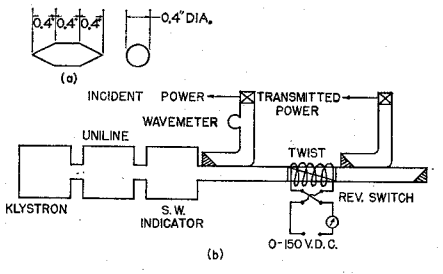

Fig. 1—(a) Tapered cylindrical ferrite specimen; (b) block diagram of experimental equipment.

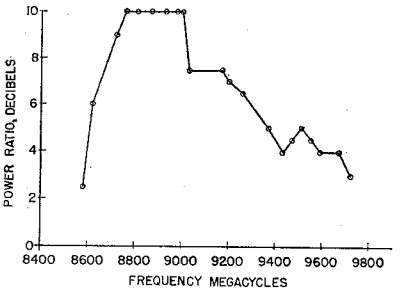

Fig. 2—Transmitted power ratio on reversal of magnetic field at constant magnetizing current (H =160 oersteds).

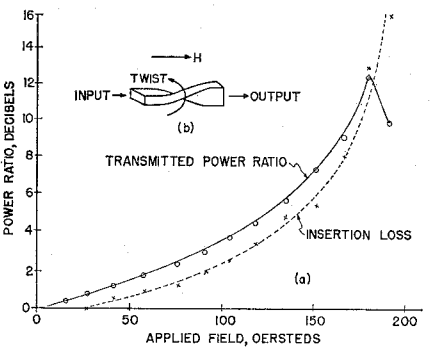

Fig. 3—(a) Transmitted power ratio and insertion loss at constant frequency (f=8900 mc); (b) conditions for attenuation in forward direction.

the transmitted power by more than 10 db. The power ratio on reversal of the magnetic field is shown in Fig. 2 at a constant value of magnetizing current for the frequency range of 8600–9700 mc and in Fig. 3(a) at a constant frequency of 8900 mc with the magnetizing current variable. The insertion loss was approximately equal to the power ratio over the range investigated. Conditions for attenuation in the forward direction are shown schematically in Fig. 3(b).

The voltage standing wave ratio of the ferrite-loaded twist was about 2.5 and was not affected appreciably by changes of frequency or magnetic field. The corresponding reduction of incident power of approximately 1 db was taken into account in plotting the above data.

The field configuration in the loaded rectangular twist does not lend itself to simple analysis, particularly since higher modes are likely to be excited, because of the discontinuity presented by the ferrite specimen. However, it is conceivable that a combination of TE_{10} and TE_{01} modes could result in a circularly polarized component which in conjunction with the axial magnetic field causes the effects described.

Thanks are due to Dr. C. L. Hogan for his interest in these experiments and for the supply of ferrite material.

A. E. Barrington
Cambridge Electron Accelerator
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Contributors

Helmut M. Altschuler (S'47–A'49–M'54–SM'55) was born in Germany in 1922. He received the B.S. and M.S. degrees from the Polytechnic Institute of Brooklyn, N. Y., in 1947 and 1949, respectively, both in electrical engineering. At the present time, he is continuing his graduate studies at P.I.B.

H. M. Altschuler

During 1947 and 1948 Mr. Altschuler held a Research Fellowship at the Microwave Research Institute of P.I.B., and since then has been employed there, presently in the capacity of research associate.

His work has been chiefly concerned 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.

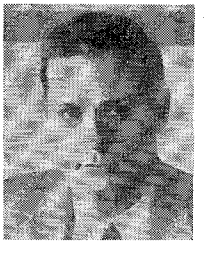
Bert A. Auld (S'49–A'53–M'58) was born on November 4, 1922, in Wei-Hwei-fu, China. He received the B.S. degree in electrical engineering from the University of British Columbia, Vancouver, B. C., Can., in 1946.

B. A. Auld

From 1946 to 1948 he was employed by the National Research Council, Ottawa, Can. In 1949 he received the M.S. degree, and in 1952, the Ph.D. degree in electrical engineering from Stanford University, Stanford, Calif. During the following year he worked at the Stanford Microwave Laboratory on VHF and UHF antennas. From 1953 to 1955 he was employed by Electrical and Musical Industries Ltd., Hayes, Middlesex, England, where he worked on the stagger-tuning of multicavity klystrons. Since 1955 he has conducted research on microwave ferrite devices and has taught applied electromagnetic theory at the University of British Columbia.

