NOTES & NEWS.

A 12 Ton Birlec Electric Arc Steel Melting Furnace was inaugurated at the Metal and Steel factory, Ishapore on Sunday, the 29th November 1959 by the Defence Minister Shri V. K. Krishna Menon to meet the growing demand of high quality steels. This is the largest Electric Furnace of its kind in India.

The growth and development of Electric steel-melting in India and abroad is well described by the Superintendent of the Metal and Steel Factory, Ishapore. Dr. D. P. Chatterjee, I.O.F.S., M.Sc., B.Met., Ph.D., F.R.I.C., F.I.M., F.G.M.S., in a fine Souvenir Brochure of the opening ceremony, where he also describes the Role of Ordnance factories in the development of Steel Manufacture in India.

The first Electric Arc Furnace for Steel Manufacture in India was a "2-Ton Stobic" Electric Arc Furnace connected with 3 single phase transformers each of 260 KVA capacity with voltage tappings 120, 160, and 200 Volts erected in 1920-21 at Ballygunge, Calcutta, by Messrs. Hukumchand Electric Steel Co., Ltd., now known as Bhartia Electric Steel Company Ltd., for the manufacture of Steel Castings as well as small billets size ingots for rolling down to small sections.

The first Government owned electric arc steel melting furnace was erected in 1931 at the Metal and Steel Factory, Ishapore. This is a Stobic Electric Arc Furnace hand-charged and mounted on roller supports connected to a double reduction tilting gear driven by a 5½ H.P. motor. The furnace is supplied with three phase, 50 cycle alternating current from a step down indoor type transformer of 850 KVA capacity reducing voltage from 3,300 to 180 and having tappings 180, 140 and 100 volts. The maximum power required other than for momentary surges is 680 KWH.

At present there are more than twenty firms in this country engaged in the production of electric steels both for the manufacture of special quality steel castings as well as different types of wrought steel for various engineering purposes. About 50 nos. of electric arc furnaces are in operation in sizes varying from ½ ton to 12-ton capacity and the annual electric steel production both as ingot and castings exceeded 0.10 million tons in 1958. With the establishment of foundries in the Government-owned steel plant at Rourkela, Bhilai and Durgapur, Heavy foundry and forge project at Ranchi, Coal Mining & machinery plant at Durgapur and also at various other places planned by the private industries, many more small and bigger size furnaces will soon be added to the above numbers and further increase in electric steel production is likely to take place.

NEW SCIENCE H.Q.

An eye-arresting shape has been added to the skyline of Canberra, Australia's fast-growing national capital.

It is the recently-opened headquarters building of the Australian Aacademy of Science.

The body of the building is contained inside a massive dome, 156 ft. across at its base, and surrounded by a narrow moat.

The dome is a thin concrete shell covered with copper sheets, and rests on arches set in the moat. The overall diameter, including the moat, is 166 ft.

The one entrance to the building is by a small bridge over the moat. The bridge is of glass and gold mosaic tiles.

The hub of the building is an air-conditioned circular conference room, 64 ft. in diameter and 37 ft. high, to seat 220 people. In the gallery of this room are recessed booths for a multi-lingual interpretation system, as well as special facilities for the public, press, radio and television.

The building is 45 ft. high, with two storeys.

In addition to the main conference room there are reception rooms, reading room, committee rooms and administrative offices.

The curved walls of each of the outside rooms are of glass, shaded from the direct rays of the sun by the arches of the dome. On these arches is reflected in changing patterns the water in the moat.

In the two stairs halls of the building are fountains from which single jets of water spray high into the air between terrazzo steps.

To counter unusual accoustic conditions generally encountered in domes, special baffle discs hang from the ceiling, and a baffle corridor encircle the walls of the chamber about 10 ft. above floor level.

Timber panelling is a feature of the main conference room and corridors. All timber used in the buildings is Australian.

Most interior lighting comes from circular vents let into the dome of the building. In the day these vents admit natural light. At night special tube lights set around the vents provide artificial two-way lighting, inside and outside.

In the grounds surrounding the building more than 7,000 seedlings are being planted, and a belt of tress will eventually encircle the building.

