

# Proceedings of the Iowa Academy of Science

---

Volume 37 | Annual Issue

Article 84

---

1930

## Velocity of Ultra-Sonic Waves in Vapor

George E. Thompson  
*Iowa State College*

Copyright ©1930 Iowa Academy of Science, Inc.

Follow this and additional works at: <https://scholarworks.uni.edu/pias>

---

### Recommended Citation

Thompson, George E. (1930) "Velocity of Ultra-Sonic Waves in Vapor," *Proceedings of the Iowa Academy of Science*, 37(1), 314-315.

Available at: <https://scholarworks.uni.edu/pias/vol37/iss1/84>

This Research is brought to you for free and open access by the Iowa Academy of Science at UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact [scholarworks@uni.edu](mailto:scholarworks@uni.edu).

was made upon the resistance of the cortical layer transverse to the length of the tuber.

IOWA STATE COLLEGE,  
AMES, IOWA.

---

### THE EFFECT OF GAS-PRESSURE ON TESLA-LUMINESCENCE

G. M. WISSINK

In investigating the tesla-luminescence of cod-liver oil, it was observed that the nature of the luminescence would change very rapidly with the pressure. This effect was noticed for the cod-liver oil vapor, for carbon-dioxide and for air. In the case of air it was found that there was an abrupt change from a pinkish glow at about 4 mm. pressure to a bright orange at about 2 mm. The actual value of the pressure at which this effect took place has not as yet been accurately determined.

A preliminary spectroscopic study of the luminescence has shown that bands which are prominent at the higher pressure disappear at the lower.

BURLINGTON JUNIOR COLLEGE,  
BURLINGTON, IOWA.

---

### VELOCITY OF ULTRA-SONIC WAVES IN VAPOR

GEORGE E. THOMPSON

The velocity of sound waves having a frequency of 107,500 cycles per second has been measured in water vapor and in ether vapor. The waves are generated by a quartz crystal oscillator and velocities measured by an interference method similar to that used by Pierce.<sup>1</sup> The sound chamber is made air tight. After thorough exhaustion of the chamber with an air pump the vapor is introduced through a stop cock which connects the chamber with a glass bottle containing vapor. The sliding joint, through which the rod carrying the sound reflector passes, is made air tight by means of a rubber tube, which, by stretching and contracting, allows the reflector to be moved back and forth by a screw mounted outside the chamber.

The best value obtained for the velocity in water vapor is

<sup>1</sup> Proc. Am. Acad. 60, 271 (1925).

about 430 meters per second at 26°C. For ether vapor the value is 195 meters per second at 23°C. These values are about five per cent higher than the values given in the International Critical Tables.

By using the velocity formula we get 428 meters per second for

$$V = \sqrt{\frac{\alpha p}{d}}$$

the velocity in water vapor at 25°C ( $V=1.321$ ), a value which is in satisfactory agreement with the experimental value. For ether vapor at 35°C ( $V=1.093$ ) the formula gives 199 meters per second which agrees within the limits of experimental error with the experimental result after correction is made for the difference of temperature.

IOWA STATE COLLEGE,  
AMES, IOWA.

---

## MEAN FREE PATH OF GASES BY A DIRECT METHOD

JOHN A. ELDRIDGE

Apparatus consists of a brass tube partitioned into chambers. Partitions contain small holes which are exactly aligned. Gas is introduced at a pressure of several millimeters at one end; a vacuum is maintained in other chambers by rapid pumping and the molecular beam passing through the aligned holes is measured by impact upon a vane suspended from a quartz fiber. Introduction of a gas in one of intermediate chambers deflects away a definite proportion of the beam giving a direct measure of the mean free path.

STATE UNIVERSITY OF IOWA,  
IOWA CITY, IOWA.

---

## THE EARTH AS A SOURCE OF HEAT FOR OUT-BUILDINGS

L. V. CRUM

The object of this experiment was to investigate the possibilities of utilizing the earth's heat near the surface to warm chicken houses, garages, and other out-buildings during extremely cold weather.

A section of water radiator was buried in a trench seven feet deep which was dug in the dirt floor of a henhouse. Directly above