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The Earth as a Source of Heat for Outbuildings

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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.

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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.

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THE EARTH AS A SOURCE OF HEAT FOR OUT-BUILDINGS

L. V. CRUM

The object of this experiment was to investigate the possibilities of ultilizing 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

this another similar radiator was mounted and connected by two inch pipes to the lower radiator. The radiators were filled with kerosene and were ready for operation January 1, 1930.

During the following weeks of cold weather the temperature of the kerosene in the upper radiator was recorded and at no time was it found to be as low as 30°F. The lowest temperature noted in the chicken house was 14°F while on the outside it was -23°F.

That end of the chicken house which contained the radiator was later insulated from the remainder which was to be used as a control. But since the installation of this partition the weather has been so warm that it has been impossible to obtain any accurate data on the effectiveness of this arrangement in keeping the room warm.

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PROBLEMS SUGGESTED BY AN UNCERTAINTY PRINCIPLE IN ACOUSTICS

G. W. STEWART

At the suggestion of Professor A. Lande the principle adopted is $\Delta\nu \cdot \Delta t = 1$, where ν is the intrinsic frequency of an acoustic signal and Δt is its time duration. Applying this principle one finds that it is consistent with experiments on the change in ν in the vibrato and the failure to detect it by ear, with recorded tests on minimum perceptible differences in frequency, and with the minimal time for tone perception. The problems suggested by the principle are: (1) Variations in Δt and $\Delta\nu$ by an artificial vibrato with aural observations of detectable $\Delta\nu$, (2) redetermination of minimum perceptible differences in frequency as dependent upon Δt and (3) an examination of Δt required for tone perception with varied values of $\Delta\nu$ required for so-called tone perception.

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ON THE CONDUCTIVITY OF COD LIVER OIL

L. W. BUTLER

Further experiments have been conducted on the conductivity of cod liver oil under varying conditions. All experiments on the