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MINUTES OF THE MEETING OF THE OHIO SECTION AT COLUMBUS, FEBRUARY 19, 1949

THE 1949 Mid-Winter Meeting of the Ohio Section of the American Physical Society was held in the Mendenhall Laboratories of The Ohio State University at Columbus on Saturday, February 19, 1949, with an attendance of one hundred and fifty. The program consisted of an invited paper by M. L. Pool "Nuclear Physics since the New York Meeting;" a contributed paper by Thomas Phillips "An Attempt to Define Temperature," and five other contributed papers of which the abstracts are appended.

LEON E. SMITH, *Secretary*

New Measurements of the Infra-Red Fundamental Bands of NH_3. DARWIN L. WOOD, *The Ohio State University.*—The four fundamental bands of the ammonia molecule have been measured with better resolution than formerly attainable. The perpendicular band ν_4 at 1627 cm^{-1} was measured in a vacuum grating spectrograph using an interrupted radiation beam and a thermocouple detector. The strong water vapor band at 1595 cm^{-1} has made it difficult to obtain good resolution in this region in the past,[1] but in the present work this difficulty was practically eliminated. The parallel band ν_2 near 10μ was measured in an open spectrograph with a 2-meter focus. A Golay pneumatic detector was used with an interrupted radiation beam. It was possible also in this band to improve somewhat on previous resolution of the fine structure.[2] In the 3μ region (ν_1 and ν_3) the results obtained with the vacuum spectrograph were substantially the same as those of Dennison and Hardy.[3] It is believed that with the improved resolution of the fine structure of the bands it will be possible to fit the theory of the tetrahedrally symmetric molecule to the observed spectra with more satisfaction than in the past.

[1] E. F. Barker, Phys. Rev. **55**, 657 (1939).
[2] Sheng, Barker, and Dennison, Phys. Rev. **60**, 786 (1941).
[3] D. M. Dennison and J. D. Hardy, Phys. Rev. **39**, 938 (1932).

The Measurement and Analysis of Some Infra-Red Bands of HCN. I-SHAN CHEN AND E. E. BELL, *The Ohio State University.*—Previous high resolution work on HCN by Choi and Barker[1] yielded complete rotational resolution only for the perpendicular vibration band ν_2 and partial resolution of the band $2\nu_2$. The rotational structure of the vibration bands ν_3, $2\nu_3$, $2\nu_2$, and $\nu_1+\nu_2$ have now been completely resolved with the vacuum grating spectrometer described by Bell, Noble, and Nielsen.[2] By use of the combination principles, the band centers and rotational constants have been determined as follows:

Band	Frequency cm^{-1}	$(B'-B'')$ cm^{-1}	B'' cm^{-1}
$2\nu_2$	1411.42	+0.0065	1.4776
$\nu_1+\nu_2$	2804.2	−0.0096	(1.4693)
ν_3	3311.68	−0.0102	1.4763
$2\nu_3$	6520.7	−0.0211	(1.4670)

By making measurements in an evacuated spectrometer the interference of water vapor in the $2\nu_2$ band was eliminated. Gratings of 7500, 7200, and 3600 lines per inch were used, and a chopped beam Perkin-Elmer thermocouple detection system was used for all bands except $2\nu_3$. The $2\nu_3$ band was obtained in an unevacuated spectrometer with a PbS photo-conductive detection system. The Contour and positions of the bands $\nu_1+\nu_3$ and $\nu_2+\nu_3$ were also obtained.

[1] K. N. Choi and E. F. Barker, Phys. Rev. **42**, 777 (1932).
[2] Bell, Noble, and Nielsen, Rev. Sci. Inst. **18**, 48 (1947).

The Performance of a Simple Helium Liquefier. J. G. DAUNT, C. V. HERR AND A. A. SILVIDI, *Ohio State University.*—A simple helium liquefier working on the Simon expansion principle has been in operation in the Mendenhall Laboratory for some time and details of its construction and performance are given. It enables the liquid helium to be transferred into exterior Dewar vessels in which experimental equipment can be maintained at 1°K for many hours.

The Physical Significance of the Reciprocal Lattice. ALFRED LANDÉ, *The Ohio State University.*—A crystal may be characterized by its lattice structure as well as by its reciprocal lattice. Whereas the space lattice is the basis of the wave theory of diffraction according to Laue and Bragg, the reciprocal lattice forms the background of a particle theory of diffraction, as first proposed by P. Duane. The Ewald sphere construction of the diffracted rays by means of the reciprocal lattice is but a construction in momentum space for the quantized momenta given out by the crystal and transferred to the incident particles.

A Proposed Loading of Piano Strings for Improved Tone. FRANKLIN MILLER, JR., *Kenyon College.*—An ideally stiff string has overtones ν_n which are sharper than multiples of the fundamental, the inharmonicity being proportional to n^2 This well-known theoretical result has been verified by Schuck and Young[1] for some typical strings. It is proposed to improve the tone of a piano string by attaching a small mass, thus lowering the frequency of each normal mode except those for which the mass is at a node. It turns out that for an ideally stiff string approximate correction of a large number of overtones can be obtained with a single mass suitably located. In the limit of a large mass close to an end of the string, the correction is exact for all overtones. A mass of the order of 0.1 g placed a few cm from an end of a typical string adjusts the first eight overtones to within a few hundredths of a semitone, a negligible inharmonicity. Improved tone is expected since the subjective fundamentals derived from difference tones between adjacent partials will have greatly reduced dispersion. The effect of the loading upon tuning would reduce the observed stretching of the octaves to a negligible amount. Deviations from ideal stiffness and the effect of adding 2 masses are also considered.

[1] O. H. Schuck and R. W. Young, Jr., Acous. Soc. Am. **15**, 1 (1943).