of Houston and Hsieh. The value of a determined by this method using the estimate of 3 percent for the displacements to be accounted for, is about 5×10^{-12} cm. The hypothesis of a positively infinite potential decreases a to about 4×10^{-12} cm.

The values of a are surprisingly large but could not be reduced to the classical electron radius of 2×10^{-13} cm by any modification of the experimental results which did not affect the order of magnitude of the recently discovered discrepancies.

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The Infrared Spectrum of Heavy Ammonia—ND_3

The writers have made an investigation of the infrared absorption spectrum of ND_3, using a rocksalt prism spectrometer. The sample used was very kindly supplied to us by Professor H. S. Taylor, and was prepared from heavy water estimated to be 99 percent pure. The ammonia sample was estimated to be more than 90 percent ND_3, and the absorption spectrum gave no bands characteristic of ordinary ammonia. By following the procedure of Dennison[1, 2] it is possible to calculate the positions of the fundamental vibrations of this molecule, assuming that the force fields are similar, and that the interatomic distances are the same for the two isotopes. The agreement between observed and calculated values is about as good for the ND_3 as for the values calculated and observed in the literature for the NH_3.[3] These are given in Table I. The spectrum should consist of four bands (of the six possible modes of vibration, two are doubly degenerate), in two of which the change in moment should be perpendicular to the symmetry axis. In the NH_3, the bands at 950 cm^{-1} and 3336 cm^{-1} have been assigned to the parallel vibrations, and the bands at 1631 cm^{-1} and 4417 cm^{-1} are the two fundamental perpendicular vibrations. Of the four bands observed for ND_3, the similarity in the structure of the envelopes of the bands to the corresponding frequencies of NH_3 holds extremely well, and in each case indicates the predicted type of vibration.

Table I.

Light ammonia NH_3					Heavy ammonia ND_3		
ν	Calc.	Obs.	Type	ν'	Calc.	Obs.	Type
ν_3	938	950	$\parallel$	$\nu_3'=0.762$	$\nu_3=$ 715	770	$\parallel$
ν_2	1679	1631	$\perp$	$\nu_2'=0.708$	$\nu_2=1189$	1158	$\perp$
ν_1	3336	3336	$\parallel$	$\nu_1'=0.715$	$\nu_1=2385$	2421	$\parallel$
ν_4	4466	4417	$\perp$	$\nu_4'=0.742$	$\nu_4=3334$	3287	$\perp$

The writers are continuing this investigation with a grating spectrometer of higher resolution and further details concerning the rotational structure of the bands will be presented in the future.

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[1] Dennison, Phil. Mag. **1**, 195 (1926).

[2] Dennison, Rev. Mod. Phys. **3**, 280 (1931).

[3] Schaefer and Matossi, *Dasultrarote Spektrum*, p. 251.