

FRIDAY, DECEMBER 13

2:00 P.M.

1. Reverberation Time in "Dead" Rooms, CARL F. EYRING, *Bell Telephone Laboratories* (20 minutes).

An analysis based on the assumption that image sources may replace the walls of a room in calculating the rate of decay of sound intensity after the sound source is cut off gives the more general reverberation time equation

$$T = \frac{.05V}{-S \log_e(1 - a_a)}$$

where T is reverberation time, V the volume of the room, S the surface of the room, and a_a the average coefficient of absorption of the wall surface. In the past Sabine's formula,

$$T = \frac{.05V}{Sa_a}$$

has been used to calculate reverberation time, but for rather large values of a_a , that is, for "dead" rooms this equation gives too long a time of reverberation, or in some cases, if the time is measured, it gives a value of a_a greater than unity. This we found to be the case in the Sound Stage, Sound Picture Laboratory, Bell Telephone Laboratories, Inc. Reverberation time measurements made in this room support the new formula, however. Sabine's formula turns out to be the special case of the more general equation and is to be used when a_a is small, that is, for "live" rooms, but not for "dead" rooms.

The new formula is of importance in the talking picture industry for it indicates that a "dead" room may be obtained by the use of less absorbing material than that calculated by the old formula.

October 17, 1929.

2. A Chronographic Method of Measuring Reverberation Time, E. C. WENTE and E. H. BEDELL, *Bell Telephone Laboratories* (20 minutes).

A description is given of apparatus which measures the rate of decay of sound density in a room. A loud speaker, energized from an oscillator, is preferably used as the source of sound. Current is sent through the speaker until the sound in the room has reached a steady state, whereupon the speaker is disconnected from the oscillator and the time required for the energy density in the room to decay to a definite value is recorded by the apparatus.

October 17, 1929.

3. The Measurement of Sound-Absorption by Oscillograph Records, V. L. CHRISLER, *Bureau of Standards* (20 minutes).

A sound decay curve in a reverberation room was photographed by means of an oscillograph. Computing the rate of decay from this film the total absorption in the room can be computed. The average results obtained by this method may be in close agreement with those obtained by the ear using the usual reverberation method, but the method as at present developed requires a prohibitive amount of time and labor.