Two items not specifically evaluated should be noted. The transformers tested were not particularly frequency sensitive; they behaved effectively over approximately a 20 per cent range. The several transformers tested thus far have indicated no important dependence upon a and b; only their ratio is important.

Conclusion

The utilization of an iteration of parallel plane waveguides as a $\lambda/4$ transformer to couple a millimeter wave cavity has been shown to be both effective and simple to design. Its construction is also straightforward. The accuracy of the design procedure, though based upon the use of average fields and a perturbation impedance calculation, is limited mainly by the inaccuracies in anticipated losses.

By field averaging, other waveguide impedance transforming schemes should be adaptable to the coupling of high order microwave cavities. Another variation of the $\lambda/4$ transmission line is a simple dielectric sheet. Available dielectrics limit this scheme to use in rather lossy cavities, however.

Systems which use wave structures above cutoff as transformers overcome the difficulties of achieving critical coupling experienced with reactive reflectors in lossy cavities.

The authors acknowledge the assistance of J. F. Lowe in the preparation of the transformers, and of Dr. M. D. Sirkis and D. P. Akitt in clarifying the text.

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P. D. Coleman
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Electrical Engrg. Dept.
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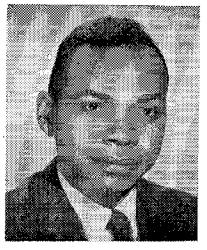
Urbana, Ill.

Contributors



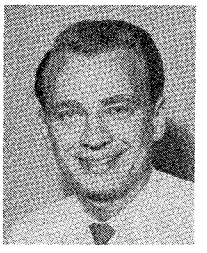
G. F. Bland (S'50–A'51–M'58) was born in Providence, R. I., on January 6, 1927. He received the Sc.B. in engineering from Brown University, Providence, in 1948, the M.S.E.E. from the University of Illinois, Urbana, in 1950, and the E.E. degree from Columbia University, New York, N. Y., in 1957.

He was a Research Assistant at the University of Illinois where he participated in the ORDVAC computer development program. In 1950 he joined the IBM Engineering Laboratories in Poughkeepsie, N. Y., and later transferred to the IBM Watson Scientific Computing Laboratory at Columbia University, in 1951. He was active in several early digital computer programs in IBM, including the IBM 701 and NORC. In 1955 he switched to microwave oriented activities when he became engaged in ammonia maser research and, a year later, in a microwave carrier logical systems program. Presently, he is at the IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y., where he is the Manager of a group which is engaged primarily in the adaptation of microwave techniques to the problems of pulse propagation in subnanosecond computer systems.

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

❖

Martin F. Bottjer was born in New York, N. Y., on July 1, 1932. He attended Hofstra College, Hempstead, N. Y., from 1956 to 1958.



From 1952 to 1956 he served as an Electronic Technician with the U. S. Air Force. Also, prior to college, he was employed as an Electronic Technician with the Hazeltine Electronics Company, Little Neck, N. Y. From 1958 to 1962 he was a Standards Engineer at Hughes Aircraft Company, Culver City, Calif. He is presently a Research Assistant at the Aerospace Corporation, El Segundo, Calif.

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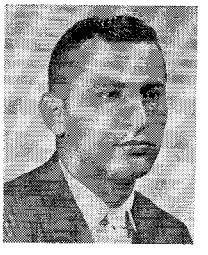
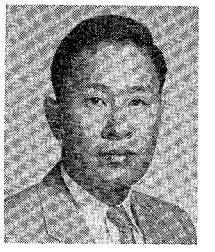


Marvin B. Chasek (S'53, A'55, M'60) was born in New York, N. Y., on January 24, 1931. He received the B.S.E.E. and M.S. degrees from Rutgers University, New Brunswick, N. J., in 1952 and 1955, respectively. Upon completion in 1960 of the Communication Development Training Program at Bell Telephone Laboratories, he also received the M.E.E. degree from New York University.

From 1952 to 1954 he was a Research Assistant at Rutgers University. In 1956 he joined the Technical Staff of Bell Telephone Laboratories, Murray Hill, N. J. Since then he has been engaged in the development of precision measurement equipment for transmission systems.

