

CONTENTS

Papers	Page
MATHEMATICAL MODEL FOR WATER DISTRIBUTION SYSTEMS by Mehdi S. Zarghamee	1
PROPERTIES OF CIRCULATION IN STRATIFIED LAKES by James A. Liggett and Kwang K. Lee	15
HYDRAULIC JUMP WITHIN GRADUALLY EXPANDING CHANNEL by Anat Arbhabhrama and Alejandro U. Abella	31
SEDIMENT TRANSPORTATION MECHANICS: Q GENETIC CLASSIFICATION OF VALLEY SEDIMENT DEPOSITS by Task Committee for Preparation of Sedimentation Manual, Committee on Sedimentation of the Hydraulics Division	43
EFFECT OF CHANNEL SHAPE ON GRADUALLY VARIED FLOW PROFILES by Nagar S. Lakshmana Rao and Kalambur Sridharan	55
EFFECT OF SIDE WALLS ON FLOW PAST BLUFF BODIES by Thomas L. Shaw	65
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD by Jaime Amorocho and Johannes J. DeVries	81
SEDIMENT TRANSPORTATION MECHANICS: F. HYDRAULIC RELATIONS FOR ALLUVIAL STREAMS by Task Committee for Preparation of the Sedimentation Manual, Committee on Sedimentation of the Hydraulics Division	101

(over)

This Journal is published monthly by the American Society of Civil Engineers. Publications office is at 345 East 47th Street, New York, N.Y. 10017. Address all ASCE correspondence to the Editorial and General Offices at 345 East 47th Street, New York, N.Y. 10017. Allow six weeks for change of address to become effective. Subscription price is \$16.00 per year with discounts to members and libraries. Second-class postage paid at New York, N.Y. and at additional mailing offices. HY.

	Page
FLOOD REGULATION BY COLUMBIA TREATY PROJECTS by Mark L. Nelson and David M. Rockwood	143

DISCUSSION
Proc. Paper 7783

ONE-DIMENSIONAL EQUATIONS OF OPEN-CHANNEL FLOW , by Theodor Strelkoff (May, 1969. Prior Discussion: Jan., 1970). closure	165
DAILY STREAMFLOW SIMULATION , by Kip Payne, William R. Neuman, and Kenneth D. Kerri (July, 1969. Prior Discussions: Apr., May, 1970). closure	167
HYDRAULIC DESIGN OF UNLINED ROCK TUNNELS , by Carl J. Huval (July, 1969. Prior Discussions: Apr., 1970). closure	169
NONLINEAR FLOW IN POROUS MEDIA,^a by Nazeer Ahmed and Daniel K. Sunada (Nov., 1969. Prior Discussions: July, Aug., 1970). by Frederic T. Mavis	170
COMPUTERS IN FLOOD CONTROL PLANNING , by L. Douglas James (Nov., 1969. Prior Discussions: Apr., June, 1970). closure	172
SEDIMENT MEASUREMENT TECHNIQUES: E. AIRBORNE SEDIMENT , by the Task Committee on Preparation of the Sedimentation Manual, Committee on Sedimentation of the Hydraulics Division (Jan., 1970. Prior Discussion: June, 1970). closure	173
MARKOV MODELS FOR FLOW REGULATION , by Moshe Gablinger and Daniel P. Loucks (Jan., 1970). errata	175
RIVER CHANNEL PATTERNS,^a by Shrikrishna V. Chitale (Jan., 1970. Prior Discussions: Oct., 1970). by A. N. Biswas and K. K. Bandyopadhyay	175

^a Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.

	Page
RIPPLE CONCENTRATION AND FRICTION FACTOR, by Fred F. M. Chang (Feb., 1970. Prior Discussion: July, 1970). closure	178
DESIGNING SPILLWAY CRESTS FOR HIGH-HEAD OPERATION, ^a by John J. Cassidy (Mar., 1970. Prior Discussions: Aug., Sept., Nov., Dec., 1970). by Ramaswamy Sakthivadivel and S. Seetharaman	180
FLOOD PEAKS FROM SMALL SOUTHWEST RANGE WATER-SHED, ^a by Kenneth G. Renard, John C. Drissel, and Herbert B. Osborn (Mar., 1970). by Thomas L. Brown and William M. Sammons	182
HOT-FILM TURBULENCE MEASUREMENTS IN WATER FLOW, ^a by Francois J. Resch (Mar., 1970). by M. H. Abdul Khader, K. Elango, and H. Suresh Rao	194
FLOW IN CONDUITS WITH LOW ROUGHNESS CONCENTRATION, ^a by John A. Roberson and C. K. Chen (Apr., 1970). by Kittur G. Ranga Raju and Ramachandra J. Garde	196
RISKS IN HYDROLOGIC DESIGN OF ENGINEERING PROJECTS, ^a by Ben Chie Yen (Apr., 1970. Prior Discussion: Sept., 1970). by Triyugi Prasad	201
OPEN CHANNEL EXPANSIONS FITTED WITH LOCAL HUMP, ^a by Amruthur S. Ramamurthy, Sanjay Basak, and Pattabhi Rama P. Rao (May, 1970). by B. S. Thandaveswara	202
RESISTANCE STUDIES ON SMOOTH OPEN CHANNELS, ^a by V. V. Jayaraman (May, 1970. Prior Discussions: Sept., Dec., 1970). by Rupchand M. Advani and Pashupati N. Modi	204
PRESSURE SURGE ATTENUATION UTILIZING AN AIR CHAMBER, ^a by Don J. Wood (May, 1970). by John S. Gladwell and Cheng-nan Lin	207
OPTIMUM DESIGN OF COMPLEX WATER RESOURCE PROJECTS, ^a by David Stephenson (June, 1970). by Marshall E. Moss	208
SEDIMENT TRANSPORTATION MECHANICS: J. TRANSPORTATION OF SEDIMENT IN PIPES, ^a by the Task Committee for Preparation of the Sedimentation Manual, Committee on Sedimentation of the Hydraulics Division (July, 1970). by M. R. Carstens	209

	Page
CALIBRATION OF WALNUT GULCH SUPERCRITICAL FLUMES,^a by Wendell R. Gwinn (Aug., 1970). by Herman J. Koloseus	214

TECHNICAL NOTE
Proc. Paper 7824

PLOTTING POSITIONS FOR HYDROLOGIC FREQUENCIES by John R. Stipp and George K. Young, Jr.	219
---	-----

INFORMATION RETRIEVAL

The key words, abstract, and reference "cards" for each article in this Journal represent part of the ASCE participation in the EJC information retrieval plan. The retrieval data are placed herein so that each can be cut out, placed on a 3 x 5 card and given an accession number for the user's file. The accession number is then entered on key word cards so that the user can subsequently match key words to choose the articles he wishes. Details of this program were given in an August, 1962 article in CIVIL ENGINEERING, reprints of which are available on request to ASCE headquarters.

^a Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.