

THE NATIONAL METALLURGICAL LABORATORY, INDIA

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IT was during the last war that the Government of India realised that only planned industrial research on the many problems of the chemical, metallurgical and engineering industries could harness the country's vast resources for the prosecution of the war. This realization was given effect to by the creation of the Board of Scientific and Industrial Research in April 1940 and of the Council of Scientific and Industrial Research afterwards. The Council was established to meet the long-felt need of a Central organisation for a co-ordinated prosecution of scientific and industrial research. As the main result of the unbounded energies of Sir S. S. Bhatnagar, Director of the Department of Scientific and Industrial Research, that it was made possible to obtain from the Government of India more than a crore of rupees for the establishment of a number of Research Laboratories to be sited in different parts of India. One of these, namely, the National Metallurgical Laboratory, is to be built at Jamshedpur.

In order to ensure the progress and expansion of the metallurgical industry it was decided by the Council that a National Metallurgical Laboratory be established in India. Accordingly, a Laboratory Planning Committee, under the Chairmanship of Sir J. J. Ghandy, Director, the Tata Industries, Ltd., was constituted to formulate a scheme. The author was appointed the Assistant Director to assist the Planning Committee in the preparation of detailed plans, and Messrs. Ballardie Thompson and Matthews of Calcutta were appointed the Architects. A tentative scheme was first circulated in 1945. This scheme was later on drastically altered on the basis of the suggestions and comments received from research workers of repute in various countries, and principally on the basis of the funds available with the Council. The final scheme recently prepared was approved on the 17th September 1946 by the Governing Body of the Council of Scientific and Industrial Research, and the Foundation-Stone of the Laboratory was laid on the 21st November 1946, by the Hon'ble Mr. C. Rajagopalachari, Member for Education and Arts, Interim National Government.

As stated earlier the Laboratory will be located at Jamshedpur which is the centre of modern metallurgical industries in India. The Tata Industries, Ltd., have generously placed at the disposal of the Council a very suitable site for the construction of the Laboratory. Services, such as electricity, water, gas, sewage and effluent disposals, are available close to the site.

The Laboratory when completed will cover all aspects of metallurgical research, both fundamental and applied, and will also carry out research on ores, minerals and refractories as applied to metallurgy. The preparation of minerals and ores and the smelting of the latter are so definitely a part of the development of the country's metallurgi-

cal industries that facilities for mineral research have been provided at the Laboratory, complete with pilot plant equipment for semi-commercial development.

As the metallurgical industry is one of the biggest consumers of refractories, research on this subject has also been associated with that on metallurgy, and that the work on metallurgical furnace design might also be undertaken. Work on refractories will be greatly facilitated by the presence of the ore-dressing and minerals research section with its specialized laboratory and pilot plant assemblies.

In consequence, provision has been made in the final plans of the National Metallurgical Laboratory, for administration, including statistics, library, museum, lecture theatre, etc., chemical analysis, physical chemistry, physics as it affects metallurgical problems, the examination, preparation and smelting of metallic ores, the melting, heat-treatment and working of metals and alloys, research into the structure and physical properties of metals and alloys, the electro-deposition and surface treatment of metals, and research on refractories. Facilities will also be provided for the application of research results to commercial operating conditions and for the study of such conditions as they affect the quality of the products and the efficiency and economy of commercial production. The National Metallurgical Laboratory will work in close collaboration with the other laboratories of the Council, particularly on long-term research of a fundamental nature.

Broadly, the work of the National Metallurgical Laboratory will be divided into the following divisions:—

1. *Physical Metallurgy Division* including thermal, electrical and magnetic tests, experimental heat treatments, pyrometry, X-ray analysis, radiography, optical properties, application of ultrasonics to metallurgical problems, etc.

2. *Metallography Division* including electron and normal microscopy, macroscopy, inclusions study, experimental foundry, making, mechanical working and heat treatment of metals, physical testing of metals at various temperatures, etc.

3. *Chemical Metallurgy Division* including extraction and refining of metals from their similar materials (ore-dressing and mineral beneficiation).

4. *Inorganic Chemistry Division* including analytical chemistry of metals, alloys, ores, refractories, slags, fuels, etc., study of gases and inclusions by vacuum fusion and other methods, micro-analysis, etc.

5. *Physical Chemistry Division* including electro-metallurgy, study of corrosion and protection of metals, surface treatment of metals, polarography, spectrography, study of slag-metal relationship, chemical microscopy, thermo-dynamics, radioactivity, colorimetry, electro-chemistry, electrolytic production of