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



Fang-Shang Chen (S'56–M'60) was born in Taipeh, Taiwan, China, on February 25, 1928. He received the B.S. degree in electrical engineering from National Taiwan University, Taiwan, in 1951, and the M.S.E.E. degree from Purdue University, Lafayette, Indiana, in 1955, and the Ph.D. in electrical engineering from the Ohio State University, Columbus, in 1959.

He worked as a Research Assistant and later as a Research Associate in the Electron Device Laboratory of the Ohio State University, from 1956 to 1959. Since 1959 he has been a member of the Technical Staff of the Bell Telephone Laboratories, Murray Hill, N. J., engaged in the development of ferrite devices and recently of the maser.

Mr. Chen is a member of Tau Beta Pi, and Sigma Xi.

❖

Marvin Cohn (S'49–A'51–M'57–SM'61) was born in Chicago, Ill., on September 25, 1928. He received the B.S. degree, in 1950, and the M.S. degree in electrical engineering, in 1953, both from the Illinois Institute of Technology, Chicago. In 1960 he received the Doctor of Engineering degree from The Johns Hopkins University, Baltimore, Md.

He was employed by the Glenn L. Martin Company, Baltimore, from 1951 to 1952.

He was then with the Radiation Laboratory of Johns Hopkins 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 did research and development work on broad-band and superheterodyne receivers and surface-wave transmission and was Head of the Millimeter Wave Techniques Group of the Radiation Laboratory. Since July, 1960 he has been a Research Scientist with the Research Division of Electronic Communications, Inc., Timonium, Md. He is currently engaged in work on millimeter wave systems and ferroelectric materials and devices.

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

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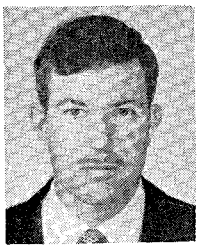

Robert E. Collin (M'54–SM'60) was born in Donalda, Alberta, Canada on October 24, 1928. He received the B.S. degree in engineering physics from the University of Saskatchewan, Saskatoon, Canada, in 1951. The following two and a half years were spent in graduate work at Imperial College, London, England, from which he received the Ph.D. degree and the diploma of Imperial College, in 1954.

Upon returning to Canada, he worked at the Canadian Armament Research and Development Establishment, Quebec, from 1954 to 1958. Since 1958 he has been on the professorial staff of the Electrical Engineering Department at Case Institute of Technology, Cleveland, Ohio.

Dr. Collin is a member of Sigma Xi.

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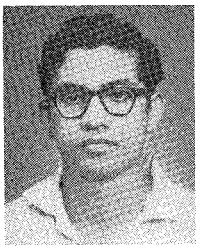

Pankaj Das was born in Calcutta, India, on June 15, 1937. He received the B.Sc. degree in physics and the M.Sc. (Tech.) degree in radio physics and electronics from Calcutta University, Calcutta, India, in 1957 and 1960, respectively.

Since 1960 he has been engaged in the study of transport properties of semiconductors at the Institute of Radio Physics and Electronics, University of Calcutta.

Mr. Das is a Fellow of The Indian Physical Society.

J. B. Davies was born in Liverpool, England, on May 2, 1932. He received the B.A. degree in mathematics from Jesus College, Cambridge, England, in 1955, and the M.Sc. degree in mathematics, in 1957, and the Ph.D. degree in mathematical physics, in 1960, both from the University of London, England.

Since 1955 he has worked at Mullard Research Laboratories, Salfords, Surrey, England, except for the period 1958–1960 spent at University College, London. His work has been concerned with problems of electromagnetic theory.

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Wilhelm H. Eggimann was born in Zürich, Switzerland, in April, 1929. He received the diploma in electrical engineering in 1954 from the Swiss Federal Institute of Technology, Zürich. He received the M.S. and Ph.D. degrees in electrical engineering from Case Institute of Technology, Cleveland, Ohio, in 1959 and 1961, respectively.

