

Kingdom, was the effort made, in camps both at home and abroad, to continue, however imperfectly as to means and methods, the education already gained, having regard to the fact that sooner or later large numbers of men would return to civil occupations and duties, and that it would be desirable, so far as time and circumstances permitted, that military service should offer opportunities of continued study. It is gratifying to observe that the Army of Occupation on the Rhine, which numbers 250,000 men, is animated by the same spirit. The 222nd number of the *Cologne Post*, a daily paper printed and published at Cologne in English for the Army of Occupation, and the Christmas souvenir number of the same journal (price 9d., or 7 marks), both contain articles urging the vital importance of education, not only in its general and scientific aspects, but also as applied to the promotion of special phases of industry, of commerce, and of agriculture, with the view of fitting men for these several pursuits, and describes the means taken at Cologne and other Rhine towns for effective instruction and training in the various subjects by the institution of laboratories, workshops, and field allotments. At Siegfried there was held recently an exhibition in which was displayed a great deal of good work, the results of training men who had previously learned no trade to become wage-earners of the best possible type. The courses of study include educational facilities extending from the absolutely illiterate to the university graduate, but these articles are also remarkable for the point of view they express, namely, that the soldiers are urged on returning home to civilian life to insist that their children shall receive their due, and be trained to think and to appreciate the beauties of life.

#### SOCIETIES AND ACADEMIES.

##### LONDON.

**Royal Meteorological Society**, December 17.—Sir Napier Shaw, president, in the chair.—F. J. W. Whipple: The laws of approach to the geostrophic wind. The mode of transition from the winds near the surface of the earth to the general current at moderate heights has been discussed by various authors. In the present paper stress is laid on the geometrical aspect of the question. The term "relative wind velocity" being used for the velocity which must be combined with the geostrophic wind velocity by vector addition to give the actual wind velocity at any level, the laws of approach to the geostrophic wind are:—(1) The relative wind turns uniformly with increasing height; (2) the relative wind decreases with increasing height according to the exponential law; and (3) the actual wind at the surface and the relative wind there are inclined at  $135^\circ$ .—G. M. B. Dobson: Winds and temperature-gradients in the stratosphere. From the results of temperature observations by *ballon-sondes*, it can be shown that the horizontal pressure-gradient, and therefore the wind velocity, should decrease rapidly on passing from the troposphere to the stratosphere. Previously there had been little confirmation of this by actual observations. Seventy ascents recorded by the International Commission gave data for temperature, wind velocity, and wind direction to great heights. These showed that, almost without exception, winds of moderate or great velocity in the troposphere fall off very rapidly on entering the stratosphere, while the wind direction remained constant. On days with small pressure-gradients this effect was not usually found—a result which was to be expected, since the slope of the tropopause would then not necessarily be towards the low pressure. Horizontal pressure and temperature-

gradients calculated for the observed winds on typical days with moderate or large pressure-gradients show that the pressure-gradient is suddenly reduced, and the temperature-gradient suddenly reversed, on entering the stratosphere. The temperature-gradients calculated from the observed wind velocities are in good agreement with those deduced by Mr. W. H. Dines from temperature and pressure observations.—Capt. C. J. P. Cave: Quotations from the Diary of Samuel Pepys on the weather. In this the author has collected together all references to the weather from the "Diary," using for this purpose Wheatley's edition. These amount to as many as 557 entries, and are arranged in chronological order. They form a brief comment on the general weather conditions prevailing from January, 1660, to May, 1669. In a preliminary essay the author summarises the principal weather events for each year. He points out that Pepys cannot claim to be considered as a meteorologist, and that his references to the weather are such as anyone might make in writing a diary or in correspondence. He also states that Pepys's memory for meteorological events was not always good, and his remarks on the worst or best weather he remembers must be taken with caution.

