered tuff from Panna were treated for recovery of diamonds in the pilot plant. A 20 ton sample from Khetri (Rajasthan) was subjected to beneficiation in the continuous pilot plant and valuable data for the establishment of the concentrator at Khetri was obtained.

The pilot plant at Daribo was set up and copper concentrates are being produced from the ore.

24,891 determinations were carried out as against 15,888 determinations carried out last year. Apart from investigations on the interpretation and correlation of experimental data as well as analytical research carried out on complexometric titration of aluminium, lead and zinc, two chemical processing problems were undertaken, *viz.* (i) extraction of vanadium from waste sludge in Bauxite processing plants at Noori and (ii) processing of off-coloured barytes from Andhra Pradesh. The results so far obtained reveal that vanadium pentoxide of high purity (70 and 75% recovery) can be extracted and separated from phosphorus in the sludge containing 1·92% V_2O_5 and 1·75% P_2O_5 on dry basis.

6. *Workshop.*—The workshop of the Bureau located at Nagpur is now fully equipped and undertakes almost all types of repairs of trucks, compressors and drilling machinery and other equipment of the Indian Bureau of Mines. The workshop also produces tungsten carbide tipped drill bits for the use of the Bureau.

76

CHAPTER V

GEOLOGICAL SURVEY OF INDIA

Re-organisation.—The Geological Survey of India was functioning on a centralised basis, primarily because of the past traditions. With the expansion of the Department it was felt that it would no longer be practicable for it to function as a centralised organisation with officers having their headquarters at Calcutta and fields of action hundreds of miles away. The department has therefore been reorganised on a regional basis for securing effective decentralisation, especially in the execution of field work and the separation of Administrative and technical functions. Three regional directorates have been set up and are functioning since 1st September, 1961; for the Eastern Region with headquarters at Calcutta, for the Northern Region with headquarters at Lucknow and for the Southern Region with headquarters at Hyderabad. Circle offices have also been set up under the three regions in almost all the States.

The advantages under the new set up are (i) separation of administration from technical work enabling the scientific personnel to devote maximum attention to their specialised fields of activity, (ii) effective supervision of field work, (iii) close liaison with State Governments, (iv) regional availability of laboratory, library and workshop facilities, in addition to those available at the headquarters office, (v) direct participation of Regional/Circle officers in planning, research and coordination work on an all India basis.

2. *Training Schemes.*—Training Schemes—one for the post-graduate students in Geology and the other for the University teaching staff—are being continued in the Geological Survey of India.

The scheme for Making Laymen Mineral Conscious is being continued and 10 units are operating in different States.

3. *Geological Mapping.*—Regional mapping (on 1:63,360 and smaller scales) of an area of 37,120 sq. kms. was carried out in the States of Andhra Pradesh, Assam, Bihar, Gujerat, Himachal Pradesh, Jammu and Kashmir, Kerala, Madhya Pradesh, Madras, Maharashtra, Mysore, Orissa, Punjab, Rajasthan, Uttar Pradesh, West Bengal and in Tirap Frontier Division of N.E.F.A.

Traverse mapping of 496 sq. kilometres in Ladak and reconnaissance mapping of 6,000 sq. kilometres in Madhya Pradesh and Andhra Pradesh were also completed.

Large scale mapping (on 1 : 31,680 and large scales) was carried out in various mineral belts of the country and about 8,830 sq. kms. of area was covered.

4. Mineral Investigations.

Coal.—In the South Karanpura coalfield, drilling investigation in the Jainagar block was continued (1840 metres) while investigations were completed in the Gidi-'C' and Sayal 'D' blocks after drilling 538.79 and 110.91 metres respectively. Reserves estimated in Gidi 'C' and Sayal 'D' Blocks stand at 126.48 and 510 million tonnes respectively.

Detailed mapping was continued in the North Karanpura coalfield, Bihar, and drilling was commenced in the Barwadih block. A total of 682.57 metres has been drilled so far.

In the Jharia coalfield, Bihar, drilling investigations were continued in the Sudamdih (158.20 metres) and Sitanala (684.80 metres) areas. Reserves estimated so far in these blocks are 16.74 and 6.84 million tonnes respectively.

Drilling was continued in the Sanri area of Ramgarh coalfield, Bihar, and a total of 1074.99 metres was drilled.

In the Singrauli coalfield, Madhya Pradesh, detailed mapping and drilling were continued. 2320 metres were drilled.

In the Pench-Kanhan Valley coalfield, a total of 1100 metres was drilled during this period.

In the Raniganj coalfield, West Bengal, drilling was completed in Salanpur (311·20 metres) and Newada (22·4 metres) areas. Drilling in Shyamdih-Bolkunda was taken up during the period and 784·67 metres were drilled. Shallow drilling was continued in the Dhangajhor area (75·24 metres).

Detailed mapping and drilling of the Kalakot coalfield was undertaken and so far 850 metres have been drilled and a reserve of 6·6 million tonnes estimated.

During this period, a total of 10,850 metres was drilled in various coalfields and a total of 2615·94 million tonnes of reserves was estimated in Ramgarh (2·5 million tonnes), Sitanala area in Jharia (6·84 million tonnes), Singrauli (2600 million tonnes) and in Kalakot (6·6 million tonnes) coalfields. Detailed mapping and investigations of the Sonahat, Sohagpur, Tawa Valley, and Jhillimilli coalfields of Madhya Pradesh, Chanda-Wardha Valley coalfield in Maharashtra, Singareni coalfield in Andhra Pradesh and Ib river valley coalfields in Orissa were undertaken.

Copper.—Detailed large scale mapping and prospecting by pitting, trenching, geo-chemical sampling and drilling were continued in the Singhbhum Copper Belt, Bihar. A total of 1250 metres was drilled. In the Roam-Sidheswar area of the Singhbhum Copper Belt, five mineralised zones with average grade of copper 1·88% to 2·42% and having a range of width from 5·1 to 10·1 metres in one of the boreholes; two mineralised zones 5·58 metres and 6 metres thick in two other boreholes were encountered. Recently a few mineralised zones have also been encountered in another borehole.

Plane table mapping and drilling investigations in the Khetri Copper Belt, Rajasthan, were continued in the Dhanota-Udaipur area, and were commenced in the Sjtkui area during the period. Drilling was completed in the Khetri area and the existence of the mineralised zone over a strike length of 2 kilometres in continuation with Mandhan-Kudan block was proved. A total of 740 metres was drilled.

In the Pratapgarh area, Alwar District, Rajasthan, drilling for copper was continued in co-ordination with the Indian Bureau of Mines and 460 metres were drilled. Primary sulphide mineralization was encountered from 306 metres depth and continued upto 333 metres depth.

Detailed geological mapping and drilling investigations were continued in the silicified and gossanized belt at Mumdatikra, Bastar District (Dandakarnaya) and a total of 430 metres was drilled. Four main zones varying in thickness from 0·14 metres to 6·13 metres containing pyrite and chalcopyrite were encountered in one of the boreholes. One zone assayed 0·17% copper. Yet another zone showing finely disseminated mineralization was encountered between 205·93 and 211·49 metres. Calculated width of this zone is 3·9 metres.

In the Kalyadi area, Hassan District, Mysore, drilling for copper was taken up by the Mysore Government, at the locations indicated by the G.S.I. and a total of 280 metres was drilled. Copper mineralisation was struck at a depth of 57·91 metres and continued uninterrupted upto 85·34 metres. Out of the 27·43 metres of mineralised zone, a few sections appear to be fairly rich. Minor mineralization was also encountered in the second borehole from 38·34 to 38·54, 48·91 to 53·15, 64·53 to 65·42 and 94·43 to 97·25 metres.

Detailed regional and plane table mapping, prospecting by pitting, trenching and geochemical sampling were carried out in the Agnigundala, Garimenipenta, Mailaram and Yellambailu areas of Andhra Pradesh; Dhansal-Sawalkot and Doga areas in Jammu and Kashmir; and in Chamoli and Kalsi areas in Uttar Pradesh.

Copper –Lead-Zinc-Nickel, etc.–In the Mamandur area, Madras, investigation by drilling was continued for copper-lead-zinc and a total of 310 metres was drilled. Copper, lead-zinc mineralisation zone was intersected at a depth of 35·91 metres in a borehole. The total width of the mineralized zone is 11·5 metres. The core of the mineralized lode met with in an earlier borehole gave encouraging results on assay, the metal values averaging 0·338% copper, 6·26% zinc, and 15·458% lead over a zone 0·8 metres wide and 0·407% cu, 7·28% Zn. and 1·35% lead over a zone 0·7 metres wide. Trenching operations have revealed indications of the northward extension of the mineralised zone.

