Abstracts of Technical Articles by Bell System Authors

Testing Cathode Materials in Factory Production.[1] J. T. ACKER. The paper deals with the methods of testing radio-tube cathode materials in factory production, and especially with a comparison of several specific lots of materials of variable content. It is believed that this is the first time the electron-tube industry has made mass tests on a well-controlled engineering basis of cathode materials which vary in single component elements.

Advances in the Theory of Ferromagnetism.[2] R. M. BOZORTH. This article presents the results of the most recent investigations in the field of ferromagnetism. There have been a number of new ideas brought forth through research along these lines, of which three of the most outstanding ones are explained and illustrated.

On Magnetic Remanence.[3] R. M. BOZORTH. The magnetic retentivity of many materials is about half of the magnetization at saturation, a fact accounted for by simple domain theory. In some materials, however, the retentivity is only a small fraction of saturation, sometimes less than 10 per cent. The explanation of this fact is discussed. It is suggested that in materials with almost zero magnetic anisotropy the Bloch walls between domains increase in thickness until they envelop the whole specimen and the domain structure disappears.

Multifrequency Pulsing in Switching.[4] C. A. DAHLBOM, A. W. HORTON, JR., and D. L. MOODY. Applications of multifrequency pulsing in switching are described in this article. Today, many installations of this type are being made in cities throughout the nation. This system permits operators or senders to complete calls to crossbar offices without the aid of other operators.

Circuits for Cold Cathode Glow Tubes.[5] W. A. DEPP and W. H. T. HOLDEN. This paper discusses fundamental operating characteristics and typical circuits using cold cathode glow tubes for relays, impulse generators, pulse counting and interlocking functions.

The Substitution Method of Measuring the Open Circuit Voltage Generated by a Microphone.[6] M. S. HAWLEY. An analysis of the substitution method of measuring the open circuit voltage generated by a microphone is given

[1] *Proc. I.R.E.—Waves and Electrons Section*, v. 37, pp. 688–690, June 1949.
[2] *Elec. Engg.*, v. 68, pp. 471–476, June 1949.
[3] *Zeits. f. Physik*, v. 124, 7/12, pp. 519–527, 1948.
[4] *Elec. Engg.*, v. 68, pp. 505–510, June 1949.
[5] *Elec. Mfg.*, v. 44, pp. 92–97, July 1949.
[6] *Jour. Acous. Soc. Amer.*, v. 21, pp. 183–189, May 1949.

which shows that the "normal" substitution voltage equals the open circuit voltage for all types of acoustic measurements and for any value of electric impedance loading the microphone. It is shown that the method recently proposed by some authors of removing the acoustic load from the microphone when applying the substitution voltage results in a substitution voltage which does not equal the open circuit voltage. It is also shown that a formula for the response of a transducer derived for a system in which the microphones are open-circuited may be used when the microphones are terminated by finite electrical impedances, by replacing the generated open circuit voltages in the formula by the corresponding "normal" substitution voltages.

Consideration is given to the restriction in the definition of the pressure response of a transducer made necessary by the fact that the pressure on a microphone diaphragm is a function of the electrical impedance terminating the microphone.

An experiment is described which involves a microphone coupled to a chamber, the acoustical impedance of which is high relative to that of the microphone. The results of this experiment agree with the conclusions of the analysis.

A Note on Filter-Type Traveling-Wave Amplifiers.[7] J. R. PIERCE* and NELSON WAX. A small-signal analysis of systems in which an electron beam interacts with a circuit composed of discrete filter elements is given here. The effects of a line beam interacting with a series of gaps, which are capacitive elements of a filter structure, are calculated, and it is shown that an admittance can be introduced which arises from the presence of the electrons. This admittance is in parallel with the gap capacitance, and thus will alter the propagation factor of the filter circuit. It is shown that traveling-wave solutions exist for the combination of electron beam and filter circuit, and that there is a solution which has a positive real part, indicating that gain will be exhibited.

[7] *Proc. I.R.E.*, v. 37, pp. 622–625, June 1949.
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