❖

Carroll M. Barrack (S'49–A'50–M'56) was born in Baltimore, Md., on March 15, 1927. He received the B.S. and Ph.D. degrees in electrical engineering in 1950 and 1956, respectively, from The Johns Hopkins University, Baltimore, Md.



C. M. Barrack

In 1954, he became associated with Aircraft Armaments, Inc., Cockeysville, Md., where he worked on video and pulse circuitry, precision test equipment, radar systems, data handling equipment, and weapons systems evaluation. In

1957 he joined Electronics Communications, Inc., Timonium, Md., as a research engineer concerned with the development of microwave ferrite devices. He is presently an electronics department manager at Miller Research Laboratories, Baltimore, Md.

Dr. Barrack is a member of Tau Beta Pi, Sigma Xi, and an associate member of the AIEE.

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Aaron D. Bresler (S'43–A'46–M'55–SM'59) was born in New York, N. Y., on June 20, 1924. He received the B.E.E. degree from the College of the City of New York in 1944. From 1944 to 1947 he served with the U. S. Army Signal Corps., attaining the rank of first lieutenant. In the year following his discharge, Mr. Bresler was employed as a telephone engineer with the armed services in Austria. From 1948 to 1951, and again from 1953–1955, he was an instructor in the Electrical Engineering Department of C.C.N.Y. In 1951 he received the M.E.E. degree from the Polytechnic Institute of Brooklyn and joined the staff of its Microwave Research Institute where, for two years, he engaged in development work on microwave components. Since rejoining the staff of the Microwave Research Institute in 1955 he has been engaged in analytical studies of propagation and diffraction phenomena in anisotropic waveguides.

A. D. Bresler

Mr. Bresler is a member of Tau Beta Pi, Eta Kappa Nu, and Sigma Xi.

❖

Marvin Cohn (S'49–A'51–M'57) was born in Chicago, Ill., on September 25, 1928. He received the B.S.E.E. degree in 1950 and the M.S.E.E. degree in 1953, both from the Illinois Institute of Technology, Chicago.

M. Cohn

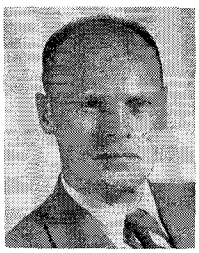
From 1951 to 1952, he was employed by the Glenn L. Martin Company, Baltimore, Md.; he was with the Radiation Laboratory of The Johns Hopkins University, Baltimore, from 1952 until he entered the U. S. Army Signal Corps in 1953. He was stationed at White Sands Proving Grounds where he worked on the analysis of missile tracking systems.

In 1955 he returned to the Radiation Laboratory, where he has done research and development work on broad-band and superheterodyne receivers and surface-wave transmission lines. He is head of the Millimeter Wave Techniques Group of the Radiation Laboratory.

Mr. Cohn is a member of Eta Kappa Nu, Tau Beta Pi, and Sigma Xi.

❖

William Culshaw (SM'57) was born in Lancashire, England, on February 5, 1914. He received the B.Sc. degree in physics from the University of Sheffield in 1941, the B.Sc. degree in mathematics and the Ph.D. degree both from the University of London in 1947 and 1952, respectively.



W. Culshaw

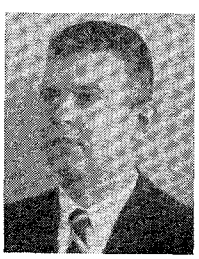
From 1942 to 1954 he was a staff member of the Telecommunications Research Establishment, Malvern, England, where he was with the microwave receiver and millimeter wave divisions. From 1954 to 1956 he was a member of the Radio Physics Laboratory, Ottawa, Canada, where he worked on scattering, and antenna problems.

Since 1956, he has been a member of the Microwave Physics Section of the National Bureau of Standards, Boulder Laboratories, Boulder, Colo., where his primary interests are in millimeter wave research, and microwave optics.

Dr. Culshaw is a member of the Scientific Research Society of America.

❖

James W. Duncan (A'53–SM'59) was born in Decatur, Ill., on September 15, 1926. From 1944–1946 he served as an electronic technician with the U. S. Navy. He attended Millikin University, Decatur, from 1946–1948, and in 1950 received the B.S. degree in electrical engineering from the University of Colorado, Boulder.



