CONTENTS

	Papers	Page
	NONLINEAR FLOW THROUGH GRANULAR MEDIA by David Ellis Wright	851
	FEASIBILITY OF WATER EXPORT by Edward Kuiper	873
	FLOW AROUND 180° BENDS IN OPEN RECTANGULAR CHANNELS by Mostafa M. Soliman and E. Roy Tinney	893
	OPERATIONAL HYDROLOGY USING RESIDUALS by George K. Young and William C. Pisano	909
	NEW BEDFORD HURRICANE BARRIER OPERATIONAL PROBLEMS by Saul Cooper	925
	DESIGN HYDROGRAPHS FOR PENNSYLVANIA WATERSHEDS by John E. McSparran	937
	STRUCTURAL DAMAGE FROM TSUNAMI AT HILO, HAWAII by Lymon C. Reese and Hudson Matlock	961
	RATIONALIZATION OF LACEY'S REGIME FLOW EQUATIONS by Mohammad Akram Gill	983
[MEANDERING TENDENCIES IN STRAIGHT ALLUVIAL	
	by Hsieh W. Shen and Saburo Komura	997
	(over)	

This Journal is published bimonthly by the American Society of Civil Engineers. Publications office is at 2500 South State Street, Ann Arbor, Michigan 48104. Editorial and General Offices are at 345 East 47th Street, New York, N. Y. 10017. Subscription price is \$8.00 per year with discounts to members and libraries. Second-class postage paid at Ann Arbor, Michigan. EM, HY, SA, SM.

		Page
Frank D. Masch, Chmn	Erosion of Cohesive Materials,	1017
DWORSHAK DAM SPILLWAY DESIGN by Albert L. McCormmach	AND OUTLETS HYDRAULIC	1051
BEHAVIOR OF SMALL GAS F LIQUID by Subba Rao Gutti	BUBBLES IN ACCELERATED	1073
COMPUTER SIMULATION OF WATERWAYS		1000
by Robert A. Baltzer and C	Chintu Lai	1083
	DISCUSSION	
	Proc. Paper 6015	
-		
MPROVED METHOD OF FLO Graves (Jan., 1967. Prior Dis 1967).	OOD ROUTING, by Eugene A. cussion: May, Sept., Nov.,	
closure	• • • • • • • • • • • • • • • • • • • •	1121
I. R. Wood (Mar., 1967. Prior		1130
CONTROL POINT IN A LATE by Kenneth V. H. Smith (May, 1968).	RAL SPILLWAY CHANNEL ^a , 1967. Prior Discussion: Jan.,	
FIDAL VELOCITIES ACROSS BARRAGE ^a , by A. Roy Halliw cussion: May, 1968).	A PARTLY-COMPLETED ell (Sept., 1967. Prior Dis-	1130
RECIRCULATION AND SAND-	FEED TYPE FLUME EXPERI- E. Rathbun, and Everett V.	1134
by Thomas Blench by Thomas Maddock, Jr.	• • • • • • • • • • • • • • • • • • • •	1138 1139 1147

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

	Page
WALL EFFECTS IN PERMEAMETERS ^a , by Colin R. Dudgeon (Sept., 1967). by Joseph B. Franzini	1148
WATER-HAMMER ANALYSIS OF DISTRIBUTION SYSTEMS ^a , by Victor L. Streeter (Sept., 1967). by Donald H. Mill	1150
SIMPLIFIED DESIGN FOR FLUME INLETS ^a , by Clifford D. Smith (Nov., 1967. Prior Discussion: May, 1968). by K. N. Shivashankara Rao	1152
DETERMINATION OF EFFICIENT OPEN CHANNEL SECTIONS ^a , by Mohammad Ali Mahdaviani (Nov., 1967. Prior Discussion: May, 1968). by V. Murahari and P. Sreenivasulu	1153
GLEN CANYON DAM DIVERSION TUNNEL OUTLETS ^a , by William E. Wagner (Nov., 1967). by Kyatsandra Seetharamiah, Nagar S. Lakshmana Rao, and B. C. Syamala Rao	
STEADY AND UNSTEADY FLOW TOWARDS GRAVITY WELLS ^a , by Mohammad Ali Mahdaviani (Nov., 1967. Prior Discussion: May, 1968). by Mostafa M. Soliman	
VORTEX-INDUCED OSCILLATIONS AT LOW-HEAD WEIRS ^a , by Zoltán G. Hankó (Nov., 1967). by Dirk Clays and Gérard Tison, Jr.	1160
HYDRAULICS OF SPATIALLY VARIED PIPE FLOW ^a , by Wan Wang Hu (Nov., 1967). by Fred W. Blaisdell, Philip W. Manson, and Kesavarao	1100
Yalamanchili	1168
by Edward Silberman	1172
TECHNICAL NOTES	
Proc. Paper 6046	
THE ORIGIN OF MANNING'S FORMULA by Ralph W. Powell	1179

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