$$H = E_{1\Delta}\ (2/3)e^{-E_{1\Delta}/RT} \qquad (2)$$

$E_{1\Delta}$ can be evaluated from (2). It turns out out to be 0.75 ± 0.05 volts. The new theoretical specific heat curve which includes the contribution from the above determined $^1\Delta$ level, fits the experimental values of specific heats very well over the whole temperature range investigated—i.e., 1400° to 2500°K.

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July 22, 1932.

A Remark on Erikson's Measurements of the Ionization by γ-Rays at Various Pressures and Potentials

In the Physical Review of July 1, 1932, I. S. Bowen has published measurements on the ionization of air by γ-rays under pressures from 1 to 93 atmospheres applying collecting fields from 1.55 to 1009 volts per cm of a high degree of uniformity.

This author as well as others working in this field recently do not seem to have noticed the work of H. A. Erikson[1] who, as early as 1908, carried out measurements with air for pressures varying from 20 to 400 atmospheres and collecting fields up to 2500 volts over a distance of about 0.8 cm, hence 3100 volts per cm. He also investigated the influence of the temperature on the ionization at a pressure of 200 atmospheres and carried out measurements for carbon dioxyde. The purpose of the present note is to call attention to this beautiful paper of Erikson, which somehow seems to have been overlooked by most of the workers in this field.

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[1] H. A. Erikson, Phys. Rev. **27**, 473 (1908).

Dependence of the Ionization Produced by γ-Rays upon Pressure and Temperature

Broxon[1] has measured the variation of ion current with pressure alone, up to 170 atmospheres. Upon a beta-ray absorption hypothesis, he could explain the form of his i *vs.* p curve very well. However, Millikan and Bowen[2] and Compton, Bennett and Stearns[3] have independently offered an explanation of this curve, based on the idea that at high pressures, there is a lack of saturation. On the basis of their suggestion, Compton, Bennett and Stearns[4] have derived an equation relating ion current to density and temperature. This equation is

$$i = I\rho(1 + A^2\rho^2/T^2)^{-1/2}$$

where A is a constant for each gas, and from this, the temperature coefficient of ionization is found to be

$$\beta = di/idT = (A^2\rho^2/T^3)/(1 + A^2\rho^2/T^2)$$

In order to test this theory, the writer has performed experiments in which β was measured when the temperature range was from 8°C to 38°C, and others in which the ion current was measured when the temperature was varied from room temperature to about 160°C. Though the results obtained seem sufficiently definite to report at this time, it is hoped that several features can soon be investigated further.

A cylindrical steel chamber with inside dimensions of about 30 cm long and 6 cm diameter was surrounded by a brass cylinder to contain the water or glycerine bath. No gas leak was detected at any pressure over a period of a weak. Gas and electric heaters heated the bath evenly, and its temperature was read with a mercury in glass thermometer. The collecting rod was insulated with amber from a brass guard ring which in turn was insulated from the chamber with hard rubber. Protection for the insulators from the heat was provided. The electrical leak was found to be negligible at both low and high temperatures though it appeared to be slightly greater at high temperatures. The Lindemann electrometer was used usually at 80 divisions per

[1] J. W. Broxon, Phys. Rev. **37**, 1320 (1931).
[2] R. A. Millikan and I. S. Bowen, Nature **128**, 582 (1931).
[3] A. H. Compton, R. D. Bennett and J. C. Stearns, Phys. Rev. **38**, 1565 (1931).
[4] A. H. Compton, R. D. Bennett and J. C. Stearns, Phys. Rev. **39**, 873 (1932).