In the Ramsu area, Jammu and Kashmir, drilling investigations were continued for copper and nickel and a total of 79·55 metres was drilled.

Detailed large scale and plane table mapping and prospecting by pitting, trenching, and geochemical sampling were carried out for lead and zinc in the Karampudi area, Andhra Pradesh; Darabi area, Jammu and Kashmir; Zawar and Banswara area, Rajasthan; and in Padhan and Uchich mine areas in Punjab. Drilling operations have been started in the Darabi area, Jammu and Kashmir and total of 75 metres was drilled.

Gold.–Drilling investigations in the Nandydroog mine area of the Kolar Goldfield were continued. During the period 360 metres were drilled. Bridge shaft lode was intersected between 81·53 metres and 82·37 metres in one of the boreholes with 18" (45·72 cms.) of quartz lode assaying 52·98 dwts./ton and sludge assaying 7·2 and 15·6 dwts./ton. Besides this, within the quartz lode 2" (5·08 cms) of quartz with visible gold is present.

Detailed mapping and the study of the auriferous lodes in the Gadag Schist belt along with southern and western extension of the main Gadag Goldfield area, Mysore, were completed. Detailed examination of the Hutti goldfield, Mysore, by surface and underground mapping has been commenced.

Iron.–Detailed and large scale mapping and prospecting by pitting, trenching and sampling were undertaken in connection with the investigation of iron ore occurences in the Warangal District, Andhra Pradesh, Matah-Sangor areas in Jammu and Kashmir, Lana Chota near Kanhai in Sirmur District, Himachal Pradesh, South Arcot, Madras, Bailadila area, Madhya Pradesh and in the Sambalpur District, Orissa. The investigations revealed five new ore lodes in the Bailadila area and three bands of banded-haematite-quartzite in the Warangal District, Andhra Pradesh.

Investigations by large scale mapping and drilling of iron ore were completed in the Redi area, Ratnagiri District, Maharashtra. 289·59 metres were drilled with Maharashtra Government drill and a total reserve of 15 million tonnes of iron ore was estimated.

Manganese.—Regional and detailed large scale mapping of the managanese deposits in the Srikakulam District, Andhra Pradesh, were completed. Three mangeniferous horizons from which the ore deposits are derived were established.

Preliminary survey for locating new manganese deposits in the Midnapur District, West Bengal, revealed the existence of minor manganese deposits at many places. Those at Chaukisal appear to be of some importance.

Chromite.—Detailed investigations by large scale mapping and sampling of the chromite deposits in the Hassan and Chikamagalur Districts, Mysore, have shown the deposits to be of the nature of narrow lenticular and impersistent ore bodies of generally low to medium grade. Investigation by detailed large scale mapping of the chromite bearing areas of Dhenkanal District, Orissa, was started. About 1700 tonnes of chromite have been estimated from the area in the vicinity of the trenches dug by the Orissa Mining Corporation, North/east of Mahulbhanj Parbhat.

Tin.—Investigation of the occurence of tin ore in the Ranchi District, Bihar, was continued by large scale mapping and sampling.

Gypsum.—Drilling investigations in the Nagaur area, Rajasthan, were closed after drilling about 140·88 metres in two boreholes. The reserves of gypsum in the areas are estimated to be of the order of 800 million tonnes.

Detailed mapping and sampling of the gypsum deposits in the Assar-Badarwah area, Doda District, Jammu and Kashmir were continued. The Kolhata and Hariara deposits are estimated to have a probable reserve of 76,600 tonnes of gypsum down to a depth of 30·48 metres.

Limestone.—Detailed geological mapping and sampling of the lime-stone deposits in the Sahabad District was completed. Investigation by drilling for flux-grade lime-stone was commenced and a total of 240 metres was drilled. The quality of limestone met with in one of the boreholes appears to be good.

Detailed mapping and sampling of the limestone deposits in the Bandu-Basaria, Banskudea-Suiyadih and Tongi areas of Hazaribagh District, Bihar and Ghabar area, Sirmur District, Himachal Pradesh, were completed.

Reconnaissance survey of large areas was carried out in the Satna, Sidhi, Shadol and Rewa Districts, Madhya Pradesh, to locate areas underlain by limestone suitable for detailed prospecting. An eight metre thick band of Kajrahat limestone was located near Jinnah in Satna District, extending over a distance of about seven kilometres.

Magnesite.—In the Salem District, Madras, plane table mapping of the magnesite deposits revealed that the several parallel shear zones are the controls of the magnesite vein formation.

Bauxite.—Mapping and prospecting by pitting of the bauxite deposits in the Kutch District were carried out. Earlier, a reserve of 6 million tonnes of bauxite was estimated from these deposits. Investigation of the Amarkantak and Phutka Pahar bauxite deposits, Madhya Pradesh, in connection with the Indo-Hungarian Aluminium Project was started by detailed mapping, pitting and drilling. Drilling of about 73·75 metres was completed in 7 boreholes in Jamuna Dadar, Amarkantak area. Bauxite of medium quality was encountered in all the boreholes. Besides mapping, pitting, and drilling of about 259 metres in 25 boreholes, over 800 samples were collected for analysis from Phutka Pahar area.

Rock Phosphate.—Prospecting by pitting of the phosphatic nodules in the Uttattur beds in the Karai-Uttattur area was continued. Out of the eleven pits put down during the period, four did not show any nodules. In the deep pit the average yield of phosphatic nodules is 2·37 k.gms. per 2·83 cubic metres of rock excavated. Investigation by detailed mapping and sampling for rock phosphate in the Tehri-Garhwal and Dehra Dun Districts, Uttar Pradesh, was undertaken.

Flourite.—Large scale plane-table mapping, pitting and sampling of the mineralized zone at Amba Dungar were continued and samples were collected to determine the nature of flourite mineralization. A minimum reserve of one million tonnes of flourspar rock has been estimated.

Clay.—Drilling investigation for china clay at Patharghatta, Bihar, was completed. A total of 162·195 metres was drilled in five boreholes.

Investigation of the china clay deposits in the Birbhum District, West Bengal, by hand auger drilling was completed and 20 new deposits were located.

Sulphur.—Investigations for sulphur in the Barren Islands, Andamans, were completed. Several pits and trenches were dug in the crater of the volcano and also in the parasitic cones. Hand auger holes were sunk on the floor of the crater. The parasitic cones were seen to contain rich concentration of sulphur but no indications of any large deposit of sulphur on the volcano were met with.

Glass sands.—Investigations of the glass sands in the Sahabad District, Bihar, were continued. Soft friable quartzite was noted between one to one and a half metres depth at Marpa.

5. *Geophysical Investigations.*—Geophysical investigations were carried out for manganese ore in Srikakulam District (Andhra Pradesh) and in North Kanara (Mysore), for copper ore in Singhbhum Copper Belt (Bihar), Danta Taluk (Gujarat), Kalyadi area (Mysore), and in Dhanota and Singhana areas, Khetri Copper Belt (Rajasthan); for chromite in Kankauli-Vagda area in Ratnagiri District (Maharashtra); for graphite in Trivandrum District (Kerala); for coal in the coalfield areas (Bihar); for lignite in the Eastern Coastal Belt of Madras; for groundwater in Bhagalpur District (Bihar), Singhana and Jodhpur areas (Rajasthan), and in Ramanathapuram District (Madras); and for bed rock topography in the Bisalpur dam site area (Rajasthan).

6. *Engineering Geology Investigations.*—Geological investigations were carried out in connection with the following projects and dam sites and necessary technical advice was rendered.

