Applications of Mechanical Science

TWO pamphlets recently issued by the Association of Engineering and Shipbuilding Draughtsmen (London: The Draughtsman Publishing Co., Ltd.) may be cited as indicating the continued process of translating the work of investigation and research into the most practical terms. One of these is Part 2 of "The Application of Influence Lines to the Stress Analysis of Beams and Lattice Girders" by R. McCrae (2*s*.), of which Part 1 dealing with beams was noticed in NATURE of May 23, p. 861. The part now published treats of lattice girders and deals with various types of loading.

While a lattice girder is, as a whole, subjected to bending and shear, these actions produce in its individual members conditions of tension and compression which vary according to the loading. It follows, then, that the treatment differs from that of beams, where the influence line diagrams represent the bending moments and shear forces due to a unit load at any point in the span. Despite this difference, however, the variation in the treatment here expounded is more a matter of detail than of principle, and for those who have much work of this kind to do the method offers useful advantages over the more formal modes of analysis.

The second pamphlet referred to is "Mechanical Tests for Engineering Materials" by A. M. Roberts (4*s*.), a subject of wider appeal. The development of mechanical testing has been very rapid in recent years, and an elaborate and comprehensive technique has been devised to deal with different materials and to meet widely varying requirements. For the draughtsman it is advisable that he should be able to indicate or specify suitable acceptance tests for the materials he has incorporated in his designs, and it follows that he must be in a position to decide which methods of testing are most appropriate to each machine or structural detail, so that he can ensure its satisfactory performance in service.

It is to meet this particular requirement that the pamphlet has been prepared, and it explains, in suitably condensed form, the methods and purposes associated with the more usual forms of tests. Tensile, bend, hardness and impact tests are described and elaborated in detail, and the relation of the part under consideration and its service conditions to the appropriate test procedure is discussed; while, in some cases, suggestions are included as to the method of approach in designing for service under static, dynamic or other special conditions. It will thus be apparent that the point of view of the author is different from that of the usual writer on material testing, and his information will supply a real need in the case of many who as designers, buyers or in other capacities are not directly brought into contact with the technical processes of testing, yet require to possess such knowledge as is set out here.

Sir Charles Parsons Memorial

ACTING in conjunction with various engineering institutions, the Royal Society has made arrangements for honouring the memory of Sir Charles Parsons, whose name is best known in connexion with his invention of the compound steam turbine. These include a memorial in Westminster Abbey, a memorial library in London House, and an annual lecture which, each fourth year, will be delivered on the north-east coast—the scene of Parsons' major activities—and in the intervening years is to be given in London.

This year's lecture, the first of the series, was given before the North-East Coast Institution of Engineers and Shipbuilders at Newcastle-on-Tyne on Friday, November 6, and took the form of a personal appreciation by Sir Frank Smith, who is one of the secretaries of the Royal Society and also secretary of the Department of Scientific and Industrial Research. On the same day, the Institution inaugurated a special exhibition to illustrate the work of Parsons, the wide range of his scientific interests and the fertility of his inventive powers.

In introducing his subject, Sir Frank Smith referred to the influences which heredity and the scientific environment of his youth, as a son of that distinguished man of science, the third Earl of Rosse, exercised upon the course of Parsons' life and work. Those who saw the workshops at Birr Castle have testified to the profound impression made on them by the installations of machinery and furnaces in the towers of the old building and by the matchless self-possession and unfailing resources of the master mind and guiding hand. The son, who had received his early training there, retained throughout life a keen interest in optics and astronomy, and in his later years was attracted by the same astronomical problem as had earlier engrossed his father, namely, that of producing reflecting mirrors of great size. Their construction in glass did not appeal to him as an engineer and, holding the view that, in the future, larger sizes than 200 inches would be required, he planned that they should be made of steel and had arranged to build a small mirror in sections to test his ideas in practice.

When Parsons went down from Cambridge in 1877, the prevailing feeling about the steam engine was that the limit of useful improvement had been reached. Newcomen's engine required 25 lb. of coal per horse-power hour; Watt had reduced this figure to 5·5; and the amount had in the succeeding years been brought down to about 2 lb. Undaunted by those views, Parsons pressed forward with his invention, and in 1884 took out his first patent, the claims of which show to-day how clearly he realized the future of his engine. The novelty he introduced lay in the method by which he utilized the expansive force of steam. His first turbine, which was of the double-flow type, was made in the same year, and is now to be seen in the Science Museum. It is suggested that, in this invention, Parsons was inspired