

## CONTENTS

Papers	Page
MOSSYROCK PROJECT—RIVER DIVERSION AND CARE OF FISH by Earl J. Beck	1
ROCK MECHANICS STUDIES FOR MOSSYROCK ARCH DAM by David E. Kleiner and Richard C. Acker	11
DESIGN OF MOSSYROCK ARCH DAM by Roman P. Wengler and William Y. J. Shieh	25
MOSSYROCK ARCH SPILLWAY by David S. Louie	39
DESIGN AND CONSTRUCTION OF MOSSYROCK PENSTOCKS by Edgar T. Moore	49
COWLITZ SALMON HATCHERY by Quentin A. Edson and Ray J. Banys	61
EARTHQUAKE RESEARCH NEEDS FOR NUCLEAR POWER PLANTS by George W. Housner	77
THERMAL-HYDRAULIC STUDY: ARKANSAS COOLING RESERVOIR by Herbert S. Riesbol, James B. Anderson, Fred H. Wend, and Harlan T. Holmes	93
HYDROELECTRIC POWER PLANT TRASHRACK DESIGN by Lloyd E. Sell	115

(over)

---

This Journal is published aperiodically 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 \$6.00 per year with discounts to members and libraries. CO, UP, PO, PP, SU.

	Page
COOLING WATER SOURCES FOR POWER GENERATION by Louis G. Hauser . . . . .	123
CABIN CREEK PUMPED STORAGE HYDROELECTRIC PROJECT by Hugh W. Hight . . . . .	135
CHALLENGES OF UNDERGROUND TRANSMISSION AND DISTRIBUTION by David W. Gilman and Edward J. Steeve . . . . .	151
INTEGRATION OF PUMPED-STORAGE WITH TIDAL POWER by Thomas L. Shaw and Geoffrey R. Thorpe . . . . .	159
EHV-DC SYSTEM TIES LOS ANGELES TO NORTHWEST by William M. Mahoney . . . . .	181
STEEL PENSTOCK DESIGN FOR TIMS FORD DAM by George E. Day and Horace S. Beckner . . . . .	203
AQUATIC ECOSYSTEMS AND THERMAL POWER PLANTS by Loren D. Jensen and Derek K. Brady . . . . .	209

---

DISCUSSION

Proc. Paper 7784

---

RESEARCH NEEDS IN CIVIL ENGINEERING ASPECT OF POWER, by Research Committee of the Power Division (May, 1968. Prior Discussion: Mar., 1969). closure . . . . .	221
TRANSPORTING EQUIPMENT FOR GRAND COULEE THIRD PLANT, by Harold G. Arthur (Nov., 1968). errata . . . . .	222
ANALYSIS AND DESIGN OF TOWER FOUNDATIONS, by Richard L. Wiggins (Mar., 1969. Prior Discussion: June, 1970). closure . . . . .	222
TAILWATER ENCROACHMENT, <sup>a</sup> by David N. Raffel (Oct., 1969). by R. M. King . . . . .	223
CONCRETE VOLUME CHANGE FOR DWORSHAK DAM, <sup>a</sup> by Donald L. Houghton (Oct., 1969). by Károly, Szepesi and Zoltán Szilvássy . . . . .	227

---

<sup>a</sup> Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.

	Page
HORIZONTAL SURFACE DISCHARGE OF WARM WATER JETS, <sup>a</sup> by Nobuyuki Tamai, Robert L. Wiegel, and Gordon F. Tornberg (Oct., 1969).	
by Klas Cederwall . . . . .	229
TOWER DESIGNS FOR AEP'S 765-KV PROJECT, <sup>a</sup> by Richard A. Kravitz and A. James Samuelson (Oct., 1969).	
by E. S. Zobel . . . . .	234
DESIGN CRITERIA FOR TURBINE-GENERATOR PEDESTALS, <sup>a</sup> by Asadour H. Hadjian (Jan., 1970).	
by Paul Rogers . . . . .	236
ARCH DAM DESIGN: STATE OF THE ART, <sup>a</sup> by Merlin D. Copen and Loyd R. Scrivner (Jan., 1970).	
by Serge V. Valent . . . . .	237
by J. Laginha Serafim . . . . .	241
HYPERBOLIC COOLING TOWERS, DEVELOPMENT AND PRACTICE, <sup>a</sup> by Paul Rogers and Eli W. Cohen (Jan., 1970).	
by Alan G. Davenport, Salman H. Abu-Sitta, and Nicholas Isyumov . . . . .	244
NEW DESIGN CRITERIA FOR USBR PENSTOCKS, <sup>a</sup> by Harold G. Arthur and John J. Walker (Jan., 1970).	
by Charles F. Corns . . . . .	248
by George E. Day and Horace S. Beckner . . . . .	250
by Andrew Eberhardt . . . . .	251
by Robert W. Mikitka and Joel H. Trammell . . . . .	252
by Malcolm N. Stephens . . . . .	253
by Alberto Mosseri and Carlos S. Ospina . . . . .	255
by Mircea S. Vasilescu . . . . .	256
BASIC STRUCTURAL DESIGN OF CONCRETE CHIMNEYS, <sup>a</sup> by Wadi S. Rumman (June, 1970).	
by Robert W. Peirce . . . . .	258
RIVER DIVERSION FOR BOUNDARY DAM, <sup>a</sup> by Adolf A. Schilling (June, 1970).	
by Frederic L. Lawton . . . . .	259
DIVERSION AT PORTAGE MOUNTAIN PROJECT, <sup>a</sup> by Harold K. Pratt (June, 1970).	
by David E. Wright . . . . .	260
DESIGN OF CARTERS PUMPED STORAGE PROJECT, <sup>a</sup> by Walter W. Burdin (June, 1970).	
by Frederic L. Lawton . . . . .	261

---

<sup>a</sup> Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.

	Page
POST-TENSIONED CONCRETE NUCLEAR STRUCTURES, <sup>a</sup> by Glen A. Chauvin, Robert J. Small, and Adolf Walser (June, 1970).	
by Robert E. Shewmaker . . . . .	262
ROCK PROPERTIES AND STEEL TUNNEL LINERS, <sup>a</sup> by George H. Kruse (June, 1970).	
by Frederic L. Lawton . . . . .	263
CONCRETE CHIMNEY DESIGN, CONSTRUCTION AND OPERATION, <sup>a</sup> by Philip G. Sikes (June, 1970).	
by Robert W. Peirce . . . . .	264

**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.

---

<sup>a</sup> Discussion period closed for this paper. Any other discussion received during this discussion period will be published in subsequent Journals.