

national collections, which would serve as the basis for a national system, in which museums of general cultural and archaeological interest dovetailed with a grouping of auxiliary museums of localised or specialised function. That there is already a certain amount of co-operation, localisation and specialisation in action is, of course, well known. The university museums, having special functions, would have a special place in such a scheme. There is at present, in fact, a certain amount of specialisation as between the museums of the various universities, the Pitt-Rivers at Oxford being the most conspicuous example. In one direction the way has been pointed out by Dr. R. E. Mortimer Wheeler, in his address when declaring open the Bishop Hooper's Lodging as a folk museum at Gloucester on October 10 last. A report of his address and of the opening ceremony will be found in the *Museums Journal* of December. Dr. Wheeler's most suggestive remark was that pending, or the pessimist might say failing, the institution of a national folk museum, the local museum should set about the collection of the material of local folk culture before it is too late.

English Instrument Making

At a meeting of the Newcomen Society held at the Science Museum on December 11, a paper by Dr. R. S. Clay and Mr. T. H. Court on "English Instrument Making in the 18th Century" was read. As is well known, Mr. Court has contributed largely to the collection of scientific instruments in the Museum. Some of these had been arranged on the lecture table, and during the reading of the paper Dr. Clay used them to illustrate his remarks. In the eighteenth century, he said, England was fortunate in having a number of men who were not merely instrument makers but also men of scientific knowledge. Moxon, Senex, Short, Dollond and Nairne were all fellows of the Royal Society, and they and others such as Benjamin Martin, George Adams and James Ferguson made advances in the construction of scientific instruments which placed English microscopes, telescopes, etc., in the forefront and caused them to be copied abroad. One important invention was that of Marshall, who introduced the method of grinding a large number of lenses together on a block with a spherical tool, another that of the method of drawing brass tubes on a steel mandrel by which tubes capable of sliding smoothly in one another for telescopes could be made. Cuff, it appears, first introduced an all-brass telescope as a commercial instrument. The invention of the achromatic lens by Dollond, the invention of the quadrant by Hadley, the improvement in dividing scales by Bird and Ramsden and the construction of reflecting telescopes by Short all contributed to the supremacy of the English instruments. The biographies of a few of the most famous instrument makers only are known. Short was one of the few who made money by his business; a good many others were at various times made bankrupt. The outstanding men at the end of the century were Jesse Ramsden (1735-1800) and Edward Nairne (1726-1806).

Dr. R. A. Millikan and the Earth's Magnetic Field

EVER since the time of Gauss, it has been assumed that the intensity of the earth's magnetic field is practically symmetrical. When attempting to find out the nature and distribution of the cosmic rays, Dr. Millikan has discovered that we must seriously modify our ideas about the earth's field. According to a report by Science Service, Washington, D.C., Dr. Millikan in a paper read at a meeting of the National Academy of Sciences at Charlottesville, Va., stated that the magnetic field extends into space for at least 10,000 miles and that the magnetic intensity is stronger on the side of the earth opposite to America. There is a greater effect on the cosmic ray intensity from the north magnetic pole to the equator in the region of India than there is in comparable latitudes in America. The Department of Terrestrial Magnetism of the Carnegie Institution of Washington has compared the magnetic variations on the surface of the earth with Millikan's results determined by cosmic ray intensities. It concludes that the variations of magnetism extend many thousands of miles into space. The earth's field appears to be lopsided.

A Standardisation of Inefficiency

IN the *World Economic Survey* just issued by the League of Nations instructive statistics are given of the world production of electrical energy. Taking the average annual issue from 1925 until 1929 as 100, the issue in 1932 was 119, in 1933 it was 125 and in 1934 it was 138. Perusal of the *Survey* shows that in no other branch of industrial activity has such rapid progress been made during this period of great depression. *World Power* of October, in commenting on this, points out that the manufacture of plant does not increase *pari passu* with the demand for electrical energy. Part of the lag may be due to the great advances made in generating efficiency as a result of industrial research. This may have inspired a policy of caution among buyers of plant, and so they may be chary of placing new orders. It may be advisable to correlate technical research and new orders for electrical development, if overseas countries continue to protect inefficient installations by obsolete standardisation regulations. *World Power* states that scientific investigation is likely to receive a severe setback because research work will lack a world market for the products it improves. A secondary boom tends to develop in the sheltered manufacturing industries abroad, which receive added protection from the depreciation of the exchange. A number of foreign countries with depreciated exchanges are adopting plant and equipment regulations which give results much inferior to those obtained by research and the best technical practice. There is in fact a tendency towards standardising inefficiency, and this discourages scientific research.

Modern Physics

OF the series of pamphlets recently issued in Paris by Messrs. Hermann et Cie under the title "Actualités