

below the normal in all months except December. The defect was marked in July, August, and September. During 1918 a daily journal of the weather over the Indian Ocean was kept by means of observations obtained from ships' log-books. The logs of sixty voyages were copied. So far as is known, there were five cyclones in the South Indian Ocean during the year 1918. The daily records of observations published each month are of considerable value in adding to our knowledge of the physics of the globe. Epochs of diurnal range are regularly shown by the several instruments. The velocity of the wind at the Mauritius Observatory is seen to increase very regularly at the midday hours and to fall off during the night, the range frequently being shown even on days when the normal trade winds are interrupted. The seismograms record sixty-seven earthquakes during 1918.

THE January number of the "Abstracts of Papers" issued by the Institution of Civil Engineers contains 235 pages, twelve of which are devoted to name and subject indexes. The abstracts, of which there are 387, are classified under the six heads: Measurement, Materials, Structures, Distribution of Energy, Appliances, and Specialised Practice. Each head is, as a rule, subdivided into sections. It is impossible to read through the abstracts without realising the importance to the future of the engineering profession in this country of a knowledge of the progress which is taking place in the practice of engineering throughout the world. From the number of abstracts devoted to it, the question of fuel economy appears to have been taken up with vigour in America and in Germany. In the former country the use and advantages of pulverised low-grade coal have been investigated, and it appears that 75 to 80 per cent. efficiencies can be obtained with it in boilers of all sizes. In Germany the utilisation of the waste heat from iron and steel furnaces to generate steam in boilers is being strongly advocated as the best form of economy.

THE reviewer of part i. of "The Daily Telegraph Victory Atlas of the World," in NATURE of November 13, 1919, remarked, towards the end of a favourable notice: "The changes due to the Peace Treaty are incorporated, but a mistake is made in the area of the Slesvig plebiscite." The publishers of the map, Messrs. Geographia, Ltd., wrote at the time to say that the boundary shown on their map was correct. The reviewer's comment, as stated in our issue of December 25, p. 419, was based upon the abstract of the Treaty of Versailles, and the recent publication of the Treaty has enabled him to compare its wording with the large-scale map of Slesvig. He now writes to acknowledge the correctness of Messrs. Geographia's map in this respect, and to apologise for his mistake. We on our part much regret that, on a point of fact, a review in our columns should have contained a statement which now proves to be in error, and that, in consequence, the accuracy of a particular frontier line on Messrs. Geographia's production was wrongly questioned.

MESSRS. W. HEFFER AND SONS, LTD., Cambridge, have in the press "The Theory of Direct-current Dynamos and Motors: A Text-book for University

Students of Electrical Engineering," by J. Case, which has been written to fill the gap between books of general electrical engineering and the specialised ones dealing with designs. The aim has been to furnish the student with a fairly comprehensive study of the principles and theories underlying the design of direct-current dynamos and motors, and the work will contain many worked examples; also exercises for the student. The notation adopted is that of the International Electrotechnical Commission.

MR. C. BAKER's classified list (No. 68) of second-hand scientific instruments includes in one of its sections a number of microscopes and accessories which should be of particular interest at the present time to students and other workers. There are also sections on surveying and astronomical instruments, spectroscopes and projection apparatus, and other instruments.

MR. L. T. HOGBEN wishes to direct attention to an omission in the abstract of his Royal Society paper, "Studies in Synapsis," i., reprinted in NATURE of February 12 (p. 649). He does not conclude that abortive spindles characterise the Hymenoptera in general, but only the Hymenoptera parasitica.

OUR ASTRONOMICAL COLUMN.

MERCURY AS AN EVENING STAR.—This planet will reach its greatest easterly elongation ($18^{\circ} 11'$) on March 3, and set at about that date rather more than an hour and three-quarters after the sun. This will be the most favourable period of the year for viewing Mercury in the evenings. The intending observer should look towards the east-by-south region of the horizon, and when the atmosphere is clear the planet will be seen about an hour after sunset at a low altitude. It will set on February 26 at 7.5 p.m., on March 4 at 7.31 p.m., and on March 11 at 7.23 p.m.

