

## Contributors to this Issue

H. A. AFFEL, S.B. in Electrical Engineering, Massachusetts Institute of Technology, 1914; Research Assistant in Electrical Engineering, 1914-16. American Telephone and Telegraph Company, Engineering Department and the Department of Development and Research, 1916-34; Bell Telephone Laboratories, 1934-. As Assistant Director of Transmission Development, Mr. Affel is concerned with toll transmission problems, including the development of carrier telephone systems.

J. W. BEYER, B.S., State College of Washington, 1915; Westinghouse Electric and Manufacturing Company, 1915-16. Instructor in Electrical Engineering, State College of Washington, 1916-19. Western Electric Company, Engineering Department, 1919-24. Bell Telephone Laboratories, 1924-. Mr. Beyer is concerned with the development of carrier telephone terminals and pilot channels for open-wire circuits.

E. C. BLESSING, B.S. in Electrical Engineering, Purdue University, 1922. Western Electric Company, Engineering Department, 1922-25; Bell Telephone Laboratories, 1925-. Mr. Blessing has been engaged in the development of carrier systems.

S. I. CORY, B.E.E., Ohio State University, 1916. American Telephone and Telegraph Company, Engineering Department and Department of Development and Research, 1916-1934; Bell Telephone Laboratories, 1934-. During this entire time Mr. Cory has been engaged in transmission development work, chiefly on telegraph systems and transmission-measuring methods.

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KARL K. DARROW, B.S., University of Chicago, 1911; University of Paris, 1911-12; University of Berlin, 1912; Ph.D., University of

Chicago, 1917. Western Electric Company, 1917-25; Bell Telephone Laboratories, 1925-. Dr. Darrow has been engaged largely in writing on various fields of physics and the allied sciences.

LLOYD ESPENSCHIED, Pratt Institute, 1909, has taken an important part in much of the Bell System's invention and development in the field of radio and carrier currents; also in technical contacts and international conferences abroad. Previously, in the Department of Development and Research of the American Telephone and Telegraph Company; now, as Research Consultant of the Bell Telephone Laboratories, participates in a broad front of electric-communications development.

FRANK GRAY, B.S., Purdue, 1911; Ph.D., University of Wisconsin, 1916. Western Electric Company, Engineering Department, 1919-25. Bell Telephone Laboratories, 1925-. Dr. Gray has been engaged in work on electro-optical systems.

WILLIAM H. HARRISON, Vice President and Chief Engineer, American Telephone and Telegraph Company. Pratt Institute, graduate in Industrial Electrical Engineering, 1915. New York Telephone Company, repairman, apparatus inspector, 1909-14. Western Electric Company, engineer, 1914-18. American Telephone and Telegraph Company, 1918-33, Department of Operation and Engineering, engineer; Equipment and Building Engineer; Plant Engineer. Bell Telephone Company of Pennsylvania, Diamond State Telephone Company, Vice President in charge of Operations, 1933-37. American Telephone and Telegraph Company, Department of Operation and Engineering, Assistant Vice President, 1937-38; Vice President and Chief Engineer, 1938-.

L. W. HUSSEY, A.B., Dartmouth, 1923; M.A., Harvard, 1924; B.S. in E.E., Union College, 1930; Mathematics Department, Union College, 1924-29. Bell Telephone Laboratories, 1930-. Mr. Hussey has been engaged principally in work on the stability of regenerative systems and on modulation in non-linear resistances.

B. W. KENDALL, S.B., Massachusetts Institute of Technology, 1906; Instructor in Physics at Massachusetts Institute of Technology, Barnard College, and Columbia University, 1906-13. Engineering Department of the Western Electric Company, 1913; Bell Telephone Laboratories, 1925-. As Toll Development Director Mr. Kendall has charge of the development of carrier, voice frequency, and telegraph

circuits. His early work was on repeaters in connection with the transcontinental line; he has also been connected with carrier-current development since its inception.

R. C. NEWHOUSE, B.E.E., Ohio State University, 1929; Guggenheim Fellow, Ohio State University, 1929-30; M.Sc., Ohio State University, 1930. Bell Telephone Laboratories, 1930-. During most of this period Mr. Newhouse has been engaged in the design and development of aircraft radio transmitters. In recent months his efforts have been confined to the development of the terrain clearance indicator, for which he has been given the 1938 Lawrence Sperry Award by the Institute of the Aeronautical Sciences.

J. T. O'LEARY, B.S. in Electrical Engineering, Villanova College, 1918. American Telephone and Telegraph Company, Department of Development and Research, 1919-34. Bell Telephone Laboratories, 1934-. Mr. O'Leary has been concerned with the transmission aspects of carrier systems.

E. PETERSON, Cornell University, 1911-14; Brooklyn Polytechnic, E.E. 1917; Columbia University, A.M. 1923; Ph.D. 1926. Electrical Testing Laboratories, 1915-17; Signal Corps, U. S. Army, 1917-19. Western Electric Company, Engineering Department, 1919-25; Bell Telephone Laboratories, 1925-. Lecturer in Electrical Engineering, Columbia, 1934-. As circuit research engineer, Dr. Peterson's work has been largely in theoretical studies of non-linear circuits and circuit elements.

J. J. PILLIOD, E.E., Ohio Northern University, 1908. American Telephone and Telegraph Company, Long Lines Department, 1908-11; General Engineering Department, 1912-13; Long Lines Department, Division Plant Engineer, 1914-17; Engineer of Transmission, 1918-19; Engineer, 1920-. Mr. Pilliod is the head of the Long Lines Engineering Department.

J. N. REYNOLDS, B.S. in Electrical Engineering, Purdue University, 1904; E.E. 1907. Western Electric Company, Engineering Department, 1904-25. Bell Telephone Laboratories, 1925-. Mr. Reynolds has been continuously associated with the development of machine switching apparatus. As Special Studies Engineer, he is now engaged in the development of improved forms of crossbar switch and allied apparatus.

FREDERICK J. SCUDDER, New York Telephone Company, 1905-10; Western Electric Company, Engineering Department, 1910-25; Bell Telephone Laboratories, 1925-. Mr. Scudder has been engaged in the development of machine switching systems since 1910, and in his present capacity as Systems Development Engineer is in charge of fundamental studies and circuit development of panel and crossbar systems.

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