From 1954 to 1956, he worked as an Instructor and Research Assistant at the Swiss Federal Institute of Technology. In 1961, he joined the Professorial Staff of the Electrical Engineering Department at Case Institute. He is presently engaged in research work on interaction of electromagnetic fields with plasmas.

Dr. Eggimann is a member of Sigma Xi.

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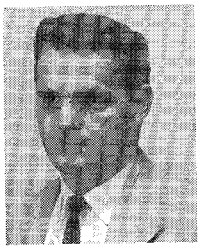


Andrew F. Eikenberg (M'60) was born in Baltimore, Md., on January 9, 1931. He entered McCoy College, The Johns Hopkins University, Baltimore, Md., in 1955, where he has completed the course requirements for a Certificate in Electrical Engineering. He is currently continuing study for a B.S. degree in electrical engineering.

From 1951 to 1955 he served in the U. S. Air Force as an Electronics Technician and Instructor in Microwave Radio Relay Techniques. He worked at the Martin Company, Baltimore, as a Technician, from 1955 to 1956, and as an Engineer doing ferrite loaded antenna development from 1956 to 1958. In November, 1958 he joined the staff of the Research Division, Electronic Communications, Inc., Timonium, Md., where he has worked on Ferrite Phase Shifters and Circulators.

Clifford E. Fay (A'26–SM'45–F'56) was born in St. Louis, Mo., on December 2, 1903. He received the B.S. and M.S. degrees in electrical engineering, from Washington University, St. Louis, Mo.

In 1927 he joined Bell Telephone Laboratories, Murray Hill, N. J., where he was engaged in the development of high-power electron tubes until 1955. More recently he has been concerned with the development of microwave ferrite devices.

Mr. Fay is a member of Sigma Xi and Tau Beta Pi.

❖

Albert G. Franco (S'54–M'58) was born in New York, N. Y., on August 10, 1935. He received the B.S., M.S. and E.E. degrees in electrical engineering from Columbia University, New York, N. Y., in 1956, 1957 and 1962, respectively.

In 1957 he became a member of the IBM Watson Research Laboratory at Columbia University where he was engaged in applying microwave techniques for high speed computing. Since August, 1960 he has been a staff member of the IBM Research Center in Yorktown Heights, N. Y. He is currently engaged in a study of the propagation characteristics of nonconventional waveguide structures.

Mr. Franco is a member of Eta Kappa Nu and Tau Beta Pi.

❖

Martin I. Grace (S'57–M'59) was born in New York, N. Y., on June 16, 1936. He received the B.S.E.E. degree from the Polytechnic Institute of Brooklyn, N. Y., in 1958. He is presently completing work toward the M.E.E. degree at the Institute.

From 1958 to 1961 he was an Engineer in the Applied Electronics Department of the Airborne Instruments Laboratory, Deer Park, N. Y., where he worked on ferrite devices and backward-wave parametric amplifiers. In March, 1961 he joined the staff of the Advanced Devices Laboratory of Airtron, Inc., Morris Plains, N. J., as a Group Leader working on the development of parametric amplifiers and ferrite devices. In 1960 he joined the staff of the Department of Electrical Engineering at the Polytechnic Institute of Brooklyn as a part-time Instructor.

John C. Hoover (M'59) was born in Dayton, Ohio, on December 18, 1932. He received the B.S. degree in electrical engineering from Ohio State University, Columbus, in 1956.

While attending the Ohio State University, he was employed by the Radio Astronomy Group of the University where he assisted in the design and development of a large aperture antenna for radio astronomy. He was employed by the Hamilton Standard Division of United Aircraft, St. Petersburg, Fla., and engaged in the design of electrohydraulic control systems for aircraft. His work in this field resulted in a patent for a fluid bearing for a hydraulic pump. In 1958 he was transferred to the Missiles and Space Division of United Aircraft. In this position he engaged in studies of Missile systems and components for space environments. In March, 1959 he joined the Sperry Microwave Electronics Company, Clearwater, Fla., and was assigned to the Antenna Development Group. His studies of extreme bandwidth RF radiation monitors while assigned to this group resulted in patents for a slot antenna and a compensated spiral antenna for electromagnetic radiation monitors. In 1960 Mr. Hoover was assigned to the Advanced Studies Group of the Solid State and Microwave Components Development Department. With this group he has engaged in advanced studies of microwave diodes and their applications.