CENTENARY OF THE ROYAL ASTRONOMICAL SOCIETY.—At the annual general meeting of this society held on February 13, the president, Prof. A. Fowler, gave an address on the foundation of the society just a century before. The four men who were most influential in its formation were the Rev. William Pearson, Mr. Francis Baily, Sir John F. W. Herschel, and Mr. Charles Babbage. The two latter both lived until 1871, and there are no fewer than fifteen surviving fellows whose fellowships overlapped with theirs. One of these, Mr. Inwards, said that he remembered speaking to Sir John Herschel at a meeting of the society. There was at first a good deal of opposition to the new society on the part of the Royal Society, and the Duke of Somerset, who was elected the first president, quickly resigned this office owing to the pressure brought to bear upon him. He was succeeded after an interval by Sir William Herschel, who was then eighty-two years of age, and died in 1822. Mr. Stephen Groombridge, well known for his Star Catalogue, was another of the original members. They were not called fellows until 1830, when the Royal Charter was granted, giving the society its present title; it was previously called the London Astronomical Society. The earliest publications of the Society were in the form of memoirs; the Monthly Notices did not commence until several years later, and were at first only small pamphlets containing ephemerides of comets and other matters of transient interest.

IS VENUS CLOUD-COVERED?—Mr. Evershed has taken many photographs of the spectrum of Venus in recent years, for the purpose (*inier alia*) of endeavouring to detect the Einstein shift, and of testing his own hypothesis that the earth has an effect on the atmospheric circulation of the sun. In the course of this work he found, to his surprise, that a much longer exposure-time was needed than was the case in photographing the spectrum of a cumulus cloud on which the sun was shining (Monthly Notices R.A.S., November). Mr. Evershed expected the time to be shorter, for the intensity of sunlight on Venus is 1.92 times as great as on the earth. Allowing for the absorption of Venus's atmosphere, he concludes that if Venus were covered with clouds similar to our cumulus clouds, the exposure-time would be less on the former than on the latter in the ratio of 1 to 1.3, whereas the contrary is the case. He concludes that the atmosphere of Venus is not cloud-laden, but that its lower strata contain much dust in suspension, veiling the surface features. This conclusion is similar to that reached by Prof. Lowell from his observations at Flagstaff.

Mr. Evershed thinks that the values of the colour-indices assigned by Prof. H. N. Russell to the sun and Venus (+0.79m. and +0.78m.) are mutually inconsistent, since they imply that no selective absorption takes place in Venus's atmosphere. Mr. Evershed finds evidence of decided selective absorption in the violet, as compared with his cloud spectra.

PROFESSIONAL METEOROLOGY.

SIX parts of the new Professional Notes of the Meteorological Office have now been issued. The first¹ deals with the relation between cloud and wind direction at Richmond, and gives tables for each month for 10h., 16h., and 22h. for fifteen years, showing the number of times each cloud amount was associated with each wind direction or with calms; it would perhaps have been clearer if percentage values had been given. Several important points come out, such as the well-known tendency of cloud to disperse at night, but it is also shown that this tendency is not the same for all winds or for all seasons. Cloud forecasting became important during the war, and will in future be of wide application; it is to be hoped, therefore, that Lieut. (now Capt.) Brunt will fulfil his intention of continuing this research. Tables also give values for Greenwich for January and July, and various differences from Richmond are apparent; Richmond had only 59 calms in 180 months, while Greenwich had 58 in 20 months, which indicates, perhaps, a difference in estimating light winds. Greenwich had more south-west and fewer south and north-west winds than Richmond, due probably to local exposure.

