

TA7
C6
CER 74-75/45
COPY 2

OF RESEARCH REPORTS, PAPERS, BULLETINS, AND THESES
OF ENGINEERING, COLORADO STATE UNIVERSITY



engineering
engineering
engineering
engineering

Catalog of Research Reports, Papers, Bulletins and Theses

For the period July 1, 1971 through June 30, 1974

COLLEGE OF ENGINEERING, COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO 80523

July 1, 1974



U18401 0074221

CER74-75DBS45

CONTENTS

	Page
College of Engineering Administrative Officers	iii
Introduction	iv
Abbreviations Used in this Catalog	v
Department of Agricultural Engineering	1
Department of Atmospheric Science	16
Department of Civil Engineering	26
Department of Electrical Engineering	58
Department of Mechanical Engineering	71
United States Department of Agriculture - Agricultural Research Service	79
United States Geological Survey	82
Series - ECOM Technical Reports	84
Series - Fluid Mechanics Papers	85
Series - Fluid Mechanics Program - Research Memoranda	85
Series - Hydrology Papers	87
Series - Hydro-Machinery Laboratory Reports	90
Series - Sanitary Engineering Papers	92
Series - THEMIS Technical Reports	92
Series - Water Management Technical Reports	94
College of Engineering Author Index	97

COLLEGE OF ENGINEERING
ADMINISTRATIVE OFFICERS

Lionel V. Baldwin, Dean, College of Engineering

Daryl B. Simons, Associate Dean for Research

Everett V. Richardson, Administrative Engineer

Judson M. Harper, Head, Department of Agricultural Engineering

T. H. Vonder Haar, Head, Department of Atmospheric Science

J. W. N. Fead, Head, Department of Civil Engineering

Russell J. Churchill, Head, Department of Electrical Engineering

Fred W. Smith, Head, Department of Mechanical Engineering

INTRODUCTION

This catalog presents a list of Colorado State University publications prepared by the faculty, research staff and students of the College of Engineering. Included are publications of U.S. Government staff affiliated with the College of Engineering.

A listing of publications prior to 1971 may be found in previous catalogs, "Research Reports, Papers, Bulletins, and Theses," Civil Engineering Numbers CER63RAS71, CER65DKS52, CER68-69DBS40, and CER70-71DBS69.

A supplement to this catalog will be issued every two years.

The publications by members of various departments are listed alphabetically by senior author. Papers

coauthored by members of different departments in the College of Engineering are cross-referenced with appropriate notes.

Theses and dissertations may be obtained on an interlibrary loan by writing to the Director of Libraries, Colorado State University.

Copies of publications, when available, may be obtained for a nominal charge. See notation at end of each departmental listing as to whom to address communication when requesting copies. Papers and reports out of print may be duplicated at a cost of 10¢ per page. An additional fee will be charged for postage and handling.

ABBREVIATIONS USED IN THIS CATALOG

AAS/AIAA	American Automotive Society/American Institute of Aeronautics and Astronautics
ACI	American Concrete Institute
AEC	Atomic Energy Commission
AGARD	Advisory Group for Aerospace Research and Development
AGU	American Geophysical Union
AIAA	American Institute of Aeronautics and Astronautics
AIChE-SPE	American Institute of Chemical Engineers - Society of Petroleum Engineers
AIME	American Institute of Mining Engineers
AMS	American Meteorological Society
AMS/WMO	American Meteorological Society/World Meteorological Association
Arch. Met. Geophys. Biokl.	Archiv fur Meteorologie Geophysik und Bioklimatologie
ARMA	Autoregressive-Moving-Average
ARS	Agricultural Research Service
ARS/SCS	Agricultural Research Service/Soil Conservation Service
ASAE	American Society of Architectural Engineers
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ATDL	Atmospheric Turbulence and Diffusion Laboratory
ATS	Applications Technology Satellite
CAT	Clear-Air Turbulence
CIAP	Climatic Impact Assessment Program
CO-TIE	Cooperation via Televised Instruction in Education
CPIA	Chemical Propulsion Information Agency
CSAE	Canadian Society of Agricultural Engineers
CSU	Colorado State University
CUSUSWASH	Council of United States Universities for Soil and Water Development in Arid in Sub-Humid Areas
ECOM	United States Army Electronics Command
EMG	Electromyographic
EPA	Environmental Protection Agency
ERM	Engineering Research Magazine
ESSA	Environmental Sciences Services Administration
GARP	Global Atmospheric Research Program
GATE	GARP Atlantic Tropical Experiment
IAHR	International Association for Hydraulic Research
IASH	International Association of Scientific Hydrology
IBP	International Biological Program
ICID	International Commission on Irrigation and Drainage
ICSU/WMO	International Council of Scientific Unions/World Meteorological Organization
IEE	Institute of Electrical Engineers
IEEE	Institute of Electrical and Electronics Engineers
IFAC	International Federation of Automatic Control
ISA	Instrument Society of America
IUGG	International Union of Geodesy and Geophysics
JANNAF	Joint Army-Navy-NASA-Air Force
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NAVWEARSCHFAC	Navy Weather Reserach Facility
NCAR	National Center for Atmospheric Research
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
NWS	National Weather Service
ONR	Office of Naval Research
OWRR	Office of Water Resources Research
RANN	Research Applied to National Needs
SIAM	Society for Industrial and Applied Mathematics
SWIEECO	Southwestern Institute of Electrical and Electronics Engineers Conference
UAG	University of Alaska Geophysics Institute
UES	Undergraduate Education and Science
UMSCHAU	German Magazine similar to SCIENCE
USAEC	United States Atomic Energy Commission

Abbreviations - continued

USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WMO	World Meteorological Association
WMO/AMS	World Meteorological Association/American Meteorological Society
WMO/IAMAP	World Meteorological Association/International Association of Meteorological and Atmospheric Physics
WMO/IUGG	World Meteorological Association/International Union of Geodesy and Geophysics

ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF AGRICULTURAL ENGINEERING

Judson M. Harper, Head

1971-74

COREY, A. T., Professor: (flow through porous media).	KEMPER, W. D., Professor: (water management).
DOWNS, W. H., Research Associate: (power and machinery).	LONGLEY, T. S., Research Associate, Extension Agricultural Engineer: (irrigation).
EARLY, A. C., Assistant Professor: (water management).	McWHORTER, D. B., Assistant Professor: (soil and water).
EVANS, N. A., Professor: (irrigation and drainage).	MILES, D. L., Assistant Professor and Extension Irrigation Engineer: (irrigation).
FREY, A. L., Associate Professor: (food engineering).	SKOGERBOE, G. V., Professor: (irrigation and drainage).
HANSEN, R. W., Associate Professor and Extension Agricultural Engineer: (farm structures and power machinery).	SMITH, J. L., Associate Professor: (power and machinery).
HARPER, J. M., Professor and Head of Department: (food engineering).	WALKER, W. R., Assistant Professor: (irrigation and drainage).
HART, W. E., Associate Professor: (irrigation and drainage).	WARD, R. C., Assistant Professor: (systems analysis).
HEERMANN, D. F., Affiliate Faculty ARS: (irrigation).	WHITE, M. D., Associate Professor: (natural resources law).

PUBLICATIONS

Department of Agricultural Engineering

- Adam, K. M., see D. B. McWhorter, Department of Agricultural Engineering.
- Addink, J. W., D. L. Miles, and G. V. Skogerboe, Modeling infiltration from time varying application rates. Paper No. 73-242 presented at 1973 Summer Meeting, American Society of Agricultural Engineers, University of Kentucky, Lexington, Kentucky, June 17-20, 1973. 21 p. AEP72-73JWA-DLM-GVS25.
- _____ and D. L. Miles, Water infiltration under center-pivot sprinklers. Paper No. 72-725, presented at 1972 Winter Meeting, American Society of Agricultural Engineers, Chicago, Illinois, December 11-15, 1972. 19 p. AEP72-73JWA-DLM10.
- Ayars, J. E., see G. V. Skogerboe, Department of Agricultural Engineering.
- Bargsten, G., G. V. Skogerboe, and W. R. Walker, The Grand Valley--an environmental challenge. U.S. Environmental Protection Agency Grant No. S-800278, "Grand Valley Salinity Control Demonstration Project." (In cooperation with James P. Law, Jr., U.S. Environmental Protection Agency.) Narrated slide presentation with colored brochure. February 1974. 25 p. AER73-74GB-GVS-WRW9.
- Barrett, J. W. H. and G. V. Skogerboe, Computing backwater at open channel constrictions. Paper 9841, American Society of Civil Engineers, Proceedings, Journal of Hydraulic Division, Vol. 99, No. HY7, July 1973. 14 p. AEP73-74JWHB-GVS18.
- _____, Width constrictions in open channels. Prepared under U.S. Agency for International Development Contract No. AID/csd-2460. November 1971. 105 p. Water Management Technical Report No. 15. \$3.00.
- _____, see G. V. Skogerboe, Department of Agricultural Engineering.
- Beetner, G., T. Tsao, A. Frey, and K. Lorenz, Stability of thiamine and riboflavin during extrusion processing of triticale. Presented at 34th Annual Meeting, Institute of Food Technologists, New Orleans, Louisiana, May 12-15, 1974. 11 p. AEP73-74GB-TT-AF-KL33.
- _____, A. L. Frey, and R. G. Bautista, A simulation study of a multistage mixer-settler extractor. Transactions of the American Institute of Mining Engineers, Vol. 254, December 1973. 5 p. AEP72-73BAG-ALF62.

