Tuned Power Lines

By H. H. Skilling[8]

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Intercontinental Radiotelephone Service from the United States

By J. J. Pilliod[9]

A COMPREHENSIVE abstract of this paper is published on pp. 748-52 of this issue of ELECTRICAL ENGINEERING. **(A. I. E. E. Paper No. 31-129)**

Electrical Solutions of Problems of Regular Scheduled Flight

By C. F. Green[10]

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The San Francisco-Los Angeles Section of the Pacific Coast Telephone Cable Network

By E. M. Calderwood[11] and D. F. Smith[12]

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Electrical Measurements of Sound-Absorption

By A. L. Albert[13] and W. R. Bullis[14]

PRINCIPALLY because of the recent development of high-quality radio broadcasting, group address systems, and sound motion pictures, the acoustic characteristics of buildings are now an important factor of architectural design. Using the work of Sabine and others as a basis, it is possible to design studios and auditoriums to give complete acoustic satisfaction.

However, since the sound-absorbing properties of various acoustic and building materials differ widely, it is necessary to determine quite accurately the sound-absorbing coefficients before reliable reverberation calculations can be made. These coefficients have been measured previously by various means, two of which are widely used. The first of these consists of covering the inner surface of a specially constructed room with the absorbing material to be tested. The sound-absorbing coefficients then can be calculated from the measured reverberation time. The other method is very similar except that instead of covering the surface of a room with the absorbing material, the material is placed on large panels in the room. Both of these methods as well as others which have been devised are accurate but necessitate the use of large test samples and are somewhat slow and expensive in use.

This paper describes an electrical method of measuring the sound-absorption properties of acoustic materials. Both the equipment and method can be said to be simple and rapid in operation, and inexpensive. With this method, the sound absorbing properties are determined by the effect produced on the electrical characteristics of a loud speaker by sound waves reflected from the absorbing material. The test equipment includes a relatively small wooden tube inside of which a loudspeaker with a special mounting may be moved back and forth with respect to the end of the box in which is mounted the sound-absorbing material to be measured. In addition to this equipment there is simply a vacuum-tube oscillator with a bridge measuring arrangement including the loudspeaker coil in one side of the bridge circuit.

Advantage is taken of the generally known fact that the electrical impedance measured between the terminals of a telephone receiver or loudspeaker is greatly affected by the location of the device with respect to reflecting surfaces in front of it. The effects of various sound-absorbing materials, as reflected through the adjustable loudspeaker device, are translated through the bridge readings into comparable figures which reveal the relative characteristics of different samples of materials. Although the tests which have been made and which are described in the paper indicate that this method gives consistent results, it is believed that the device can be made even more satisfactory and perhaps arranged to give the sound-absorbing coefficients directly as an indicating-instrument reading rather than from the impedance-bridge settings. **(A. I. E. E. Paper No. 31 M 6)**

Cathode Drop in Arcs and Glow Discharges

By S. S. Mackeown[3]

THE ARC is defined as an electrical discharge in a gas or a vapor in which the cathode drop is of the order of 10 or 20 volts and the current density to the cathode spot is of the order of hundreds or thousands of amperes per square centimeter. For an arc to exist it is necessary that there be some mechanism for producing electrons at or near the cathode. Unfortunately, there is no general agreement among physicists as to the mechanism which produces this low cathode drop with the correspondingly high current density which is characteristic of an electric arc. In this paper the author reviews briefly the different prevalent theories regarding the low cathode drop in an arc, offering discussions and interpretations based upon extensive research work carried out at the California Institute of Technology.

The author divides his subject treatment into four general parts: (1) the cathode drop in an arc, (2) the normal cathode drop in a glow discharge, (3) the abnormal cathode drop, and (4) transition from a glow discharge to an arc. In each case prevalent theories are briefly presented and discussed. **(A. I. E. E. Paper No. 31 M 5)**