Nagarjunasagar project, Godharbham dam site, Bailadila-Kottavalasa railway alignment, Upper-Sileru Hydro-electric Project, Manjira Barrage site, Srivaradarajaswamy Project, Maner dam site, in Andhra Pradesh, Parambikulam-Aliyar Project, Hindustan Photo Film Factory site in Madras, Koyna Project, Vaitarana Hydro-electric scheme Mina dam site, Pick weir site near Valarwadi, Poona, Dina and Bagh Irrigation Projects, in Maharashtra; Ukai dam site in Gujerat, Hasdeo, Bila, Simaria, Sindh, Chaldu, Bilsa, Bhansakhadi, Nahera, Sitawara, Bargi Projects, and Nalshera tank Project in Madhya Pradesh, Kopili dam site, problems of canal lining for structures on Pagaldiya, Dhansiri and Jamuna rivers, and Umium Hydel Project in Assam; dam sites across Ajoy and Pathro rivers, Jaintia reservoir scheme, Saktia Barrage, Tenughat and water supply scheme for the D.V.C. South Koel Hydel Project, Masan dam site, Gandak Irrigation Project, Badu Irrigation Project and Mines Colony at Bermo in Bihar; Salandi and Upper Kolab dam sites, Birgovindpur Barrage and Balimela Hydel Project in Orissa; Farakha Barrage site, Teestan Barrage and dam and Jaldhaka Hydel Projects in West Bengal; Kothar dam site and Kosi Hydel Project in Nepal; Beas, Ghaggar, Ganga Valley, Kotlibel and Bhakra dams and Uhl-Hydel Project in Punjab; Yamuna Hydel Project, Ramganga and Purnagiri dam sites and site for a bridge at Gaula Aquiducti in Uttar Pradesh; Sher-Gantmula and Tapoban Gulabkoti Projects; Chenani Hydel Project, landslides along the Jammu-Srinagar National Highway, Lower Chenab Valley and Upper Chenab Project in Jammu & Kashmir; Beas Sutlej-link Project in Himachal Pradesh; Chambal Valley Project (Stage II) and Banas dam site in Rajasthan; Pamba-Kakki hydro-electric project and Kalla dam site in Kerala and Manu dam site in Tripura.

7. *Groundwater Investigations.*—Groundwater investigations were carried out in East and West Godavari, Chittoor, Adilabad, Nellore and Krishna Districts in Andhra Pradesh; the Industrial Belt of Greater Bombay and the Tarapore Atomic Power Project and parts of Amraoti District in Maharashtra; Kandla Port, Baroda City, Kutch and Zalawad Districts in Gujrat; Palghat District in Kerala; Hoshangabad, Gwalior and Narsinghpur Districts in Madhya Pradesh; Avadi-Villivakkam areas, Chingleput, Tanjore, Trichinopoly and Tinnevely Districts, residential area near Avadi, English Electric Co. (P) Ltd., Pallavaram, M/s Amalgamations Ltd., at Sembium, and for the proposed Salem-Neyveli Steel Project in Madras; Sahabad, Purnia, Champaran and Gaya Districts, Rajgir area, the campus of Indian School of Mines, Dhanbad in Bihar; Balasore District, Orissa; in the 24 paraganas, Nadia, West Dinajpur, Murshidabad, Bankura; Midnapur and Burdwan Districts and the Greater Calcutta Industrial area in West Bengal; for the Chitrakut Dam, the Tarai and Babar areas, Allahabad, Jaunpur, Faizabad, Kanpur, Jhansi, Saharanpur, Dehra Dun and Meerut Districts in Uttar Pradesh; Ambala, Mahendragarh, Hoshiarpur, Gurgaon, and Rohtak Districts in Punjab; the Kheri copper Belt, Sikar, Barmer, Jaisalmer and Sawai Madhopur Districts in Rajasthan and in and around the Delhi area.

8. CENTRAL LABORATORIES.

Petrological Laboratory.—Besides the work of identification of minerals and rocks, research work was carried out in the Petrological Laboratory on Rajmahal basalts and pitch stones; pegmatites of Kodarma; bentonites from Barmer, Rajasthan, South Karanpura coals; mica periodite sills in Jharia coalfields, Siwana and Jasai and Singhbhum granites; sulphide ores in the Singhbhum copper belt, Bihar; titanium ores in Purulia District, West Bengal; Malani suite of volcanic rocks and petrography of Khetri rocks, Rajasthan; Simlipal complex, Orissa; Syenites from Madhya Pradesh and on charnockites of India.

Palaeontological Laboratory.—Research work on vertebrate and invertebrate fossils was continued. Identification and examination of invertebrate fossil collections from Chota Udaipur, the fuller's earth deposit of Rajasthan, Upper Palaeozoic marine fossils from Madhya Pradesh and Banswara, were carried out. Study of fossil anthropoid apes based on the departmental collection and vertebrate fossil collection from Haritalyangar, Himachal Pradesh was carried out. Palynological study of a number of samples from the Great esturine formation of Skye Island (England), samples from Askot (Pithoragarh District, Uttar Pradesh) sandstone sample from Suratgarh (Rajasthan), carbonacessous shale samples from Singrauli coalfield, coal samples from South Karanpura coalfield, clay samples from Mirzapur District were undertaken. Micropalaeontological study was continued on materials collected from Andaman, Rajasthan, Kashmir

and Surat. Palaeobotanical study on the collection from some of the Raniganj beds and the Karewas was carried out.

Chemical Laboratory.—In the Chemical Laboratories at the Headquarters and the regional offices, analytical work pertaining to various industrial minerals, metallic minerals, water samples, etc. was carried out. During the period about 13,207 samples were analysed. Research work undertaken includes direct determination of aluminium in iron ore by selective precipitation in the presence of organic masking agents, separation and estimation of niobium and tantialum in bauxites in India, estimation of copper and zinc in lead-zinc ores by the electrolytic separation of copper followed by the complexometric titrimetry of zinc.

9. *Publications.*—The following publications were released during the period:—

1. Rec. G.S.I. Vol. 89, Pt. I—General Report of the Geological Survey of India for the year 1955, by B. C. Roy.

2. Mem. G.S.I. Vol. 90—Paleogeography of the Gondwana period in Gondwana land with special reference to India and Australia and its bearing on the Theory of Continental Drift by F. Ahmed.

3. Bulletin Series A. No. 18—Indian Precious stones, by L.A.N. Iyer (Revised by R. Thiagarajan).

4. Bulletin, Series A. No. 9—Iron-ore, Iron & Steel, by M. S. Krishnan (Reprint).

5. Indian Minerals, Vol. XV, Nos. 2 and 3.

10. *XXII. Session of the International Geological Congress,* 1964.—At the invitation of India, the International Geological Congress will hold their XXII Session at the Vigyan Bhawan, New Delhi, in December 1964. The Congress is devoted to the advancement of investigations relating to the study of earth, considered from theoretical and practical points of view. The sessions of the Congress are called every three or four years and last for about one week. The excursions form an important feature of each session and every possible facility is given to the members to study the geological structure and mineral resources of the country where the session is held.

An Organising Committee consisting of eminent geologists (including Government officials) for the above Session to be held in India in 1964 has been set up to deal with scientific matters. An Accommodation and Transport Committee has also been set up to make arrangements relating to accommodation and transportation for the session which is likely to be

attended by 1,500 to 2,000 delegates from all parts of the world besides a large number of Indian Geologists.

The first circular of the Congress duly approved by the working group of the Organising Committee has been issued to National Contact Committees, Geological Surveys, Institutions, Associations, Universities, Societies etc. in various parts of the World.

CHAPTER VI

PETROLEUM

Oil & Natural Gas Commission.—During the financial year 1961-62, the Oil and Natural Gas Commission put 18 Geological field parties in Jammu and Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujerat, Andhra, Madras, West Bengal, Assam, Andamans and Nepal. The geological parties completed about 306 square miles of detailed mapping, 8596 square miles of semi-detailed mapping and 948 linear miles of traversing during the year. At the Commission's laboratories 5288 samples were analysed petrologically, 2481 samples palynologically, 3907 samples palaeontologically and 1129 samples chemically.

2. Geophysical Surveys were conducted in the various parts of the country in the Punjab, U.P., Rajasthan, Bihar, West Bengal, Gujerat, Assam, Madras and Andhra Pradesh during the period under report. From April to June, 1961, 12 seismic and 10 gravity-*cum*-magnetic parties were put into operation; subsequently the number of seismic parties was increased to 13 during the field season of 1961-62. The recess period between the field seasons was utilized by all the parties for recomputation of data collected during the field operations and finalization of reports. Four electrologging parties were active throughout the year.

3. 14 experts from USSR have worked during the year, mostly in the Electrologging Section. A West German team carried out seismic survey in North Bihar and is presently operating in Bihar-Bengal. The contract entered into with Schlumberger Seaco Inc. for carrying out electrologging work at the various drill sites was extended for a period of 1 year from August, 1961.

4. A contract has been entered into between the Oil & Natural Gas Commission and the French Petroleum Institute for carrying out oil exploration in Jaisalmer areas. The Government of France have offered a credit of Rs. 4 crores to meet the foreign exchange expenditure of this project.

5. No new structure has been discovered in Gujerat area in the current field season so far. The Dataganj structure in U.P. roughly delineated last year was confirmed in the current field season. In the Kishanganj area of Bihar and West Bengal, the German team has obtained some interesting results which are being studied further.