Department of Agricultural Engineering - continued

- Beetner, G., T. Tsao, A. Frey, and J. Harper, Degradation of thiamine and riboflavin during extrusion processing. Presented at the 33rd Annual Meeting, Institute of Food Technologists, Miami Beach, Florida, June 12, 1973. Journal of Food Science, Vol. 39, 1974. 2 p. AEP72-73GB-TT-AF-JH52.
- _____, A. L. Frey, and R. G. Bautista, The analysis of two phase countercurrent fluid flow in a multistage mixer-settler extractor. AIME meeting, Proceedings 1973 International Symposium on Hydrometallurgy, New York, February 1973. 18 p. AEP72-73GAB-ALF6.
- _____, A. L. Frey, and R. G. Bautista, A hydrodynamic study of a multistage mixer-settler extractor. Presented at the AIME National meeting, San Francisco, California, February 1972. 42 p. AEP71-72ALF40.
- _____, A. L. Frey, and R. G. Bautista, A simulation study of a multistage mixer-settler extractor. Ames Laboratory-USAEC and Department of Chemical Engineering, Iowa State University, Ames, Iowa, 1972. 23 p. AER72-73GAB-ALF5.
- Lorenz, K., J. Welsh, R. Norman, _____, and A. Frey, Extrusion processing of triticale. Presented at the 33rd Annual Meeting, Institute of Food Technologists at Miami Beach, Florida, June 11, 1973. Journal of Food Science, Vol. 39, 1974. 21 p. AEP72-73KL-JW-RN-AF53.
- _____, see:
1. R. Limjaroenrat, Department of Agricultural Engineering.
 2. Tsao, T., Department of Agricultural Engineering.
- Bennett, R. S. and J. H. Taylor, Irrigation scheduling studies for water quality improvement. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality, Grand Junction, Colorado, May 16-18, 1972. 7 p. AEP71-72RSB-JHT37.
- _____, Cutthroat flume discharge relations. Prepared under U.S. Agency for International Development Contract No. AID/csd-2460, March 1972. 134 p. Water Management Technical Report No. 16.
- Austin, L. H., G. V. Skogerboe, and _____, Outlet transitions with triangular-shaped baffles. ASCE Proceedings, Journal of Irrigation and Drainage Division, Vol. 97, No. IR 3, September 1971. 16 p. AEP70-71-72LHS-GVS-RSB15.
- _____, see:
1. G. V. Skogerboe, Department of Agricultural Engineering, (10 coauthorships).
 2. W. R. Walker, Department of Agricultural Engineering, (2 coauthorships).
- Boetger, M. and A. Frey, Semi-batch fermentation of *Lactobacillus delbrueckii*. ASCE Paper No. 74-5032, presented at 1974 Annual Meeting of the American Society of Agricultural Engineers, Oklahoma State University, Stillwater, Oklahoma, June 23-26, 1974. 25 p. AEP73-74MB-AF37.
- Boonkird, V., Culverts as flow measuring devices. Prepared under U.S. Agency for International Development Contract No. AID/csd-2460, February 1972. 105 p. Water Management Technical Report No. 17.
- _____, see G. V. Skogerboe, Department of Agricultural Engineering.
- Clyma, W., G. L. Corey, and M. S. Shafique, Cropping patterns, water supply and irrigation practices at the Shadab Water Management Watercourse. Annual Report, 1973. 16 p. AER73-74WC-GLC24.
- _____, Evapotranspiration and irrigation water requirements for Pakistan. Supported by U.S. Agency for International Development Contract No. AID/csd-2162. Prepared for publication in Indus, a monthly publication of the Water and Power Development Authority, Lahore, Pakistan. Bulletin of the Irrigation, Drainage, and Flood Control Research Council, Lahore, Vol. 3, No. 2, December 1973. 8 p. AEP73-74WC22.
- _____, and A. Ali, Watercourse losses: case study no. 2. Annual Report 1973. Colorado State University, Water Management Research, December 1973. 8 p. AER73-74WC20.
- _____, see G. L. Corey, Department of Agricultural Engineering.
- Corey, A. T., Subsurface drainage. Course material for AE450, for spring 1972. 1971. 163 p. Class Notes 71-72-1.
- Brooks, R. H., B. Ng, G. L. Corey, and _____, Drainage of soil profiles. Paper No. 8389, Proceedings of the ASCE Journal of the Irrigation and Drainage Division, Vol. 97, No. IR 3, September 1971. 13 p. AEP71-72ATC45.
- _____, see D. B. McWhorter, Department of Agricultural Engineering.
- Corey, G. L., Optimizing irrigation water management practices in Pakistan. Prepared, by request, for Mr. Bucha, Presidential Adviser for Agriculture in Pakistan, January 1974. 10 p. AER73-74GC17.
- _____, and W. Clyma, Improving farm water management in Pakistan. Colorado State University, Water Management Research Contract/Pakistan. Field Party Report No. 1, June 1973. 28 p. AER73-74GLC-WC23.
- Brooks, R. H., B. Ng, _____, and A. T. Corey, Drainage of soil profiles. Paper No. 8389, Proceedings of the ASCE Journal of the Irrigation and Drainage Division, Vol. 97, No. IR 3, September 1971. 13 p. AEP71-72ATC45.
- _____, see W. Clyma, Department of Agricultural Engineering.
- Downs, H. W. and J. L. Smith, Injection feeding of birds. Paper No. 73-5519, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 32 p. AEP73-74HWD-JLS15.

Department of Agricultural Engineering - continued

- Downs, H. W., A pneumatic nutrient injector. Presented at the American Society of Agricultural Engineers Rocky Mountain Regional Meeting, Farmington, New Mexico, April 1972. AEP71-72HWD52.
- Kienholz, E. W., _____, and R. I. Hillman, Improved food pump system for feeding experimental birds. Presented at Poultry Science Association Annual Meeting, West Virginia University, Morgantown, Virginia, August 5-8, 1974. AEP74-75EWK-HWD-RIH5.
- Kienholz, E. W., _____, and R. I. Hillman, The food pump system for feeding animals: a technique for improving biological research. Abstract No. 32, p. 31. Presented at Today's Research--Tomorrow's Colorado, 87th Annual Research Conference, Colorado State University, Fort Collins, Colorado, February 25-March 1, 1974. Presented at World's Poultry Congress, New Orleans Louisiana, August 1974. AEP73-74EWK-HWD-RIH51.
- Early, A. C., The yield response of sugar cane to irrigation in the Philippines. Proceedings, International Society of Sugar Cane Technologists, Vol. 15, Durban, South Africa, June 1974. 24 p. AEP73-74ACE27.
- _____, Digital simulation of a sugar cane producing-processing district in the Philippines to test alternative irrigation policies, harvesting policies, and irrigation capacity development. Proceedings, International Society of Sugar Cane Technologists, Vol. 15, Durban, South Africa, June 1974. 23 p. AEP73-74ACE26.
- _____, and R. P. Gregorio, Consumptive use of water by sugar cane in the Philippines. Proceedings of the International Society of Sugar Cane Technologists, Vol. 15, Durban, South Africa, June 1974. 16 p. AEP73-74ACE25.
- Evans, N. A., Salt problem in the Colorado River. Presented at Regional meeting of the American Society of International Law on "The 1973 Mexico-U.S. Colorado River Agreement and its Implications," Oaxtepec, Mexico, March 15, 1974. 11 p. AEP73-74NAE49.
- _____, Oil shale. In Environment and Colorado: A Handbook. (P.O. Foss, editor). Environmental Resources Center, Colorado State University, Fort Collins, Colorado, 1974. 7 p. I.D.73-74-16.
- _____, Nuclear gas stimulation. In Environment and Colorado: A Handbook. (P.O. Foss, editor). Environmental Resources Center, Colorado State University, Fort Collins, Colorado, 1974. 8 p. I.D.73-74-16.
- _____, Engineering design considerations--for land treatment and disposal of secondary effluent. Proceedings, Land Treatment Symposium at University of Colorado. In Colorado State University Environmental Resources Center Information Series No. 9, November 1973. 31 p. AEP73-74NAE46.
- _____, Energy related water problems of the Colorado River Basin. Proceedings, Conference on Water and Energy, University of Nebraska, October 23, 1973. 4 p. AEP73-74NAE45.
- Evans, N. A., Water resources research--a summary for FY 1973. Annual Report Series No. 9, Environmental Resources Center, Colorado State University, August 1973. 82 p. AER73-74NAE22.
- _____, Inventory of current water resources research at Colorado State University. Information Series No. 8, Environmental Resources Center, Colorado State University, July 1973. 64 p. AER73-74NAE25.
- _____, Ed., Directory of environmental research faculty. Colorado State University Environmental Resources Center Information Series No. 5, December 1972. 105 p. AER72-73NAE13.
- _____, Environmental hazards in oil shale development. Presented at the 65th Annual Meeting of the American Institute of Chemical Engineers, New York City, November 27, 1972. 19 p. AEP72-73NAE11.
- _____, Water resources research--a summary for FY 1972. Annual Report Series No. 8, Environmental Resources Center, Colorado State University, August 1972. 75 p. AER72-73NAE12.
- _____, An inventory of environmental resource research in progress. Information Series No. 3, Environmental Resources Center, Colorado State University, July 1972. 55 p. AER72-73NAE11.
- _____, S. A. Schumm, R. D. Heil, D. Romine, W. E. Marlatt, C. W. Cook, C. H. Wasser, and A. T. Wilcox, Environmental inventory, portion of Piceance Basin. Contract report for Cameron Engineers, Inc., Denver, Colorado. Environmental Resources Center, Colorado State University, December 1971. AER71-72NAE12.
- _____, Water resources research--a summary for FY 1971. Annual Report Series No. 7, Environmental Resources Center, Colorado State University, August 1971. 72 p. AER71-72NAE11.
- _____, The recent past and possible future in information transfer in Colorado. Proceedings of the National Symposium on Social and Economic Aspects of Water Resource Development, American Water Resources Association Cornell University, Ithaca, New York, June 1971. 5 p. AEP70-71NAE17.
- _____, Statement to the subcommittee on irrigation and reclamation of the committee on interior and insular affairs, U.S. House of Representatives. On H.S. 1400 and related measures--to amend the Water Resources Research Act of 1964 (P.L. 88-370). Washington, D.C., June 29, 1971. 9 p. AER70-71NAE9.
- Freeman, L. R., see R. C. Ward, Department of Agricultural Engineering.
- Frey, A. L., T. Tsao, and J. M. Harper, Generalized polynomial programming optimizes nonlinear process models. Food Technology, Vol. 27, No. 3, 1973. 3 p. AEP72-73ALF-TFT-JMH65.