It would be more satisfactory to compare cloud amount with wind at cloud-level or with gradient direction, for Mr. Newnham's paper² on a night valley wind shows that surface winds may be shallow and more or less unrelated to upper-air phenomena. Cold air flows down valleys at night in radiation weather, and if, at so open a station as Benson, the wind at night sometimes blows "very steadily from east-by-south to east-south-east regardless of what the direction had been during the previous day," the need for caution in dealing with surface winds is obvious. But in the case of fog it is the surface wind that is of

¹ "On the Inter-relation of Wind Direction and Cloud Amount at Richmond." By Lieut. David Brunt. (Meteorological Office, 1918.) Price 3d.
² "Notes on Examples of Katabatic Wind in the Valley of the Upper Thames at the Aerial Observing Station of the Meteorological Office at Benson, Oxon." By E. V. Newnham. (Meteorological Office, 1918.) Price 3d.

importance, as appears in Mr. Brooks's paper³ on the fog in London on January 31, 1918, when the incidence of the fog seems to have been influenced by "shallow streams of cold air flowing down the sides of hills." The isobaric maps in this paper show a bend in the isobars over the Thames estuary which Mr. Brooks thinks is real, but possibly exaggerated "by slight inaccuracies in some of the barometer readings." Those who draw isobars know how peculiar are some of the readings, and would welcome a future Professional Note on these peculiarities.

A vast amount of information was obtained during the war on upper-air temperatures and winds, and it would be a real loss to meteorology if this were unused or lost. Lieut. Stacey and Capt. Chapman are therefore to be congratulated on having made use of some of these records. Lieut. Stacey⁴ deals with upper-air temperatures at Martlesham Heath from February, 1917, to January, 1918, and sets out the information clearly on the whole, though several misprints are noticeable. Unfortunately, "no information is to hand of the type and exposure of the instruments used," which is to be regretted, especially as one would suppose such information could have been obtained; as a matter of fact, the thermometers were exposed on the wing-struts of the aeroplanes, but the type of thermometer varied from time to time, and therefore the early records are probably not strictly comparable with the late ones; but these facts are not recorded in the paper. It is very desirable that all details of meteorological war-work should be collected before it is too late to obtain them.

Capt. Chapman⁵ reviews formulæ connecting increase of wind velocity with height. Many of the early ones were linear, but linear formulæ are unlikely, and were probably only intended as working guides until more observations were available. From a consideration of many observations, including 190 in north-eastern France, the author deduces the formula $V = a \log H + b$ (where V is the wind velocity, H the height, and a and b are constants), which fits most of the observations below the height at which the mean gradient velocity is reached. The whole paper deserves careful study. In another publication⁶ Capt. Chapman discusses the normal curve of errors in connection with what meteorological observations should be classified as unusual or exceptional.

Meteorology has advanced rapidly in recent years, and these publications, and others, show that the advance in this country is due largely to the Meteorological Office, and it is to be hoped that its future activities may not be hampered by the proverbially unscientific attitude of Government Departments.

STEAM BOILERS AND ECONOMISERS.

AS chief engineer of the Manchester Steam Users' Association Mr. C. E. Stromeyer prepares a yearly memorandum. The memorandum for the year 1918-19 deals with fuel economy and with economiser and furnace collapses. Some industries require much power and little steam for heating and boiling; others much steam and little power. If two such industries could combine, the cost of 1 h.p. could be reduced from, say, 2 lb. of coal to $\frac{1}{3}$ lb. If, for instance, a spinning mill consumes 20 tons of coal

³ "Incidence of Fog in London on January 31, 1918." By C. E. P. Brooks. (Meteorological Office, 1918.) Price 3d.

⁴ "Upper-Air Temperatures at Martlesham Heath, February, 1917, to January, 1918." By Lieut. W. F. Stacey. (Meteorological Office, 1919.) Price 1s.

⁵ "The Variation of Wind Velocity with Height." By Capt. E. H. Chapman. (Meteorological Office, 1919.) Price 1s.

⁶ "On the Use of the Normal Curve of Errors in Classifying Observations in Meteorology." By Capt. E. H. Chapman. (Meteorological Office, 1919.) Price 6d.