

## Contributors to This Issue

S. P. SHACKLETON, B.S., E.E., University of Michigan, 1915. American Telephone and Telegraph Company, Engineering Department, 1915-19; Department of Development and Research, 1919—. Mr. Shackleton's work has been connected with toll circuit development, including toll switchboards, telephone repeaters and testboards.

H. W. PURCELL, B.S., Harvard University, 1905; Engineering Department of the Western Electric Company, 1906-20; Department of Development and Research, American Telephone and Telegraph Company, 1920—. Mr. Purcell has been associated with the design of electromagnets and more recently with the development of machine switching apparatus.

WALTER A. SHEWHART, A.B., University of Illinois, 1913; A.M., 1914; Ph.D., University of California, 1917; Engineering Department, Western Electric Company, 1918—. Mr. Shewhart has been engaged in the study of the relationship between the microphonic and the physico-chemical properties of carbon.

EDWARD C. MOLINA, Engineering Department of the American Telephone and Telegraph Company, 1901-19, as engineering assistant; transferred to the Circuits Design Department to work on machine switching systems, 1905; Department of Development and Research, 1919—. Mr. Molina has been closely associated with the application of the mathematical theory of probabilities to trunking problems and has taken out several important patents relating to machine switching.

ROBBINS P. CROWELL, Southern New England Company, assistant chief operator, New Haven, 1907-09; chief operator, New London, 1909-10; New York Company, assistant manager, 1910-13; engineer in the Traffic Department, 1913-16; Engineering Department, American Telephone and Telegraph Company, 1916—. Mr. Crowell has been concerned chiefly in the preparation and introduction of peg counts and force adjustment routines.

FRANCIS F. LUCAS, Plant and Engineering Departments of Associate Companies, 1902-10; Installation Department Western Electric Company, 1910-13; Engineering Department, 1913—. Mr. Lucas is a materials engineer and has specialized in the application of microscopy to industrial problems.

J. G. FERGUSON, B.S., University of California, 1915; M.S., 1916; research assistant in physics, 1915-16; Engineering Department of the Western Electric Company, 1916—.

KARL K. DARROW, S.B., University of Chicago, 1911; University of Paris, 1911-12; University of Berlin, 1912; Ph.D., in physics and mathematics, University of Chicago, 1917; Engineering Department, Western Electric Company, 1917—. At the Western Electric, Mr. Darrow has been engaged largely in preparing studies and analyses of published research in various fields of physics.

# ERRATA

ISSUE OF JANUARY, 1924

On page 162, line 11 from bottom of page, and on page 163, line 4:

*read  $K\gamma$  instead of  $K\delta$ .*

On page 173, line 3 from bottom of page:

*read emerging instead of engineering.*