Department of Agricultural Engineering - continued

Frey, A. L. and J. M. Harper, Optimal menu planning without direct computer intervention. Paper No. 73-368, presented at the 1973 Annual Meeting of the American Society of Agricultural Engineers, University of Kentucky, Lexington, Kentucky, June 17-20, 1973. 9 p. AEP72-73ALF-JMH54.

_____, A future in food engineering. Agricultural Engineering Journal, Vol. 54, No. 9, 1973. 6 p. AEP72-73ALF16.

_____, T. F. Tsao, and J. M. Harper, Optimization of nonlinear process models through application of generalized polynomial programming. Presented at the 32nd Annual Meeting, Institute of Food Technologists, Minneapolis, Minnesota, May 24, 1972. 12 p. AEP71-72ALF-TFT-JMH28.

Al-Zakri, A. S. and _____, Activated sludge as a source of protein. Paper No. 72-581, presented at the ASAE 1972 Winter Meeting, Chicago, Illinois, December 11-15, 1972. 19 p. AEP72-73ALF9.

Madson, P., and _____, Protein extraction from *Saccharomyces cerevisiae*. Presented at the 34th Annual Meeting, Institute of Food Technologists, New Orleans, Louisiana, May 12-15, 1974. 32 p. AEP73-74AF34.

Sumardi, C. and _____, Analysis of a village process for tempe production. Presented at the 34th Annual Meeting, Institute of Food Technologists, New Orleans, Louisiana, May 12-15, 1974. 22 p. AEP73-74AF35.

Lorenz, K., J. Welsh, R. Norman, G. Beetner, and _____, Extrusion processing of triticale. Presented at the 33rd Annual Meeting, Institute of Food Technologists, Miami Beach, Florida, June 11, 1973. Journal of Food Science, Vol. 39, 1974. 21 p. AEP72-73KL-JW-RN-AF53.

_____, see:

1. G. Beetner, Department of Agricultural Engineering, (6 coauthorships).
2. M. Boetger, Department of Agricultural Engineering.
3. J. M. Harper, Department of Agricultural Engineering, (2 coauthorships).
4. R. Limjaroenrat, Department of Agricultural Engineering.
5. J. L. Smith, Department of Agricultural Engineering.
6. M. L. Stone, Department of Agricultural Engineering.
7. T. Tsao, Department of Agricultural Engineering.

Gold, R. C., J. L. Smith, and R. D. Hall, Development of an organic waste slurry injector. Paper No. 73-4529, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 13 p. AEP73-74RCG-JLS17.

Gold, R. C., J. L. Smith, and D. B. McWhorter, Subsurface organic waste disposal. Interim Report. Department of Agricultural Engineering, Colorado State University, November 1973. 76 p. AER73-74RCG-JLS-DBMS.

_____, see J. L. Smith, Department of Agricultural Engineering, (3 coauthorships).

Hall, T. L. and J. H. Taylor, Water and land resources in Eden Valley, Wyoming. Environmental Resources Center, partial Technical Completion Report, OWRR No. B-043-COLO. Prepared for the Office of Water Resources Research, February 1973. Department of Agricultural Engineering, March 1973. 193 p. AER72-73TLH-JHT21.

Hansen, R. W., Dry matter content of grain, hay or silage. Fact Sheet, GPE-6102. Great Plains Extension Committee Feedlot Handbook, 1974. AEP73-74RWH71.

_____, Building insulation--comfort and energy conservation. Service in Action No. 4.601. Colorado State University Extension Service, December 1973. 2 p. AER73-74RWH14.

_____, Farm machinery noise--dangers and protection. Service in Action No. 5.100. Colorado State University Extension Service, December 1973. 2 p. AER73-74RWH13.

_____, Metric measurements and conversion tables. Service in Action No. 9.119. Colorado State University Extension Service, December 1973. 2 p. AER73-74RWH12.

_____, Energy conservation--wise use of appliances. Service in Action No. 9.120. Colorado State University Extension Service, December 1973. 2 p. AER73-74RWH11.

_____, Estimating quantities of hay and silage. Cooperative Extension Service, Great Plains Beef Cattle Feeding Handbook, GPE-6101, 1973. 2 p. AER73-74RWH10.

_____, Wise use of appliances saves money and energy. Used as handouts at various meetings. Colorado State University, 1973. 8 p. AEP73-74RWH8.

_____, Insulate buildings for comfort and energy conservation. Used as handouts at various meetings. Colorado State University, 1973. 8 p. AEP73-74RWH7.

_____, Use and care of home heating and cooling equipment. Used as handouts at various meetings. Colorado State University, 1973. 4 p. AEP73-74RWH6.

_____, Diesel fuel vs. furnace oils. Nebraska Farmer, December 1973. AEP73-74RWH62

_____, Pollution control and waste disposal. Four Corners Regional Committee and Colorado State University Extension Service. Beef Cattle Back-grounding Handbook, 1973. AEP73-74RWH70.

Department of Agricultural Engineering - continued

- Hansen, R. W., Utilizing and recycling of livestock wastes. Presented at the 1973 Meeting of Academy of Veterinary Consultants, Denver, Colorado, August 1973. AEP73-74RWH67.
- _____, Feedlot planning and construction. Four Corners Regional Committee and Colorado State University Extension Service. Beef Cattle Backgrounding Handbook, 1973. AEP73-74RWH69.
- _____, CSU offers building plans. Colorado Rancher and Farmer, August 1973. AEP73-74RWH65.
- _____, Corn may need drying this fall. Colorado Rancher and Farmer, August 1973. AEP73-74RWH64.
- _____, A well managed hay crop. National Journal of Sheep Production and Management, Vol. 18, No. 9. 1973. AEP73-74RWH63.
- _____, Grain drying has many advantages. Colorado Rancher and Farmer, September 1972. Nebraska Farmer, August 18, 1973. 3 p. AEP72-73RWH43.
- _____, Federal pollution permits on the way. Colorado Rancher and Farmer, July 1973. AEP73-74RWH66.
- _____, Annual report of research related to waste management of livestock. Report to Interdisciplinary Council on Feedlot Pollution of the Research Committee, Great Plains Agricultural Council, April 1973. AEP73-74RWH26.
- _____, Farm feed processing systems. Presented at Dairy Operators Workshop, Trinidad, Colorado, April 27, 1973. 12 p. AEP72-73RWH15.
- _____, Fire! It doesn't always happen to someone else! Colorado Rancher and Farmer, April 1973. Nebraska Farmer, March 3, 1973. 2 p. AEP72-73RWH47.
- _____, Trailer fire prevention. Colorado Rancher and Farmer, 1973. Nebraska Farmer, 1973. 1 p. AEP72-73RWH40.
- _____, Plan your dairy for durability. Colorado Rancher and Farmer, March 1973. 2 p. AEP72-73RWH38.
- _____, Prevention of fires is everyone's job. Gunnison County Globe, February 28, 1973. 1 p. AEP72-73RWH39.
- _____, Mobile home fire safety. Various Colorado Newspapers, released by Colorado State University Office of Information, January 19, 1973. 5 p. AEP72-73RWH44.
- _____, Motor oils--engine service classification. Colorado State University Extension Service. Revised November 1, 1972. 2 p. AEP70-71RWH24.
- _____, More on stacking bales of hay. Nebraska Farmer, August 1972. AEP72-73RWH45.
- _____, Engineer your baled hay stacks. Colorado Rancher and Farmer, August 1972. 1 p. AEP72-73RWH42.
- Hansen, R. W., Livestock producers must prevent water pollution. Colorado Rancher and Farmer, August 1972. 2 p. AEP72-73RWH41.
- _____, The super silo. The Furrow, June 1972. AEP71-72RWH46.
- _____, Water pollution regulations for the livestock industry. Colorado State University Extension Service. Service in Action No. 4.600. May 15, 1972. 2 p. AEP71-72RWH30.
- _____, Stacking baled hay. Colorado State University Extension Service. Service in Action No. 4.502. May 15, 1972. 1 p. AEP71-72RWH29.
- _____, Livestock waste disposal and water pollution control. Supported by Colorado Department of Health, the Water Pollution Control Commission, and the Soil Conservation Service. Colorado State University Cooperative Extension Service Bulletin No. 480a, October 1971. 29 p. AEP71-72RWH13.
- _____, How to comply with Colorado's livestock confinement water pollution regulations. Presented at County Extension Livestock Waste Seminars, winter of 1971-72. 4 p. AEP71-72RWH2.
- Jordan, D. C., _____, and D. Holmstrom, Calf huts for year around use in Colorado. Paper No. 73-4553, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 6 p. AEP73-74DCJ-RWH-DH19.
- _____, see M. L. Stone, Department of Agricultural Engineering.
- Harmann, D. V. and J. M. Harper, Modeling a forming food extruder. Journal of Food Science, Vol. 39, November-December 1974. 11 p. AEP73-74DVH-JMH14.
- _____, 4-H electricity for lighting, unit III. 4-H member's manual M21003A, Cooperative Extension Service, Colorado State University, February 1974. 42 p. I.D.73-74-5.
- _____, and J. M. Harper, Effect of extruder geometry or torque and flow. ASAE Transactions, Vol. 16, No. 6, 1973. 5 p. AEP71-72DVH-JMH41a.
- _____, and J. M. Harper, Corn grits extrusion--the effects of extruder geometry and operating conditions. Paper No. 72-370, presented at the 1972 Annual Meeting of ASAE, Hot Springs, Arkansas, June 27-30, 1972. 25 p. AEP71-72DVH-JMH41.
- _____, 4-H electric motors, unit VI. 4-H member's manual M21006A, Cooperative Extension Service, Colorado State University, June 1973. 38 p. I.D.72-73-16.
- _____, 4-H adventures in electronics, unit V. 4-H member's manual M21005A, Cooperative Extension Service, Colorado State University, June 1973. 50 p. I.D.72-73-15.

