

The author's experience and ingenuity in applying X-ray methods to localise the position of foreign bodies are so well known that when he comes forward with improved methods of electric probing, which have the distinguishing merit of the utmost simplicity, we may be sure they will find immediate and extensive application.

GEODETIC SCIENCE.

NO. 3 of the new series of professional papers of the Ordnance Survey contains some excellent notes on the geodesy of the British Isles, by Colonel Close, R.E., which bring the position of geodetic achievement fairly up to date, and incidentally add some historical indications of the processes by means of which our position in the world of geodetic science has been secured. Their usefulness has been increased by the addition of a very ample bibliography of the science, and by simple diagrams illustrating certain special features affecting geodetic levelling, including the principal triangulation of Great Britain, the geographical position of the West European meridional arc, and of the European longitudinal arc. In the section of the pamphlet dealing with standard measurement it is interesting to observe that the national standard yard, which was legalised in 1855, consists of a marked length on a bronze bar bearing a definite relationship to the "international" metre (also a measured length on a bar), which was originally intended to represent one ten-millionth of the length of the earth's meridional quadrant.

Colonel Close's sketch of the various operations undertaken to determine the figure of the earth, dating from Airy's investigations of 1830 to Helmert's determination of 1906, proves incidentally the extraordinary value of the early investigations undertaken with inferior instruments. On Airy's figure the whole of the mapping of the United Kingdom still depends, nor have the results deduced from the reduction of the principal triangulation affected the map values. In the length of 700 miles from Shanklin to the extreme north of the Shetlands Airy's figure gives about four seconds in latitude too much, if we accept Helmert's figure as the criterion. This does not affect the linear accuracy of the map. Three figures were computed by Colonel Clarke (in 1858, 1866, and 1880 respectively) from the data furnished by the reduction of the principal triangulation. They are all in use, either in Africa or America. The mean value in length determined by Clarke of the semi-axis major of the ellipse, the revolution of which about its minor axis produces the spheroid of the earth's surface, is less than that of Airy and only slightly greater than that of Helmert. Colonel Close records his opinion that the probable value is somewhat greater than Clarke's mean.

Many people must have noticed the apparently haphazard way of recording "bench" marks by the Ordnance Survey to indicate altitudes determined by levelling. They are to be found on most un-

substantial walls, on milestones, and even on gate-posts, and they must, many of them, inevitably be unstable. In the section of the pamphlet dealing with levelling, Colonel Close indicates the method by which, in future, such marks will be rendered permanent. Concrete blocks will be sunk on to hard rock foundations at intervals of about twenty-five miles all over the country; a bolt of bronze, with a knob of flint being embedded in the concrete. This section is also of interest as a record of the difficulties experienced in dealing with the adopted datum of mean sea-level. Indian survey investigations have contributed largely to the solution of this troublesome problem. It is in India, too, under Colonel Sir S. Burrard, that the most comprehensive investigations have been made in the matter of the deflection of the level, and the apparent eccentricities of the force of gravity, including the difficult problems which beset the speculative subject of isostasy; but Colonel Close's references to early English methods of determining the value of deflection due to local topography are extremely interesting as a record of the first steps taken in the evolution of this special branch of geodetic science. These plain and intelligible notes on a highly complicated subject, being entirely free from any affectation of technical specialism, should attract a much wider range of scientific interest than is indicated by the title of Ordnance Survey Professional Papers. T. H. HOLDICH.

SCIENTIFIC FACTORS OF INDUSTRIAL SUCCESS.

THE Institute of Industry and Commerce (now the Institute of Industry and Science), so the introductory leaflet states, is a counterpart of a German organisation known as the *Hansa Bund*. How the *Hansa Bund* arose or by whom and when it originated we have no knowledge. It is a confederation of important German firms for promoting, encouraging, and facilitating German home and foreign trade. It is proposed by similar means, but on somewhat "superior lines," to do the same for British industry, and the directors invite those interested in the development of our industries by the aid of science to enrol themselves as members. A portion of the revenue of each year is to be devoted to scientific research under the supervision of our most eminent men of science. Accompanying this leaflet are a number of brochures touching on the causes and effects of German commercial success and on the remedies for British commercial decline.

If "in the multitude of counsellors there is safety," in the diversity of their opinions there may also arise confusion. Sir W. Ramsay conceives that the main purpose of the Institute is to combat German industrial methods, which are said to be organised on a policy of dishonesty and trickery. This is to be undertaken by the State by adopting something of their methods, or by endeavouring to thwart them. Mr. S. Roy Illingworth, in his pamphlet on "The Organisation