6. (a) Drilling has been in progress at the various drill sites. In Cambay region, drilling and testing of 19 deep wells has been completed.

Drilling in one well and testing operations at six more wells are continuing. In this area, 25 wells were completed upto 31-3-62, the total depth of all the wells, being 52,810 metres. Out of the 19 wells in which testing was completed, 6 are oil producing, 10 gas producing and the remaining 3 wells are dry.

(b) In Ankleshwar, drilling has been completed in 36 wells (total depth of wells being 52,332 metres) upto the end of March 1962. Out of these 27 wells have been found to be oil-bearing, two dry and the rest are being tested.

(c) In Ahmedabad area, 3 wells have been completed and drilling in well No. 1 is in progress; depth reached on 31st March was 2023 metres. Two wells have been found oil producing and the third is being tested. Total metreage drilled upto 31st March 1962 is 7387 metres.

(d) In Assam, oil has been struck in Rudrasagar well No. 2 which was drilled down to a depth of 3850 metres. Rudrasagar well No 4 has been drilled down to 2514 metres and drilling is in progress. Arrangements to drill other wells in this region are in progress.

(e) In Punjab, Janauri Deep Well No. 1 has been drilled upto a depth of 4531 metres, the deepest so far drilled under the auspices of the Commission. The testing of this well is in progress. Another well in this region is being drilled at Adampur, and the depth reached upto 31st March, 1962 was 2528 metres. One structural well at Zira was also drilled upto the depth of 743 metres.

(f) The structural well being drilled at Badaun (U.P.) at the end of the year 1961-62 was completed during this year, reaching a depth of 1167 metres. Another structural well was started on the 1st December, 1961, and it had reached a depth of 1006·42 metres upto the 31st March, 1962. Further drilling in this well is in progress. A deep rig has also been erected in this region; it started the drilling of Ujhani well No. 1. The depth reached on 31st March, 1962 was 1254.46 metres.

(g) Two structural wells have been drilled at Padra in Gujerat upto depths of 681 and 674 metres respectively, and both have been found productive on testing. The testing of different zones of well No. 2 is in progress. One structural well at Pugal has been started and depth reached on 25th March, 1962 is 171.96 metres.

7. At the end of March, 1962, 15 deep rigs, 4 structural rigs, 4 workover rigs and 2 Bucknites were under operation in the various parts of the country.

8. 24 officers of the Commission were sent to USSR, U.S.A., Canada, France etc. for training in various aspects of oil exploration, drilling and production during 1961-62.

9. Two officers of the Oil & Natural Gas Commission were deputed during July-September 1961 to visit the U.S.S.R., Czechoslovakia and Rumania as members of the National Productivity Council Oil Industry Team sponsored by the National Productivity Council.

10. An officer of the Commission was deputed in January, 1962 to the U.S.A. to attend the U.N. Inter-Regional Seminar on Techniques of Petroleum Development held in U.S.A.

11. The Third Five Year Plan of the Oil and Natural Gas Commission had earlier envisaged an outlay of Rs. 115 crores with a foreign exchange element of Rs. 53 crores. But on account of increased activities and success achieved in locating three new oil fields viz. Ankleshwar and Kalol in Gujerat and Rudrasagar in Assam, the revised plan envisages a total expenditure of Rs. 202 crores with a foreign exchange component of Rs. 71 crores. For the present, the Planning Commission have approved the foreign exchange expenditure upto the extent of Rs. 68 crores and the matching rupee expenditure.

12. After the initial experimental production of crude oil at Ankleshwar oil fields, which commenced on the 15th August 1961, the trial production started at Ankleshwar from 15-2-1962. Whereas between 1-9-61 and 6-2-62, despatches of crude oil on an average of 100 tons (approximately) per day were made to the Burmah Shell refinery at Bombay alone, the Commission has started production of crude at the rate of 600 tons per day from 15-2-62, being supplied to the refineries of Burmah Shell and Esso at Trombay. This rate of production is envisaged to be stepped up to 1500 tons per day by October 1962.

13. The Commission envisages a total cumulative production of six million tons during the Third Five Year Plan period, and an annual production of 3 to 3.5 million tons in the last year of the Plan.

14. *Proposals from oil Companies regarding Oil Exploration.*—Pursuant to the promulgation of the Petroleum and Natural Gas Rules, proposals for oil exploration in India were received from several foreign oil companies. After detailed negotiations, agreements between Government of India and Burmah Oil Company/Assam Oil Company/Oil India Ltd., and Government of India and E.N.I. of Italy were executed on 27-7-61 and on 29-8-1961 respectively. According to the agreement, the E.N.I. have agreed to provide a credit of Rs. 46·15 crores for the establishment of petroleum projects in the public sector, such as product pipe-lines connecting Barauni, Calcutta and Delhi, a gas fractionation plant in Assam, a liquid petroleum gas bottling plant and distributing facilities, supply of production and distribution equipment, and contract drilling etc. Additional projects to be covered by the credit are to be finalised after further consultation with E. N. I.

15. *Oil India Limited.*—O.I.L. was incorporated on 18-2-59 with the Government of India holding 33 1/3% of the paid up shares in the company. The main objectives of the company are (i) exploration for and production of crude oil (including natural gas), and (ii) construction of a pipeline to transport the crude oil to the Government-owned refineries at Nunmati (Assam) and Barauni (Bihar) with initial capacities of 0.75 and 2.0 million tons per annum respectively. The existing area of operation of O.I.L. is 510.35 sq. miles in Assam. Consequent on the signing of the Second Supplemental Agreement on 27-7-61, the Government of India and the B.O.C. became equal share holders in O.I.L. and the company is to be granted exploration licences covering an additional area of 1886 sq. miles. The paid up share capital of the company is Rs. 28 crores. During 1961-62, the Government invested Rs. 4 crores in the share capital of O.I.L.

Upto 12-3-62, 123 wells were drilled by O.I.L. of which 84 wells are oil producing, 3 gas producing, 15 dry and 21 wells are awaiting further testing. Total crude oil and gas produced during 1961 were approximately 0.32 million metric tons and 1688 million cubic feet respectively. According to the latest assessment, the reserves of crude oil and natural gas (proved and indicated) are 48.1 million tons and 740,428 million cubic feet respectively.

16. *Pipeline Project*—Oil India is constructing a 720 miles long crude pipeline from Nahorkatiya to Barauni. The first stage of the pipeline from Nahorkatiya to Nunmati (about 248 miles) has been completed and fully tested. The second stage from Nunmati to Barauni is expected to be completed by the end of 1962.

The progress on the construction of the second stage of the pipeline as on 24-3-62 was as follows:—

Right of way cleared	..	341 miles.
Pipe strung	..	327 miles.
Ditching	..	297 miles.
Pipe welded	..	310 miles.
Pipe lowered and backfilled	..	287 miles.

17. Indian Refineries Ltd.—

(a) *Gauhati Refinery.*—The first public sector refinery at Nunmati in Assam was inaugurated on the 1st January, 1962. The refinery which has an annual refining capacity of 0.75 million tons has been established in collaboration with the Rumanian party, M/s. Industrial export,

Bucharest. The refinery is expected to reach its full capacity by June, 1962. The estimated total cost of the refinery is about Rs. 17.70 crores.

(b) *Barauni Refinery*—The detailed project report together with working drawings for the second public sector refinery, with a capacity to refine another 2.0 million tons of indigenous crude oil, received from the U.S.S.R. authorities has been examined and finalised. The project report has been slightly amended to make provision for the production of about 60,000 tons of Lube Oils in place of J.B.O., the production of which was expected to prove costly.

Land for the refinery site, railway siding and approach and link roads has been acquired. Proposals for acquisition of further land for the sewage plant and sewage line and additional 8 acres for township are being processed by the Government of Bihar. Work on the strengthening of the refinery site, fencing around the refinery, construction of a broad-gauge railway siding and a hostel for Russian technicians is progressing according to schedule. Work on temporary godowns for stores and equipment, repairs to roads and buildings in the Hathidah colony for employees, twin-type quarters at the factory site, field laboratory, building at the factory site etc. has been completed. About 17,093 metric tons of equipment/material have so far been received from U.S.S.R. as against a total of 38,075 metric tons to be received. Some Russian technicians are already in position at Barauni. 63 Indian trainees have been deputed to U.S.S.R. for purpose of specialised training in the erection, commissioning and operation of the refinery. The first one-million-ton unit of the refinery is scheduled to be commissioned by early 1963, and the second one-million-ton unit by middle of 1963. The entire refinery including the Kerosene unit and the lube oil processing unit is scheduled to be on full stream by April 1964. The total cost of the refinery is likely to be of the order of Rs. 37 crores.

