

items belong to the second half of the nineteenth century. In both the angling and the natural history catalogues, the prices are generally lower than the usual quotations.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A pharmacist for the Royal Naval Hospitals—The Medical Director-General of the Navy, Queen Anne's Chambers, Tothill Street, S.W.1 (Aug. 30). Three assistant surveyors in the department of the Civil Engineer-in-Chief, Admiralty, and H.M. Naval Establishments at Home and Abroad—The Civil Engineer-in-Chief, Admiralty, S.W.1 (Aug. 31). A lecturer in the mechanical and civil engineering department of the Sunderland Technical College—The Chief Education Officer, Education Offices, 15 John Street, Sunderland (Sept. 3). An assistant lecturer and demonstrator in mechanical engineering in the Faculty of Engineering, the University of Bristol—The Registrar, Merchant Venturers' Technical College, Bristol (Sept. 5). An assistant lecturer and demonstrator in the British School of Malting and Brewing and department of the biochemistry of fermentation of the University of Birmingham—The Secretary, The University, Birmingham (Sept. 7). A half-time assistant in the department of mathematics of the University College of Swansea—The Registrar, University College, Singleton Park, Swansea (Sept. 8). A temporary assistant lecturer in mathematics in the University

of Manchester—The Registrar, The University, Manchester (Sept. 10). An assistant lecturer in zoology in the University of Manchester—The Registrar, The University, Manchester (Sept. 10). A warden of the Moulton Farm Institute and assistant county agricultural organiser—The Secretary for Education, County Education Offices, Northampton (Sept. 14). A professor of forensic medicine in the Faculty of Medicine, Egyptian University, Cairo, and a professor of clinical surgery in the Faculty of Medicine, Egyptian University, and surgeon to Kasr-el-Ainy Hospital and Director of the Surgical Unit—The Dean of the Faculty of Medicine, Kasr-el-Ainy, Cairo, Egypt (Sept. 26). A reader in physics in the University of Dacca, East Bengal—The Registrar, University of Dacca, East Bengal, India (Sept. 30). A professor of physics at Agra College, Agra—The Officiating Principal, Agra College, Agra, U.P., India (Oct. 14). A vice-principal and a resident secretary of the Chadacre Agricultural Institute—Earl of Iveagh, 11 St. James's Square, S.W.1. An inspector of surveys under the Sudan Government, Survey Department—Advisory Engineer, Sudan Government, London Office, Wellington House, Buckingham Gate, S.W.1. A secretary of the City of London College—The Secretary, City of London College, White Street, E.C.2. A director of the Endemic Diseases Section, Public Health Department, Egyptian Government—The Under Secretary of State, Public Health Department, Cairo.

Our Astronomical Column.

AUGUST METEORS OF 1928.—Mr. W. F. Denning writes: "The August meteors returned this year with tolerable activity, but in point of numbers they were not very abundant so far as the data enabled a fair judgment to be formed. On the night (Aug. 11), when the maximum is usually attained, the sky was cloudy in the hours following midnight and observation could not be made, so that the time and strength of the shower at its best were not ascertainable. However, the display did not fail in bringing some bright and beautiful objects, with the same swiftness of motion and phosphorescent trails as we have been accustomed to witness. The radiant, too, exhibited the usual displacement to eastwards night to night.

"At Bristol before 23^h G.M.T., Aug. 11, 28 meteors were noticed. On Aug. 12, 165 meteors were counted in 5½ hours by two observers between 21^h G.M.T. and 3^h G.M.T. Aug. 13. In the early morning of Aug. 14, between 2^h and 4^h G.M.T., meteors were falling at the rate of about 27 per hour for one observer. The most conspicuous object observed was a fireball on Aug. 14, 2.17 A.M. It passed down the sky in the south-east region of Aquila near the west-south-west horizon, and at the end of its flight gave a great outburst of light which lit up the sky like a lightning flash. It must have passed from north-east to south-west over Cornwall during its combustion, but duplicate observations have not yet been received to enable the exact place to be fixed."

BETELGEUSE AND ANTARES.—These two stars are the brightest stars of type *M*, and have attracted much attention in recent years from their enormous diameters as revealed by the Mt. Wilson interferometer. It had previously been ascertained that both stars had variable radial velocities, and that Betelgeuse showed variation in light, but for a long

time no correlation was detected between the two variations, and no period assigned to the light-variation.

Dr. Spencer Jones discusses the problem in *Mon. Not. Roy. Astr. Soc.* for June, using some spectroscopic observations made at Lick Observatory and the Cape during the last thirty years. He treats it in the manner usually adopted for spectroscopic binaries. He obtains for Betelgeuse: period 5.78 years, eccentricity 0.21, amplitude of velocity variation 2.1 km./sec. The corresponding quantities for Antares are 7.35 years, 0.49, 2.1 km./sec. In each star there is evidence of smaller irregular disturbances with periods of a few months. The period 5.78 years probably coincides with that of the light-variation of Betelgeuse; the maximum velocity of recession comes about half a year after light minimum, that of approach one year after light maximum. This is analogous to the conditions in the Cepheid variables, and it is concluded that the variable radial velocity arises from pulsation of the star's surface, not from duplicity; the latter would probably be detected with the interferometer if it existed. The amount of pulsation in the case of Betelgeuse would be well over one-third of the radius of the star, a larger amount than that noted in the Cepheids. Dr. Jones suggests that this may arise from the very low density of the outer layers of the star. The interferometer indicated that the star's radius was variable; on the whole, the variations accord with the above theory, though those in the year 1923 were discordant.

Observations of the diameter with the new 50-foot interferometer over a number of years should afford a trustworthy test of the pulsation hypothesis; it is also suggested that observers should note whether the colour of the stars changes; theory demands that they should be redder at maximum expansion, and whiter at maximum contraction.