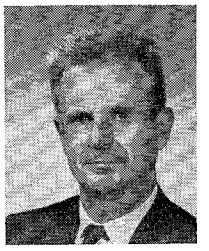
❖

B. L. Humphreys was born in London, England, on March 8, 1922. He received the B.Sc. (Honors) degree in mathematics from Birkbeck College, London, England, in 1942.

From 1942 to 1948 he was employed at the Research Laboratories of General Electric Company, Wembley, England, working on valve circuitry. Since 1948 he has been employed at Mullard Research Laboratories, Salfords, Surrey, England, working on various UHF and microwave systems, and is now head of the Microwave Ferrite Devices Section.

❖

Edward M. T. Jones (S'45–A'51–M'55–SM'56) for a photograph and biography, please see page 93 of the January, 1962, issue of these TRANSACTIONS.



Julius A. Kaiser, Jr. (S'48–A'50–M'53) was born in Washington, D. C., on February 26, 1920. He received the B.S. degree in electrical engineering from the University of Maryland, College Park, in 1948, and did graduate work there from 1948 to 1952.

He was a member of the RF Research Branch at the Naval Research Laboratory, Washington, D. C., from 1948 to 1955, where he was engaged in the development of millimeter wavelength components. In 1955 he joined the Microwave Antennas and Components Branch at the same establishment where he did research and development in microwave antennas. From 1958 to 1962 he was employed in the Microwave Branch at the Diamond Ordnance Fuze Laboratories, Washington, D. C. Currently he is engaged in antenna systems at the National Aeronautics and Space Agency, Goddard Space Flight Center, Greenbelt, Md.

Mr. Kaiser is Chairman of the Washingington, D. C. chapter of PGMTT.

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Irving Kaufman (S'45–A'47–M'54–SM'62), for a photograph and biography, please see page 583 of the November, 1961, issue of these Transactions.

❖

Frank Keywell was born in Detroit, Mich., on March 16, 1923. He received the B.A. degree in physics-meteorology from the University of California at Los Angeles, in 1944 and the M.S. degree, in 1951, and the Ph.D. degree, in 1954, in physics from the University of Southern California, Los Angeles. His thesis work, done under an ONR contract, was related to high-vacuum sputtering of metals due to ion bombardment and a statement of the phenomenon in terms of radiation damage in metals.

During World War II he served with the United States Air Force in the fields of weather forecasting and aircraft operations. After graduation he joined the Bell Telephone Laboratories, Murray Hill, N. J., where he has done work in the field of silicon junction transistor development by means of gaseous diffusion techniques. He was employed by Hughes Aircraft Company, from 1958 to 1960, where he worked on development of microwave varactors and nuclear particle detectors. He has continued this work to the present at Semiconductor Devices Incorporated, Newport Beach, Calif.

Dr. Keywell is a member of the American Physical Society and Sigma Xi.

Roland F. Koontz (S'59–M'61) was born in Los Angeles, Calif., on October 2, 1936. He received the B.S. degree in electrical engineering from the University of Notre Dame, Notre Dame, Ind., in 1958, and the M.S. degree in electrical engineering from the University of Pennsylvania, Philadelphia, in 1960.

Since 1958 he has engaged in high-power radar transmitter design with emphasis on the problems of testing such transmitter systems. He has been active in the design and development of special test equipment required for monitoring of phase and spectral characteristics of pulsed microwave transmitter systems. He is presently with the Transmitter Skill Center of the Moorestown Missile and Surface Radar Division of the Radio Corporation of America, Moorestown, N. J.

❖

Kenneth L. Kotzebue (S'56–M'59) was born in San Antonio, Tex., on December 4, 1933. He received the B.S. degree in mechanical engineering from the University of Texas, Austin, in 1954, the M.S. degree in engineering from the University of California at Los Angeles, in 1956, and the Ph.D. degree in electrical engineering, in 1959, from Stanford University, Calif.

