PROCEEDINGS

OF THE

AMERICAN PHYSICAL SOCIETY

MINUTES OF THE WASHINGTON MEETING, APRIL 22–23, 1927

The 145th regular meeting of the American Physical Society was held at the National Academy of Sciences in Washington, D. C. on Friday and Saturday, April 22 and 23, 1927. The presiding officers were Professor Karl T. Compton, President of the Society, and Professor Henry G. Gale, Vice-president of the Society.

On Friday evening there was a dinner for the members of the Society and their friends at the Hotel Raleigh. The speakers at this dinner were Professor R. A. Millikan, Dr. E. E. Slosson, and Professor P. M. Debye.

At the regular meeting of the Council held on Friday, April 22, 1927, three were transferred from membership to fellowship and nineteen were elected to membership. *Transferred from Membership to Fellowship*: F. S. Brackett, J. J. Hopfield, and R. de L. Kronig. *Elected to Membership*: Charles S. Allen, Howard H. Brinton, C. J. Campbell, C. C. Cole, W. E. Curtis, Ralph K. Day, Milan W. Garrett, Newell S. Gingrich, Philip C. Jones, S. C. Lind, Noel C. Little, H. E. Marsh, Wm. Crawford McKissack, Jr., J. Howard McMillen, John G. Moorhead, Charles A. Rinde, Harry Rolnick, Henry Semat, and Lloyd P. Smith.

The regular program of the American Physical Society consisted of 94 papers, numbers 12, 14, 21, 35, 37, 43, 44, 46, 61, 72, 87, 88, 91, 92, 93, and 94 being read by title. The abstracts of these papers are given in the following pages. An **Author Index** will be found at the end.

HAROLD W. WEBB, *Secretary*

ABSTRACTS

1. A thermo-magnetic effect on gases. NOEL C. LITTLE, Bowdoin College.—If a temperature gradient is maintained in a gas completely enclosed by a metal box placed between the poles of an electro-magnet, the isothermal surfaces in the gas are warped upon the excitation of the field, provided the field is non-uniform. That the effect varies with the nature of the gas was shown by a thermo-couple placed midway between the ends of the pole pieces where the temperature gradient was 15 degrees per centimeter. When a field of 15 kilograms was excited, drops in temperature were observed as follows: in air 16 degrees, in oxygen 18 degrees, in nitrogen and carbon dioxide none, in hydrogen 6.6 degrees, in propane 16 degrees.

2. Critical potentials of copper. RICHARD HAMER and SURAIN SINGH, University of Pittsburgh.—Critical potentials of copper have been investigated in the region up to 30 volts. The method adopted was to search for repeatedly occurring breaks in the current potential curves when a copper cylinder and insulated central copper rod suspended in a highly evacuated quartz tube were heated to about 700°C. The measurement of the potentials was made to depend on the determination by a potentiometer of the e.m.f. across a standard resistance

lines and no doubt belong to OI. The triplet is perhaps an unresolved group similar to one in sulphur at λ1480 (unpublished work) which contains eight lines, the normal triplet separation occurring twice. The discrepancy of the separations of the above triplet of oxygen from the normal separation may be explained on this basis. λ1152 is always accompanied by a diffuse band or group on its ultraviolet side. Two single lines λλ1217.62 and 999.47, the latter measured with the carbon line λ1037.021 as standard, occur in the arc spectrum of oxygen with relative intensities of 5 and 7 respectively, the separation of these lines being 17925.6 cm^{-1}. The green aurora line attributed to oxygen has a frequency 17924.7 cm^{-1}. The difference between these two values is 0.9 cm^{-1}, so that the two numbers are identical to within limits of experimental error. This tends to indicate that this aurora line λ5577.35 I. A. is related to the two ultraviolet lines of oxygen, the most plausible relation being that the ultraviolet lines have a common initial or final state and the aurora line represents the transition between their respective final or initial states.

88. X-ray absorption and valence. W. B. MOREHOUSE, Westinghouse Lamp Company.—Experiments reported at the Washington Meetings, April, 1926, suggested that the absorption of heterogeneous x-rays by an element depends upon its valence. Results obtained from the same reactions using zirconium filtered beams indicate the same general results, but the magnitude appears to be somewhat greater, which suggests that the effect may be different for different wave-lengths. From a combination of Moseley's Law with the absorption law it can be shown that at the absorption limit, $d\tau_a/\tau_a = 6db/(N-b)$ where τ_a = atomic absorption coefficient at the short wave-length side of the K limit, b = screening constant, and N = atomic number which indicates that if the screening constant changes the absorption coefficient will change. Existing data shows that the emission and absorption spectra depend upon the valence; in general the higher the valence the shorter the wave-length, which from Moseley's law indicates that the screening constant decreases, which in turn indicates qualitatively that the absorption coefficient should decrease with increase in valence. Calculations from the difference in wave-length of the L limits for iodine in the free state and iodine in sodium iodide gives a decrease in absorption of approximately 0.4 percent which is in agreement with experimental results. Hence with change of valence there must be a slight change in the electron configuration of the atom. (This work was done at Cornell University.)

89. Report on the ether-drift experiments at Cleveland in 1927. DAYTON C. MILLER, Case School of Applied Science.—The ether-drift interferometer which was used at Mount Wilson in California in the experiments of 1921–1926 has been mounted on the campus at Case School of Applied Science in Cleveland. Only minor changes, suggested by experience, have been made in the apparatus. Special precautions have been taken to obviate troubles caused by vibration from city traffic. A series of observations which will extend throughout the year, comparable with those made at Mount Wilson, is now in progress. The results for the first epoch of the series indicates an effect of the same order of magnitude as was obtained at Mount Wilson and consistent with the conclusions previously announced.

90. The photo-electromotive force in selenium. R. L. HANSON, Cornell University. (Introduced by F. K. Richtmyer.)—A detailed study was made of the e.m.f. developed in a selenium cell by illumination, an effect originally discovered by Adams and Day in 1876 and later observed by Fritts, Uljanin and others. Careful investigation has shown this not to be a thermal e.m.f. The results of the investigation up to date are the following: (1) For the same illumination the e.m.f. is independent of the current through the cell. (2) Over wide ranges the e.m.f. is directly proportional to the intensity of illumination. (3) For the same intensity of illumination the e.m.f. is a maximum in the region λ = 490.

91. Charge Density in the new mechanics. R. M. LANGER, Naval Research Laboratory, Washington, D. C. (Introduced by G. Breit.)—The Schrödinger expression for the electric moment can be written $\mu^2 - 1 = N_1/(\nu_1^2 - \nu^2) + N_2/(\nu_2^2 - \nu^2) + N_3/(\nu_3^2 - \nu^2) + \cdots$. This is the form of the classical dispersion formula in which the N_i's indicate the number of oscillators capable of emitting the frequencies ν_i. For the case of the hydrogen atom the first terms have