

second-hand works relating to the Far East, *i.e.* Japan, China, Korea, Formosa, Siam, Philippine Islands, and the East Indian Archipelago.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An assistant master, to teach engineering, at the Rochester Technical Institute and Junior Technical School—The Principal, Technical Institute, Rochester (Aug. 3). A temporary pathologist in the Public Health Laboratories of the County Council of the West Riding of Yorkshire—J. C. McGrath, County Hall, Wakefield (Aug. 3). A lecturer in mathematics in University College, Nottingham—The Registrar, University College, Nottingham (Aug. 5). A university librarian of the University of the Witwatersrand, Johannesburg—The Secretary, Office of the High Commissioner for the Union of South Africa, South Africa House, Trafalgar Square, W.C.2 (Aug. 10). A head of the Engineering Department of the Smethwick Municipal College—The Director of Education, 215 High Street, Smethwick (Aug. 12). A lecturer in agricultural botany at Armstrong Col-

lege—The Registrar, Armstrong College, Newcastle-upon-Tyne (Aug. 17). Temporary assistant chemists at the Government Laboratory—The Government Chemist, Clement's Inn Passage W.C.2 (Aug. 17). Women senior lecturers in botany and microbiology, physics, zoology and physiology, and a lecturer in domestic science, at Huguenot University College, Wellington, Cape Province—The Registrar, Huguenot University College, Wellington, Cape Province, South Africa (Oct. 1). An experimental assistant at the Air Defence Experimental Establishment—The Superintendent, Air Defence Experimental Establishment, The Aerodrome, Biggin Hill, near Westerham, Kent. A woman lecturer in geography or biology with mathematics (subsidiary) at the Bishop Otter Training College for Women Teachers, Chichester—The Principal, Bishop Otter Training College, Chichester. A woman with training in pathology, biology, or physiology, and interested in poultry, for poultry research—laboratory and field work—at the Wellcome Physiological Research Laboratories—The Director of the Laboratories, Langley Court, Beckenham.

Our Astronomical Column.

Large Meteors.—An illustrated article by James Stokley, issued by Science Service of Washington, D.C., describes some of the largest meteor falls on record. There is a striking illustration of Meteor Crater, Arizona, which is 4000 feet in diameter, and strongly resembles one of the smaller lunar craters. It is now generally agreed, from the age of the trees on its rim, that this was formed by the fall of a gigantic meteor, not less than seven centuries ago. A sketch of an equal area located among the skyscrapers of New York shows what enormous damage might be done by such falls if they came in populous districts. The largest in modern times fell in the Yenisei Province of Siberia on June 30, 1908, when the area affected was 40 miles in diameter; there was great destruction of animals and trees.

Prof. Charles P. Olivier, who is the director of meteoric observation in the United States, is quoted as saying that most of the meteors observed are moving in hyperbolic orbits. This evidently implies a much greater excess over the parabolic velocity than is found in the case of comets; the excess in these is too slight to be detected in the comparatively rough determinations that are alone possible for meteors. Hence the meteors having such speeds cannot belong to the solar system, but are merely passing through it, having had their origin somewhere in the region of the stars.

Dr. W. J. Luyten, stationed at the South African branch of Harvard College Observatory, reports that the great mass of iron recently found in that region is a genuine meteor; he estimates it at 50 tons, which would make it the largest meteoric mass known. The Ahnighito meteor, now in New York, weighs 36½ tons.

Curvature of Space.—The *News Service Bulletin* of the Carnegie Institution of Washington, No. 13, contains an article by Dr. E. P. Hubble describing the further work of Mr. M. Humason and Dr. F. G. Pease at Mt. Wilson Observatory on the radial velocities of spiral nebulae. Note has already been made in this column of their conclusion that the apparent velocity of recession is proportional to the distance of the

object, and is thus evidence of the truth of de Sitter's deduction from the theory of relativity that remote objects should have a displacement of their spectral lines towards the red.

A few months ago the highest velocity found was that of the nebula N.G.C. 7619 in Pegasus, the distance of which was estimated as 25 million light-years; it appeared to be receding at the speed of 2400 miles per second. By using very long exposures, extending to 40 hours, the spectra of three nebulae in a cluster in Coma Berenices, near the pole of the Galaxy, have now been photographed. The distance of the cluster was estimated, by methods already described, as 50,000,000 light-years; the speeds of recession found are 4900 miles per second for N.G.C. 4860, 4600 miles for N.G.C. 4853, and 3100 miles for N.G.C. 4865. The first two support the theory of speed being proportional to distance; the third does not fit so well. Observations of other nebulae in the region are planned; it is considered possible that N.G.C. 4865 does not belong to the cluster, but is a small nebula at a less distance.

Period of the Lyrid Meteors.—Mr. Maltzev of Leningrad has been investigating the Lyrid meteoric shower and finds a period of 29.70 years to accommodate satisfactorily some of the observations. He inquires as to where details can be found of the rich display which occurred in 1863, but there seem to be very few accounts of it. However, in the B.A. Report for 1863, p. 325, there is a note on the phenomenon by Prof. H. A. Newton which may be of some use. Mr. W. F. Denning writes that he has tried on several occasions in past years to deduce a period for the shower and found 16.1 years and 29.65 years will conform with a number of the most striking displays. He does not, however, regard them as having a perfectly satisfactory application, for they do not accommodate the various showers in 1803, 1851, 1863, and a few other returns. We require more data, and this may only be obtained by careful watches of the shower in future years. Its exhibitions during the past half a century have generally been somewhat feeble.