Department of Agricultural Engineering - continued

- Harmann, D. V., Home and farm electrical systems, unit VII. 4-H member's manual M21007A, Cooperative Extension Service, Colorado State University, 1972. 38 p. I.D.72-73-17.
- _____, 4-H basic electricity, unit II. Member's manual M21002A, Cooperative Extension Service, Colorado State University, 1972. 42 p. I.D.72-73-14.
- _____, 4-H basic electricity, unit I. Member's manual M21001A, Cooperative Extension Service, Colorado State University, 1972. 41 p. I.D.72-73-13.
- _____, 4-H bicycle project, unit II. Member's manual and record book Ms0s0sA, Cooperative Extension Service, Colorado State University, 1972. 20 p. I.D.72-73-12.
- _____, 4-H bicycle project, unit I. Member's manual and record book M20201A, Cooperative Extension Service, Colorado State University, 1972. 20 p. I.D.72-73-11.
- _____, Raise your horizons. Education...key to success. Colorado Country Life, Vol. 19, No. 8, January 1972. 3 p. AEP71-72DVH44.
- _____, see J. M. Harper, Department of Agricultural Engineering.
- Harper, J. M., Nutrient standard menus for school foodservice. Presented at the 9th Annual Industry Seminar of the American School Food Service Association, Vail, Colorado, February 7, 1974. AEP73-74JMH61.
- _____, and G. R. Jansen, Comparison of type A and NSM menus in the national school lunch program. Final report on amendment to USDA Food and Nutrition Service Contract No. 12-35-600-85. February 1, 1974. 37 p. AER73-74JMH-GRJ16.
- _____, and D. Seckler, Engineering and economic evaluation of a 10,000 head capacity manure processing plant in the Chino, California area. Ceres Ecology Corporation, Sterling, Colorado, January 1974. AEP73-74JMH-DS73.
- _____, and G. R. Jansen, NSM choices. Prepared for USDA Food and Nutrition Service under Contract No. 12-35-600-85, December 18, 1973. 121 p. AER73-74JMH-GRJ6.
- _____, School lunches based on a nutrient standard. Presented at the 56th Annual American Dietetic Association Meeting, Denver, Colorado. October 24, 1973. AEP73-74JMH60.
- _____, and G. R. Jansen, NSM menu planner. Prepared for the USDA Food and Nutrition Service, Contract No. 12-35-600-85, January 8, 1973. Revised September 1973. 113 p. AER72-73JMH-GRJ7.
- _____, G. R. Jansen, and A. L. Frey, Menu planning for special diets. Presented at 26th Annual Conference on Engineering in Medicine and Biology, Minneapolis, Minnesota, September 30-October 4, 1973. 1 p. (Abstract). AEP73-74JMH-GRJ-ALF1.
- Harper, J. M. and T. F. Tsao, Evaporator staging and optimization. In Computer Programs for Chemical Engineering, Vol. 6 Design. Ed. by R. Jelinek, Aztec Publishing Co., Austin, Texas, 1973. 37 p. AEP71-72JMH-TFT39.
- _____, Development of a menu planning method based on a nutrient goal. Presented at the 27th Annual American School Food Service Association Convention, New Orleans, Louisiana, July 31, 1973. AEP73-74JMH59.
- _____, and G. R. Jansen, Nutrient standard menus. I. Philosophy, methods, and applications. Food Technology, Vol. 27, No. 6, pp. 48-52. June 1973. 3 p. AEP72-73JMH-GRJ37.
- _____, and K. Lorenz, Production and evaluation of salt bed roasted full-fat soy flour. Lebensmittel Wissenschaft un Technologie, Vol. 7, No. 5, 1974. 5 p. AEP73-74JMH-KL29.
- _____, and J. B. Lough, Nomographs simplify recipe alterations. Prepared under USDA Food and Nutrition Service Contract No. 12-35-600-85. School Foodservice Journal 27(4):72-77, April 1973. 6 p. AEP72-73JMH-JBL17.
- _____, A. L. Frey, G. R. Jansen, and J. B. Lough, Modeling food service operations for optimum nutrient retention. Prepared for the USDA, March 1973. 11 p. AER72-73JMH-ALF-GRJ-JBL10.
- _____, and D. V. Harmann, Research needs in extrusion cooking and forming. Paper No. 71-869, presented at the 1971 Winter Meeting of ASAE, Chicago, Illinois, December 7-10, 1971. ASAE Transactions, Vol. 16, No. 5, 1973. 3 p. AEP71-72JMH-DVH11.
- _____, and G. R. Jansen, Comparison of two off-line computer assisted nutrient standard menu planning techniques. Phase I Report. Prepared for USDA Food and Nutrition Service Contract No. 12-35-600-85, November 21, 1972. 58 p. AER72-73JMH-GRJ22.
- _____, and G. R. Jansen, Two off-line computer assisted nutrient standard menu planning techniques. Phase I Interim Report. USDA Food and Nutrition Service Contract No. 12-35-600-85, September 13, 1972. 149 p. AER72-73JMH-GRJ29.
- _____, T. P. Rhodes, and L. A. Wanninger, Jr., Viscosity model for cooked cereal doughs. Presented at Institute of Chemical Engineers Meeting, Portland, Oregon, August 27, 1969. Chemical Engineering Progress, Vol. 67, No. 108. 1971. 5 p. AEP71-72JMH49.
- _____, Drawing board techniques and technologies. A summary of a talk by Dr. Harper presented at "Roads to Agribusiness: Growth and Profit," Federation of Rocky Mountain States, Cosmopolitan Hotel, Denver, Colorado, May 4-5, 1972. 3 p. AEP71-72JMH47a.

- Harper, J. M., Drawing board techniques and technologies. Proceedings of Federation of Rocky Mountain State Meeting, Denver, Colorado, "Roads to Agribusiness: Growth and Profits," May 4, 1972. AEP71-72JMH47.
- Davis, D. E. and _____, Evaluation and recommendations for the agricultural equipment development research for tropical rice cultivation project. U.S. Agency for International Development Contract No. AID/csd-2541. Presented to AID, Washington, D.C., September 1973. AEP73-74JMH72.
- Jansen, G. R. and _____, Nutritional aspects of nutrient standard menus. Food Technology, Vol. 28, No. 1, January 1974. 5 p. AEP73-74GRJ-JMH23.
- Jansen, G. R. and _____, Narrative report on the potential for collaborative research on nutritional problems between Brazilian counterparts and American universities. Report to the National Science Foundation under Grants No. GF-34478 and GF-34466, December 15, 1972. 36 p. AER72-73GRJ-JMH3.
- Jansen, G. R. and _____, Evaluation of the potential for collaborative research on nutritional problems between Dr. Dutra de Oliveira's group and American universities. Report to the U.S. Agency for International Development, December 15, 1972. 45 p. AER72-73GRJ-JMH4.
- Turner, C. A., E. W. Kienholz, _____, and G. S. VijayaRaghavan, Roasted soybeans in growing and finishing diets for large turkeys. Feed-stuffs, Vol. 45, No. 2, January 8, 1973. 3 p. AEP72-73CAT-EWK-JMH-GSV14.
- _____, see:
1. G. Beetner, Department of Agricultural Engineering.
 2. A. L. Frey, Department of Agricultural Engineering, (3 coauthorships).
 3. D. V. Harmann, Department of Agricultural Engineering, (3 coauthorships).
 4. J. L. Smith, Department of Agricultural Engineering.
 5. G. S. VijayaRaghavan, Department of Agricultural Engineering, (4 coauthorships).
- Hart, W. E., Surface irrigation hydraulics model aids farmers, technicians. Agricultural Search, Vol. 1, No. 4. Colorado State University, January 4, 1974. 1 p. AEP73-74WEH20.
- _____, Design of irrigation systems. AE 452. Class Notes, Agricultural Engineering Department, Colorado State University, Fort Collins, Colorado, December 17, 1973. 227 p. plus appendix. Class Notes 73-74-4.
- _____, Irrigation engineering. Presented at the Seminar on "Prospects for Irrigation in West Africa," sponsored by Ford Foundation, L'Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres, and the International Institute of Tropical Agriculture, University of Nigeria, Ibadan, October 23-27, 1972. 118 p. plus appendix. 70 p. AEP72-73WEH51.
- Hart, W. E. and J. Borrelli, Distribution channels with multiple outlets. ASCE Proceedings, Journal of Irrigation and Drainage, Vol. 98, No. IR 2, Paper 8976, June 1972. 8 p. AEP71-72WEH42.
- _____, Subsurface distribution of nonuniformly applied surface waters. ASAE Transactions, Vol. 15, No. 4, 1972. 7 p. AEP72-73WEH2.
- Sabey, B. R. and _____, Land application of metro Denver municipal sewage sludge. Final Report to Metropolitan Denver Sewage Disposal District No. 1. Colorado State University, Agricultural Experiment Station, March 1972. 76 p. AER72-73BRS-WEH23.
- _____, see T. L. Huntzinger, Department of Agricultural Engineering, (2 coauthorships).
- Huang, K. T., J. L. Smith, and J. J. Hannan, Orchard shading. Experiment Station Progress Report PR74-5, Colorado State University, Fort Collins, Colorado, February 1974. AER73-74KTH-JLS-JJH27.
- Huntzinger, T. L., H. D. Moore, K. G. Brengle, R. L. Tinnermeier, W. E. Hart, and R. S. Whitney, 1972-1973 annual report, research demonstration farm, San Juan Basin research center, Cortez unit. Colorado State University Experiment Station. Prepared for Bureau of Reclamation, March 1973. 114 p. AER72-73TLH-HDM-KGB-RLT-WEH-RSW2.
- _____, and J. H. Taylor, Managing canal systems for water quality control. ASCE Irrigation and Drainage Specialty Conference Proceedings, September 26-28, 1972. AEP72-73TLH-JHT55.
- _____, H. D. Moore, K. G. Brengle, R. L. Tinnermeier, W. E. Hart, and R. S. Whitney, 1971-1972 annual report--demonstration farm, Cortez unit, San Juan Basin branch experiment station. Prepared for U.S. Bureau of Reclamation, July 14, 1972. AER72-73-TLH-HDM-KGB-RLT-WEH-RSW30.
- _____, see W. R. Walker, Department of Agricultural Engineering, (3 coauthorships).
- Jensen, M. E., Irrigation water requirements and management. AE 795AX. Summer quarter, 16 July-18 August, 1972. Agricultural Engineering, Colorado State University, 1972. 119 p. Class Notes 72-73-1.
- Kemper, W. D., J. Olsen, and A. Hodgdon, Fertilizer or salt leaching as affected by surface shaping and placement of fertilizer and irrigation water. U.S. Agency for International Development Contract No. AID/csd-2162. Soil Science, January-February 1974. 22 p. AEP73-74WDK-JO-AH42.
- _____, Irrigation agronomy. Presented at the seminar on "Prospects for Irrigation in West Africa," sponsored by the Ford Foundation, L'Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres, and the International Institute of Tropical Agriculture, Ibadan, Nigeria, October 23-27, 1972. 39 p. AEP72-73WDK63.

