

## Contributors to This Issue

**Frederick T. Andrews, Jr.**, B.S. (Electrical Engineering), 1948, The Pennsylvania State University; Bell Laboratories, 1948—. After seven years of research work on switching circuits and systems, Mr. Andrews supervised part of the early development effort on T carrier. In 1958, he became head of a department engaged in transmission systems engineering studies and maintenance. He has been a director since 1962 with responsibilities first in transmission systems engineering and later military communications systems engineering. Since 1968, he has been Director of the Loop Transmission Systems Laboratory with both systems engineering and development responsibility for electronic systems applied to subscriber loops. Fellow IEEE and member of Communications Society Board of Governors. Chairman, CCITT Study Group XII.

**Gregg W. Aughenbaugh**, B.S. (Electrical Engineering), 1967, Pennsylvania State University; M.S. (Electrical Engineering), 1968, Princeton University; Bell Laboratories, 1967—. Mr. Aughenbaugh has studied differential PCM transmission methods, performed system cost and growth studies, and developed analog transmission requirements for *PICTUREPHONE*<sup>®</sup> video telephone systems. Currently he is engaged in operating-telephone-company implementation and computerization of the Facility Analysis Plan, which he developed along with others in the Loop Transmission Engineering Center at Bell Laboratories. Member, IEEE, Eta Kappa Nu, Phi Kappa Phi, Tau Beta Pi.

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**W. N. Bell**, B.S., 1967, Pratt Institute; M.S., 1969 (Mathematics) Stevens Institute of Technology; Bell Laboratories, 1967–1973; New Jersey Bell, 1973–1975; Bell Laboratories, 1975—. Mr. Bell has worked on problems of crosstalk and inductive interference in telephone cables. He is presently a member of the Loop Topology and Methods Department and is concerned with loop plant utilization and construction budget analysis.

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**John Freidenfelds**, B.S.E.E., 1966, University of Connecticut; M.S.E.E./Operations Research, 1967, M.I.T.; Ph.D., Operations Research, 1971, Stanford; Bell Laboratories, 1966—. Upon joining Bell Laboratories, Mr. Freidenfelds took part in the One Year on Campus Program (M.I.T.) and later the Doctoral Support Plan (Stanford). He was assigned briefly to the antiballistic missile project and since 1971 has been in the Loop Transmission Division. He has worked on economic study methods with a concentration on capacity expansion problems. He is a member of Tau Beta Pi, Eta Kappa Nu, Sigma Xi, IEEE, and the Operations Research Society of America.

**Allen E. Gibson**, B.A., 1964, Denison University; M.S., 1966, Case Institute of Technology; Ph.D., 1969, Virginia Polytechnic Institute; Bell Laboratories, 1968—. From 1968–1972, Mr. Gibson worked on a variety of radar detection problems as part of the Safeguard project. Since 1972, Mr. Gibson has been a member of the Loop Network Engineering Department where he has been engaged in mathematical modeling of loop plant operations and has participated in the development of analysis techniques used in managing the loop plant. Mr. Gibson is currently involved in a revision of one of these analysis tools, the Economic Feeder Administration and Relief (EFAR) computer program.

**G. T. Hawley**, B.S. (E.E.), 1960, Northwestern University; M.S.(E.E.), 1965, New York University; Ph.D., 1970, Brooklyn Polytechnic University; Bell Laboratories, 1963—. Mr. Hawley has been involved in electrical protection, electromagnetic pulse, and loop range extension studies as well as loop electronics development planning. He is now supervising a group concerned with project tracking and analysis. Member, IEEE, Tau Beta Pi, Eta Kappa Nu, and Pi Mu Epsilon.

**Robert W. Henn**, B.M.E., 1966, City College of New York; M.S., 1969, New York University; Bell Laboratories, 1969—. Mr. Henn has done development work in the Loop Transmission Area since joining Bell Laboratories. He has been involved in the design of new splicing systems and the development of equipment and apparatus for loop electronic systems. As supervisor of the Facilities Exploratory Group, he is concerned with the future design of out-of-sight loop electronics facilities. Member, Tau Beta Pi, Pi Tau Sigma.