During 1954–1956 he was a member of the technical staff of Hughes Aircraft Company, Los Angeles, while a participant in the Master's Cooperative Program at U.C.L.A. He was a Research Assistant at Stanford University for two years, working in the field of solid-state parametric amplifiers. In 1958 he became a Senior Engineer with the Apparatus Division of Texas Instruments Incorporated, Dallas, where he worked in the field of semiconductor diode parametric amplifiers and harmonic generators. Since 1959 he has been a member of the technical staff of Watkins-Johnson Company, Palo Alto, Calif., engaged in research and development of solid-state microwave devices.

Dr. Kotzebue is a member of Tau Beta Pi and Sigma Xi.

❖

Emanuel Kramer (S'53–A'55–M'60) was born in Trenton, N. J., on August 11, 1932. He received the B.E.E. degree from Rutgers University, New Brunswick, N. J., in 1954. Immediately thereafter he joined the General Electric

Company where he participated in the Company-sponsored advanced engineering program. In conjunction with this program, he completed assignments in the fields of magnetic instrumentation, airborne radar, wideband analog magnetic recording. From 1956 to 1961, he was a Principal Engineer with Emerson Research Laboratories, Silver Spring, Md., where he worked on information processing in mine detectors, altimeter systems, hypersonic acoustics, coaxial and waveguide microwave components and systems, and on one of the first communications systems using millimeter waves which was designed for airborne operations. In September, 1961 he joined the IBM Communications Systems Department, Rockville, Md., as a Staff Engineer in the Advanced Techniques Group, where he is working on antennas and microwave components for space communications.

❖

Norman M. Kroll, who appeared in the Contributors' section of the July, 1962, issue of these TRANSACTIONS, has requested that the following correction be made in his biography.

The last two sentences of the first paragraph should have read as follows: "In particular, while Dr. Kroll has discussed the theory of the rising sun magnetron and contributed to its development, the distinction of inventing it belongs to Dr. Sidney Millman and Dr. Arnold Nordsieck."

❖

John H. Little received the B.S. degree in physics from Indiana University, Bloomington, in 1959.

The following three years he worked with the Microwave Branch of the Diamond Ordnance Fuze Laboratories, Washington, D. C. He is currently, with the U. S. Naval Torpedo Station, Keyport, Wash.

❖

Robert Q. Maines was born in Nyack, N. Y., on August 1, 1932. He received the B.S. degree in electrical engineering from Fairleigh Dickinson University, Rutherford, N. J., in 1959.

In 1961 he was associated with Polarad Electronics, and was responsible for the development of impulse generators and an RF oscillator with a five-to-one tuning range.

As a Project Engineer in the Advanced Devices Laboratory of Airtron, a Division of Litton Industries, Morris Plains, N. J., his activity is primarily focused on the development of advanced state-of-the-art microwave circulators, ferrite devices, harmonic suppressors and high-power resonant ring assemblies.

❖

George L. Matthaei (S'49–A'52–M'57), for a photograph and biography, please see page 408, Microwave Prize Award, of this issue.

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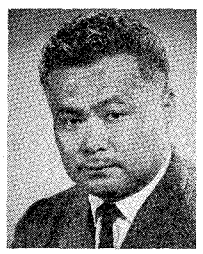

Tadao Mukaihata was born in Los Angeles, Calif., on February 10, 1924. He was the recipient of of a Danforth Foundation Research Scholarship and received the B.A. degree in physics from Denison University, Granville, Ohio, in 1924, and the M.S. degree in engineering from the University of California at Los Angeles, in 1962. He has also attended Cornell University.

Since 1949 he has been employed at Hughes Aircraft Company, Culver City, Calif., in research and development work in electronics and microwave components. He is presently Head of the Microwave Standards Section of the Primary Standards Laboratory. He has also served as Course Instructor in microwave measurements at the Bureau of Naval Weapons Representative, Pomona, Calif.