- Kemper, W. D. and J. P. Quirk, Ion mobilities and electric charge of external clay surfaces inferred from potential differences and osmotic flow. Soil Science Society of America Proceedings, Vol. 36, 1972. 30 p. AEP72-73WDK58.
- _____, I. Shainberg, and J. P. Quirk, Swelling pressures, electric potentials, and ion concentrations: Their role in hydraulic and osmotic flow through clays. Soil Science Society of America Proceedings, Vol. 36, No. 2, March-April 1972. 8 p. AEP71-72WDK48.
- Boersma, L. J. W. Cary, D. D. Evans, A. H. Ferguson, W. H. Gardner, R. J. Hanks, R. D. Jackson, _____, D. E. Miller, D. R. Nielsen, and G. Uehara, Soil water. A book. Written by Western Regional Research Technical Committee W-68, Water Movement in Soils. Published by the American Society of Agronomy and Soil Science Society of America, 1972. 279 p. AEP72-73WDK61.
- Menzies, J. D. and _____, Composts and mulches. U.S. Department of Agriculture Year Book of Agriculture, 1972. 17 p. AEP72-73WDK60.
- Shainberg, I. and _____, Transport numbers and mobilities of ions in bentonite membranes. Soil Science Society of America, Vol. 36, No. 4. July-August 1972. 6 p. AEP72-73WDK22.
- Todd, R. M. and _____, Salt dispersion coefficients near an evaporating surface. Soil Science Society of America Proceedings, Vol. 36, No. 4, July-August 1972. 5 p. AEP72-73-RMT-WDK59.
- Konrad, D. E. and D. L. Miles, Groundwater management districts in Colorado. Handout used in place of a publication, at county, etc. meetings; widely used in the field. Colorado State University, 1973. 3 p. AER72-73DEK-DLM9.
- _____, Evaporation pans used to schedule sprinkler irrigations. Colorado Rancher and Farmer, March 1972. 1 p. AEP71-72DK26.
- _____, Schedule irrigations to keep crops growing. Colorado Rancher and Farmer, March 1972. 1 p. AEP71-72DK25.
- _____, Matching crop water requirements with the center pivot system capacity. Presented at Center Pivot County Seminars, February 1972. 10 p. AEP71-72DEK4.
- Limjaroenrat, P., G. Beetner, T. Tsao, and A. Frey, Storage stability of thiamine and riboflavin in extruded rice. Presented at the 34th Annual Meeting of the Institute of Food Technologists, New Orleans, Louisiana, May 12-15, 1974. 14 p. AEP73-74PL-GB-TT-AF39.
- Lurvey, C. F., Consolidation and rehabilitation of canals in Poudre Valley. Environmental Resources Center, OWRR Project No. B-093-COLO. Prepared for AE 491--Senior Design Problem, Agricultural Engineering, Colorado State University. Report to Office of Water Resources Research, November 1973. 128 p. AER73-74CFL2.
- McWhorter, D. B., R. K. Skogerboe, and G. V. Skogerboe, Water pollution potential of mine spoils in the Rocky Mountain region. Proceedings of Fifth Symposium on Coal Mine Drainage Research, Louisville, Kentucky, October 1974. 14 p. AEP73-74DBM-RKS-GVS29.
- _____, R. K. Skogerboe, and G. V. Skogerboe, Potential of mine and mill spoils for water quality degradation. Proceedings of American Water Resources Association Symposium on Water Resources Problems Related to Mining, Golden, Colorado, July 1-2, 1974. 12 p. AEP73-74DBM-RKS-GVS30.
- _____, A. T. Corey, and K. M. Adam, The elimination of trapped gas from porous media by diffusion. Soil Science, Vol. 116, No. 1, July 1973. 8 p. AEP71-72DBM-ATC-KMA14.
- _____, D. K. Sunada, A. Prakash, and W. W. Burt, Analytical model of stream-aquifer system with pumping and recharge. Completion report submitted to Colorado State Engineer's Office, Denver, Colorado, October 18, 1972. 30 p. AER72-73DBM-DKS-AP-WWB2.
- _____, and J. A. Brookman, Pit recharge influenced by subsurface spreading. Ground Water, Vol. 10, No. 5, September-October 1972. 7 p. AEP71-72DBM-JAB15.
- _____, Steady and unsteady flow of fresh water in saline aquifers. Prepared under U.S. Agency for International Development Contract No. AID/csd-2162, June 1972. 53 p. Water Management Technical Report No. 20. \$3.00.
- _____, and J. A. Brookman, Artificial recharge from pits. A completion report prepared for the W-Y Groundwater Management District, Yuma, Colorado, February 1972. 41 p. AER71-72DBM-JAB3. (Requests to D. B. McWhorter)
- _____, see:
1. R. C. Gold, Department of Agricultural Engineering.
 2. J. L. Smith, Department of Agricultural Engineering.
 3. F. A. Zuberi, Department of Civil Engineering.
- Meyer, D. J., see G. V. Skogerboe, Department of Agricultural Engineering.
- Miles, D. L., Improvements in moving sprinkler irrigation systems for conservation of water. Colorado State University Environmental Resources Center Completion Report Series No. 49. Prepared for Office of Water Resources Research, OWRR Project No. B-039-COLO, June 1973. 167 p. AER72-73DLM19.
- _____, Don't stretch your irrigation water supplies too far! Colorado Rancher and Farmer, March 1973. 2 p. AEP72-73DLM19.
- _____, Farming circles. Irrigation Age, January 1973. 4 p. AEP72-73DLM20.

Department of Agricultural Engineering - continued

- Miles, D. L., Have you considered circular farming? Colorado Ranchers and Farmer, September 1972. 3 p. AEP72-73DLM5.
- _____, Surface water users: consider modern irrigation equipment. Colorado Rancher and Farmer, September 1972. 1 p. AEP72-73DLM4.
- _____, Furrow irrigation of sugar beets. Crystallized FACTS, American Crystal Sugar Company, Vol. 26, No. 1, Spring 1972. 2 p. AEP71-72DLM23.
- _____, Managing soils to increase sprinkler intake rates. Paper No. 72-219. Presented at 1972 Annual Meeting of ASAE, Hot Springs, Arkansas, June 27-30, 1972. AEP71-72DLM22.
- _____, Should we use water to distribute population? Colorado Rancher and Farmer, March 1972. 3 p. AEP71-72DM24.
- _____, Eliminating traction problems and increasing irrigation uniformity. Presented at County Center Pivot Seminars, February 1972. 4 p. AEP71-72DM21.
- _____, Management of sugar beet irrigation. Condensed presentation from Proceedings of Great Western Field Men's Sugarbeet Production Conference, Greeley, Colorado, February 10-11, 1972. 3 p. AEP71-72DM18.
- _____, Water laws and legislation affecting the turf industry. Condensed form of talk from Proceedings of Rocky Mountain Turfgrass Conference, Fort Collins, Colorado, January 27-28, 1972. 3 p. AEP71-72DLM19.
- _____, Modern irrigation management. Proceedings, Soil and Water Management Workshop, Greeley, Colorado, January 17, 1972. 10 p. AEP71-72DM20.
- _____, Off-season irrigation. Colorado State University Cooperative Extension Service. Rural Electric Association Newsletter, November 1971. 2 p. AEP71-72DLM3.
- _____, see:
1. J. W. Addink, Department of Agricultural Engineering, (2 coauthorships).
 2. D. E. Konrad, Department of Agricultural Engineering.
 3. H. M. Neghassi, Department of Agricultural Engineering.
- Neghassi, H. M., Crop water use and yield models with limited soil water. Prepared under U.S. Agency for International Development Contract No. AID/csd-2162, June 1974. 136 p. Water Management Technical Report No. 32.
- _____, and D. L. Miles, Effect of smoothing on furrow irrigation. Paper No. 73-411, presented at the CSAE Annual Meeting, Victoria, BC, Canada, August 22, 1973. 33 p. AEP73-74HMN-DLM4.
- Newlin, J. T. and R. C. Ward, Analysis of non-point source pollution in the Rocky Mountain - prairie region. Completion Report, Cooperative Extension Service Project No. 31-4040-2050, Colorado State University, January 1974. AER73-74JTN-RCW15.
- Nichols, S. R., G. V. Skogerboe, and R. C. Ward, Water quality management decisions in Colorado. Colorado State University Environmental Resources Center Technical Completion Report No. 38. Prepared for Office of Water Resources Research, Period July 1, 1969-June 30, 1972. June 1972. 185 p. AER71-72SRN-GVS-RCW8.
- _____, see R. C. Ward, Department of Agricultural Engineering.
- Rogers, E., see J. L. Smith, Department of Agricultural Engineering.
- Sahni, B. M., Salt water coning beneath fresh water wells. Prepared under support of U.S. Agency for International Development Contract No. AID/csd-2162, April 1972. 176 p. Water Management Technical Report No. 18.
- _____, see G. V. Skogerboe, Department of Agricultural Engineering.
- Skogerboe, G. V., W. R. Walker, J. H. Taylor, and R. S. Bennett, Evaluation of irrigation scheduling for salinity control in Grand Valley. EPA-660/2-74-052, Environmental Protection Technology Series, prepared for Office of Research and Development, U.S. Environmental Protection Agency, under Grant No. S-800278, June 1974. 93 p. AER73-74GVS-WRW-JHT-RSB19.
- _____, W. R. Walker, and R. S. Bennett, Selected irrigation return flow quality abstracts 1972-1973. Third Annual Issue, EPA-660/2-74-049. Environmental Protection Technology Series, prepared for Office of Research and Development, U.S. Environmental Protection Agency, under Grant No. R-800426, June 1974. 415 p. AER73-74GVS-WRW-RSB18.
- _____, and W. R. Walker, Planning, design and construction of water delivery and removal systems. Proceedings of Workshop on Water Delivery and Removal Systems and Related Institutional Structures, Colorado State University, April 30-May 3, 1974. AEP73-74GVS-WRW56.
- _____, Chemical water quality. Proceedings of soil shale--a symposium for environmental leaders. The Colony Cast Study. Sponsored by Colony Development Operation and held at Colorado Woman's College, Denver, Colorado, April 19, 1974. AEP73-74GVS57.

