

The A.I.Ch.E. Journal, an official publication of the American Institute of Chemical Engineers, is devoted in the main to theoretical developments and research in chemical engineering and allied branches of engineering and science. Manuscripts should be submitted to the New York office.

PUBLISHER

F. J. Van Antwerpen

EDITOR

Harding Bliss

MANAGING EDITOR

Sylvia Fourdrinier

ADVERTISING MANAGER

P. A. Jolcuvar

ADVISORY BOARD

C. M. Cooper	R. H. Newton
O. E. Dwyer	R. L. Pigford
W. C. Edmister	E. L. Piret
E. R. Gilliland	J. M. Smith
A. N. Hixson	Theodore Vermeulen
H. F. Johnstone	R. R. White
W. R. Marshall, Jr.	R. H. Wilhelm

Publication Office, 215 Canal Street, Manchester, New Hampshire. Published quarterly in March, June, September, and December by the American Institute of Chemical Engineers, 25 West 45 Street, New York 36, New York. Manuscripts and other communications should be sent to the New York office. Correspondence with the editor may be addressed to him at Yale University, 225 Prospect Street, New Haven 11, Connecticut. Statements and opinions in the A.I.Ch.E. Journal are those of the contributors, and the American Institute of Chemical Engineers assumes no responsibility for them. Subscriptions: one year, member \$6.00; nonmember \$12.00; industrial libraries \$25.00; additional yearly postage, Canada 50 cents, Pan American Union \$1.50, other foreign \$2.00 (foreign subscriptions payable in advance). Single copies: \$4.00. Second-class mail. Postage paid at Manchester, New Hampshire. Copyright 1961 by the American Institute of Chemical Engineers. National headquarters of A.I.Ch.E. is concerned about nondelivery of copies of the A.I.Ch.E. Journal and urgently requests subscribers to give prompt notification of any change of address. Sixty days must be allowed for changes to be made in the records.

Postmaster: Please send form 3579 to A.I.Ch.E. Journal, 25 West 45 Street, New York 36, N. Y.

Conservation and Engineering: VII. Conclusions	1
Agitation of Viscous Newtonian and Non-Newtonian Fluids A. B. Metzner, R. H. Feehs, Hector Lopez Ramos, R. E. Otto, and J. D. Tuthill	3
Diffusion Rates in Porous Catalysts J. P. Henry, Balapa Chennakesavan, and J. M. Smith	10
Phase Equilibria of the Propane-Hydrogen Sulfide System from the Cricondotherm to the Solid-Liquid-Vapor Region Jerome Brewer, Newell Rodewald, and Fred Kurata	13
A Note on Multicomponent Diffusion Stephen A. Shain	17
Drag Coefficients at Low Reynolds Numbers For Flow Past Immersed Bodies A. M. Jones and J. G. Knudsen	20
Boundary-Layer Behavior on Continuous Solid Surfaces: I. Boundary-Layer Equations for Two-Dimensional and Axisymmetric Flow B. C. Sakiadis	26
Heat Transfer Characteristics of Porous Rocks: II. Thermal Conductivities of Unconsolidated Particles with Flowing Fluids Daizo Kunii and J. M. Smith	29
A Quantitative Treatment of the Forgotten Effect in Liquid Thermal Diffusion D. Baldeschwieler	34
Combined Free and Forced Convection in a Constant Temperature Horizontal Tube T. W. Jackson, J. M. Spurlock, and K. R. Purdy	38
Turbulent Newtonian Flow in Annuli Donald M. Meter and R. Byron Bird	41
The Mechanics of Vertical Moving Liquid-Liquid Fluidized Systems: II. Counter-current Flow Bruce O. Beyaert, Leon Lapidus, and J. C. Elgin	46
Fluid-Particle Mass Transfer in a Packed Bed .. R. D. Bradshaw and C. O. Bennett	48
Turbulent Diffusion in the Core of Fully Developed Pipe Flow Lionel V. Baldwin and Thomas J. Walsh	53
A Modification of the Momentum Transport Hypothesis William N. Gill and Marvin Scher	61
Phase Relations of Miscible Displacement in Oil Recovery C. A. Hutchinson, Jr., and Philip H. Braun	64
The Effect of Mixer Design on the Efficiency of a Pump-Mix Mixer-Settler A. T. Davis and T. J. Colven	72
Simultaneous Mass and Heat Transfer in the Flow of Gases Past Single Spheres Spyros Evnochides and George Thodos	78
Size Distribution of Droplets from Centrifugal Spray Nozzles Paul A. Nelson and William F. Stevens	80
A Method of Measuring Thermal Diffusivities of Rocks at Elevated Temperatures W. H. Somerton and G. D. Boozar	87