18. *Gujerat Refinery*—Based on the tentative estimates of the reserves of crude oil in the Gujerat region, it is proposed to set up a refinery at Koyali, of a capacity of about 2 million tons per annum, with provision for possible further expansion. An agreement has been signed between M/s. 'Tiajpromexport', Moscow, a Soviet Organisation and the Oil and Natural Gas Commission for setting up this refinery in two stages. The project report and working drawings for the proposed refinery are expected to be received by the end of 1962.

19. *Lubricating Oil Project*—Two contracts, one with M/s. Badger N. V., the Hague, and another with M/s. E. N. I. of Italy, for preparation of techno-economic survey and project reports for a lube oil plant in the public sector with a capacity to produce about 1,00,000 tons of lube oils per annum, have been concluded. The report from M/s. Badger has been received and is being examined; the report from E.N.I. is expected

by the middle of May, 1962. There is also a propsal for a lube oil plant from M/s. Standard Vacuum Oil Company (ESSO) on participatory basis; this is still under discussion with the representatives of the Company.

20. *Existing Refineries*—All the four existing refineries in the private sector have been in full production during the year 1961. The crude oil processed by the private sector refineries during 1961 was 6,403,149 metric tons as against 6,119,313 metric tons during 1960. To the extent technically possible, the pattern of production follows the pattern of consumption, Kerosenes and diesel oils (whose demands are very much in excess of total production) having been produced in greater quantities as compared to 1960.

21. *Petroleum Supplies*—Despite the foreign exchange difficulties, the supply position of petroleum products continued to remain satisfactory during the year and it was possible to meet all the demands for oil in the country. The supplies were supplemented by imports from the rupee payment sources during the period.

It was also possible to export 193,573 tonnes of Motor Spirit and 12,695 tonnes of parafin Wax during 1961, as against 204,883 tonnes and 20,178 tonnes respectively in 1960.

22. *Indian Oil Company Limited*—On 30-6-1959, the Indian Oil Company Limited, a wholly Government-owned Company, was incorporated (with an authorised capital of Rs. 12 crores) for the marketing and distribution of petroleum products in the country. In terms of the Agreement entered into by this Company in 1960 with the Soviet Export Organisation, for the import of 1.5 million tons of petroleum products during a period of 4 years against payment in non-convertible rupees, the Company has already imported considerable quantities of deficit petroleum products. To handle these imports and the supplies available from the public sector refinery at Nunmati in Assam and the projected public sector refinery at Barauni in Bihar, the Company has acquired defence tankage at Antop-Hill and naval tankages at Cochin and Visakhapatnam; it has also taken up the construction of bulk storage facilities at Kandla, Cochin, Bombay, Calcutta, Okha, Siliguri, Asansol, Dhanbad, Kanpur, Delhi etc. and upcountry depots at important consumer points. Depots at Baroda, Ahmedabad, Indore, Ratlam, Nagpur, Kotah, Sholapur, Bhopal, Akola, Amravati, Gaya, Pathankot, Satna, and seven others are already in commission. 62 consumer pumps and 1 dealership pump have also been commissioned. Despatches of refined products from the Nunmati Refinery have started with effect from 1st February 1962.

In terms of Government's agreement with E.N.I., Indian Oil Company will import during the next one or two years distribution equipment from Italy against the credit offered by E.N.I. E.N.I. Companies are also doing project studies for a liquid petroleum gas bottling plant for the company.

23. *Oil Prices*—Till 30-9-61, ceiling selling prices of petroleum products continued to be determined by *ad hoc* agreements made by the Government with the oil companies from time to time. The last agreement concluded with the oil companies in October, 1959 with retrospective effect from 1-4-59 expired on 30-9-61.

In August, 1960, the Government had set up 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 allowing for an adequate return for the oil companies, the Committee have evolved a pricing basis. Their recommendations imply, on the basis of estimated sales of 1962, a reduction of about Rs. 15 crores annually in the selling prices of the major petroleum products and bitumen. Apart from this, ceilings in the marketing and distribution charges and profit margin on an average for the groups of Lubricants/ Greases and Specialities have also been recommended. Government have accepted the recommendations of the Committee and implemented the same with effect from 1-10-61. The reductions have been mopped up by levy of additional duties under the provisions of Mineral Oils (Additional Duties of Excise and Customs) Act, 1958. The consumer prices of these products have been allowed to remain unchanged.

As a result of the mopping up of 'cost and freight' accumulations of the oil companies, adjustments in additional (non-recoverable) duties on petroleum products have been made w.e.f. 13-4-62; ceiling selling prices have also been re-calculated from this date on the basis of new c.i.f. values as on 1-10-61.

24. *Research & 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. Steps to establish a Training and Research Wing in the Oil & Natural Gas Commission with assistance from U.N.S.F. have also been taken.

25. *Product Pipelines*—(a) SNAM Progetti (a company of the E.N.I. group) has been asked, in terms of Government's credit agreement with E.N.I., to prepare a project report for product pipelines from Barauni to Delhi and Barauni to Calcutta. The project report is expected by the end of April 1962.

(b) Messrs. Bechtel Corporation, California (U.S.A.) were asked to prepare a project report for Nunmati-Siliguri products pipeline. The report submitted by the corporation is under examination.

(c) A proposal to construct six pipelines (two for crude oil, three for gas and one for products) in Gujerat is under consideration.

CHAPTER VII

ORGANISATION & METHODS

The O&M Unit continued to function under the charge of Deputy Secretary (Administration) designated as O&M Officer in addition to his other duties as Vigilance Officer and Security Officer.

Activities:

(A) The control mechanism for watching the speed of disposal which was introduced by the O&M Division continued to serve its useful purpose. Detailed statements showing the number of Primary receipts received during the year 1961-62 up to the end of February, 1962, the number of receipts disposed of and the percentage of arrears continued to be compiled and sent to the O&M Division, Department of Cabinet Affairs.

The statement below gives comparative figures of the average monthly carryover during the four quarters of the year 1961-62 (upto end of February, 1962) and during the corresponding period of the year 1960-61 (upto end of February, 1961).

Average carryover (*i.e.* % of receipts) remaining undisposed of:

For the quarter	1960-61	1961-62
April-June	32·5	33·5
July-September	29·9	35·6
October-December	31·1	37·2
January-February	34·8	34·3

The position has been generally steady.

(B) Regular internal inspections of sections were conducted according to the round-the-year programme laid down by the O&M Division.

(C) The O&M Officer of the Department visited some Subordinate Offices during the year 1961-62 to ensure that the prescribed procedures were being followed and to assist the O&M Units in the Subordinate Organisations generally to conform to the O&M drive.

Monthly Progress Review meetings of officers of and above the rank of Under Secretary have become a stable and regular feature. All important matters including the progress achieved by the projects and the speed of disposal of Government work as evidenced through the O&M control chart are discussed at the meeting. The efficacy of this method as a means of reviewing past performances, focussing attention on long pending cases, discussing new ideas and resolving doubts and difficulties is being increasingly realised.

(94)

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. Public Sector Coal Projects, such as the National Coal Development Corporation Ltd., Ranchi, and the Singareni Colliery Co., Andhra Pradesh.

4. Setting up of Coal Washeries.

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 low temperature carbonisation plants for the production of smokeless domestic coke.

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. National Mineral Development Corporation Ltd., New Delhi.

14. Sikkim Mining Corporation.

15. 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.

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

17. 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.

18. Setting up of oil refineries in India.

19. Indian Refineries Ltd., New Delhi.

20. Production of refinery products by :

(i) Standard Vacuum Refining Company, Bombay;

(ii) Burmah-Shell Refinery, Bombay;

(iii) Caltex Refinery, Visakhapatnam; and

(iv) Assam Oil Company Ltd., Digboi.

21. Setting up of Lubricating Oil plants.

22. Indian Oil Company Limited.

23. 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.

24. Oil Advisory Committee.

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

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

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GOVERNMENT OF INDIA

MINISTRY OF STEEL, MINES AND FUEL

(Department of Iron and Steel)

SUMMARY OF ANNUAL REPORT 1961-62

Organisation.—Consequent on the re-organisation of the Ministries in April, 1957 the Ministry of Iron and Steel became the Department of Iron and Steel in the Ministry of Steel, Mines and Fuel. With this reorganisation, work relating to the administration of the Iron and Steel (Control) Order, import and export of iron and steel, the establishment of the Iron and Steel Control organisation, the steel projects in the private sector, re-rolling mills and ferro-alloy industry was transferred from the late Ministry of Heavy Industries. Although the public sector steel plants are managed by a Government company, the Department is administratively responsible for them. It is also responsible for the further development of capacity for the production of iron and steel.

