

all stations, if comparability is aimed at. The level of the water in the dish must remain constant, for the obvious reason that the evaporation is less the deeper the surface of the water stands under the edge of the vessel. Provision must be made for reading off the quantity evaporated with accuracy. The measurement of evaporation by means of floating apparatus on large surfaces of water should be introduced wherever possible.

15. (a) The degree of cloudiness is to be given by the figures 0—10, in which 0 represents a sky quite free from cloud, and 10 an entirely overcast sky. These figures refer only to the extension and not to the thickness of the cloud, the latter being indicated by accompanying expressions, such as "slight," "great," &c.

(b) Arbitrary symbols representing rain, snow, fog, &c., were adopted.

16. It was resolved that the institution of observations on atmospheric electricity be recommended only for head observatories. As regards ozone, the existing methods of determining its amount in the atmosphere are insufficient, and the Congress therefore recommended investigations for the discovery of better methods.

17. It was agreed that for observations as well as for publications, the use of the same units of measure is desirable; that among all existing systems of measure the metric has the best prospect of universal adoption; that it is most desirable, if it be not possible to introduce uniform measures at present, to use henceforth only metric and English measures (with Celsius and Fahrenheit scales), and that all action is to be supported which tends to the introduction of the uniform metric system. It was also agreed that the results of observations, or the means, should be published in the metric scale as well as in the original scales.

18. The hours of observation should be chosen which give a close approximation to the true mean temperature of the day. The following are the suitable combinations:—

h.	h.	h.	h.	h.	h.		h.	h.
6	2	1	8	2	8	} with min. temp.	8	8
7	2	1	9	3	9		9	9
7	1	9	10	4	10		10	10
7	2	9						

Observations should be set on foot at a number of normal stations, especially in Turkey, East Indies, Australia, Southern States, and Brazil, in order to ascertain the corrections for the most important meteorological elements, such as temperature, pressure, and humidity.

19. As units of time should be chosen (1) the mean solar day of the place of observation, reckoned from midnight to midnight; (2) the civil year; (3) the civil months everywhere, the calculation of the monthly means being simply arithmetical; and (4) Dove's 5-day means (73 in the year) for a selected number of stations of each country. It is proposed to count the first 12 hours of the day, from 1 to 12, as forenoon; and the following 12 hours, from 1 to 12, as afternoon; thus counting 12 o'clock midnight as the end of the day, and 12 o'clock noon as the close of the forenoon.

20. It is resolved to choose, as the periods for calculation of normal values, intervals of five years to be called *Lustra*, so that the next *Lustrum* will begin with January 1, 1876; and that as regards the more important data, old observations should be calculated in accordance with this proposal.

21. The existence of a system of weather telegraphy is, for all countries, considered to be a necessity; in addition to the direction and force of the wind, the barometric gradients at the time of observation should also be added. For purposes of storm warnings, the reduction of the barometer readings to mean sea-level for places not above 1,000 feet in height is admissible. For greater heights, the gradients are to be referred to the mean normal heights of the barometer at the stations. The relations of temperature, moisture, rain, cloud, and state of the sea and tides to storms, are recommended for investigation. As regards storm warnings, each director should give his opinion on the probable course of atmospheric disturbances which are expected, or have already commenced, not as prophecies, but as *probabilities*. Only wind-force of 8, and upwards, of Beaufort's scale should be announced.

22. As regards maritime meteorology, it is desirable that each country should, if possible, collect all its meteorological observations at one place, and that the Institute for Maritime Meteorology should be established as near as possible to the sea, and that this institute might best be placed under the general management of the chief institute of the country. The convening of

a maritime meteorological conference was declared to be desirable, and the preparation for this conference is entrusted to the permanent committee appointed by the Congress.

23. It is necessary that in every country, at least one but in case of necessity several central institutions should be established for the management, collection, and publication of meteorological observations.

24. The verification of all instruments supplied to meteorological stations, and the inspection of stations yearly, but at least once in the course of every five years, is necessary. With regard to instrumental errors detected on verification, or inspection, corrected results only should be published. It is intended that the Permanent Committee prepare, in conjunction with the other members of Congress, instructions for the institution and discussion of meteorological observations.

25. As regards standard barometers and thermometers, each central office is recommended to adopt a real standard barometer, *i.e.* an instrument which allows of the determination of atmospheric pressure according to its definition in absolute measure, and to prepare a standard thermometer on scientific principles.

26. The publication of observations at stations of the first order should be entirely separated from those of stations of the second order. It is handed over to the Permanent Committee to prepare, in conjunction with members of Congress, a form of publication suited for international purposes.

27. It is desirable to organise, on the model of the Smithsonian Institution at Washington and the Central Bureau at Haarlem, a similar office for the exchange of publications in every country.

28. A Permanent Committee of seven, with the right of increasing their number to nine, was appointed, with Dr. Buys Ballot as president. The duty of this committee is to care for the carrying out of the decision of the Congress, and arrange for convening a future Congress; and it shall place the delegates of the Congress in cognisance with its action and proceedings.

