

## Contributors to This Issue

FLOYD K. BECKER, B.S. (E.E.), 1945, University of Colorado; M.S. (E.E.), 1947, California Institute of Technology; Mountain States Telephone and Telegraph Company, 1947-51; Bell Telephone Laboratories, 1951—. Mr. Becker's work at Mountain States was in dial equipment engineering. Since joining Bell Laboratories he has been concerned with research in acoustics and underwater sound transmission and more recently with development of experimental picture transmission systems. Member I.R.E., Acoustical Society of America, Tau Beta Pi, Eta Kappa Nu.

VÁCLAV E. BENEŠ, A.B., 1950, Harvard College; M.A., Ph.D., 1953, Princeton University; Bell Telephone Laboratories, 1953—. Mr. Beneš has been engaged in mathematical systems research, involving stochastic processes describing the passage of traffic through a switching system. Member Association for Symbolic Logic, Mind Association, Institute of Mathematical Statistics, American Mathematical Society, Phi Beta Kappa.

T. H. CROWLEY, B.E.E., 1948, M.A., 1950, and Ph.D., 1954, Ohio State University; Bell Telephone Laboratories, 1954—. He has been engaged in studies of switching systems problems, including application of magnetic devices to switching circuits and studies of time-varying networks for time-division switching. He took part in the design of an analog-to-digital encoder and is at present in charge of a group engaged in theoretical analysis of switching systems problems. Member I.R.E., Eta Kappa Nu, Tau Beta Pi, Sigma Xi.

HAYDEN W. EVANS, B.A., 1934, Ohio Wesleyan University; B.S. in E.E., 1936, University of Michigan; Bell Telephone Laboratories, 1936—. Mr. Evans' early work was on transmission engineering problems on open wire and cable circuits. During World War II he was engaged in development of radar, radar test equipment and countermeasures equipment. After the war he was concerned with mobile radio systems engineering and later with planning and evaluation of new radio relay systems. He is at present in charge of a group engaged in broadband systems engineer-

ing. Senior member I.R.E.; member Acoustical Society of America, Tau Beta Pi, Sigma Xi, Phi Kappa Phi.

J. E. GEUSIC, B.S., 1953, Lehigh University; M.S., 1955, and Ph.D., 1958, Ohio State University; Bell Telephone Laboratories, 1958—. He is engaged in research and development work on the solid state maser. Member Sigma Xi, Pi Mu Epsilon.

U. F. GIANOLA, B.Sc., 1948 and Ph.D., 1951, University of Birmingham (England); Royal Aircraft Establishment, 1951; post-doctoral fellow, University of British Columbia, 1951–53; Bell Telephone Laboratories, 1953—. As a member of the transmission research department he took part in experimental and theoretical studies of transmission line structures, analyses of a new magnetostrictive transducer, the application of the solar battery to communications channels and fundamental studies of the effects of ion bombardment on semiconductors. Since transferring to communications techniques research he has been engaged in studies of solid-state memory and logic devices. Member American Physical Society, Research Society of America.

S. D. HATHAWAY, B.E.E., 1947, University of Virginia; M.S.E.E., 1950, Virginia Polytechnic Institute; M.S.E.E., 1952, University of Illinois; Bell Telephone Laboratories, 1952—. Mr. Hathaway has been engaged in systems engineering on microwave radio relay systems. He is at present in charge of a group engaged in light-route radio systems engineering. Member I.R.E., Tau Beta Pi, Eta Kappa Nu.

JOHN R. HEFELE, B.S. in E.E., 1929, E.E., 1932, Cooper Union; Fordham University, 1931–1932; Columbia University, 1932–33; Western Electric Company, 1923–25; Bell Telephone Laboratories, 1925—. Mr. Hefelee has specialized in television systems research. He has participated in all of the television developments and demonstrations of Bell Laboratories including the first demonstration in 1927. During World War II he was engaged in investigation and development of airplane detection and automatic-following radar devices. In 1956 he transferred to the visual systems group in the Transmission Research Department, where he is currently concerned with special problems of visual transmission over restricted-bandwidth channels. Member I.R.E., Society of Motion Picture and Television Engineers, Electronics Industries Association.

H. A. HELM, B.S. in physics, 1942, Massachusetts Institute of Technology; M.S. in E.E., 1956, Stevens Institute; Bell Telephone Laboratories, 1945—. His first work was in military systems development in-

volving radar and analog computers. He was later concerned with design, systems analysis and programming for digital computers, and he was an instructor in the Digital Techniques Laboratory. He is now engaged in military systems research. Member I.R.E., Association for Computing Machinery.

RAYMOND W. KETCHLEDGE, B.S. and M.S., 1942, Massachusetts Institute of Technology; Bell Telephone Laboratories, 1942—. Mr. Ketchledge first worked on infra-red detection and underwater sound systems. Later he assisted in the development of the Key West-Havana submarine cable system. His next assignment was the responsibility for equalization, regulation and other system aspects of the L3 coaxial carrier system. In 1953 he was appointed Electron Tube Development Engineer responsible for gas tube and storage tube development. He was named Switching Systems Development Engineer in 1954 responsible for memory systems and switching networks for electronic switching. In 1956 he was appointed Assistant Director of Switching Systems Development III. Senior Member I.R.E.; member New York Academy of Sciences, Sigma Xi.