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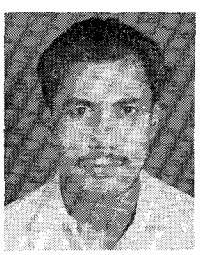


Biswaranjan Nag (A'58–SM'62) was born in Comilla, East Pakistan, on October 1, 1932. He received the M.Sc. (Tech.) degree in radio physics and electronics from Calcutta University, Calcutta, India, in 1954, the M.S. degree in electrical engineering from the University of Wisconsin, Madison, in 1960, and the Ph.D. degree in radio physics and electronics from Calcutta University, in 1961.

From 1954 to 1955 he worked in the Electronics Laboratory of the Indian Statistrical Institute, Calcutta. Since 1956 he has been at the Institute of Radio Physics and Electronics, University of Calcutta, as a Lecturer. He has done research work on electronic computers, nonlinear phenomena in electronic oscillators and parametric amplifiers. At present he is engaged in researches on the high field and microwave properties of semiconductors.

Dr. Nag is a member of the American Physical Society and a Fellow of the Indian Physical Society.

Seymour Okwit (A'55–M'60–SM'61) was born in New York, N. Y., on August 31, 1929. He received the B.S. degree in physics from Brooklyn College, N. Y., in 1952, and the M.S. degree in applied mathematics and physics from Adelphi College, Garden City, N. Y., in 1958, and the M.S. degree in physics, in 1961, from Adelphi College. He is working toward the Ph.D. degree at Adelphi in mathematical physics.

From 1952 to 1954 he was assigned to the Detection Division of the Chemical and Radiological Laboratories of the Army Chemical Center, Edgewood, Md., where he did extensive development work on instrumentation for the detection and analysis of the poisonous "G" nerve gases. He was associated with the Radar Department of Arma Corporation, Garden City, N. Y., from 1954 to 1955, where he was concerned with boresight studies on monopulse antennas. In 1955 he joined Airborne Instruments Laboratory, Melville, N. Y., as an Engineer in the Department of Applied Electronics. Since 1958 he has been responsible for solid-state devices such as low-loss circulators, low-level ferrite limiters, parametric amplifiers, cavity and traveling-wave masers and superconducting devices. He is now a Deputy Department Head in the same department, currently directing programs in these areas.

❖

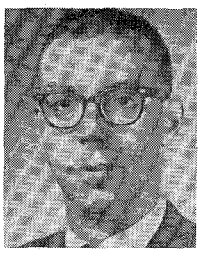
William H. Pepper (A'52–M'57) was born in New York, N. Y., on April 28, 1925. He received the B.E.E. degree from Cooper Union, New York, N. Y. in 1945, and the M.S. degree in mathematics from New York University, N. Y., in 1950.

He served in the U. S. Army from 1945 to 1946. From 1947 to 1951 he was employed at the Western Electric Company, Kearney, N. J., where he worked on telephone power plant and microwave installations. In 1951 he joined the Ordnance Development Division of the National Bureau of Standards, which is now the Diamond Ordnance Fuze Laboratories, Washington, D. C., where he has been engaged in research on radar systems and components

Mr. Pepper is a member of the Society for Industrial and Applied Mathematics.

❖

George Persky (M'62) was born in Brooklyn, N. Y., on April 26, 1938. He received the B.E.E. degree from Rensselaer Polytechnic Institute, Troy, N. Y., in 1959, and the M.E.E. degree from the Polytechnic Institute of Brooklyn, in 1961.



He was a Research Fellow at the Microwave Research Institute of Brooklyn, from 1959 to 1962, where he did research on microwave circuits. He is currently studying for the Ph.D. degree in physics at the Polytechnic Institute of Brooklyn.

Mr. Persky is a member of Tau Beta Pi and Eta Kappa Nu.

❖

J. H. Richmond (S'49–M'56–SM'59) was born in Kalispell, Mont., on July 30, 1922. He served in the U. S. Navy as a Chief Electronics Technician from 1940 to 1946 and from 1950 to 1951. In 1950, he graduated *summa cum laude* from Lafayette College, Easton, Pa., with the B.S. degree in electrical engineering. In 1952 he received the M.Sc. degree in electrical engineering and in 1955 the Ph.D. degree at The Ohio State University, Columbus.