The management of the Rourkela Steel Project was from the beginning, entrusted to the Hindustan Steel Limited but in April, 1957 the work relating to the setting up of steel plants at Bhilai and Durgapur was transferred to the Company. With the transfer of this work, a number of officers and staff were transferred to Hindustan Steel Limited and to other Ministries. As a result, the Secretariat of the Department was considerably reduced. During the year 1961-62 it continued to consist of one Secretary, three Deputy Secretaries, four Under Secretaries, one Officer-on-special-duty and sixteen Section Officers.

There is only one attached office under the administrative control of the Department at Calcutta with three Regional offices at Bombay, Madras and Delhi. The head-office of the Iron and Steel Control organisation at Calcutta is under the charge of an Iron and Steel Controller who is responsible for the administration of the Iron and Steel (Control) Order, 1956 as amended from time to time, issue of licences for the import/export of Iron and Steel, and for the purchase of steel.

With a view to assist the Industries in the Northern India requiring iron and steel as raw materials and also to establish a close and effective liaison between the sponsoring authorities *viz* Development Commissioner for Small Scale Industries and Development Wing of the Ministry of Commerce and Industry and the Licensing authorities, a Regional Office of the Iron and Steel Controller at Delhi was opened with effect from 1st August, 1961.

In order to present a clear picture regarding availability and consumption of iron and steel with special emphasis on matters relating to import and export, production, distribution and also to provide useful information regarding all aspects of the expanding steel industry to the producers and dealers of steel as well as to the consumer and general public, the Iron and Steel Controller has started publishing a monthly bulletin called "IRON & STEEL CONTROL MONTHLY BULLETIN" with effect from May, 1961.

HINDUSTAN STEEL LIMITED

The projects entrusted to the Hindustan Steel Limited for construction and operation are the three integrated iron and steel works at Rourkela, Bhilai and Durgapur, the Coal Washeries at Durgapur, Dugda, Bhojudih and Patherdih, the Pipe Plant and Fertilizer Plant at Rourkela and the Alloy and Tool Steel Plant at Durgapur and the preliminary work at Bokaro. A decision has also been taken to erect a Refractory Plant at Bhilai under the 112·5 million rouble credit programme of the U.S.S.R.

The Board of the Hindustan Steel Limited consists of eleven Members of whom one is whole-time Chairman. Besides the Chairman, there are five other whole-time Directors. The other Directors of the Company are the three General Managers of the Steel works at Bhilai, Rourkela and Durgapur, the Chairman of the Heavy Engineering Corporation and a non-official.

The authorised capital of the Company, has recently been increased from Rs. 300 crores to Rs. 600 crores. It consists of sixty lakhs of equity shares of Rs. 1,000 each of which thirty lakhs shares have been fully subscribed upto the 31st December, 1961. Government of India have also advanced a loan of Rs. 341·90 crores upto the end of December, 1961.

DEMAND, AVAILABILITY AND DISTRIBUTION OF IRON AND STEEL

Though the production in 1961 exceeded that of 1960, the total availability was still short of demand particularly in respect of sheets, tin-plates and galvanised wire. The quota system is now in force only in respect of categories like thinner gauge sheets, wire, baling hoops and tin-plates. The indents for all categories on producers were, however, routed through the Steel Control. Based on the indents received for relaxed categories and the demands placed by the various coordinating/sponsoring authorities for restricted categories for purposes of allocation, the total demand during the year 1961-62 was assessed at about 6·2 million tons, as against 5·06 million tons in 1960-61 and 4·1 million tons in 1959-60. The total demand for restricted categories during 1961-62 (sheets and wire) was about 2 million tons. Increase in demand was mostly due to the growth of steel-using industries. So long as certain categories of steel remain in short supply the possibility cannot be excluded that the demand is inflated to some extent.

(98)

Availability.—The total availability in 1961 was about 3·84 million tons, comprising of indigenous production of about 2·84 million tons and imports of about 1 million tons, against the total availability of about 3·2 million tons in 1960 and 2·6 million tons in 1959. The supply position of foundry-grade pig iron was also somewhat short as the demand was higher than the availability of about 1 million tons only, as in 1960.

Distribution.—The liberalised distribution has been continued and quotas were allotted only for thinner gauge sheets, wire, baling hoops and tin-plates. For other categories consumers were allowed to place indents direct on the Steel Control or on the stockists without any authorisation or quota certificates. Indents for relaxed categories were generally planned in full but indents for some of the critical categories *viz.* 5 mm and 6 mm plates 10 to 14 gauge sheets, $\frac{1}{4}$ inch rods and light angles were screened by the Steel Control. This was necessary as the producers continued to carry heavy outstanding orders for these sections even though distribution control had been relaxed.

During 1961-62 further steps were taken to liberalise control over distribution at the Stockists' level. The controlled stockists were authorised to sell materials not only to consumers but also to other stockists. Registered Stockists have been authorised to sell 100 per cent of some of the sections and the list of sections of which they can sell 50 per cent without any permit has also been amplified. To handle larger volume of steel more Controlled and Registered Stockholders have been appointed.

The Controlled Stockholders at present number 214 and Registered Stockholders 1903. The Controlled Stockholders have been allowed to deal in all categories of steel except tinplates and baling hoops for which there are separate stockists. A large number of stockists have also been authorised to handle both tested and untested steel.

The quota-wise allocations during last three years were:—

(in 000' tons)

	1959-60	1960-61	1961-62(*)
Railways & Defence	323	944	48
Industrial Maintenance & Packing	120	95	32
Private Industrial Development Schemes	137	144	12
Government Development Schemes	751	564	41
Steel Processing Industries (Central)	569	645	194
Rehabilitation, Export Reserve, & Export Promotion	70	47	32
Agricultural	325	380	144
States (Non-Agricultural) Government Development Schemes and Steel Processing Industries	790	1,146	167
Small Scale Industries	280	331	127
TOTAL	3,365	4,296	797

(*) Only restricted categories—sheets and wire in metric tonnes.

Scrap.—It is estimated that in 1961-62 about 69,000 tons of industrial scrap will be available for distribution to the various States for allocation to actual users as against 44,500 tons in 1960-61.

The Iron and Steel Advisory Council was re-constituted for a further period of two years. Government have also constituted a Standing Committee (Trade) for the steel industry consisting of representatives of Producers, Trade and consumers to continuously study and advise Government on problems, short term as well as long term, relating to the trade in iron and steel.

IMPORT AND EXPORT OF STEEL

Import.—Due to the acute shortage of foreign exchange strict control on steel imports was continued in 1961-62. Import licences were issued to actual users only and for categories of steel which were either not produced in the country or produced in limited quantities. In the case of established trade, import licences were confined to a few essential items like tinplates, wire, tool and alloy steel and box strappings.

2. Purchases of steel by Iron and Steel Controller, however, continued both against Development Loan Fund and from rupee payment countries.

3. *D.L.F.*—A further loan assistance of Rs. 20:52 crores ($43 million Approx.) was made available for the import of steel, in addition to the four Loans already arranged. This brings the aggregate value of the DLF Loans to $128 million. The New DLF Loan is to be utilized largely for the issue of import licences to actual users. A part of this amount has also been earmarked for procurement by the Iron and Steel Controller.

Against the aggregate value of $ 85 millions made available against the four earlier Loans, Ministry of Railways utilised $4·45 million for the import of 40,139 long tons of Railway Steel through the agency of ISM, Washington. Against the remaining amount, orders for the import of 267,889 tons of steel have been placed through tender by the Iron and Steel Controller upto the end of December, 1961. Steel items like strips, plates, wire, hoopes, strappings, tinplates and tool and alloy steel, which are in short supply in the country, are to be imported against DLF Assistance.

4. Imports of steel on barter basis were also continued against export of pig iron, ingots, blooms, billets, etc. produced by Hindustan Steel Limited as well as against export of scrap and ores etc. For import of steel a quota of 240,000 tons of scrap was made available. Only those categories of steel which are essential to the economy of the country were allowed to be imported.