J. W. Duncan

From 1950–1953 he was a development engineer at the Sandia Corporation, Albuquerque, N. M. During the years 1953–1958, he was on the staff of the Electrical Engineering Department of the University of Illinois, Urbana, where he was a research assistant and later associate in the Antenna Laboratory, performing research on surface wave launchers and antennas.

Dr. Duncan received the M.S. and Ph.D. degrees in electrical engineering in 1955 and 1958, respectively, from the University of Illinois. In September, 1958, he joined the antenna group at Collins Radio Company, Cedar Rapids, Ia.

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

Robert V. Garver, for a photo and biography, see p. 458 of the October, 1958 issue of these Transactions.

❖

Leonard O. Goldstone (M'51–SM'55) was born in Ogdensburg, N. Y., on February 15, 1922. He received the B.S. degree from Clarkson College of Technology, Potsdam, N. Y., in 1947, and the M.S. and Ph.D. degrees from the Polytecnic Institute of Brooklyn, Brooklyn, N. Y., in 1950 and 1957, respectively, all in electrical engineering. From 1947 to 1954 he was an instructor, and then assistant professor in the Electrical Engineering Department of P.I.B.

L. O. Goldstone

From 1954 to 1957 he was a research associate at the Microwave Research Institute of P.I.B. where he was engaged in research on propagation in unconventional waveguides with applications to traveling wave antennas. In 1957, he returned to the Faculty of P.I.B. as assistant professor of electrical engineering. He is also presently serving as a research consultant to Kahn Research Laboratories, Inc.

Dr. Goldstone is a member of Eta Kappa Nu and Sigma Xi.

❖

Arthur C. Hudson (M'53) was born on May 4, 1919, in Toronto, Ont., Can. He received the degree of B.A.Sc. in electrical engineering from the University of Toronto in 1941.

A. C. Hudson

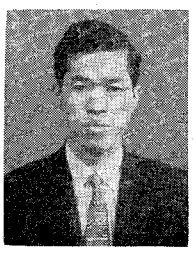
From 1941 to 1945, he was engaged in quality control of cathode-ray tube manufacture at Research Enterprises Limited, in Toronto. Since then he has been employed in the Radio and Electrical Engineering Division of the National Research Council of Canada in Ottawa, where he has been engaged in various aspects of microwave radar.

Mr. Hudson is a professional engineer in the Province of Ontario.

❖

C. M. Johnson, for a photo and biography, please see p. 183 of the January, 1959 issue of these Transactions.

Takeshi Kawahashi was born on February 21, 1921, in Heijo, Japan, He received the B.E. degree in electrical engineering from the University of Tokyo in 1943.



T. KAWAHASHI

He then became associated with the Nippon Electric Co., where, during World War II, he was engaged in laboratory research on radar equipment. Since then he has been associated with the development of supermultichannel microwave relay systems at the Development and Research Section, Radio Department, where he is an acting chief of the microwave group.

Mr. Kawahashi is a member of the Institute of Electrical Communication Engineers of Japan.

❖

D. D. King, for a photo and biography, please see p. 336 of the July, 1958 issue of these TRANSACTIONS.

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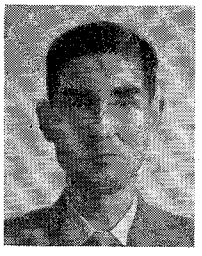
Katsu Matsumaru (A'55) was born on May 30, 1913, in Tokyo, Japan. He was graduated from Tokyo University with the B.S. degree in 1939.



K. MATSUMARU

From 1940 to 1943, he served as an assistant at Tokyo University and later, from 1944–1951, he served in the same capacity at the Tokyo Institute of Technology.

In 1951, Mr. Matsumaru joined the Radio Development Section of the Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation in Tokyo, Japan, where he has participated in the microwave research program.

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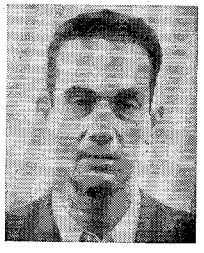
Eugene W. Sard (A'49–M'55) was born in Brooklyn, N. Y., on December 21, 1923. He received the B.S. and M.S. degrees in electrical engineering in 1944 and 1948, respectively, from the Massachusetts Institute of Technology, Cambridge, Mass. From 1944 to 1946, he served in the USNR as a radar officer. From 1946 to 1948, he was a research assistant in the Center of Analysis and the Servomechanisms Laboratory at M.I.T., working on digital computers.