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**James M. Landwehr**, B.A. (mathematics-economics), 1966, Yale; Ph.D. (statistics), 1972, Chicago; University of Michigan, 1970-1973; Bell Laboratories, 1973—. Mr. Landwehr, a member of the Statistics and Data Analysis Research Department, has performed research on a variety of applied statistical problems. These include studies of costs and revenues; comparing methods for drafting printed wiring boards; the detection of signals in data from surface physics experiments; and methods for interpreting and assessing the results of cluster analyses. Member, American Statistical Association, Institute of Mathematical Statistics, Phi Beta Kappa, Sigma Xi.

**Norwood G. Long**, B.S.E.E., 1956, Duke University; Communications Development Training Program, Bell Laboratories, 1959; Bell Laboratories, 1956—. Mr. Long has been engaged in systems engineering studies on several communications systems, beginning with TASI and submarine cables, and followed by work on the electronic telephone set and high capacity mobile telephone communications. He has been involved in loop plant operations analysis and method systems development since 1970. He is currently Head of the Loop Transmission Design Department.

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**George A. Nelson**, B.E.E., 1959, Rensselaer Polytechnic Institute; M.S., 1964, Harvard University; Bell Laboratories, 1963—. Mr. Nelson has had assignments associated with systems studies for Safeguard and Nike-X. He also has worked on systems problems of single-sideband long haul radio. Recently he completed work associated with engineering support for the SLC-40 system introduction to the operating telephone companies. Currently he is assigned to studies of maintenance requirements of future pair-gain systems. Member, Tau Beta Pi and Eta Kappa Nu.

**T. N. Rao**, B.Sc. (Physics), 1952, Madras University, India; B. Tech. (E.E.), 1957, Indian Institute of Technology, Kharagpur, India; M.S. (E.E.), 1962, University of California, Berkeley; Ph.D. (E.E.), 1967, Stanford University; Bell Laboratories, 1967—. Since joining Bell Laboratories, Mr. Rao has worked in the areas of tantalum integrated circuits and PICTUREPHONE® loop transmission. He is currently supervisor of a group involved in the development of analog carrier systems. Member, IEEE, AAAS, Sigma Xi.

**Joseph G. Schatz**, B.S.E.E., 1963, Manhattan College; M.S.E.E., New York University; Eng. Sc. D., 1971, Columbia University; Bell Laboratories, 1972-1978; AT&T, 1978—. While at Bell Laboratories, Mr. Schatz conducted long range planning studies to evaluate the effectiveness of new and existing loop electronic systems. Currently, he is a supervisor in AT&T Corporate Planning. Senior member, IEEE; member, Sigma Xi and Eta Kappa Nu.

**Michael A. Schwartz**, B.S.E.E., 1968, Rensselaer Polytechnic Institute; M.S.E.E., 1969, University of California, Berkeley; Bell Telephone Laboratories, 1968-1972; Chesapeake and Potomac Telephone Company of West Virginia, 1972-1974; Bell Telephone Laboratories 1974—. Mr. Schwartz has worked on the development of cable test sets and subscriber carrier systems. In 1972 he began an assignment to C&P Telephone of West Virginia where he worked on subscriber loop noise problems and the application of subscriber loop carrier in rural areas. Since his return to Bell Labs in 1974, Mr. Schwartz has worked on the planning and application of subscriber loop pair gain systems. Member IEEE, Tau Beta Pi.

**C. H. Sharpless**, B.S.E.E., 1970, Lehigh University; M.S.E.E., 1971, Stanford University; Bell Laboratories, 1970—. Mr. Sharpless designed integrable circuits for vestigial sideband transmission of *PICTURE-PHONE*® signals in the loop plant. Later he designed circuits for the *SLC*™-40 and participated in its design evolution along with field support. Currently he is helping define the interface between future pair-gain systems and the No. 5 ESS. Member, Eta Kappa Nu, Tau Beta Pi.

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