nual Report of the U. S. Geological Survey, references are made to Millen, Green's Cut, Waycross and Doctortown as being localities where the Lafayette might be seen. The beds at the localities mentioned can undoubtedly be correlated with the Altamaha.

Otto Veatch
Geological Survey of Georgia

CURRENT NOTES ON METEOROLOGY AND CLIMATOLOGY

LIGHTNING VAGARIES

In the *Quarterly Journal of the Royal Meteorological Society* for October, 1907, there is an account, given by Professor A. Herschel, of a remarkable excavation made by lightning in peat earth in a moorland district of Northumberland. A large hole, four or five feet in diameter, was found on a flat part of the moor, radiating from which there were six or seven furrows, and pieces of turf were thrown in various directions. The largest turf, about three feet in diameter and one foot thick, was lying 26 yards away, and other pieces were lying around within 20 yards of the hole. On excavating the hole it was found that a number of small holes radiated to various depths. Col. J. E. Capper gives an account of a captive balloon being struck by lightning.

CLOUD CLASSIFICATION

Professor Willis I. Milham, of Williams College, has published a useful pamphlet on *Cloud Classification,* intended for the use of his students in meteorology, as a guide in their practical work on cloud classification and origin (8vo, pp. 9). This pamphlet considers very briefly (1) the early history, (2) the international system, (3) the causes of clouds and (4) the thirteen cloud forms. The discrepancy between the usual ten forms of the International Classification and the thirteen here referred to comes from the fact that Professor Milham counts fracto-stratus, fracto-cumulus and fracto-nimbus each as one form. Together with the description of the individual types, reference is made to the methods of formation.

METEOROLOGICAL FORMULÆ AND TABLES

Professor Paul Schreiber, director of the Meteorological Service of Saxony, publishes a series of "Formeln und Tabellen" as a *Vorarbeit* to his Annual Report for 1903 (Dresden, 1907, fol.). These formulæ and tables deal chiefly with the thermodynamics of the atmosphere, and are designed for practical use in meteorology. The formulæ are given at the beginning. A discussion on their use follows, and a series of diagrams at the end illustrates the various physical conditions and processes concerned.

A "STEP" ANEMOMETER

At a recent meeting of the Royal Meteorological Society (*Quart. Journ. Roy. Met. Soc.,* October, 1907) Mr. Walter Child exhibited and described his "step" anemometer, which he has designed to obviate the "sheltering error." This instrument is a Robinson anemometer, with the cups so placed on the spindle that the arms are in different horizontal planes. Thus one cup does not shelter another, and the system comes to rest more rapidly when the wind drops.

R. DeC. Ward

THE MEETING OF THE INTERNATIONAL SEISMOLOGICAL ASSOCIATION

The first general assembly of the International Seismological Association since its formal inauguration in 1905, and the second meeting of its permanent commission, were held at the Hague from September 21–26, last.

Twenty-two states are now members of the association, England, Austria and Canada having joined since last year. Although France has not formally joined, preliminary steps have been taken for this purpose and it is hoped that she will soon be a regular member. Chile, the Congo, Norway, Portugal and Roumania are the only countries, members of the association, which were not represented at the meeting. There were about fifty persons present either as delegates or as invited guests, and this included a majority of the leading seismologists of the world. Professor van der Stok and his assistants made all the arrange-

ments for the meeting most successfully. We were given free use of the excellent social club at the Hague: the Minister of Colonies gave a dinner and a reception, and an excursion was made by boat through the canals; altogether the visit to the Hague was extremely agreeable and its memory will always be a pleasure.

According to the by-laws only the delegates are admitted to the meetings of the permanent commission, but this rule has never been enforced, so that all persons attending the general assembly also attended the meeting of the permanent commission. The general assembly has not a permanent president, but the chair is occupied in rotation by different members. The permanent commission elects its president for four years. Signor Palazzo, of Italy, was the retiring president; and Professor A. Schuster, of Manchester, England, was elected president for the next four years. Professor Forel, of Switzerland, was elected vice-president for two years; and the next meeting of the permanent commission was fixed to take place in Switzerland two years hence; Strassburg was continued as the central bureau of the association for the next four years.

The report of the central bureau showed that it had made careful studies of seismological instruments at Strassburg during the last year and that it had published the catalogue of earthquakes for the year 1904. This list is arranged chronologically, but it was suggested that future lists, which are to be made by the central bureau, should have a different arrangement, namely, that the earthquakes should be grouped regionally. The details of the publication of the new catalogues were put in the hands of a sub-committee. The central bureau has also published all the seismograms of the Valparaiso earthquake, or at least all of which it could obtain the originals. These have been reproduced by a heliograph process so as to be exact, and comprise 140 plates, 32 by 42 cm. each. This will furnish an opportunity for a careful comparison of the seismograms of one great world-shaking earthquake.