Since 1952 he has been engaged in research on circularly polarized antennas, rotary waveguide phase shifters, and radomes at the Antenna Laboratory of The Ohio State University. On the faculty of the Department of Electrical Engineering since 1955, he is now a Professor.

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

❖

Ernest B. Roberts was born in Denver, Colo., on December 4, 1933. He attended Santa Monica City College, Calif., and the University of California at Los Angeles.

He was employed by Hughes Aircraft Company, Culver City, Calif., in 1952, and served as an Assistant Supervisor of the Instrument Maintenance Laboratory. He is presently a Standards Engineer in the Microwave Section of the Primary Standards Laboratory.

❖

Elisabeth M. Rutz (SM'56) was born in Vienna, Austria. She received the Diplom-Ingenieur degree, and the D.Sc. degree with highest honors in applied physics from the Technical University, Vienna, in 1946.

In 1938 she joined the Research Laboratories of Siemens and Halske in Berlin, Germany, whichlater were transferred to Vienna. From 1938 to 1942 she was engaged in research and development of electroacoustic transducers, and from 1942 to 1948 in research and development of microwave and commercial tubes. From 1950 to 1955 she worked part-time as a Research Scientist at the Universities of Darmstadt, Germany, and Aachen, Germany. After coming to the United States in 1955, she joined the Emerson Research Laboratories, Silver Spring, Md., where she first was in charge of research and development of microwave antennas and components. In 1959 she was transferred to the Advanced Systems Department where she was a Fellow Engineer in charge of applied research in the fields of propagation phenomena, microwave antennas and components, and of CW-FW systems. In 1961 she joined the Communications Systems Department of IBM Corporation in Rockville, Md. She is an Advisory Engineer in the Advanced Techniques Group, where she is in charge of applied research on space antennas and microwave solid-state devices.

❖

Eugene W. Sard (A'49–M'55) was born in Brooklyn, N. Y., on December 21, 1923. He received the B.S.E.E. and M.S.E.E. degrees from the Massachusetts Institute of Technology, Cambridge, in 1944 and 1948, respectively.

From 1944 to 1946 he served in the United States Naval Reserve 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. He joined Airborne Instruments Laboratory, Deer Park, N. Y., in 1948, working at first in the Radar Department on single-channel and multiplex Track-While-Scan systems. He is presently a Consultant in the Applied Electronics Department and for the past four years has been working on the application of semiconductor diodes to various fields including low-noise amplification, harmonic and sub-harmonic generation and fast switching.

Mr. Sard is a member of Sigma Xi.

❖

S. R. Seshadri (SM'61), for a photograph and biography, please see page 300 of the July, 1962, issue of these TRANSACTIONS.

Joshua Shefer (M'56–SM'62) was born in Leipzig, Germany, on November 1, 1924. He received the B.Sc. degree in electrical engineering from the Technion, Israel Institute of Technology, Haifa, Israel, in 1948, and the Ph.D. degree from London University, London, England, in 1955.

From 1948 to 1952 he was a member of the research staff of the Electronics Research Laboratory, Ministry of Defence, Tel Aviv, Israel, where he was engaged in UHF systems and antennas. After his graduate work in England he returned to become head of a group engaged in microwave circuits and antennas. He also lectured on microwave theory and technique at the Technion, from 1956 to 1958. In 1958 he was appointed Scientific Attache at the Embassy of Israel in London, and in 1960 he joined the Gordon McKay Laboratory, Harvard University, Cambridge, Mass., as Research Fellow in applied physics, where he worked on problems of surface wave guiding structures and antennas. In September, 1962 he joined the technical staff of Bell Telephone Laboratories, Whippany, N. J.

Dr. Shefer is an associate member of IEE (London) and a member of Sigma Xi.

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Howard B. Smith, Jr. received the B.S. degree in physics from the University of Massachusetts, Amherst, in 1949.

