

Tryon and his associates have been engaged for several years past, namely, the arranging, labelling, and mounting of a very extensive collection of shells belonging to the Academy. The total number by actual count is 14,161 species, in something less than 100,000 specimens. The collection is stated to be one of the finest extant.

THE Cambridge Natural Science Club held six meetings during the past Lent term; there are now fourteen members Undergraduates and Bachelors, nearly all of whom were in residence and attended regularly, often bringing friends as visitors. The following were the subjects discussed:—Climbing Plants, introduced by Mr. Stone, St. Peter's; the Functions of the Cerebral Hemispheres, introduced by Mr. Bridge, Trinity; Precious Stones, a paper by Mr. Alfred Buxton, Trinity; Zoological Colonies, a paper by Mr. A. J. Jukes Brown, St. John's; Metamorphosis, a paper by Mr. A. M. Marshall, St. John's; Allotropism, a paper by Mr. C. P. Clough, St. John's. The meetings commence again on Saturday the 25th inst., and will be continued during the present term, and through the Long Vacation, should a sufficient number of members be in residence.

At the last monthly meeting of the Manchester Geological Society, Mr. Plant exhibited a large collection of remains of *Bos priscus* and *Rangifer*, obtained from Castleton, Derbyshire. The largest bones were portions of the skull, with the horn-cones attached, femora, and vertebrae, all much incrustated.

THE additions to the Zoological Society's Gardens during the last week include a Common Crowned Pigeon (*Goura coronata*), hatched in the Gardens; a Prince Alfred's Deer (*Cervus alfredi*) and a Vulpine Phalanger (*Phalangista vulpina*), born in the Gardens; and a Great Kangaroo (*Macropus giganteus*) from Australia, deposited.

### THE METEOROLOGICAL CONGRESS AT VIENNA \*

THE Meteorological Congress, which held its meetings in Vienna from the 2nd to the 16th of September last, had its origin in a wide-spread conviction that since meteorology can be prosecuted with success only when it is treated internationally, uniformity of procedure among different nations is indispensable; and it was to bring about this uniformity that the Congress was convened. A preliminary Conference was held at Leipzig in August 1872, for the purpose of preparing the programme for the Congress. The Austrian Government issued invitations to other Governments to send delegates to the Congress. To these invitations every European country, except France, responded, and the United States and China were also represented.

The questions which were discussed, and the names of the delegates, have already appeared in NATURE.† The following is the deliverance of the Congress on these questions:—

1. A decision regarding the best mercurial barometer for stations of the second order was postponed to a future Congress. Aneroids should not be employed at stations where there is no other barometer, but they may be used as interpolation instruments alongside the barometer.

2. It was considered impossible to lay down fixed rules for general adoption in the protection of thermometers, on the ground that regard must be had to local conditions, and that the mode of exposure which is most to be recommended, in a space which is open and accessible to all winds, and at a height of 4½ to 6 ft., cannot be used everywhere.

3. Casella's minimum, and Hermann and Pfister's metallic thermometer, since they are found to become frequently deranged, cannot be recommended for stations at which they cannot be kept in proper order and their errors ascertained. For minimum thermometers, amyl-alcohol is to be preferred to ordinary alcohol, as being less liable to distillation. It is recommended that maximum and minimum thermometers be read at the last observation of the evening, and entered on the day on which they are taken.

4. Reference having been made to the experiments on radiation by Symons, Stow, and Soret, further experiments were recommended to be undertaken by physicists, so that the subject might be brought into the sphere of the regular observations.

5. Lamont's method of observing earth temperatures, which consists of a wooden tube, to the bottom of which the thermometer is let down, and up which it is drawn in order to be read, was recommended as giving more trustworthy results than thermometers with long tubes fixed in the ground. New experiments should be made in different countries, in order to decide the question at what depths observations should be taken.

6. The use of the wet- and dry-bulb hygrometer is in the meantime recommended, and the attention of physicists is drawn to the invention of some new apparatus by which the humidity of the air may be more accurately determined. Hair hygrometers can only be used with safety where care is taken to have their indications compared with those of the wet- and dry-bulb hygrometer, so as to determine their corrections, especially near the point of saturation, where the readings are often too low.

7. It was agreed to introduce the English designations of the directions of the wind:—N. = North, E. = East, S. = South, and W. = West, and to give only sixteen directions of the wind; and in the case of intermediate directions being observed, it is proposed to count them alternately to the one or the other. Lambert's formula is not to be recommended in deducing the mean direction of the wind; but, on the other hand, the frequency and mean force of the winds which correspond to the different directions should be given in numbers. In the distribution in the windrose, those winds whose velocity is less than ½ metre per second, or 2½ English miles per hour, are not to be regarded, but counted as calms. The direction of the cloud-drift should be observed and noted.

8. No general scale for the estimation of wind-force is yet recommended, but it is desirable that a gradual advance be made towards giving the velocity of the wind in metres per second.

9. Wild's apparatus for measuring the force of the wind, already in use in Switzerland, Baden, and Russia, was recommended for introduction at stations of the second order. The velocity of the wind obtained by anemometers should be expressed in metres per second, and tables should be prepared for the mutual conversion of metres per second, kilometres per hour, and English miles per hour.

10. The best form for the receiver of the rain-gauge is a circular one with the area of one-tenth of a square metre, that is, having a diameter of about 14 in. The receiver of the rain-gauge should be placed at a height of not less than 1, and better, of 1½ metres above the ground, or at a height of from 3 to 4½ ft. In the published results the height above the ground should be stated. Where it can be done, the measurement of the rainfall should be at the end of the fall; in other cases the first observing hour of the day is recommended, in which case the amount is to be put down to the previous day. It is recommended that the duration of the fall be stated in hours.

11. It was agreed to introduce symbols for the character of the precipitation in the "Remarks" column, and to give in the monthly *résumé* the sum of the days of rain and snow separately; to have two columns, one for the quantity fallen, and one for the depth of the unmelted snow; and to give, in the yearly *résumé*, the maximum fall in twenty-four hours for each month. It was further recommended to state the number of days when the fall is less than 0.04 in. and 0.01 in.

12. Hail is defined to be as a precipitation of frozen water, in which the stones attain such a size that they may be expected to do damage to agricultural products.

13. (a) In order to obtain data regarding thunderstorms which admit better of comparison, it is recommended only to count the days of thunderstorms, but this is not intended to prevent individual observers from inserting in the column of "remarks," in addition, the number of the storms, the time of their commencement, their duration, direction of motion, &c.

(b) As days of thunderstorm, only those are to be noted on which both lightning and thunder have been observed. If only lightning without thunder has been noticed, the entry for the day should be sheet lightning.

14. As regards evaporation, the evaporating dish should not be less than seven inches in diameter, and it is indispensable that it be absolutely identical as regards diameter and depth at

\* "Report of the Proceedings of the Meteorological Congress at Vienna." Protocols and Appendices. Translated from the Official Report. Published by the authority of the Meteorological Committee. London, 1874.

† NATURE, vol. viii. p. 468.

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. Helmholz'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. Lehnebach 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