Transportation of the 200-inch Mirror

THE manufacture of the Pyrex disk for the 200-inch reflecting telescope of the California Institute of Technology is one of the most notable technical feats of this decade. A detailed description of the manufacture and annealing has already appeared as a Supplement to NATURE (February 8, 1936), and we have now received from Dr. G. E. Hale the following description of the transportation of the giant disk from Corning, N.Y., to Pasadena, California, where the mirror will be ground, polished and figured.

"The 200-inch disk was packed with great care at Corning and mounted within a heavy steel case in a special low car, built for the long trip across the continent by the New York Central Railroad. The operation of packing and transportation was a delicate one, as the base of the steel covering cleared the roadbed by only a few inches, while its upper extremity came within three or four inches of various tunnels and bridges on the route. A special train of three cars and a locomotive was provided, and this proceeded at the rate of 25 miles per hour over the New York Central, the Chicago, Burlington and Quincy, and the Atcheson, Topeka and Santa Fé systems from the glass works at Corning, N.Y., to Pasadena. The train moved only by day, with an advance scout, and all vibrations were automatically recorded. The paper record is remarkably smooth, and it was no surprise to find the large disk in perfect condition when opened in the optical shop of the California Institute. Ordinary visual tests, supplemented by observations through various parts of the disk and its rib system in polarised light, indicate the perfection of the annealing process conducted at Corning.

"To an old-timer like myself it is difficult to realise, when looking at the new disk, that the central hole has an aperture equal to that of the

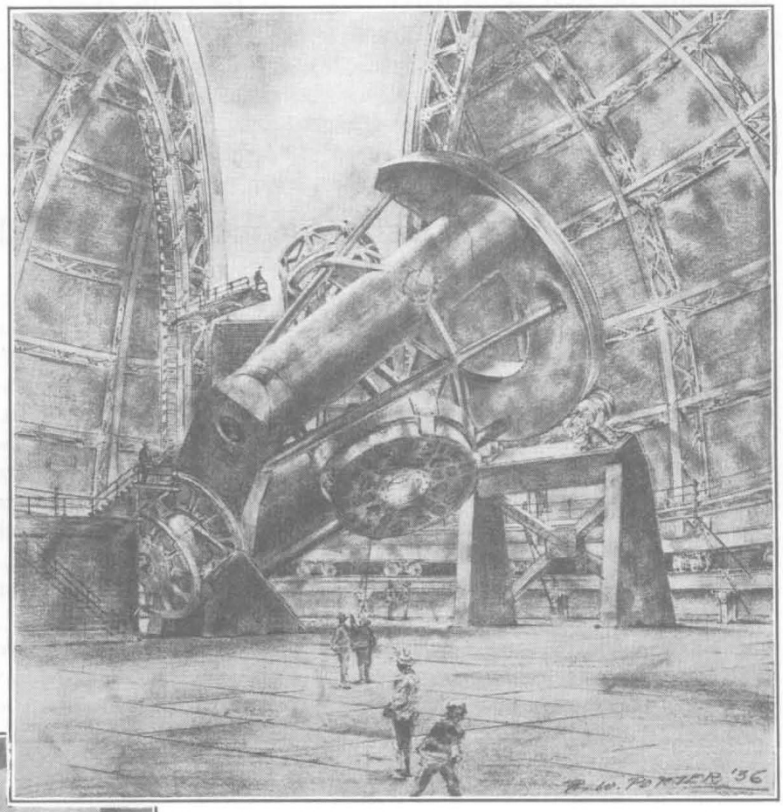

FIG. 1. Tentative sketch of the 200-inch reflecting telescope. This design may be altered in several respects before construction.

