(*Cont'd from p. 45*)

nected directly to the waveguide probe in order to minimize the effect of standing waves between the probe and the detector.

Enough readings of maximum and minimum voltage and their respective frequencies are taken to establish the cyclic recurrence of the standing wave. Computation of L for several sets of data gives a check on the accuracy of measurement as well as a means of "averaging out" any discrepancies.

This technique is subject to several limitations, among them the following:

Accuracy of frequency measurement—For accurate results, the frequency must be measured exactly. This is particularly true on long waveguide runs (L) where the change in guide wavelength between standing wave maxima is very small. Since exact frequency measurement with field equipment is very difficult, this is a primary source of error.

Complexity of the standing wave—Minor reflections, present in all practical waveguide installations, tend to shift the maxima and minima of the main standing wave, thus leading to errors in the determination of the pertinent frequencies. A broad frequency spectrum of the oscillator, which normally attends a high standing wave ratio, will also complicate the standing wave, resulting in more difficult analysis. In severe cases of complex standing waves, it may be necessary to plot carefully a curve of standing wave voltage versus frequency to identify properly the maxima and minima resulting from the main discontinuity. In these cases, it is desirable to use a larger constant than one in (2), that is, to shift the standing wave several half-guide wavelengths, rather than one. Eq. (3) must then be modified accordingly.

Using field test equipment, in experiments on L-band radar, accuracies of a few inches at fifteen feet and a few feet at seventy feet have been achieved. With the use of laboratory instruments, greater aecuracy can be expected.

In general, the accuracy of the results depends upon how severe the main discontinuity is, and upon how well the rest of the system performs, in other words, upon how simple the standing wave is. The chief value of the technique is its ability to isolate the trouble to the antenna or to a specific section of the waveguide.

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Contributors

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In 1947–48 Mr. Altschuler held a Research Fellowship at the Microwave Research Institute of the Polytechnic Institute of Brooklyn, and since then has been employed there, now in the capacity of research associate. His work has been concerned chiefly with the development of impedance meters, microwave measurement techniques, and equivalent network representations.

Mr. Altschuler is a member of Sigma Xi and Eta Kappa Nu.

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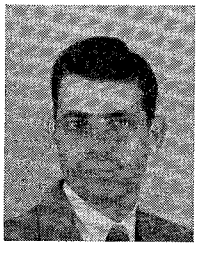

H. L. BACHMAN

Mr. Bachman has been employed since 1951 as an engineer by the Wheeler Laboratories, where he has specialized in microwave antennas and transmission lines.

He is a member of Eta Kappa Nu and Tau Beta Pi, and an associate of Sigma Xi.

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In 1952 Mr. Crandell joined the Laboratory for Electronics in Boston, Mass., where he is now engaged in microwave development problems associated with "Ground Controlled Approach Equipment."

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From 1942 to 1946 Mr. Dawirs worked in the engineering departments of a number of Westinghouse plants. From 1946 until 1948 he worked in the research department of the Curtiss Wright Corporation, Columbus plant; and since 1948 he has been with the Antenna Laboratory of the Ohio State University Research Foundation, in Columbus, Ohio.

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A. E. HARRISON

From 1936 to 1939 he was a teaching fellow at the California Institute of Technology, receiving the M.S. degree in 1937, followed by the Ph.D. degree in 1940. From 1940 to 1946, Professor Harrison was employed by the Sperry Gyroscope Company in the Klystron Development Laboratory. He joined the staff of Princeton University in 1946 as assistant professor of electrical engineering. In September, 1948, Dr. Harrison joined the faculty of the University of Washington, where he is professor of electrical engineering.

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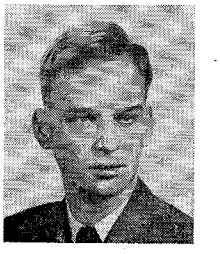
Wilbur L. Pritchard (A'45–M'48–SM'52) received the B.E.E. degree from the City College of the City of New York in 1943, and did further graduate study at M.I.T. between 1948 and 1951.



W. L. PRITCHARD

From 1943 to 1946 Mr. Pritchard was an engineer with the Philco Radio and Television Corporation, where he was engaged first in development of airborne radar systems and later of home radios and phonographs. From there he joined the Raytheon Manufacturing Company as senior engineer,

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Mr. Pritchard is Chairman of the RETMA Committee on Waveguides and Fittings and Secretary of the Boston Chapter of the IRE Professional Group on Microwave Theory and Technique.

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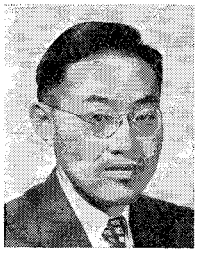

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Mr. Wall is a member of Phi Beta Kappa, Sigma Xi, Zeta Mu Tau, Tau Beta Pi, and the American Institute of Electrical Engineers.