Department of Agricultural Engineering - continued

- Skogerboe, G. V., Chemical water quality characteristics of Parachute Creek, Colorado. Appendix 12 of An Environmental Impact Analysis for a Shale Oil Complex at Parachute Creek, Colorado. Colony Development Operation, March 1974. AEP73-74GVS74.
- _____, Colorado River salinity: impact of Parachute Creek oil shale plant and alternatives for mitigation. Appendix 12 of An Environmental Impact Analysis for a Shale Oil Complex at Parachute Creek, Colorado. Colony Development Operation, March 1974. AEP73-74GVS58.
- _____, Improving water management to alleviate water-logging and salinity problems in Pakistan. Colorado State University Field Party, Water Management Research (CUSUSWASH), Islamabad, Pakistan, February 1974. 37 p. AER73-74GVS21.
- _____, W. R. Walker, R. S. Bennett, and J. H. Taylor, Irrigation scheduling for reducing salinity from Grand Valley. Paper No. 73-2532, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 20 p. AEP73-74GVS-WRW-RSB-JHT13.
- _____, R. S. Bennett, and W. R. Walker, Selection and installation of cutthroat flumes for measuring irrigation and drainage water. Colorado State University Experiment Station Technical Bulletin 120, December 1973. 80 p. AER73-74GVS-RSB-WRW4. \$3.00.
- _____ and W. R. Walker, Salt pickup from agricultural lands in the Grand Valley, Colorado. American Society of Agronomy. Journal of Environmental Quality, Vol. 2, No. 3, July 1973. 6 p. AEP72-73GVS-WRW32.
- _____, W. R. Walker, J. W. H. Barrett, and L. H. Austin, Comparison of bridge backwater relations. Proceedings of American Society of Civil Engineers, Journal of the Hydraulics Division, Vol. 99, No. HY6, June 1973. 39 p. AEP72-73GVS-WRW-JWHB31.
- _____, G. E. Radosevich, and E. C. Vlachos, Consolidation of irrigation systems: Phase 1--Engineering, legal, and sociological constraints and/or facilitators. Colorado State University Environmental Resources Center Completion Report Series No. 52. Prepared for Office of Water Resources Research under OWRR Project No. B-043-COLO, Grant Agreement No. 14-31-0001-3066, June 1973. 443 p. AER72-73GVS-GER-ECV18.
- _____ and W. R. Walker, Changing role of water conveyance systems. Meeting Preprint 1880, ASCE National Water Resources Engineering Meeting, Washington, D.C., January 29-February 2, 1973. 16 p. AEP72-73GVS-WRW8.
- _____ and W. R. Walker, Agricultural impact on water quality in western rivers. Chapter 12, in Environmental Impact on Rivers, Vol. 3, 1972. AEP72-73GVS-WRW66.
- Skogerboe, G. V. and W. R. Walker, Rehabilitation of irrigation systems for salinity control. Presented at 1972 Winter Meeting of American Society of Agricultural Engineers, Chicago, Illinois, December 11-15, 1972. 14 p. AEP72-73GVS-WRW33.
- _____, R. S. Bennett, and W. R. Walker, Generalized discharge relations for cutthroat flumes. Paper No. 9438, ASCE Proceedings, Journal of the Irrigation and Drainage Division, Vol. 98, No. IR 4, December 1972. 15 p. AEP72-73GVS-RSB-WRW7.
- _____, V. T. Sahni, and W. R. Walker, Selected irrigation return flow quality abstracts 1968-1969. First Annual Issue. Prepared for Office of Research and Monitoring, U.S. Environmental Protection Technology Series EPA-R2-72-094, November 1972. 217 p. AER72-73GVS-VTS-WRW6.
- _____ and W. R. Walker, Evaluation of canal lining for salinity control in the Grand Valley. Prepared for Office of Research and Monitoring, U.S. Environmental Protection Agency, Project No. EPA-R2-72-047. Environmental Protection Technology Series, October 1972. 212 p. AER72-73GVS-WRW1.
- _____, W. R. Walker, and V. Boonkird, Culverts for flow measurement in irrigation systems. Paper No. 72-227, presented at 1972 Annual Meeting of American Society of Agricultural Engineers, Hot Springs, Arkansas, June 27-20, 1972. ASAE Transactions, Vol. 16, No. 2, 1972. 7 p. AEP7-72GVS-WRW-VSB27.
- _____, W. R. Walker, D. J. Meyer, and R. S. Bennett, Selected irrigation return flow quality abstracts 1970-1971. Second Annual Issue. Environmental Protection Technology Series EPA-R2-73-271. Prepared for Office of Research and Monitoring, U.S. Environmental Protection Agency, under Grant No. R-800426, Project 13030 FVN, June 1972. 293 p. AER72-73GVS-WRW-DJM-RSB20.
- _____ and W. R. Walker, Salinity control measures in the Grand Valley. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality, Grand Junction, Colorado, May 16-18, 1972. 14 p. AER71-72GVS-WRW35.
- _____, W. R. Walker, and J. E. Ayars, Modelling water quality from agricultural lands. Presented at International Symposium on Mathematical Modelling Techniques in Water Resources Systems, May 9-12, 1972. Ottawa, Canada. 11 p. AEP71-72GVS-WRW-JEA12.
- _____, R. S. Bennett, and W. R. Walker, Installation and field use of cutthroat flumes for water measurement. Prepared under U.S. Agency for International Development Contract No. AID/csd-2460, March 1972. 48 p. Water Management Technical Report No. 19.