5. Although the foreign exchange position continued to be difficult, import of tool and alloy steel and special categories of steel which have not yet been indigenously produced in appreciable quantity, was allowed more or less to the extent recommended by the sponsoring authorities. Stainless steel sheets required for utensil manufacture were obtained under barter imports arranged by the State Trading Corporation. Imports of about 4,000 tons of stainless steel sheets on barter have been arranged during the year and of which 250 tons are for meeting the requirements of industries other than utensil manufacture.

The total import of iron and steel during 1961 (upto September, 1961) aggregated to 729,200 tons as against 941,548 tons in 1959 and 1,144,121 tons in 1960. The category-wise break up of imports in 1961 is given below:—

	Quantity in tons	Value in Rs.
Ingots, blooms, slabs billets etc.	11,585	8,321,572
Joists, girders, angles sleepers, sections bars and rods	60,158	51,303,270
Plates and Sheets (coated and uncoated)	*314,984	255,838,639
Hoops and Stips	30,083	39,995,770
Wire rods and wire coated or uncoated	69,777	58,892,615
Rails and Rail fittings	174,432	116,649,121
Castings and Forgings	16,448	40,486,844
Tool and Alloy Steel	44,756	97,664,986
Pig iron and Sponge Iron	1,577	808,366
Scrap	6,400	3,867,623
Total	729,200	673,828,806

*Includes.

	Qty. tons.	Value (Rs.)
Tinplate	35,883	35,544,302
Terneplate	171	180,101

Export.—Only such items of steel as could not be utilised in the country were allowed to be exported. Specific ceilings were also fixed for export to neighbouring countries as a special case. In addition provision was made for exportable categories of steel to East European Countries with

whom India has rupee payment agreements. The exports in 1961 upto September, 1961 have been as follows:—

	(Quantity in metric tons)
Pig Iron	67,687
Blooms, Billets, Slabs etc.	58,190
Finished steel	12,089
	137,966

The policy of permitting export of only those categories of scrap which could not be used in the country has been continued. In 1961 (upto September) a quantity of 262,638 tons of scrap was exported.

A Committee headed by Iron and Steel Controller was also set up to enquire into the whole question, including availability of scrap, the requirements of users in the country, the systems of distribution, the availability for export, the manner for export, etc. The report has been submitted and is at present being examined by the Government.

Production of Iron and Steel.—During 1961, the production of finished steel was 2·84 million tonnes as against 2·26 million tonnes in 1960. The production of pig iron for sale reached the figure of 1·14 million tonnes as against 1·09 million tonnes in 1960. The production of saleable steel and pig iron in the three public sector plants was 0·99 and 0·81 million tonnes respectively in 1961 as against 0·43 and 0·81 million tonnes respectively in 1960.

Selling prices.—During the year under review, the selling prices of pig iron (all grades), tested billets, annealed wire and galvanised wire and Jute Bailing hoops were increased. With Rourkela Steel Project coming into production, new categories like Wide Hot rolled strips, cold rolled strips and sheets came into the market. Suitable prices were fixed for these categories. The selling prices of other categories of steel remained unchanged and the overall level of selling prices of iron and steel remained more or less stationary.

PRIVATE SECTOR

Pig Iron.—Against a target capacity of 1·5 million tons of pig iron envisaged in the Third Plan, the integrated steel works will be producing a million ton and the balance of half a million ton will be available from small/medium sized pig iron plants in the private sector. So far a capacity of about 285,000 tons (which includes two medium sized plants each with a capacity of 100,000 tons per annum) has already been licensed. It is also proposed to licence shortly a further capacity to cover the gap in the private sector.

102

Steel Wire.—The existing and a projected capacity for the production of steel wire is about 350,000 tons. This together with the capacity of small scale units which are likely to come up, is expected to meet the estimated demand of 400,000 tons based on the Report of the Panel of Experts. There may be scope for licensing further capacity for the manufacture of special types of wire for which there is at present a capacity of 75,000 tons.

Ferro-manganese.—Against a target of 200,000 tons in the Third Plan, a total capacity of about 256,000 tons has been licensed of which a capacity of about 158,000 tons has been installed.

A Committee was appointed in November, 1961 to study the various problems of the ferro-manganese industry with special reference to supply of raw materials, railway freight, production cost, export market, etc. This Committee has not yet submitted its report.

Ferro-Chrome.—Based on the target fixed for tool, alloy and special steels by the end of Third Plan *i.e.* 375,000 tons per annum it is estimated that the demand for ferro-chrome will be about 40,000 to 45,000 tons. The capacity licensed so far is about 16,000 tons and the gap will be filled by licensing further units in the field.

Ferro-silicon.—At present Mysore Iron & Steel Works is the only producer of ferro-silicon in the country. Against a target capacity of 40,000 tons envisaged in the Third Plan period, a capacity of 32,200 tons have been approved so far and further units will be licensed to cover the gap taking into consideration the prospects of exports of ferro-silicon.

Steel Re-rolling Industry.—In planning the development of the steel industry in the Third Plan, the position of the steel re-rolling industry was reviewed taking into account the demand for sections which could be rolled in re-rolling mills. The review showed that it should be possible to licence about 100,000 to 150,000 tons of additional capacity in the re-rolling industry to small units to meet local demands. Accordingly, a capacity of 128,600 tons for setting up new re-rolling mills in Assam, Bihar, Gujarat, Kerala, Madras, Madhya Pradesh, Andhra Pradesh, Maharashtra and Jammu and Kashmir has been sanctioned and further capacity of 15,000 tons each for Mysore and Orissa is proposed to be sanctioned shortly.

Alloy Steel.—Against the requirements of the Third Plan which have been estimated at 200,000 tons a year, 85,000 tons are estimated to be available from the Central Alloy and Tool Steel Plant and Ordnance factories. A further capacity of 120,100 tons has been sanctioned for the manufacture of such steels in the private sector. This is in addition to an existing capacity of about 10,000 tons.

For the manufacture of alloy steel castings and such alloy steels as do not require special rolling equipment, capacity already existing and licensed is about 100,000 tons. Recently, an additional capacity of 126,500 tons has also been sanctioned.

Ingots and Billets.—Electric furnaces already sanctioned and those in progress are likely to provide a total of about 200,000 tons of billets a year for the re-rolling industry. The question of permitting further capacity will be considered in the light of the recommendations of the Scrap Investigation Committee which are being examined.

Tinplates.—It is estimated that the requirements of Tinplates by the end of Third Plan period will be about 300,000 to 350,000 tons. The capacity so far approved is about 330,000 tons of which the existing capacity is 80,000 tons. This figure also includes the capacity planned on the Rourkela Steel Plant—50,000 tons of hot-dip plates and 100,000 tons of electrolytic tinplates.

TISCO, IISCO & MISW.—The Tata Iron & Steel Company have completed their two million tons programme for the production of 1·5 million tons of saleable steel. The Indian Iron & Steel Company have also completed their expansion programme for the production of 0·8 million tons of saleable steels. The expansion programme of the Mysore Iron and Steel Works for the production of 85,000 tons of steel was undertaken in right earnest towards the end of 1960 when orders were placed for plant and machinery.

Rourkela Steel Project.—The Rourkela Steel Plant is designed to produce one million tons of steel ingots to be rolled into 720,000 tons of flat products like plates and sheets, is complete except for minor items. The product-mix of the Rourkela Works at the million-ton stage will be:

	Tons
1. Wide heavy plates and narrow heavy plates	200,000
2. Hot rolled sheets and strips	300,000
3. Cold rolled sheets and strips	170,000
4. Tinplates	50,000
	720,000

The pipe plant which has been put up as an adjunct to the steel plant has been in operation for more than a year. Work is still progressing on the Fertiliser plant which is intended to produce 580,000 tons of Calcium Ammonium Nitrate (Nitro-chalk) per annum.

Production in the Rourkela Steel Plant in 1961 has been as follows:

Items	Qty. in metric tonnes
1. Pig Iron	438,855
2. Steel ingots	311,905
3. Slabs	183,681
4. Plates	67,478
5. Hot rolled strips	70,988
6. Cold rolled strips	6,426
7. Pipes	27,000
8. Crude Tar	25,600

Out of 7,546 houses taken up for construction till the end of 1961, 7,118 houses have been completed. Out of 4,000 cheap-type houses, 231 houses have been completed and 2,298 are under construction. Tenders have been invited for the remaining houses.

It has been decided to expand the capacity of the Rourkela Steel Plant from 1 million to 1·8 million tons of steel ingots—from 720,000 tons to 1,240,000 tons in terms of flat products—during third five year plan period. A project report for the expansion has been prepared by the Designs organisation of the Hindustan Steel Limited. Tenders for the plant and equipment required has been called for and most of the orders are expected to be placed about the middle of the year.