At the Rome meeting of the permanent commission in October, 1906, a prize was offered for the best cheap seismograph, the details of the competition being left to the central bureau. The conditions imposed were that the instruments should not cost more than about 300 Marks, that it should record one component of the movement and should magnify from 40 to 50 times. The results were not very satisfactory. The low limit of the price seems to have kept out some competitors, so that only four competing instruments were exhibited at the Hague. One of these, shown by Professor Agamennone, consisted of two horizontal pendulums at right angles to each other and supported by pivots; between them was a horizontal pendulum arranged to record the vertical motion. All three instruments recorded on smoked paper and on a single drum. The price of this instrument was 550 Marks; but in view of the fact that all three components were registered, it was admitted to the competition. Spindler and Hoyer, mechanics of Göttingen, exhibited an inverted pendulum of the Wiechert type weighing about 80 kilograms, which recorded the two horizontal components on a single drum, and magnified from 40 to 120 times. The price of the instrument was 350 Marks. The same mechanics also exhibited a pendulum for vertical movement which had a grid-iron arrangement to prevent shifting of the instrument by changes of temperature. This instrument cost 550 Marks and was accordingly excluded. The third instrument, made by Schmidt, of Utrecht, Holland, was a small inverted pendulum recording the two horizontal components on a single drum; the whole instrument did not occupy more space than about one cubic foot and its magnifying power was about 200. These instruments are to be sent to Strassburg and their relative efficiency carefully tested before the prize is awarded.

It has been the tendency of the association to refer all investigations to the central bureau. There was a reaction against this at the Hague meeting, and the new investigations ordered were put into the hands of special

committees. For instance, a special committee was appointed to consider the form of the next catalogue of earthquakes; another to consider the question of seismological bibliography; a third will collect information regarding mistpoeffers, and a fourth will study microseismic movements; the latter are continued movements of periods usually between four and eight seconds, which sometimes last for hours and even days. They have been observed throughout the world and have been supposed to be due to variations of the barometer, to winds, to the beating of the waves upon the shore, etc.

There were a number of scientific papers presented. Professor Wiechert gave his conclusions regarding the interior of the earth as the result of seismological observations. He finds that the velocity of the first preliminary tremors of an earthquake is about 7.2 kilometers per second at the surface of the earth and increases gradually to a depth of 1,500 kilometers; there it suddenly increases to 12.8 kilometers per second. Below that depth the variations are slow for some distance but finally approach the velocity of 10 kilometers near the center. Professor Wiechert considers that this confirms his earlier idea of a central core of iron or steel surrounded by a stony layer, and that it fixes the radius of the core at 4,500 kilometers, and the thickness of the stony layer at 1,500 kilometers. The existence of long vibrations of periods of 18 seconds or more reveals, he thinks, the existence of a layer of liquid or plastic material at a depth of about 30 kilometers from the surface.

Prince Galitzin advocated the use of strong electro-magnetic damping and electro-magnetic recording for seismographs. He showed a small horizontal pendulum provided with coils of wires in a strong magnetic field. One set of coils served to damp the instrument and the second set was connected with a dead beat galvanometer whose deflections are recorded photographically. The velocity and not the displacement of the pendulum is recorded. Although requiring considerable skill for its installation, this instrument promises to be very valuable.

Professor Rosenthal gave the results of his studies of seismograms. He thinks that the periods of vibrations, during the principal part of the movement, increase progressively and therefore concludes that the seismogram is drawn out for somewhat the same reason that the spectrum is. It is to be noted, however, that other observers have failed to detect the progressive change of period.

Harry Fielding Reid

SCIENTIFIC NOTES AND NEWS

A "Life of Lord Kelvin" is in course of preparation by Professor Sylvanus P. Thompson. It will be published by The Macmillan Company.

At the Chicago meeting of the American Society of Naturalists, Professor D. P. Penhallow, of McGill University, was elected president, and Professor H. E. McKnower, of the Johns Hopkins University, secretary.

The president of the American Chemical Society, Professor Marston T. Bogert, of Columbia University, has been reelected for the ensuing year.

Professor George E. Stratton, of the Johns Hopkins University, has been elected president, and Professor A. H. Pierce, of Smith College, has been elected secretary, of the American Psychological Association.

Professor Hugo Münsterberg, of Harvard University, has been elected president, and Professor W. P. Montague, of Columbia University, vice-president, of the American Philosophical Association.

The Chicago Section of the American Mathematical Society, meeting in affiliation with the American Association, elected Professor G. A. Miller chairman, and reelected Professor H. E. Slaught secretary, for the ensuing year.

Dr. Walter M. Mitchell has been appointed director of the Haverford College Observatory.

Dr. Theobald Smith, professor of comparative pathology at Harvard University, has received the degree of doctor of laws from the University of Chicago.