For the extension of meteorological knowledge it was recommended that stations provided with self-registering instruments be established on high mountain-tops; that experiments on the possibility of continuous meteorological observations with captive balloons be instituted; that stations be established in the North Polar regions, and also in the high southern latitudes; on the north coast of Africa; that the organisation of the stations in Turkey be made more complete, especially the Central Observatory at Constantinople, and that the meteorological station at Athens be maintained.

29. The establishment of an International Institution for the Advancement of Meteorology was declared to be really useful and desirable, and it was remitted to the Permanent Committee to prepare a detailed scheme for this purpose for the consideration of a future Meteorological Congress.

(To be continued.)

SCIENTIFIC SERIALS

Poggendorff's Annalen der Physik und Chemie, No. 1, 1874. —In this number M. Holz communicates an account of experiments on bar-magnetism which he made in Prof. Helmholtz's laboratory. They had reference to the effect produced on magnetic moment of bars, when these were subjected to the corrosive action of dilute muriatic acid for twenty-four hours. He finds (among other things) that the amount of magnetic moment of a steel bar, with regard to quality, depends on the structure of the iron, and the carburet of iron (*Karboneisen*) united with it; that it increases per unit of weight, through abstraction of magnetised iron, and decreases through abstraction of magnetised carburet of iron; also, that particles of carburet of iron remaining after solution of the iron are magnetisable, and receive permanent magnetism. —M. Lehnbach gives a determination of the emissive power of dark bodies, by the ice-calorimetric method. The principle is briefly this: Suppose a thin glass sphere filled with ice, and placed within a larger sphere, whose temperature is above 0°, and constant; also that the former has an arrangement for showing the amount of ice melted in a given time, and a vacuum can be made within the spheres; then the increase of heat received by the inner globe may be measured calorimetrically. The apparatus is said to prove very serviceable for measuring emissive power. —M. Braun investigates some points connected with elastic vibrations, the amplitudes of which are not infinitely small; and M. Meyer studies the theory of elastic effects. —A method of graphic representation of absorption-spectra is described by M. Vierordt, and the curves are given for

some ten different substances. The curves are very regular and characteristic, and he considers that with those spectra, in which the absorption continuously increases from one end to the other, a measurement of the light intensity at six or eight parts of the spectrum is quite sufficient, in order to construction of the whole absorption curve, and determining the relation of absorption to the wave-length of the light.—Attention is directed to some new physical phenomena: thus M. Kundt has observed a well-marked dichroism in certain substances (such as caoutchouc and gutta-percha) on stretching. Examined with a dichroscopic lens a thin strip gave two images, one dark brown, the other nearly straw-yellow; the ray whose vibrations are in the direction of stretching is the most absorbed.—M. Antolik studies what he calls the “gliding” of electric sparks; a phenomenon which is had, if *e.g.* a spark be made to strike a soot-smear glass ball. The path-trace left by the spark shows two light parallel lines, and a dark one between; the former are due to thrusting aside of the soot, and, in the dark band, the soot seems compressed, for, on washing the globe, the soot remains there after the rest has gone. The outer edge of the light band shows, in the microscope, a number of dark and light triangles, apparently produced by induction.—M. Obermayer describes phenomena presented by the dispersion of some solutions of aniline colours in water.—M. Edlund rejects, as inadequate, a recent experimental investigation, by Prof. Röntgen, of the question: Is the galvanic current an ether current? and M. Reye replies to M. Zöllner on the subject of sun-spots and protuberances.—A Japanese toy-bird is the topic of a note by M. Erdmann. The bird is placed with its back on a board, by means of which it is thrown forward; and after rising 8 ft. or 9 ft. in a parabolic curve, it returns, head foremost, to the thrower.—M. Nordenskjöld furnishes some particulars as to the nature of cosmic dust which had been observed to fall, with atmospheric precipitates, in the neighbourhood of Stockholm.—Among the matter selected from other serials we may note an account of M. Wiedemann's researches on the elliptical polarisation of light, and its relation to the surface colours of substances; and remarks on the arrangement of a *dispersimeter*, by M. Mousson.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 23.—Note On the minute anatomy of the alimentary canal, by Herbert Watney, M.A., Cantab. Communicated by Dr. Sanderson, F.R.S., Professor of Practical Physiology, University College.