A parking lot provides space for about 250 cars in the grounds.

The main purposes of the building is to provide a meeting place for Fellows of the Academy, and for their scientific conferences.

The Australian Academy of Science is the representative body of Australian scientists at the national level, with functions comparable with those of the Royal Society of London and national academies of science in many other countries.

AUSTRALIAN TECHNOLOGICAL ITEMS.

Canberra (By Air Mail)

POSSIBILITIES OF COAL RESEARCH

The urgency of finding new uses and new markets for Australian coal has resulted in the establishment by the Australian Government of a Coal Utilisation Research Committee to review the details of the widespread research already undertaken by Government agencies, and by private industry.

The committee plans also to investigate the possibilities of pulverised coal to power locomotives, and the gasification of coal at high pressure to produce chemical and liquid fuel products cheaper than those obtained from flow oil. It will also investigate the successful South African Sasol (oil from coal) industry initiated five years ago, and the possibility of tapping new markets in South-East Asia.

The oil and gasification aspects are believed in informed quarters to offer the best passibilities for the Australian coal industry.

Gasification projects would require huge plants on the coal fields, but their cost would be justified if they could be developed economically.

Australian coal could be used to build houses, car bodies, according to Dr. J. A. Dulhunty, Reader in Geology at the Sydney University. He left Australia recently to spend seven months in overseas countries studying developments in coal research.

He says that scientists overseas and in Australia had almost perfected a process to produce materials for such products. If the cost of producing plastics from coal could be reduced these new materials may replace timbers and metals.

Scientists were trying to perfect a chemical process to transform raw coal into a pliable plastic mass. When they achieved this, demand for Australian coal was likely to be increased by millions of tons annually.

FINGER JOINTING OF SHORT TIMBERS

Forest product research workers in Australia have successfully tested a process known as "finger jointing", which enables the use of short lengths of usually discarded timber to be used for flooring, and for various forms of joinery.

Apart from mill shorts there is available a very large quantity of timber which is not utilised at present solely because of its restricted length.

In finger jointing, the ends to be used are cut in the form of wedges, or fingers, which interlock to give glued joints, which have satisfactory strength characteristics.

As a result of suggestions by the Australian Commonwealth Scientific and Industrial Research Organisation, the Penola Timber Company at Mount Gamblier, South Australia, has installed a plant to finger-joint radiata pine. Special cutting machines, designed for local conditions, have been installed. Two plants in Victoria are also using the process, and timbers produced have passed the standard flooring puncture test of the Commonwealth Experimental Building Station. This test requires that the floor at any one point should be able to withstand a load of 700 pounds applied to an area of $\frac{1}{2}$ square inch, for 15 minutes.

SPECIAL PAINT FOR PHOTOGRAPHIC LABORATORIES

A special type of paint for darkrooms of photographic laboratories, has been formulated for Kodak (A/sia) Pty. Ltd. Made by Balm Paints Pty. Ltd., of Melbourne, it has been given the trade name of "Kodak Green."

It is designed to help a darkroom operator to reduce the time needed for his sight adaptation on coming out into the light, after working in the dark. Under darkroom conditions the iris of the eye gradually opens, the vision adapts itself to the absence of light. This process usually requires half an hour.

When an operator comes out into the light another period of adaptation is necessary. It has been found by tests at the Kodak plant that when the paint is used in conjunction with reduced lighting, sight adaptation is speeded up.

An important consideration in arriving at the formula was the paint's effect

on sensitive film as certain ingredients in standard paints have a damaging effect on the silver salts used in photographic emulsions, and cause chemical fogging.

JUMP IN AUSTRALIAN STEEL PRODUCTION.

Australia's steel-making capacity was raised to more than 3,500,000 tons a year when a new blast furnace recently commenced operation at the works of Australian Iron and Steel Ltd. at Port Kembla, near Sydney.

With its ancillaries and associated blower station delivering 1,750,000 tons of air a year, it cost Rs. 10,66,66,700. About 80 per cent of this was spent on local labour and materials.