Department of Agricultural Engineering - continued

- Skogerboe, G. V. and J. P. Law, Jr., Research needs for irrigation return flow quality control. Water Pollution Control Research Series. Prepared for Office of Research and Monitoring, Environmental Protection Agency, Project No. 13030, November 1971. 105 p. AER71-72GVS-JPL9.
- _____, W. R. Walker, T. Y. Wu, and R. S. Bennett, Slope-discharge ratings for cutthroat flumes. Presented at 1971 Winter Meeting, ASAE, Chicago, Illinois, December 7-10, 1971. Paper No. 71-746. ASAE Transactions, Vol. 16, No. 1, 1973. 4 p. AEP71-72GVS-WRW-TYW-RSB9.
- _____ and W. R. Walker, Salinity control research in Grand Valley. Presented at the 28th Annual Meeting, Colorado River Water Users Association, Las Vegas, Nevada, December 6-7, 1971. 16 p. AEP71-72GVS-WRW8.
- _____, L. H. Austin, and R. S. Bennett, Energy loss analysis for open channel expansions. ASCE Proceedings, Journal of Hydraulics Division, Vol. 97, No. HY10, October 1971. 18 p. AEP71-72GVS-LHA-RSB10.
- _____, Water management aspects of consolidating irrigation systems. Presented at ASCE Irrigation and Drainage Division Specialty Conference on "Optimization of Irrigation and Drainage Systems," October 6-8, 1971, Lincoln, Nebraska. 24 p. AEP71-72GVS1.
- Austin, L. H., _____, and R. S. Bennett, Outlet transitions with triangular-shaped baffles. ASCE Proceedings, Journal of Irrigation and Drainage Division, Vol. 97, No. IR 3, September 1971. 16 p. AEP70-71LHA-GVS-RSB15.
- Law, J. P., Jr., and _____, Eds., Managing irrigated agriculture to improve water quality. Proceedings of National Conference held at Grand Junction, Colorado, May 16-18, 1972. 306 p. AEP71-72GVS51.
- Law, J. P., Jr., _____, and J. D. Denit, The need for implementing irrigation return flow quality control. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality, Grand Junction, Colorado, May 16-18 1972. 17 p. AEP71-72GVS33.
- Law, J. P., Jr., and _____, Potential for controlling quality of irrigation return flows. Journal of Environmental Quality, Vol. 1, No. 2, April-June, 1972. 7 p. AEP71-72GVS43.
- Radosevich, G. E., E. C. Vlachos, and _____, Constraints in water management on agricultural lands. Paper No. 73050, Water Resources Bulletin, Vol. 9, No. 2, April 1973. 8 p. In WRRRI Report No. 039, New Mexico Water Resources Research Institute, Nineteenth Annual New Mexico Water Conference, "Water in Food and Fiber Production," June 1974. 15 p. AEP73-74GER-ECV-GVS9.
- Skogerboe, G. V., see:
1. J. W. Addink, Department of Agricultural Engineering.
 2. G. Bargsten, Department of Agricultural Engineering.
 3. J. W. H. Barrett, Department of Agricultural Engineering.
 4. D. B. McWhorter, Department of Agricultural Engineering, (2 coauthorships).
 5. S. R. Nichols, Department of Agricultural Engineering.
 6. W. R. Walker, Department of Agricultural Engineering, (11 coauthorships).
 7. R. C. Ward, Department of Agricultural Engineering, (3 coauthorships).
- Smith, J. L., R. C. Ward, and E. Rogers, Development of a micronutrient applicator for orchards. Paper No. 74-1564, presented at the 1974 Winter Meeting of American Society of Agricultural Engineers, Chicago, Illinois, December 10-13, 1974. 15 p. AER73-74JLS-RCW-ER8a.
- _____, R. C. Gold, D. B. McWhorter, and B. R. Sabey, Subsurface injection of sewage sludge. Paper No. 73-2542, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 11 p. AEP73-74JLS-RCG-DBM-BRS16.
- _____ and R. C. Gold, On-land disposal of sewage sludge through subsurface injection. Presented at Rocky Mountain Regional ASAE Meeting, Laramie, Wyoming, April 1973. AEP72-73JLS-RCG56.
- _____, C. P. Houck, and R. D. Hall, Recycle of wastewater sludge through subsurface injection. Presented at Texas A&M Short School, College Station, Texas, March 6, 1973. 25 p. AEP72-73JLS13.
- _____ and R. C. Gold, Development of a subsurface injector for total recycling of sewage sludge. Colorado State University Experiment Station Progress Report No. 42, PR72-42, November 1972. 3 p. AER72-73JLS-RCG8.
- _____, A. L. Frey, and J. M. Harper, Automotive emissions control. Presented to Health and Environment Committee, Colorado State Senate, March 16, 1972. 9 p. AEP71-72JLS-ALF-JMH17.
- _____, K. Hillman, and A. M. Flikke, Experimental analysis of vibratory tillage. Paper No. 71-639, presented at the 1971 Winter Meeting ASAE, Chicago, Illinois, December 7-10, 1971. ASAE Transactions, Vol. 15, No. 5, 1972. 4 p. AEP71-72JLS7.
- _____, J. L. Dais, and A. M. Flikke, Theoretical analysis of vibratory tillage. Presented at 1971 Winter Meeting, ASAE, Chicago, Illinois, December 7-10, 1971. Paper No. 71-638. ASAE Transactions, Vol. 15, No. 5, 1972. 3 p. AEP71-72JLS6.

Department of Agricultural Engineering - continued

Smith, J. L., see:

1. H. W. Downs, Department of Agricultural Engineering.
2. R. C. Gold, Department of Agricultural Engineering, (2 coauthorships).
3. K. T. Huang, Department of Agricultural Engineering.
4. R. E. Tribelhorn, Department of Agricultural Engineering.
5. J. Yow, Department of Agricultural Engineering.

Stone, M. L., R. W. Hansen, and A. L. Frey, Design study of refeeding beef cattle wastes. Paper No. 73-4504, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 14 p. AEP73-74MS-RH-ALF3.

Story, A. G., Spectral reflectance of light and infrared radiation by potatoes, stones, and soil clods. ASAE Transactions, Vol. 16, No. 2, 1972. 3 p. AEP69-70AGS1.

Tribelhorn, R. E. and J. L. Smith, Chopping energy of a forage harvester. Paper No. 74-1001, presented at the 1974 Annual Meeting of the American Society of Agricultural Engineers, Oklahoma State University, Stillwater, Oklahoma, June 23-26, 1974. 26 p. AEP73-74RET-JLS36.

Tsao, T., G. Beetner, K. Lorenz, and A. Frey, Extrusion processing of instant rice spaghetti. Presented at the 34th Annual Meeting, Institute of Food Technologists, New Orleans, Louisiana, May 12-15, 1974. 15 p. AEP73-74TT-GB-KL-AF38.

_____, see:

1. G. Beetner, Department of Agricultural Engineering, (3 coauthorships).
2. A. L. Frey, Department of Agricultural Engineering, (2 coauthorships).
3. J. M. Harper, Department of Agricultural Engineering.
4. P. Limjaroenrat, Department of Agricultural Engineering.

Vanderholm, D. H. and R. C. Ward, Data acquisition for water quality management--an analysis of traditional grab sampling methods. Proceedings of Watersheds in Transition Symposium, Colorado State University, sponsored by American Water Resources Association, June 1972. 21 p. AEP72-73DHFV-RCW1.

_____, see R. C. Ward, Department of Agricultural Engineering.

VijayaRaghavan, G. S. and J. M. Harper, High temperature drying using a heated bed of granular salt. ASAE Transactions, Vol. 17, No. 1, 1974. 4 p. AEP73-74GVS-JMH43.

_____ and W. K. Bilanski, Stem-leaves moisture difference effect on alfalfa during harvest. Paper No. 73-309, presented at the CSAE Annual Meeting, Victoria, BC, Canada, August 22, 1973. 11 p. AEP73-74GSV5.

VijayaRaghaven, G. S. and J. M. Harper, Drying agricultural materials in an agitated granular bed. Paper No. 73-320, presented at 1973 Annual meeting of the American Society of Agricultural Engineers, University of Kentucky, Lexington, June 17-20, 1973. 21 p. AEP72-73GSV-JMH18.

_____, J. M. Harper, and R. D. Haberstroh, A study of heat transfer using granular media. Paper No. 72-892, presented at the American Society of Agricultural Engineers 1972 Winter Meeting, Chicago, Illinois, December 11-15, 1972. 19 p. AEP72-73GSV-JMH-RDH12.

_____, J. M. Harper, and W. E. Kienholz, Nutritive value of salt-bed roasted soybeans for broiler chicks. Poultry Science Journal, Vol. 53, March 1972. 21 p. AEP72-73GSV-JMH-EWK30.

Turner, C. A., E. W. Kienholz, J. M. Harper, and _____, Roasted soybeans in growing and finishing diets for large turkeys. Feedstuffs, Vol. 45, No. 2, January 8, 1973. 3 p. AEP72-73CAT-EWK-JMH-GSV14.

Walker, W. R., G. V. Skogerboe, R. S. Bennett, and J. H. Taylor, Development of salinity control technology in Grand Valley. Paper No. 74-2031. Presented at the 1974 Summer Meeting of the American Society of Agricultural Engineers, Stillwater, Oklahoma, June 23-26, 1974. AEP73-74WRW-GVS-RSB-JHT55.

_____, G. V. Skogerboe, and R. C. Ward, Water supply, treatment, distribution, and reuse optimization in arid urban areas. Presented at 9th American Water Resources Conference, Seattle, Washington, October 21-26, 1973. Water Resources Bulletin, Vol. 10, No. 6, December 1974. 6 p. AEP73-74WRW-RCW-GVS11.

_____, G. V. Skogerboe, and T. L. Huntzinger, Optimal allocation of water quality controls in urbanizing river basins. Presented at the 9th American Water Resource Conference, Seattle, Washington, October 21-26, 1973. Water Resources Bulletin, Vol. 10, No. 5, October 1974. 8 p. AEP73-74WRW-GVS-TLH10.

_____ and G. V. Skogerboe, The impact of water quality objectives on urban water supply planning. Presented at the 8th American Water Resources Conference, St. Louis, Missouri, October 30-November 2, 1972. American Water Resources Association, Water Resources Bulletin, Vol. 9, No. 4, October 1973. 13 p. AEP72-73WRW-GVS34.

_____, G. V. Skogerboe, R. C. Ward, and T. L. Huntzinger, Institutional requirements for optimal water quality management in arid urban areas. Environmental Resources Center Completion Report Series, Partial Report No. 48. Summary Completion Report to the Office of Water Resources Research, under Agreement No. 14-31-0001-3567, June 1973. 45 p. AEP72-73WRW-GVS-RCW-TLH28.