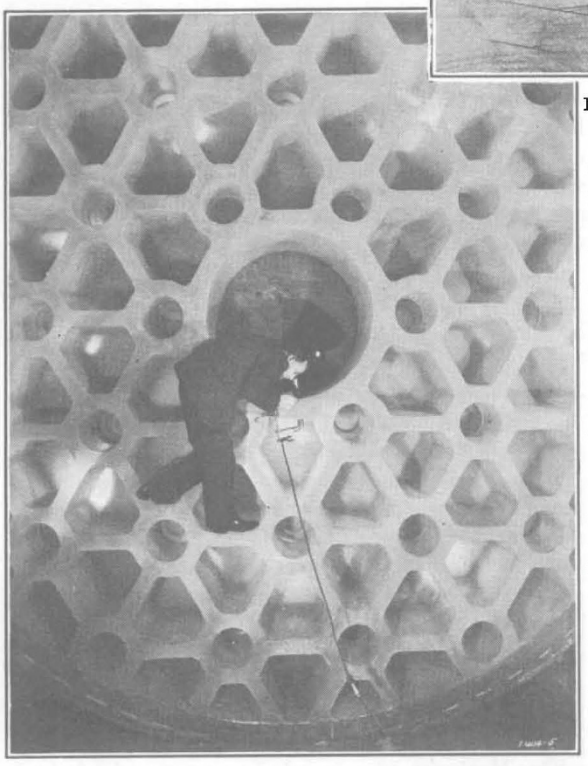

FIG. 2. Dr. McCauley testing the 200-inch disk with polarised light at the Corning Glass Works.

40-inch Yerkes refractor. No other scale gauge could be more striking to me, as I recall so vividly the arrival of the 40-inch objective at the Yerkes Observatory in 1897. Contrasted with our previous refractors, it greatly excited our anticipations, and our hopes of good performance have not been disappointed during the intervening years."

The accompanying illustrations show (Fig. 1) a tentative sketch of the complete 200-inch reflecting telescope, and (Fig. 2) Dr. McCauley testing the great disk with polarised light at the Corning glass works. The design shown in Fig. 1 may be altered in several respects before construction takes place.

British Chemical Plant Exhibition

ON Monday next, June 22, the Right Hon. J. Ramsay Macdonald is to open an exhibition of British Chemical Plant at the Central Hall, Westminster, S.W.1. This exhibition, which has been organised by the British Chemical Plant Manufacturers' Association, will occupy the ground floor and basement of the Central Hall, and will run concurrently with the Chemical Engineering Congress of the World Power Conference, which is meeting in the same building from 9.30 a.m. until 6.30 p.m. on June 22–27 and until 8 p.m. on June 23 and 26.

Although the British Chemical Plant Manufacturers' Association has sponsored this exhibition, the management committee has wisely given firms not members of the Association an opportunity of displaying their manufactures. One condition, however, has been imposed on all exhibitors, namely, that all plant exhibited shall be of British manufacture, the criterion laid down being that at least 75 per cent of the cost of the plant shall represent labour or material within Great Britain or the Empire.

The last exhibition organised by this Association was held in 1931, so that those who are attending this, the first international conference on chemical engineering, may be able to observe the rapid progress made within five years. To others who are not intimately acquainted with chemical engineering, the exhibition should provide an admirable illustration of the scope of the subject and the complexity of the plants which may have to be used when a laboratory experiment or research has to be developed into an industrial process.

Of the forty-eight firms which are exhibiting, thirty have declared that a number of exhibits which they are showing, amounting to a hundred in all, have not been shown by them at any previous British chemical plant exhibition.

Materials of construction being of outstanding importance to the chemical engineer, it is not surprising to find that this aspect of the subject has received considerable attention, both from the research associations working in close alliance with the Department of Scientific and Industrial Research, as well as commercial enterprises. Numerous exhibits are therefore to be found throughout the stands of the exhibition which deal with the improvements in the cast irons now available, developments which have taken place in steels designed to resist corrosion or withstand high temperatures, the protection of steel by glass, enamels, or other metals.

Owing, for example, to the tendency to intergranular corrosions in austenitic stainless steels, after they have been heated to a dull red heat, the welding of such steels into chemical plant having dimensions greater than the internal dimensions of the heat treatment furnace could only be done at the expense of the corrosive resistance properties of the welds. Research in this field, however, has shown that the addition of silicon to such a chromium nickel steel not only eliminates the necessity for the heat treatment of the welded joints, thus removing the limitations to the size of vessel which could be manufactured and still retain its resistant qualities, but also that this type of steel increases the resistance to attack by various acids, and oxidation at high temperatures. Examples of vessels made from this type of steel as well as various types of welding and cutting equipment are on view in the industrial section of the exhibition.

Research has not been idle in connexion with the non-ferrous metals and their alloys, whilst a considerable amount of development has also taken place in refractory and ceramic materials, possibly accelerated by the extended use of metals or alloys possessing high corrosive resisting properties. Here again is ample illustration of the progress which has been effected by the typical pieces of chemical plant to be seen on the various stands in the exhibition.

The National Physical Laboratory and kindred associations have been interested in the problem