He worked in the Laboratory of Physical Biology of the National Institutes of Health, Bethesda, Md., from 1951 to 1955. He worked at the Diamond Ordnance Fuze Laboratories between 1955 and 1962, the majority of time in the Systems Feasibility branch. He is currently with the U. S. Naval Torpedo Station, Keyport, Wash.

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William H. Steier (S'58–M'60), for a photograph and biography, please see page 584 of the November, 1961, issue of these TRANSACTIONS.

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Jesse J. Taub (S'48–A'50–M'55–SM'61) was born in New York, N. Y., on April 27, 1927. He received the B.E.E. degree from the College of the City of New York, in 1948, and the M.E.E. degree from Polytechnic In-

stitute of Brooklyn, N. Y., in 1949.

In 1949, he joined the microwave tube section of the Naval Material Laboratory, Brooklyn, as a Project Engineer, and in 1951, he became Supervisor of the klystron and microwave semiconductor unit. In 1955, he joined Airborne Instruments Laboratory, Deer Park, N. Y., where he is now a Consultant to the Applied Electronics Department. He has been concerned with the development of microwave filters, parametric amplifiers, multimode measurements, and quasi-optical components for millimeter wavelengths.

Mr. Taub is a member of Sigma Xi.

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Bernard L. Walsh, Jr. (M'56) was born in Detroit, Mich., on January 11, 1932. He received the B.S. degree in physics from the University of Detroit, in 1954.

Since 1954 he has been employed by Hughes Aircraft Company, Culver City, Calif., where he is presently Staff Engineer, Microwave Components Department. At Hughes his experience has been in parametric amplifiers, electromagnetic theory, microwave antennas for missiles and satellites, and design of anechoic chambers for microwave frequencies and antenna systems. He has also served as Project Engineer for the DSIF PARAMP subsystem.

Mr. Walsh is a member of the American Physical Society.

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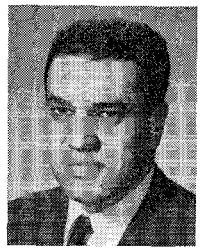
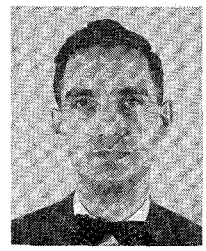


Ernest Wantuch (A'51–M'52) was born in Vienna, Austria, on February 1, 1926. He received the Ph.D. degree in physics from New York University, N. Y., in 1950.

He has been associated with Airtron, Morris Plains, N. J., since 1956 when he joined the Company as head of the Cambridge Division, a newly created organization within Airtron, formed to study and develop advanced microwave ferrite devices. In his present position as Vice President and Director of Engineering he is responsible for the direction of all engineering research activities, as well as for the expansion of the scope of this effort to include new areas of study and development. Prior to joining Airtron he was Section Manager in charge of microwave development at the Missile Systems Division, Raytheon Manufacturing Company, Waltham, Mass.

Dr. Wantuch is a member of Phi Beta Kappa and the American Physical Society.



Leo Young (M'54–SM'57) was born in Vienna, Austria, on August 18, 1926. After winning a scholarship from St. Johns College, Cambridge, England, he obtained at Cambridge the B.A. degree with honors in mathematics, in 1945, and the B.A. degree with honors in physics, in 1947. He received the M.A. degree from Cambridge University, in 1950. He was awarded the M.S.E.E. degree by The Johns Hopkins University, Baltimore, Md., in 1956, held the Westinghouse Electric Corporation's B. G. Lamme Scholarship during 1958–1959, and obtained the D.Eng. degree from Johns Hopkins, in 1959.

He was an Engineer with A. C. Cossor, Ltd., London, from 1948 to 1951, and from 1951 to 1953 was associated with Decca Radar Ltd., London, as head of the Microwave and Antenna Laboratory. He came to the United States in 1953, joining the Westinghouse Electric Corporation, Baltimore, where he was an Advisory Engineer in the Electronics Division. Since 1960, he has been a Senior Research Engineer at Stanford Research Institute, Menlo Park, Calif.

Dr. Young is a member of Sigma Xi, the AIEE, the IEE, the Optical Society of America and the American Association for the Advancement of Science.