Abstracts of Technical Articles by Bell System Authors

Experimental Determination of Helical-Wave Properties.[1] C. C. CUTLER. The properties of the wave propagated along a helix used in the traveling-wave amplifier are discussed. A description is given of measurements of field strength on the axis, field distribution around the helix, and the velocity of propagation. It is concluded that the actual field in the helix described is slightly weaker than would be predicted from the relations presented by J. R. Pierce for a hypothetical helical surface.

Results of Microwave Propagation Tests on a 40-Mile Overland Path.[2] A. L. DURKEE. This paper gives the results of a series of microwave radio propagation tests over an unobstructed 40-mile overland path. The purpose of the tests was to investigate the transmission characteristics of such a path at centimeter wavelengths over a long period of time. Statistics on the transmission results at wavelengths ranging from 1.25 to 42 cm. are given. The tests extended over a period of about two years.

A Tunable Vacuum-Contained Triode Oscillator for Pulse Service.[3] C. E. FAY* and J. E. WOLFE. A tunable push-pull triode oscillator is described in which the vacuum-tube components and the entire r.f. portion of the oscillator circuit are contained in an evacuated metallic envelope. A terminal is provided for coaxial output into a 50-ohm transmission line. The oscillator was developed for the frequency range of 390 to 435 Mc. and is tunable by mechanical means continuously through this range. Pulse power of above $\frac{1}{2}$ megawatt is obtained with pulse voltages of 15 to 17 kilovolts applied.

A Proposed Loudness-Efficiency Rating for Loudspeakers and the Determination of System Power Requirements for Enclosures.[4] H. F. HOPKINS and N. R. STRYKER. Experimental and computed data relating to the loudness contribution of various ranges of the frequency spectra of speech and music are correlated with the corresponding energy distribution. A relatively simple measurement of sound pressure and a knowledge of certain acoustic radiation phenomena are applied to this correlation to form the basis of a

[1] *Proc. I. R. E.*, February 1948.
[2] *Proc. I. R. E.*, February 1948.
[3] *Proc. I. R. E.*, February 1948.
* Of Bell Tel. Labs.
[4] *Proc. I. R. E.*, March 1948.

method for predicting the loudness established by loudspeakers in enclosures. A loudness-efficiency rating for loudspeakers is suggested, and its application to sound-system engineering problems is described.

A Sheet of Air Bubbles as an Acoustic Screen for Underwater Noise.[5] DONALD P. LOYE* and WM. FRED ARNDT. In Pearl Harbor, where there often were eight hundred ships of all kinds, the underwater noise level was high. No place was found where noise measurements could be made satisfactorily, and therefore it was decided that the best arrangement would be to insulate Auxiliary Repair Docks and measure the noise of submarines while they were in the docks. This was done by the development of a suitable air bubble screen across the open end of the dock. Such an acoustic barrier was comparatively easy to install, did not interfere with submarines entering and leaving, kept ocean surface oil out of the dock, insulated against low- as well as high-frequency noises as was required and, after extensive experimentation, the noise of the screen was reduced to a level that did not interfere with the noise measurements. The insulation of the screen upon the noise of a nearby submarine charging batteries is illustrated by a phonograph recording.

A Method of Determining and Monitoring Power and Impedance at High Frequencies.[6] J. F. MORRISON and E. L. YOUNKER. A method and newly developed devices for determining and monitoring power and impedance levels in transmission lines at high frequencies are explained. Practical considerations influencing accurate determination of power and impedance levels are analyzed, and the previous and newly developed methods of monitoring these important quantities under changing conditions of load are compared.

Automatic Volume Control as a Feedback Problem.[7] B. M. OLIVER. Feedback amplifier theory is shown to be applicable to the usual a.v.c. system. Expressions are derived for the loop gain in terms of the design requirements and the gain-control characteristic of the controlled amplifier. Using these expressions, the design of an a.v.c. system is quite straightforward and its characteristics, such as regulation and effect on desired modulation, are readily predictable.

[5] *Jour. Acous. Soc. Amer.*, March 1948.
* Of Western Electric Co.
[6] *Proc. I. R. E.*, February 1948.
[7] *Proc. I. R. E.*, April 1948.