The furnace has a rated daily capacity of 1,700 tons of pig-iron—the basic ingredient of steel—or more than 600,000 tons a year. This raises the capacity of the works, with their three other furnaces, to approximately 1,900,000 tons of pig-iron, or more than 2,000,000 tons of steel a year.

However, blast furnaces vary in temperament and performance, just as do human, and this one is an iron-maker's dream. It has been exceeding its rated capacity almost since its first cast, and has already reached the phenomenal output of 2,120 tons in 24 hours. The management expects that it will rank among the greatest iron producers in the world.

The giant furnace has a giant's appetite. In producing its rated 600,000 tons of pig-iron annually, it will consume 1,000,000 tons of iron ore (or sinter), 500,000 tons of metallurgical coke and 160,000 tons of limestone.

It will use a greater weight of pre-heated air than all these. The 1,750,000 tons will be blown in to aid the digestion process.

The vast blower station supplying this volume of air to the furnace has two axial flow turbo blowers—the first of their type to be used in Australia—each capable of delivering 125,000 cubic feet of air a minute at a pressure of 35 lbs. to the square inch. The steam turbines which drive them are each of 15,000 h.p.

The new plant is close to a 1,200-foot concrete wharf. This has been built at a cost of Rs. 2,13,33,400 in the new inner harbour being developed at Port Kembla.

When the new harbour is completed, in March next, the furnace will be fed direct from an ore stockpile with a capacity of 750,000 tons now being built behind the wharf. Ore ships tying up at the wharf will discharge their

cargoes direct into the stockpile. At present, fuel for the furnace is brought by rail from storage bins a mile away.

Preparing the location—30 acres of reclaimed swamp land—was a job of some magnitude. It required 500,000 cubic yards of filling to raise it to the general of the steelworks area, 1,633 steel piles averaging 65 feet in length, and 26,500 cubic yards of concrete to support the weight of 10,000 tons of structural steel work and 14,900 tons of brickwork incorporated in the plant.

The whole of the furnace structure, the cast house, hot blast stoves and gas cleaning plant are of fully welded construction which not only facilitates speedy erection of plant, but very considerably reduces the total weight of steel used.

The highest point of the furnace is 273 feet from ground level. The diameter of the furnace hearth is 29 feet, and the three stoves are each 135 feet high and 28 feet 3½ inches in diameter.

The skip bridge is 220 feet long and there are two charging skips each with an effective carrying capacity of 360 cubic feet. The skips, loaded with 18 tons of ore and travelling at the rate of 450 feet a minute, travel from the skip bridge to the receiving hopper at the top of the furnace in 42 seconds.

The furnace top equipment is of conventional design comprising hopper, distributor, and small and large bell, the latter a one-piece steel casting 16 feet 6 inches in diameter and weighing 27 tons.

The whole of the charging, including skip control, coke screening and charging, coke breeze disposal, distribution operation, and bell operation is controlled by an interlocked automatic electrical control mechanism.

The cast house is equipped with four casting positions all within the same building, providing protection against the weather during casting for the rail trucks conveying the molten metal to the open hearths a mile away for conversion to steel. The trucks, with overall length of 54 feet and carrying 180 to 200 tons of molten iron, weigh 333 tons when fully loaded. They rank amongst the heaviest vehicles of their type in the world.

The mud gun control cabin is air-conditioned. Duplication of the principal control and recording instruments and gauges enables on-the-spot observation of furnace operating conditions. The mud gun of the electric plunger type, with a clay whole capacity of 12 cubic feet—is also controlled from this cabin. The unit forces the clay into the top hole at 450/500 lbs. a square inch pressure.

The method of slag control at the new furnace is new to Australia. Slag is run direct from the furnace into pits in a catchment area, instead of into rail truck ladles, for immediate removal. The pits are 200 feet long and 65 feet wide and can hold five days' slag—approximately 5,500 tons. Water is sprayed on the slag to expedite consolidation and it is then mechanically loaded into road vehicles for road building material or other useful purposes.

The management of the steel works expect that the new plant will enable Australia's steel requirements to be met from existing facilities for many years to come; but the economy of the country is expanding at such a rapid rate that additional blast furnaces may be needed before long.