Zoological Society (anniversary), April 29.—Viscount Walden, F.R.S., president, in the chair.—The report of the council, which was read by the secretary, Mr. P. L. Sclater, F.R.S., stated that the number of ordinary members of the Society on January 1 last was 3,173, of foreign members 25, and of corresponding members 196.—The total income of the Society in 1873 was 28,099*l.*, being 1,371*l.* more than that of 1872, and exceeding the income of any previous year, even those of the years 1851 and 1862, when the Great and International Exhibitions were held, which have hitherto been regarded as exceptional years. The total ordinary expenditure of 1873 had been 22,721*l.*, and 4,945*l.* had been likewise devoted to extraordinary expenditure, leaving a balance of 1,384*l.* to be carried forward for the benefit of the current year. The assets of the Society on December 31, 1873, were calculated at 10,530*l.*, while the liabilities were reckoned at 5,490*l.* The reserve fund consisted at the close of the year of a sum of 8,000*l.* reduced three per cents., but it had been resolved to increase this fund by investing the interest of it from time to time, and by purchasing a further sum of like stock to the amount of 500*l.* every year. The scientific publications of the Society for 1873 had consisted of the usual octavo volume of “Proceedings,” and of three parts of quarto “Transactions.” The most important work undertaken in the Society's gardens in 1873 had been the rebuilding of the main refreshment-room in the South Gardens at a total cost of 2,096*l.* The total number of visitors to the Society's Gardens in 1873 had been 713,046, being 64,958 more than the corresponding number in 1872, and exceeding that of any previous year since the Gardens had been open to the public. The number of animals in the menagerie on December 31, 1873, was 2,187. Many of the accessions during the year had consisted of specimens of rare or little known animals, of which full particulars were given. The report concluded with a long list of donors and their several donations to the menagerie. The adoption

of the report was moved by Mr. J. Stewart Hardy, M.P., seconded by Prof. Tennant, and carried unanimously. The meeting then proceeded to elect the new members of council and the officers for the ensuing year, and, a ballot having been taken, it was found that Viscount Walden, F.R.S., had been elected president, Mr. Robert Drummond, treasurer, and Mr. P. L. Sclater, F.R.S., secretary to the Society. The new members of council elected were Robert Hudson, F.R.S., the Marquis of Ripon, K.G., Lord Arthur Russell, Osbert Salvin, F.R.S., and Lord Walsingham.

Anthropological Institute, April 28.—Prof. Busk, F.R.S., president, in the chair.—Mr. H. H. Howorth read a paper, entitled *Strictures on Darwinism*; part 3, on *Gradual Variation*. The paper was in continuation of a series in which the author endeavoured to show that Mr. Darwin's main conclusion is not supported by the evidence of the changes of type that can be examined. Mr. Darwin differed from the older naturalists in assigning, as the cause of variation, a struggle between the individuals of a class for existence by which a favoured individual and its progeny eventually survive. They, on the contrary, argued that variation is induced by a change in the external conditions of climate, food, &c., which operate upon the whole class together and make it change, as a whole, in a certain definite manner and direction, that is in one which can be actually predicted. So that if any individual of a class or any number of individuals of a class be subjected to a certain alteration of conditions, a certain definite and uniform change will be produced in the individual or the class. Again if the new conditions were annihilated, the object of the experiment is reverted to its original surroundings. The author supported that argument by a large number of facts, and in doing so was constrained to conclude that the operating cause of variation in man, as in the case of plants and animals, is the working of external causes; and that an individual with its progeny is not so much better fitted for enduring the new conditions that it eventually supplants the rest, but rather that the whole class is moulded together into a new shape, which is called a new variety. Some facts were drawn from the experience of history showing that where the conditions have been uniform, as in Egypt, although there has been a considerable mutual pressure among the individuals of a class for food, &c., yet there has been no variation, while a transplanting of similar individuals, as in the case of European emigration to America, has been followed by almost immediate change. The illustrations that might be drawn from the cases of man, as in the changes that have ensued in both the Aryan and the black emigrants to North America, of the Dutch to the Cape, of the Portuguese to South America, &c., were notable and telling instances of the operation of the law argued for by the author, inasmuch as changes of type of a marked character have occurred where there has been neither time nor opportunity for the creation of a fresh type by the successive amelioration or change in the idiosyncrasies of the descendants of a common ancestor, but where the change has undoubtedly occurred in the whole class together over a very wide area.

DUBLIN

Royal Irish Academy, March 16.—Rev. J. H. Jellett, B.D., president, in the chair.—The minutes of the previous meeting having been read and confirmed, Dr. Ingram, secretary to the council, read the annual report, which referred to the work done by the Academy during the previous session, the state of the museum, &c. Seven members were lost by death during the year.—At the conclusion of the report, a ballot took place for the election of president and council. Dr. Stokes, F.R.S., was declared duly elected president, and the following officers were elected:—J. R. Garstin, LL.B., treasurer; E. Perceval Wright, M.D., secretary; J. T. Gilbert, librarian, and Dr. R. M'Donnell, F.R.S., secretary of foreign correspondence.

April 13.—Dr. Stokes, president, in the chair.—A paper was read by M. Donovan On some Improvements of a Comparable Self-acting Hygrometer.—John Casey LL.D., read a paper On a new method of finding the Equation of the Squares of the differences of the roots of a Biquadratic, given by its general equation.—Mr. H. W. Mackintosh read a paper On the Anatomy of the Coatimondis and Marten. During the summer of last year two species of the coatimondi (*Nasua narica* and *N. fusca*), and two specimens of the common species of marten (*Martes foina*), which formed part of the collection in the Dublin Zoological Gardens, having died, were obtained for the Dublin Uni-