Bhilai Steel Plant.—The one-million-ton stage of the plant has been completed. The product-mix of the Bhilai works at the million-ton-stage will be:—

	Ton
1. Rails, Standard gauge	100,000
2. Rails, narrow gauge	10,000
3. Rails, sleeper bars	90,000
4. Standard and broad-flanged beams, channels, angles and other light heavy structurals sections.	284,000
5. Round and squares	121,000
6. Flats	15,000
7. Billets for re-rolling	150,000
TOTAL	770,000

The plant has now embarked upon expansion to 2·5 million tons steel ingots during the Third Five-Year Plan. The Bhilai Steel Plant when expanded will produce 1·95 million tons finished steel and ·3 million tons of pig iron.

Production in 1961 was as follows:—

	(In Mln. tons)
1. Pig iron	957,092
2. Steel ingots	701,647
3. Blooms	572,688
4. Billets	372,271
5. Rails unfinished	98,005
5. Rails finished	86,302
7. Structurals unfinished	55,792
8. Structurals finished	53,958

The detailed project report for expansion submitted by the U.S.S.R. organisations was accepted by the Government on 20th November, 1961. The work with regards to expansion has already started and is expected to be finished by 1966.

Up-to-date 7,211 quarters have been completed. 289 quarters are under construction.

Durgapur Steel Project.—One million tons of ingot steel to be produced at Durgapur Steel works will be processed into about 8 lakh tons of saleable steel comprising:—

	Tons
1. Heavy forging blooms	10,000
2. Forging Blooms	30,000
3. Forging Billets	60,000
4. Billets for rerolling Industry	50,000
5. Merchant bar sections	240,000
6. Light and medium sections	200,000
7. Sleepers	60,000
8. Wheels and axles	50,000
TOTAL	800,000

Besides, the plant will also produce 3·60 lakh tons of pig iron for sale. In addition, there will be by-products like ammonium sulphate, benzene, toluene, xylene, solvent naptha, road tar and wood preserving creosote.

The construction of the Plant is almost complete except for the coke oven battery No. 3 and the Blast Furnace No. 3. Actually Coke Oven Battery No. 3A was lighted on 31st January 1962 and No. 3B is almost complete. Blast furnace No. 3 is almost complete except for finishing items. As regards the Wheel and Axle Plant, the First Axle was made on a trial basis on 1st November, 1961. Production of wheel sets is likely to start shortly.

Production in 1961 was as follows:—

Item	Qty. (in M.tons)
1. Pig Iron	721,312
2. Steel ingots	363,166
3. Blooms and slabs	355,208
4. Sleepers	9,897
5. Billets	270,043
6. Sections	34,800
7. Merchants	19,051
8. Sleeper Bars	14,250

The construction of township has advanced considerably side-by-side with the construction of Steel Plant. About 6,383 houses were completed by the end of December, 1961, out of 7,500 houses proposed for the first phase. Another 2,800 houses are proposed in the second phase of construction. The township has three health centres, four shopping centres, one multi-purpose school, three primary schools and seven hostels. In addition to these, 3 schools and a permanent hospital of 250 beds are also under construction.

The programme for expansion of steel plant at Durgapur during the Third Five-Year Plan period has been drawn up. The capacity of the expanded plant will be 1:6 million tons of steel ingots and 300,000 tons of pig iron.

Preliminary steps for planning the temporary construction facilities for the expansion scheme have already been taken. All formalities in connection with invitation of tenders and placement of orders for the plant and equipment for Code Oven, Blast Furnace, new Power Plant, and Skelp Mill are expected to be finalised during 1962-63.

Alloy and Special Steels Plant.—The detailed project report, submitted by the Consulting Engineers, M/s. M. N. Dastur & Co., Calcutta, was generally accepted by Hindustan Steel Limited and also Government. M/s. Atlas Steels Limited, Canada, have been appointed as Advisers for Production Know-how and training and an agreement was signed with them in this behalf by the Hindustan Steel Ltd. on the 12th September, 1961.

The major portion of the land required for Alloy Steels Project is already available and acquisition proceedings for the remaining are under way.

Tenders for site levelling, boundary wall and shop offices have been received and are being finalised. Tenders for Administrative Building, Storage Sheds etc. will be called for shortly. Tenders specifications have been drawn up and the tender enquiries for the various Units of the plant are likely to be issued during March, 1962.

Negotiations are in progress with the Durgapur Project Limited for finalising contract for permanent supply of 45,000 kw of power for the Plant. The construction of Coke Oven Gas and Oxygen lines from Durgapur Steel Plant to Alloy Steels Plant is in progress.

Bokaro Steel Project.—The fourth Steel Plant at Bokaro which has been included in the Third Five Year Plan is designed to have an initial capacity of one million tons of steel ingots and 350,000 to 400,000 tons of saleable pig iron with facilities for further expansion. M/s. Dastur & Co. have submitted the preliminary Project Report. The detailed Report is yet to be prepared. Meanwhile, preliminary work such as land acquisition survey of township and plant area is under progress.

Coal Washeries.—With the limited reserves of metallurgical coals in the country, two measures of conserving these coals were kept in view in locating and designing new steel works, *i.e.* (i) washing of metallurgical coals; and (ii) blending, to the extent convenient, the metallurgical coals with non-metallurgical coals. In pursuance of this policy the Hindustan Steel Ltd. was to instal four coal washeries to supply washed coals to the steel plants. These are in addition to these coal washeries in the private sector and a fourth one put up by the National Coal Development Corporation.

Of the four coal washeries to be constructed by the Hindustan Steel Ltd., the one at Durgapur was commissioned in April, 1960. It will supply about 900,000 tons of washed coal (on two shifts) per year to the Durgapur Steel Works. The second washery at Dugda which is to supply about 1·8 million tons of washed coal per year has also been commissioned on the 29th December, 1961. The third washery at Bhojudih which will supply about 0·9 million tons of washed coal per year is expected to be completed by the middle of 1962. The fourth washery at Patherdih is expected to be ready by the third quarter of 1963, and will supply about 1·3 million tons of washed coal per year.

It has been decided to expand the washing capacity at Dugda and Bhojudih. Tenders for the Dugda expansion have been invited by the 31st March, 1962. Dugda will be expanded so as to wash about 2·4 million tons of raw coal per year. The input capacity of the washery at Bhojudih will be expanded by about 0·8 million tons of coal per annum. A contract for this purpose has been placed with the same U.K. firm who are the contractors for the first stage.

108

Training for operation.—On the recommendations of the Training Plan Development Team an overall training programme has been finalised. Well equipped Institutes have been established at all the three steel projects for the training of artisan trainees, junior operatives, senior operatives and engineers. About 100 engineers, 200 operatives and 300 artisans are likely to be trained every year in these Institutes. So far 275 Graduate Apprentices, 297 operatives and 905 skilled workers and artisans have been trained in these Institutes. In addition, 29 outsiders were also trained.

With the functioning of these Institutes, the majority of the personnel are being trained in the steel plants. Engineer operatives are sent abroad only when specialised training is required and for which facilities are not available in India. During April, 1961 to December, 1961 only 60 engineers and 16 operatives were sent abroad. So far 1,496 Engineers and 477 Operatives have been sent abroad, of which 1,443 engineers and 462 operatives have returned after training.

Prospects for future.—During the 2nd Plan period, three new steel plants each of one million tons capacity have been installed in the Public Sector. The ingot capacity of the two steel works at TISCO and IISCO in the Private Sector has also been doubled.

The overall targets proposed for the iron and steel industry to meet the requirements of pig iron and finished steel, during the Third Plan period are 10·2 million tons of steel ingots capacity and 1·5 million tons of pig iron for sale. Of this the Public Sector is expected to produce 7 million tons of ingot steel and 1 million tons of pig iron. Private Sector is expected to contribute 3·2 million tons of steel ingots and 0·5 million tons of pig iron. The production in the Public Sector is expected to be achieved by expansion of the existing steel works at Bhilai, Durgapur, Rourkela and Mysore Iron and Steel Works and installation of new steel plant at Bokaro. The expansion of the existing steel works would ensure fuller utilisation of the existing installed capacity and hence diminishing cost. The expansion of capacity in Private Sector is expected to come from installation of scrap based on electric furnaces. Preliminary investigations are being conducted with Neyveli Lignite in regard to the process as well as the raw materials intended to be used at Neyveli for the production of pig iron.

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