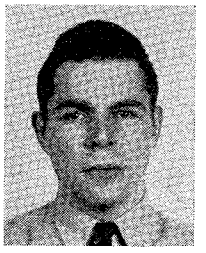
E. W. SARD

Since 1948, he has been with Airborne Instruments Laboratory, Mineola, N. Y., working at first in the Radar Department and more recently in the Applied Electronics Department. For the past two years he has been working on the application of semiconductor diodes to various fields including fast switching, harmonic generation, and low-noise amplification.

Mr. Sard is a member of Sigma Xi.

❖

Jerome R. Singer (S'55–M'57) was born October 16, 1921, in Cleveland, Ohio. After four years at sea as a navigator, he received the B.S. degree in mathematics from the University of Illinois, Urbana, and the M.S. and Ph.D. degrees in physics from Northwestern University, Evanston, Ill., and the University of Connecticut, Storrs, respectively.



J. R. SINGER

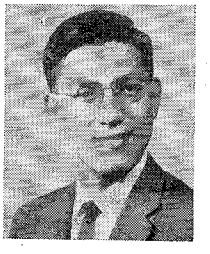
He has been a member of the engineering staff of Sperry Gyroscope Co. and Boeing Airplane Co. He was a solid-state physicist at the Naval Ordnance Laboratory, White Oak, Md., and chief staff physicist of the National Scientific Laboratories, Inc., Washington, D. C. He is presently an associate professor in the electrical engineering division at the University of California, Berkeley.

His interests are in solid-state physics, particularly magnetic materials, masers, and electronic systems.

Dr. Singer is a member of the Physical Society, Sigma Xi, AAAS, Physical Society of Great Britain, Optical Society of America, and Acoustical Society of America.

❖

Charles C. H. Tang was born on September 27, 1924, in Shanghai, China. He received the B.S. degree in physics in 1946 from the University of Shanghai. He taught in the physics department of the University from 1946 to 1949; from 1950 to 1951 he was chief accountant at the Universal Textile Co., Ltd., Hongkong.



C. C. H. TANG

In 1952, he received the M.S. degree in electrical engineering from Oklahoma State University, Stillwater, and then entered Harvard University, Cambridge, Mass., on a Gordon McKay Scholarship, where in 1956 he received the Ph.D. degree in applied physics. After remaining at Harvard for a year as a Research Fellow he joined the University of California, Berkeley, where from 1957 to 1958 he was an assistant professor in electrical engineering. Currently he is an associate professor in physics at Tunghai University, Taichung, Taiwan.

Dr. Tang is a member of Sigma Xi and Phi Kappa Phi.

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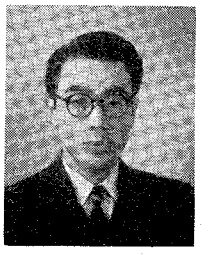
Teiji Uchida was born on December 17, 1931, at Morioka, Iwateken, Japan.

In 1954, he received the B.E. degree in electrical engineering from the University of Tokyo.



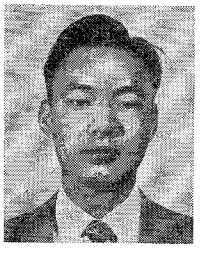
T. UCHIDA

After his graduation, he joined the Nippon Electric Co., and since that time, has been engaged in the development of supermultichannel microwave relay systems at the Development and Research Section, Radio Department, where he is a member of the engineering staff.

Mr. Uchida is a member of the Institute of Electrical Communication Engineers of Japan and of the Institute of Electrical Engineers of Japan.

❖

Omar Wing (S'50–A'53–M'58) was born in Detroit, Mich., on March 2, 1928. He received the B.S. degree in electrical engineering from the University of Tennessee, Knoxville, Tenn., in 1950, and the M.S. degree from the Massachusetts Institute of Technology, Cambridge, Mass., in 1952.



O. WING

He then joined Bell Telephone Laboratories as a member of the technical staff. Since 1956, on leave from Bell Laboratories, he has been an instructor in electrical engineering at Columbia University, New York, N. Y.

Mr. Wing is a member of Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, Sigma Xi, and the AIEE.

❖

Leo Young, for a photo and biography, please see p. 186 of the January, 1959 issue of these TRANSACTIONS.