V. O. MOWERY, B.E., 1954, Johns Hopkins University; M.S., 1956, California Institute of Technology; Bell Telephone Laboratories, 1956—. Mr. Mowery has had CDTP assignments in semiconductor surface studies and development of PCM repeaters. His present assignment is in development of the flying spot store for electronic switching systems. Member I.R.E., American Physical Society, Tau Beta Pi, Sigma Xi.

MARTIN NESENBERGS, Technische Hochschule, Karlsruhe and Stuttgart (Germany); B.S., 1952, University of Denver; M.S., 1958, New York University; Bell Telephone Laboratories, 1953—. Since completing the CDTP course he has been engaged in development work on the flying spot store for electronic switching. Member American Physical Society, Sigma Pi Sigma, Pi Mu Epsilon.

MARTIN PETER, Dipl., 1952, Swiss Federal Institute of Technology; Ph.D., 1955, Massachusetts Institute of Technology; research associate, M.I.T., 1955-57; Bell Telephone Laboratories, 1957—. Mr. Peter has been engaged in fundamental research involving microwave spectroscopy in the physics of solids. Member American Physical Society, Sigma Xi.

JOHN R. PIERCE, B.S., 1933, M.S., 1934, and Ph.D., 1936, California Institute of Technology; Bell Telephone Laboratories, 1936—. Director

of Research-Communications Principles at Bell Laboratories. He has specialized in research on electron tubes, microwave research, electronic devices for military applications and communications circuits. Mr. Pierce has been granted 55 patents and is the author of four books. For his research leading to the development of the beam traveling wave tube, he was awarded the 1947 Morris Liebmann Memorial Prize. Fellow I.R.E., American Physical Society; member Acoustical Society of America, American Institute of Electrical Engineers, National Academy of Sciences, British Interplanetary Society.

LINCOLN P. RICE, B. of E.E., 1953, and M.S. in E.E., 1955, Georgia Institute of Technology; Bell Telephone Laboratories, 1954—. After completing the Communications Development Training Program course, Mr. Rice worked on personal radio signaling systems in the Special Systems Engineering Department. He is now engaged in work on data transmission systems. Member I.R.E., Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, Sigma Xi.

W. W. RIGROD, B.S. in E.E., 1934, Cooper Union Institute of Technology; M.S. in Eng., 1941, Cornell University; D.E.E., 1950, Polytechnic Institute of Brooklyn; State Electrotechnical Institute (U.S.S.R.), 1935-39; Westinghouse Electric Corporation, 1941-51; Bell Telephone Laboratories, 1951—. His work has been related principally to the study and development of electron tubes, both the gaseous-discharge and the high-vacuum types. Member I.R.E., American Physical Society, Sigma Xi.

E. O. SCHULZ-DUBOIS, Dipl. phys., 1950, and Dr. phil. nat., 1954, Johann Wolfgang Goethe University (Germany); Purdue University, 1954-55; Raytheon Manufacturing Co., 1956-57; Bell Telephone Laboratories, 1957—. At Purdue Mr. Schulz-DuBois was engaged in solid state research, particularly on paramagnetic resonance in irradiated semiconductors. At Raytheon he was concerned with the development of ferrite materials and devices. After joining Bell Laboratories he worked for a short time on low-frequency ferrite isolators. His present work is with paramagnetic materials and slow-wave structures for application to solid state maser devices.

W. M. SHARPLESS, B.S. (E.E.). 1928 and E.E., 1951, University of Minnesota; Bell Telephone Laboratories, 1928—. As a member of the Radio Research Department he worked for several years on problems associated with transatlantic short-wave radio reception and took part in studies of the angle of arrival of microwaves. During World War II

he was concerned with development of radar systems and later with design of artificial dielectrics and microwave antennas. More recently he has been associated with studies of point-contact rectifiers and low-level power measurements in the millimeter-wave field. Fellow I.R.E.; member American Physical Society, Scientific Research Society of America.

W. T. WINTRINGHAM, S.B., 1924, Harvard Engineering School; American Telephone and Telegraph Company, 1924-34; Bell Telephone Laboratories, 1934—. At A. T. & T. Mr. Wintringham was engaged in studies of radio telephone systems and transatlantic radio telephone. He later worked on UHF and VHF systems and development and installation of special short wave antennas. During World War II he worked on military projects and then took part in studies of television transmission systems, application of information theory to television and color television. Since 1956 Mr. Wintringham has been in charge of the visual systems research group involved in such projects as facsimile, slow-scan television and picturephone. Fellow I.R.E., American Association for the Advancement of Science, Society of Motion Picture and Television Engineers; member Acoustical Society of America, Optical Society of America, Tau Beta Pi.