##### EDINBURGH.

**Royal Society**, November 3.—Prof. F. O. Bower, president, in the chair.—Capt. T. B. Franklin: The cooling of the soil at night, with special reference to late spring frosts. The aim of this investigation was to obtain data on which predictions might be formed as to the coming night temperature. Continuing a course of investigation, the author gives a formula whereby the minimum temperature on any calm, clear night may be known by about 5 p.m. on the previous afternoon. A comparison of his results with the observed minimum soil temperatures on twenty favourable nights between April and October, 1919, shows an average error of  $0.3^\circ$  C. only; it would thus appear that, under the weather conditions favourable to spring frosts, it is possible to forecast the occurrence of a frost with great exactness.—Sir Thomas Muir: Note on the determinant the matrix of which is the sum of two circulant matrices.—G. F. Quilter: Note on and exhibition of photographs of appearances of mirage at Ingatestone. These photographs showed apparent pools of water in the street in which pillars appeared reflected at a distance of about a hundred yards. The photographs were interesting as following up a previous paper by Mr. Alex. G. Ramage communicated to the society in 1918.

December 1.—Prof. F. O. Bower, president, in the chair.—Dr. R. Kidston and Prof. W. H. Lang: Old Red Sandstone plants showing structure from the Rhynie Chert bed, Aberdeenshire. Part iii.: *Asteroxylon Mackiei*, Kidston and Lang. The fourth vascular Cryptogam found in the silicified peat-bed at Rhynie, the age of which is not younger than the middle Old Red Sandstone of Scotland, was a larger and more complex plant than *Rhynia Gwynne-Vaughani*, *R. major*, and *Hornea Lignieri*, described in the earlier papers of this series. It has been named *Asteroxylon Mackiei* after Dr. Mackie, the original discoverer of the chert-bed. The remains of *Asteroxylon* are abundant, though fragmentary, and give, with more or less certainty, a fairly complete knowledge of the plant.

December 8 and 9.—Prof. W. Peddie, vice-president, in the chair.—Prof. R. A. Sampson: (1) Newton's views on gravitation and their subsequent history. (2) The theory of Einstein and its observational tests. In the second address, by the kindness of Sir Frank Dyson, the Greenwich photographs taken at the expedition to

Sobral, Brazil, were exhibited, and the method of measurement and agreement obtained were explained. It was pointed out that the first success of Einstein's theory was to explain completely a long-outstanding discrepancy in connection with the orbit of Mercury. Of the two other tests, which were in the form of predictions, one, that gravity would modify the solar spectrum, had not been verified, while the second, that light from a star passing near the sun would be deviated, had been verified. The general processes by which Einstein derived this formula carried no assurance that the results would describe Nature, and the theory must rest upon such tests as he himself has proposed for it. From this point of view, though it shows its changes only in minute remote phenomena, its claims are too vast to be settled in a short time.

## PARIS.

**Academy of Sciences**, December 1, 1919.—**M. Léon Guignard** in the chair.—**P. A. Dangeard**: The distinction of the chondriome into vacuome, plastidome, and spherome.—**The Prince of Monaco**: The oceanographic study of the Mediterranean. An account of an international conference held at Madrid on November 17 last, at which France, Italy, Spain, Greece, Monaco, Egypt, and Tunis were represented.—**G. A. Boulenger**: The distribution in Africa of the barbel, sub-genus *Labeobarbus*.—**G. Bouligand**: The problem of Dirichlet for an infinite domain.—**R. Soreau**: Experimental laws of the variations of barometric pressure and of the specific gravity of air with altitude. From forty series of observations with sounding balloons, carried out in 1912 at Trappes, Uccle, Strasbourg, Hamburg, Munich, Pavia, and Vienna at heights up to 23 km., formulæ are deduced giving the pressure and density as functions of the altitude.—**H. Godard**: Observation of Finlay's periodic comet (1919e) made at the Bordeaux Observatory with the 38-cm. equatorial. Position of comet and comparison star given for November 25.—**M. Auric**: The cycle of eclipses. The ratio  $l/d$  is expressed in continued fractions, the fifth of which,  $\frac{242}{313}$ , was known to the Chaldeans as the Saros cycle; its error is 0.036 day in 18 years. The fraction  $\frac{4994}{13115}$  is in error by only 0.0003 day in 365.4 years.—**G. Sagnac**: The direct comparison of the two simultaneous mechanical systems of radiation. Method of showing the translation of the earth.—**S. Procopiu**: Layers of metal, of minimum thickness, measured by their electromotive force.—**H. Abraham**, **E. Bloch**, and **L. Bloch**: The ultra-rapid kinematograph. The film is moved continuously and the object illuminated by electric sparks. With the arrangement described and figured, upwards of twenty thousand photographs per second can be taken on the film.—**G. A. Hemsalech**: The spectra emitted by the red fringe and luminous vapour in the neighbourhood of a plate of incandescent graphite.—**C. Staehling**: The radio-activity of uranium. An account of some experiments undertaken in an attempt to split up uranium into uranium I. and uranium II. The attempt at separation was unsuccessful, but some of the phenomena described do not appear to be simply explained by the current theories of radio-activity.—**G. Claude**: The synthesis of ammonia at very high pressures. The results of a series of experiments on the formation of ammonia from its elements in presence of a catalyst at pressures varying between 200 and 1000 atmospheres and at temperatures between 536° C. and 740° C. are given graphically. At 1000 atmospheres and 536° C. the percentage of ammonia in the mixture amounts to 41 per cent. Having regard to the reaction velocity as well as yield, the zone of utilisable temperature is between 500° C. and 700° C. The yield per gram of catalyst

