the standpoint of disturbance experienced by the electrified double layer. The waterfall theory of thunderstorms now appears probable since the discrepancies hitherto attached to it have been removed by the preceding results. A large number of singularities accompanying the waterfall effect, together with the photoelectric activity and the surface tension of different fluids, can be traced to their surface conditions.—*H. H. Ho[dgson]*.

GAGE APERTURE AND WEIGHT OF CATCH.

By Prof. CHARLES N. HASKINS.

[Dated: Dartmouth College, Hanover, N. H., Nov. 20, 1915.]

In connection with the problem of determining snowfall or rainfall by weighing, I note the following simple relation which seems to be of interest in that it enables private observers to determine the precipitation in this way without the use of specially graduated balances. The relation is: If the diameter of the gage is 10.5 inches, the rainfall in hundredths of an inch is equal to twice the weight of the catch in ounces. This relation is true to within about 1 part in 2,500, which is of course of ample precision. The proof of this results from a simple calculation.

ATMOSPHERIC-ELECTRIC OBSERVATIONS ON THE THIRD CRUISE OF THE "CARNEGIE," 1914.[1]

By W. F. G. SWANN.

[*Reprinted from* Science Abstracts, Sec. A, Oct. 25, 1915, § 1437.]

The general course covered by the cruise was from Brooklyn (left June 8) to Hammerfest in northern Norway; from Hammerfest (July 25) northward to latitude 79° 52′ N. in the neighborhood of Spitsbergen, and then southwestward to Reykjavik in Iceland (Aug. 24), and so back to Brooklyn. The measurements discussed in the present report are those of potential gradient, conductivity, and the radio-active content of the air. Potential gradients were measured by the use of an ionium collector projecting from the stern of the ship connected to a Wulf bifilar electroscope. The standardization of this apparatus was carried out by means of simultaneous ship and shore observations on two occasions. The conductivity was measured by Gerdien's method, and a few observations were also taken of the ionic numbers. The radio-active content was measured by the stretched-wire method of Elster and Geitel with certain modifications devised by the author. There is some uncertainty as to what the measurements obtained by this method really mean, and a considerable amount of discussion is devoted to the point.

The mean potential gradient found on the voyage was 93 volts per meter. The measurements were made between 9 a. m. and noon, at which period of the day Simpson and Wright found in the South Atlantic a mean value of 80 volts per meter; so that, considering the difficulties in the way of obtaining absolute readings, there is a fair agreement between the two results. The mean conductivity was 2.52×10^{-4} electrostatic unit. This is rather greater than the average value found on land. Passing out to sea from the American shore, the conductivity appears first to fall somewhat below the normal land value, and then increases again as the vessel gets out into the open sea. This distribution was observed both on leaving and returning to the shore. The local decrease near the shore is found to be due to a low value of the specific velocity of the ions in the same region. The electrical results have been grouped in various ways with the different meteorological elements, but no marked relationships are found. In discussing the radio-active content, the mean value expressed in Elster-and-Geitel units is found to be 23, corresponding to about 12×10^{-12} curie of radium emanation per cubic meter. This amount is much smaller than would be necessary to account for the conductivity of the air. A similar result has been found by most observers. In the latter portion of the paper an application of the theory of radio-active disintegration is made to the decay curves obtained in the Elster-and-Geitel method, and it is found that while some of the curves can be accounted for by the presence of radium emanation alone in the atmosphere, others appear to require the presence of some more slowly decaying products than those of radium emanation.—*J. S. Di[nes]*.

[1] *See* Terrest. magn., March 1915, 20: 13–48.

FOGGY DAYS IN MANCHESTER, ENGLAND.[1]

By W. C. JENKINS.

[*Reprinted from* Science Abstracts, Sec. A, Oct. 25, 1915, § 1377.]

An inquiry as to whether the number of foggy days in Manchester [England], has increased or decreased in the past 10 years. A distinction is drawn between "fog days" or days of surface fog, and "gloom days" or days on which there was fog at a little distance above the surface but not actually on the ground. The figures for the 10 years are arranged in various ways, and it is found that taking the year as a whole the number of foggy and gloomy days combined has increased 30% between the beginning and ending of the period. The most marked part of this increase is in the number of days of gloom.—*J. S. Di[nes]*.

PHYSICAL CONDITIONS OF THE ACCUMULATION OF THE SUN'S HEAT IN THE SALT SEAS.[2]

By M. RÓZSA.

[*Reprinted from* Science Abstracts, Sec. A, Oct. 25, 1915, § 1381.]

The investigation of the accumulation of the sun's heat in some salt seas was first undertaken by Kalecsinzky, and the problem in general solved. In the present paper a report is given of the special physical conditions of the warming process, and some experimental researches in connection with this. It is found that a considerable accumulation of the sun's heat can only occur in those salt seas in which the upper layers increase in concentration in consequence of a more permanent diffusion process.—*A. E. G[arrett]*.

ABSORPTION OF ULTRA-VIOLET AND INFRA-RED RADIATIONS BY ARABLE SOIL.[3]

By J. F. TRISTAN and G. MICHAUD.

[*Reprinted from* Science Abstracts, Sec. A, Aug. 30, 1915, § 982.]

Photographs were taken in ultra-violet light through a quartz lens, silvered after Liebig, which is transparent to light of from 3100 to 3300 Å units. For the photo-

[1] *See* Mem. Manchester lit. and phil. soc., Apr. 30, 1915, No. 5, 59: 1–4.
[2] Physik. Zeits., Mar. 15, 1915, 16: 108–111.
[3] *See* Archives des sciences, March, 1915, p 270–273.