

terrestrial magnetism and atmospheric electricity with the Department of Terrestrial Magnetism of the Carnegie Institution of Washington throughout his forthcoming expedition to the Arctic regions. During the North-East Passage, 1918-21, the Amundsen Expedition made a series of highly valuable magnetic observations at rather more than fifty different points, and Capt. Amundsen's chief scientific assistant, Dr. H. U. Sverdrup, has been associated with the Department of Terrestrial Magnetism since last October in order to complete the reduction and publication of the magnetic observations thus far obtained by the expedition. He will rejoin the *Maud*, Capt. Amundsen's vessel, early in March at Seattle. It is expected that Capt. Amundsen will resume his Arctic expedition, the chief object of which is to obtain scientific data relating to geography, oceanography, meteorology, gravity, terrestrial magnetism, and atmospheric electricity, about June 1.

H.R.H. The Duke of York will open the Research Laboratories of the British Cotton Industries Research Association, Shirley Institute, Didsbury, Manchester, on Tuesday, March 28. The opening ceremony will take place at 3.30 P.M.

THE Société Genevoise d'Instruments de Physique informs us that it has not at the London address, 95 Queen Victoria Street, E.C.4, a specimen of the printing chronograph referred to in Our Astronomical Column on February 16, p. 217.

THE trustees of the Percy Sladen Memorial Fund have given a substantial grant towards the expenses of the expedition to S.W. China by Prof. J. W. and Mr. C. J. Gregory, who are leaving for Rangoon at the end of March. The expedition will therefore be conducted as one of the Sladen Trust Expeditions.

PROFESSOR NILS BOHR, of the University of Copenhagen, will give a course of five lectures on the "Quantum Theory of Radiation and the Structure of the Atom" in the Cavendish Laboratory, Cambridge, on March 6, 7, 10, 13, and 14, at 4.45 P.M. The last two lectures, of a more advanced character, will deal with "Selected Problems in the Theory of Atomic Constitution."

THE members of the Geologists' Association of London are about to entertain at dinner their retiring President, Mr. William Whitaker, F.R.S. Mr. Whitaker, who is in his 86th year, joined the Geological Survey in 1857 and the Geologists' Association in 1875. He has frequently served as a member of the Council and has conducted innumerable excursions. He was President from 1900 to 1902, and has recently completed a second term of office. The dinner will be held on Saturday, March 25, at Stewart's Restaurant, 50 Old Bond Street, W., at 7 o'clock. A large attendance is expected.

AT a joint meeting of the Faraday Society and the Oil and Colour Chemists' Association, to be held on Thursday, March 9, at 8 P.M., in the rooms of the Chemical Society, Burlington House, W.1, a group of papers will be presented dealing with the properties of powders considered from various aspects. Prof. T. Martin Lowry and Mr. L. C. McHatton will deal with the grading of powders by elutriation, Prof. P. G. H. Boswell will contribute a paper on elutriation from the point of view of the geologist, and Dr. J. W. French will speak on grinding and polishing powders. Dr. R. S. Morrell, Mr. C. A. Klein, and Mr. W. J. Palmer will discuss the subject from the point of view of the oil and colour chemist, and Mr. R. W. Whympster will deal with certain applications to cocoa and chocolate. The subject will then be thrown open for general discussion.

Our Astronomical Column.

RELATION OF SPECTRAL TYPE TO MAGNITUDE.—The Henry Draper Catalogue of the Spectra of Stars, which is now completed but not yet fully published, contains as many as 225,000 stars. The classification is based on the Harvard system, wherein more than 99 per cent. of all the stars fall into the six main groups designated by the arbitrary letters B, A, F, G, K, and M. It is now known, from the work of Lockyer and Russell, that the actual sequences of changes in a star's spectrum are from M to B as the star increases in temperature (giants), and from B to M as the star cools (dwarfs). Thus for each letter mentioned above there are two distinct kinds of stars, and the nearer the letter is to M the greater this distinction becomes. It is necessary, therefore, to bear this fact in mind when reading the Harvard College Observatory Circular (No. 226) on the relation of spectral type to magnitude by Dr. Harlow Shapley and Miss Annie J. Cannon. Of the numerous tables given in the paper the following abstract of one of them exhibits some of the main results of the investigation.

The second column may be considered as representing the distribution of naked-eye stars among the various spectral classes. It will here be seen that the hot A stars exceed in number those of any other type, the cooler K class running it a close second. This

state of things is reversed in the three following columns, which show a drop in magnitude for each

Spectral division	Visual magnitudes brighter than			
	6.25	7.25	8.25	9.25
B	719	1,286	2,061	3,026
A	2,018	5,904	15,884	39,342
F	680	2,160	6,536	15,224
G	656	2,456	8,776	27,160
K	1,984	6,144	20,760	51,008
M	538	1,453	4,491	10,657

column. In all columns, however, the A and K type stars are prominent features. In discussing the frequency of spectral divisions for successive fainter magnitude intervals, the B type stars rapidly fall off as fainter stars are considered. The A stars fall off to about the 8th magnitude, but then rapidly rise again. The F and M types maintain their frequency nearly throughout to magnitude 8.5, but fall slightly afterwards. The frequency of the G type increases very rapidly throughout the whole series up to magnitude 9.5, while the K class increases up to the 8th magnitude and then falls off. A plate accompanying the paper shows graphically many of the features of the tables.