Lynx rufus or *L. canadensis*) killed in the state. The following bounties have been paid in Berkshire County under the provisions of this act: 1903, $100; 1904, $110; 1905, $115; 1906, $100; 1907, $60.[6] The records are not sufficiently explicit as to the species of *Lynx*, but the loupcervier seems far less common, as in only a few cases was the distinction made on the certificate. These animals (*L. rufus*) are sporadically reported from other sections of the state, but often from localities that lead to the suspicion that they may have immigrated from the western hilly or mountainous parts.

C. E. GORDON
MASSACHUSETTS AGRICULTURAL COLLEGE

SOCIETIES AND ACADEMIES

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 652d meeting was held on October 10, 1908, President Bauer presiding. The following papers were presented:

Vertical Temperature Gradients of the Upper Atmosphere: Mr. W. J. HUMPHREYS.

The extensive work that has been done during the past ten years in exploring the air with sounding balloons was reviewed and illustrated with typical curves.

The records obtained with these balloons show that for about 3,000 meters above the surface of the earth the winds are turbulent and the temperature gradient irregular. Above this for some distance the temperature decreases nearly uniformly to a minimum at an altitude of from nine to fifteen kilometers usually. This height and the temperature both are functions of season, of latitude and of type of weather; and the temperature gradient is similarly affected.

Above the minimum the temperature gradient usually changes abruptly and from that point up as far as soundings have been made slowly increases.

All these phenomena were separately discussed and explained as mainly due to the amount and distribution of water vapor in the atmosphere and the consequent location and temperature of the effective radiating surface of the earth.

The results are in accord with the best determinations of the solar constant and with the known laws of radiation and absorption.

[6] Personal letter, Mr. Henry Brewster, treasurer of Berkshire County.

The New Magnetic Survey Yacht "Carnegie": Mr. W. J. PETERS.

A paper on the proposed new vessel designed for a continuation of the magnetic survey of the oceanic areas.

The paper first gave the reasons which made it desirable to purchase a vessel especially built for the requirements of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington. Then followed data concerning the size, sail area and expected performances.

A brief description of the living quarters, accompanied by slides, and also a statement of the methods of observation which are to be on the lines followed in the previous work on the *Galilee* in the Pacific Ocean.

There was also exhibited a graphic representation of the curves of expected maximum ship deviations. A more complete publication will appear elsewhere.

THE 653d meeting was held October 24, 1908. The following papers were read:

The Results of Recent Observations in Atmospheric Electricity: Mr. P. H. DIKE.

The paper gave a summary of some of the recent work in atmospheric electricity and showed the relationship of this work to that done along the same lines on board the Carnegie Institution Magnetic Survey Yacht *Galilee* during the cruise recently finished.

Continuous records made at various observatories of the course of the potential gradient show its extreme variability and slight apparent connection with other atmospheric phenomena. It is of interest as a factor in the determination of the earth-air current.

The discovery of the ionization of gases led to the study of the conductivity of the air, at first by faulty methods through the lack of appreciation of the errors due to saturation currents. J. J. Thomson cleared up the misunderstandings and led the way to more accurate work. For field work the Gerdien conductivity apparatus has been found most useful, and gives fairly consistent results. In conjunction with the record of the potential gradient it gives the earth-air current in absolute measure. Gerdien has found this current at Göttingen to be about 2.5×10^{-16} amperes, with a conductivity for positive electricity of 1.16×10^{-4} electrostatic units and for negative of 1.12×10^{-4} electrostatic units.

The speaker had made use of the same type of

instrument on board the *Galilee*, making observations at sea from latitude 55° 41′ north to 45° .07′ south, but was unable to measure the potential gradient. The conductivities found gave as means $\lambda p = 1.60 \times 10^{-4}$ and $\lambda n = 1.433 \times 10^{-4}$ electrostatic units, somewhat greater than Gerdien found on land. A description of the method of observation at sea was given and the difficulties mentioned. Calibrations of the electroscope in New Zealand and at the Bureau of Standards in Washington showed its sensitiveness to be nearly constant, but gradually increasing.

C. T. R. Wilson's method of measuring the earth-air current was described. He uses a test plate maintained at zero potential while insulated from the earth, and arrives at a value for the current almost identical with that of Gerdien, namely, 2.2×10^{-16} amperes. Mention was made of Schering's work in Göttingen on the continuous registration of the conductivity of the atmosphere, and his apparatus described. He avoids saturation currents by removing the charged body to a sufficient distance from earthed conductors, and obtained a trace showing the course of the conductivity by means of an electrometer connected with the charged body.

Satterly at the Cavendish Laboratory, Cambridge, Eve at Montreal and Ashman at the University of Chicago, have all made independent determinations of the quantity of radio-active emanation in the atmosphere in terms of the mass of radium per cubic meter required to maintain in equilibrium the observed amount of emanation. Ashman condensed the emanation by cooling with liquid air, Eve absorbed it with cocoanut charcoal and Satterly used both methods. The results give as the radium equivalent per cubic meter according to Ashman 97×10^{-12} gram, Eve 60×10^{-12} gram, from results extending over a year, and with a ratio of maximum to minimum of 7 to 1, and Satterly, 88×10^{-12} gram for the charcoal method and over 100×10^{-12} for the liquid-air method.

On board the *Galilee* practically no radio-active deposit could be collected, yet the ionization was as great as on land, tending to disprove the theory that the ionization of the air is due to the radio-active content.

Attention was called to the need for a well-equipped observatory for research along these lines in this country, where the subject has been almost entirely neglected.

Thermometric Lag in Calorimetry: Mr. W. P. White.

Of late, in calorimetry by the method of mixtures, several attempts have been made to avoid an error due to the lag of the thermometer to which considerable importance has been attached.

This error, however, does not exist at all, which may be shown as follows: In a calorimetric run by the method of mixtures, all the temperature data lie upon a temperature-time curve whose form determines both the cooling correction and the main temperature interval. The exact instant at which temperatures on this curve are read is unimportant, so long as the temperature *intervals* are preserved. If now, all temperatures are plotted the same number of seconds wrong, as they would be when the same lagging thermometer is used throughout, no appreciable error can result. The importance of lag in calorimetric thermometers has, therefore, been greatly overestimated.

R. L. Faris,
Secretary

The Elisha Mitchell Scientific Society of the University of North Carolina

The 179th meeting of the society was held in Chemistry Hall on Tuesday, October 13, 1908, 7:30 P.M. The program was as follows:

"Results of the Microscopic Study of the Slate near Chapel Hill," Mr. H. N. Eaton.

"Chemical Energy," Professor J. E. Mills.

"A Further Contribution on the Regenerative Power of Sponges," Professor H. V. Wilson.

Alvin S. Wheeler,
Recording Secretary

Section of Biology, Pittsburgh Academy of Science and Art

The first meeting of the year was held at the Carnegie Institute on Tuesday evening, November 10. At the invitation of the section about twenty-five geologists attended the meeting, and it was decided that there was sufficient interest manifested to warrant the formation of a Geological Section in Pittsburgh. As the Biological Section had already prepared a program which embraced a large number of topics of interest to geologists, it was thought best to combine the two sections for the present year at least. The meeting was addressed by Director W. J. Holland, Dean M. E. Wadsworth, Mr. R. R. Hice, Mr. F. Hewett, Mr. F. Z. Schellenberg, Mr. E. Andrews, Mr. F. S. Webster, Professor J. G. Ogden, Dr. A. E. Ortmann and the secretary of the section.

Percy E. Raymond,
Secretary