

investigation of the nature of the obscurity of the air during the prevalence of the Harmattan wind at Togo, West Africa, with reports (1) by Captain v. Seefried, who conducted the experiments with glass filtering tubes packed with wadding, and (2) by the Geological Central Section for German Protectorates. The cloudiness has been supposed by some authorities to be due to ashes from grass fires, and by others to dust particles from desert regions. The geological report is to the effect that the principal cause is essentially due to the remains of diatoms, and that the presence of particles of ashes is only to be considered as a secondary and local phenomenon. It is pointed out that this result agrees with opinions as to the nature of the dust observed in the vicinity of Cape Verde Islands, and it is suggested that some botanist skilled in the examination of diatoms might determine from their forms the place of origin of the dust particles obtained in Togo.

THE Survey Department of Egypt has recently published an important volume containing daily readings (August, 1872–December, 1911) of the Nile gauge at Roda (Cairo), together with summaries and diagrams. In a preface by Mr. J. I. Craig (director, Meteorological Service) it is pointed out that projects are in hand, or proposed, that will tax the supplies of the river to the utmost, and that it is more than ever desirable that existing records should be made accessible. With the exception of the nilometer at Aswan, the gauge at Roda is the oldest in the country; its readings have been recorded (with several gaps) for about thirteen centuries, but it is only from 1872 that complete daily readings exist, and up to the end of 1899 these were recorded according to the Coptic calendar and in old measures, so that the figures were of little value to European investigators. The formidable work of conversion to Gregorian dates and to modern measures, together with computations for the whole period in question, has been carried out with scrupulous care by Mohammad Effendi Kâsim (inspector, Meteorological Service), who has also contributed the introductory text. This period of daily records includes five cases of high floods (exceeding 20 metres) and five cases of low floods (not exceeding 18 metres), also years of abnormally early and late floods, such as that of 1880 (forty-nine days early) and that of 1894 (twenty-four days late).

In a paper presented to the Astronomical and Astrophysical Society of America in January, and reprinted in abstract in the July Journal of the Washington Academy of Sciences, Mr. W. J. Humphrys, of the United States Weather Bureau, examines the question whether the presence of volcanic dust in the upper atmosphere is sufficient to account for the periods of abnormal cold which have at times been experienced simultaneously over the whole earth. He finds that the meteorological records from 1750 onwards show that cold periods were in every case preceded by volcanic eruptions, and that the greater the eruption the longer the period of unusual cold. In the case of the eruption at Krakatoa in 1883 the years 1884–5–6 were all 1° or 2° F. below the normal temperature. Measurements made at the U.S. Weather Bureau

since 1883 show that dust in the upper atmosphere produced by an eruption may decrease by 20 per cent. the intensity of solar radiation received at the earth's surface.

OUR ASTRONOMICAL COLUMN.

A STAR WITH LARGE PROPER MOTION.—In *Astronomische Nachrichten*, No. 4674, Miss E. F. Bellamy directs attention to the large proper motion of Helsingfors 914, which was found when assisting the Vatican Observatory in the reductions of its portion of the Astrographic Catalogue (zones +65° to +55°). The star is close to Helsingfors 913, and since the seconds of R.A. in the Helsingfors Catalogue for 914 and 913 are 44.8s. and 44.2s., whereas in BD they differ by 5s., and the Vatican residuals also differed by nearly 5s., it was at first thought that there was a mistake in Helsingfors. Subsequent investigation showed that Helsingfors 914 had a considerable proper motion, the motions being +0.236s. and +0.36" annually. Miss Bellamy points out that the centennial proper motion in arc of a great circle is +157.0", the largest proper motion hitherto found in either the Oxford or Rome work, the next largest being 141.9".

"GIANT" AND "DWARF" STARS.—In an address given at the meeting of the Royal Astronomical Society in June last, and reported in the current number of *The Observatory*, Prof. H. N. Russell presented a short account of the studies which have led him to adopt a theory of stellar evolution through stages of increasing and decreasing temperatures, as Ritter deduced from thermodynamical considerations and similar to the idea of a "temperature curve" which spectroscopic work led Sir Norman Lockyer to suggest represented the course of development of a stellar body from a sparse meteoritic swarm to a dense, feebly radiating, and dying sun. Briefly, by considering absolute magnitude (a function of mass, density, and surface brightness) and spectral type, Russell finds that there are no faint white stars; all the very faint stars are red, and among the reddest stars, K and M classes, there is a distinct separation into two groups, one much brighter, the other much fainter, than the sun. To explain the existence of the two kinds of stars, the "giant" and "dwarf" stars first noticed by Dr. Hertzsprung, recourse is made to the evidence afforded by double stars and eclipsing variables; from the former differences due to mass are eliminated, and from the latter the effects of variation of density are deduced. It appears that the series of dwarf stars is one of slowly increasing density from B to M, while among the giant stars density decreases very rapidly from B to M, and it is suggested that the giant stars of class M represent a very early stage of evolution, class B a stage near the middle, and the dwarf stars later stages according to increasing faintness and ruddiness. As a confirmation of the theory it is pointed out that the actual densities of the stars of class A and B are of the order of magnitude (one-tenth that of water) at which Lord Kelvin predicted temperature should be a maximum.

THE STATIONARY RADIATION OF METEORS.—The present position of this puzzling question in the field of meteoritic astronomy is discussed by Mr. W. F. Denning in the August number of *The Observatory*. The observational difficulties and possible accuracy of determinations of radiants are indicated. The reality of the phenomenon is insisted upon, and some of the unsatisfying explanations which have been offered by Greg, Ranyard, Proctor, Herschel, and Turner, among others, are briefly mentioned.