per hour is much higher than that obtained in German works.—**L. Guillet**: The transformation undergone by certain aluminium alloys. It was shown about twenty years ago that certain alloys of aluminium with iron, manganese, and nickel rapidly fell to powder on exposure to air. This phenomenon has been further investigated, and it is found that the change in the aluminium-manganese alloy is due to an allotropic modification, whilst the aluminium-antimony alloy oxidises in moist air. The iron and nickel alloys did not change, and it is probable that some unknown impurity was the cause of the falling to powder observed in the earlier experiments.—**P. Dejean**: The critical points of self-tempering steels.—**A. Kling**, **D. Florentin**, **A. Lassieur**, and **R. Schmutz**: The preparation of chloromethylchloroformates. The existence of monochloromethyl- and dichloromethyl-chloroformates is proved and methods for their preparation are described.—**L. Moret**: The discovery of lacustral Eocene beds at the Roc de Chère (Lake of Annecy).—**L. Mercier** and **C. Lebailly**: Primitive cancer of the pancreas and giant cells in mice.—**P. Bugnon**: The use of commercial inks in plant histology. Some commercial inks of French manufacture can be employed with advantage as histological stains. Two formulæ for triple stains are given in which ink is one of the constituent dyes.—**J. Offner**: Phytogeographical remarks on the massifs of Vercors and Dévoluy.—**M. Baudouin**: The fibula of a newly born infant of the Polish Stone period, and consequences in anatomical philosophy. The faces of the bone are smooth and free from the grooving found in the Neolithic adult. The grooves are therefore acquired, being due to special muscular actions depending on the mode of walking of these prehistoric men.—**MM. G. Bertrand**, **Brocq-Roussen**, and **Dassonville**: The influence of temperature and other physical agents on the insecticidal power of chloropicrin. When using chloropicrin against insects the intensity of the light and the hygrometric state of the air need not be taken into account; the temperature, however, is of importance; the higher the temperature, the more rapid is the destruction of the insects.—**T. Kabeshima**: Experimental researches on preventive vaccination against the dysentery bacillus of Shiga.

## CALCUTTA.

**Asiatic Society of Bengal**, December 3, 1919.—**Dr. N. Annandale**: A loom used by the Gaodar herdsmen of Seistan. The loom, though of very simple structure, seems to be degenerate rather than primitive, its peculiarities depending not so much on lack of skill in its makers as on lack of proper materials, notably wood.—**V. H. Jackson** and **A. T. Mukerjee**: Improvements in measurements with quadrant electrometers. Part ii. Simplified arrangements for accurate and continuous work. During most months in the year accurate measurements with sensitive quadrant electrometers cannot be made in India without special precautions, owing to the high temperature and humidity. In continuation of earlier work the authors have now considerably simplified the arrangements for accurate and continuous work.—**V. H. Jackson** and **A. T. Mukerjee**: The utility of desiccants in electrostatic measurements. The authors have tested the relative efficiency of the various desiccants used in electrostatic measurements under strictly uniform conditions, using Dolezalek electrometers with the arrangements described in the previous paper. Calcium chloride has been found quite unsatisfactory, metallic sodium (extensively used in Germany) and phosphorus pentoxide worse than useless, and quicklime only temporary in its effect. Strong sulphuric acid is the only satisfactory desiccant for this purpose.