- Walker, W. R., T. L. Huntzinger, and G. V. Skogerboe, Coordination of agricultural and urban water quality management in the Utah Lake drainage area. Environmental Resources Center Completion Report Series, Partial Report No. 47. Technical Completion Report to OWRR, Agreement No. 14-31-0001-3567, June 1973. 160 p.
- _____, R. C. Ward and G. V. Skogerboe, Evaluation of urban water management policies in the Denver metropolitan area. Environmental Resources Center Completion Report Series, Partial Report No. 46. Technical Completion Report to OWRR, Agreement No. 14-31-0001-3567, June 1973. 153 p. AER72-73WRW-RCW-GVS26.
- _____ and G. V. Skogerboe, Mathematical modeling of water management strategies in urbanizing river basins. Environmental Resources Center Completion Report Series, Partial Report No. 45. Technical Completion Report to OWRR under Agreement No. 14-31-0001-3567, June 1973. 127 p. AER72-73WRW-GVS25.
- _____, G. V. Skogerboe and R. S. Bennett, Flow-measuring flume for wastewater treatment plants. Journal of the Water Pollution Control Federation, Vol. 45, No. 3, March 1973. 11 p. AEP72-73WRW-GVS-RSB48.
- _____, Conveyance and distribution system lining for salinity control. Presented at the 1972 Specialty Conference, Irrigation and Drainage Division, American Society of Civil Engineers, Spokane, Washington, September 1972. AEP72-73WRW57.
- _____ and G. V. Skogerboe, Hydrologic modeling for salinity control evaluation in the Grand Valley. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality, Grand Junction, Colorado, May 16-18, 1972. 9 p. AEP71-72WRW-GVS34.
- _____ and G. V. Skogerboe, Agricultural land use in the Grand Valley. Prepared for Grand Valley Salinity Control Demonstration Project. Grand Valley Water Purification Project, Inc., and U.S. Environmental Protection Agency, July 1971. 75 p. AER71-72WRW-GVS1.
- Evans, R. G., _____, and G. V. Skogerboe, Agricultural land use in the Poudre Valley. Prepared for U.S. Department of the Interior, OWRR Project No. B-083-COLO, October 1, 1973. 221 p. AER73-74RGE-WRW-GVS1. \$10.00.
- W. Roger Walker and _____, Surviving with salinity in the Lower Sevier River Basin. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality Grand Junction, Colorado, May 16-18, 1972. 7 p. AER71-72WRW38.
- _____, see:
1. G. Bargsten, Department of Agricultural Engineering.
 2. G. V. Skogerboe, Department of Agricultural Engineering, (21 coauthorships).
 3. R. C. Ward, Department of Agricultural Engineering.
- Ward, R. C., Routine surveillance alternatives for water quality management. Journal of the Water Pollution Control Federation, Vol. 46, No. 11, 1974. 21 p. AEP73-74RCW24.
- _____, G. V. Skogerboe, and W. R. Walker, Institutional constraints on agricultural water use. Paper No. 73-2545, presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 20 p. AEP73-74RCW-GVS-WRW12.
- _____ and L. R. Freeman, Data requirements of a water quality management program. American Water Resources Association Journal, Vol. 9, No. 6, December 1973. 29 p. AEP72-73RCW-LRF26.
- _____ and D. H. Vanderholm, Cost-effectiveness methodologies for data acquisition in water quality management. OWRR, Vol. 9, No. 3, June 1973. 10 p. AEP72-73RCW21.
- _____, Data acquisition systems in water quality management. Prepared for the Water Quality Office, Environmental Protection Agency, Project No. 16090 FUO, Contract No. 1401201. Socio-economic Environmental Studies Series, EPA-R5-73-014, May 1973. 266 p. AER71-72RCW10.
- _____ and G. V. Skogerboe, Environmental education in agricultural engineering: an excellent opportunity. Journal of Water Pollution Control Federation, March 1973. 14 p. AEP72-73RCW-GVS28.
- _____, S. R. Nichols, and G. V. Skogerboe, Surveillance in water quality management. Journal of the Water Pollution Control Federation, Vol. 45, No. 10, March 1973. 21 p. AEP72-73RCW-SRN-GVS27.
- _____, Dairying on urban greenbelt areas. Proceedings of the National Dairy Housing Conference, Michigan State University, East Lansing, February 4-6, 1973. 8 p. AEP72-73RCW46.
- _____, Water management in poultry processing. Paper No. 72-896, presented at the 1972 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-15, 1972. 13 p. AEP72-73RCW24.
- _____, Mathematical simulation for tile drainage system design. Paper No. 72-552, presented at the 1972 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-15, 1972. 21 p. AEP72-73RCW23.
- _____, E. H. Wiser, and D. A. Link, An approach to optimized design of tile drainage systems. Part I--Simulation of plant response to tile drainage. Part 2--Optimization of system design. Papers No. 3846 and 3847 of Journal Series of North Carolina Agricultural Experiment Station, Raleigh, August 1972. Part 1, 11 p., Part 2, 10 p. AEP72-73RCW50.
- _____, D. A. Link, and W. M. Crosswhite, An application of network theory to water management in poultry processing. Water Resources Bulletin, Vol. 8, No. 3, June 1972. 10 p. AEP71-72RCW32.

Department of Agricultural Engineering - continued

Ward, R. C., ed., Proceedings, workshop on home sewage disposal in Colorado. Sponsored by Environmental Resources Center, Colorado State University, and by Water Pollution Control Division of the Colorado Department of Health. Information Series No. 4, June 14, 1972. 81 p. AER71-72RCW26.

_____, Environmental concern and its impact on water use in poultry processing. Presented at Consumer Concerns '71, Colorado State University, October 1971. 15 p. AEP71-72RCW31.

_____ and W. M. Crosswhite, What to do now about reducing water, waste. Broiler Industry, September 1971. 3 p. AEP71-72RCW5.

Wiser, E. H., _____, and D. A. Link, Optimized design of subsurface drainage systems. ASAE Transactions, Vol. 17, No. 1, 1974. 4 p. AEP73-74RCW50.

_____, see:

1. J. T. Newlin, Department of Agricultural Engineering.
2. S. R. Nichols, Department of Agricultural Engineering.
3. J. L. Smith, Department of Agricultural Engineering.
4. D. H. Vanderholm, Department of Agricultural Engineering.
5. W. R. Walker, Department of Agricultural Engineering, (3 coauthorships).

White, M. D., Water as a tool in land use planning. Presented at the 1974 Regional Meeting of the Rocky Mountain Chapter, American Society of Agricultural Engineers, Fort Collins, Colorado, 1974. AEP73-74MDW54.

White, M. D., HB1041: an analysis from the county's perspective. An article appearing in the Land Use Planning Handbook. Cooperative Extension Service, Colorado State University, 1974. AEP73-74MDW53.

_____, Legal considerations in obtaining suitable supplies for oil shale operations in western Colorado. Proceedings of the National Symposium on Water Problems Related to Mining, American Resources Association, Golden, Colorado, 1974. AEP73-74MDW52.

_____, Environmental resources law, Vols. I, II, and III. AE488, Winter Quarter 1974, Agricultural Engineering Extension, Colorado State University, 1974. 1258 p. Class Notes 73-74-1.

_____, Water as a tool in land use planning. AE788, Spring Quarter, 1974. Department of Agricultural Engineering, Colorado State University, 1974. Class Notes 73-74-3.

_____, Report on water law developments: Colorado. Natural Resources Lawyer, Vol. 6, No. 3, Summer 1973. pp. 443-446. AER73-74MDW7.

Wu, T. Y., Effect of settlement on flume ratings. Prepared under U.S. Agency for International Development Contract No. AID/csd-2460, August 1971. 99 p. Water Management Technical Report No. 12.

_____, see G. V. Skogerboe, Department of Agricultural Engineering.

Yow, J. and J. L. Smith, Theoretical analysis of sinusoidal vibratory soil cutting. Paper No. 73-1539 presented at the 1973 Winter Meeting of the American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973. 20 p. AEP73-74JY-JLS21 .

Class Notes 71-72-4. For AE553, see: C. W. Thomas, Department of Civil Engineering.

Department of Agricultural Engineering

Theses

Addink, J. W., Water infiltration under center-pivots. Ph.D. Dissertation, August 1972. Adviser: G. V. Skogerboe. AED72-73JWA78.

Ayars, J. E., Drainage in Grand Valley. M.S. Thesis, June 1973. Adviser: G. V. Skogerboe. AET72-73JEA77.

Barrett, J. W. H., Width constrictions in open channels. M.S. Thesis, November 1971. 106 p. Adviser: G. V. Skogerboe. AET71-72WHB15. \$3.00.

Bennett, R. S., Cutthroat flume discharge relations. M.S. Thesis, March 1972. 134 p. Adviser: G. V. Skogerboe. AET71-72RSB43. \$3.00.

Boonkird, V., Culverts as flow measuring devices. M.S. Thesis, February 1972. 105 p. Adviser: G. V. Skogerboe. AET71-72VB44. \$3.00.

Chandler, R. L., Salt water coning in anisotropic media. M.S. Thesis, December 1973. Adviser: D. B. McWhorter. AET73-74RLC73.

Downs, H. W., Injection feeding of birds. M.S. Thesis, June 1974. Adviser: J. L. Smith. AET73-74HWD74.

Duke, H. R., Drainage design based upon aeration. Ph.D. Dissertation, August 1972. Adviser: A. T. Corey. AED71-72HRD45.

Gold, R. C., Sub-surface organic waste disposal. M.S. Thesis, June 1974. Adviser: J. L. Smith. AET73-74RCG71.

Harmann, D. V., Modeling a foods extruder. M.S. Thesis, June 1974. Adviser: J. M. Harper. AET73-74DVH72.

Department of Agricultural Engineering - continued

- Harris, W. B., Cotton seed aeration. Ph.D. Dissertation, June 1973. Advisers: J. M. Harper and D. B. McWhorter. AED72-73WBH79.
- Huang, K. T., Orchard frost protection by shading. M.S. Thesis, June 1974. Adviser: J. L. Smith. AET73-74KTH69.
- Huntzinger, T. L., Future water use model of Utah valley. M.S. Thesis, December 1971. 294 p. Adviser: G. V. Skogerboe. AET71-72TLH21.
- Khan, Q. A., Irrigation management in Pakistan. M.S. Thesis, January 1974. 177 p. Adviser: G. V. Skogerboe. AET73-74QAK16.
- Limjaroenrat, P., Storage stability of B₁ and B₂ in rice. M.S. Thesis, June 1974. Adviser: A. L. Frey. AET73-74PL70.
- Mayfield, R. L., Grain treatment with a particulate bed. M.S. Thesis, June 1974. Adviser: J. M. Harper. AET73-74RLM67.
- Neghassi, H. M., Crop water use and yield models with limited soil water. Ph.D. Dissertation, April 1974. 136 p. Adviser: D. F. Heermann. AED73-74HMN13.
- Nichols, S. R., Water pollution: South Platte River. M.S. Thesis, March 1972. 230 p. Adviser: G. V. Skogerboe. AET71-72SRN19.
- Sahni, B. M., Salt water coning beneath fresh water wells. Ph.D. Dissertation, April 1972. 176 p. Adviser: A. T. Corey. AED71-72BMS29. \$3.00.
- Tribelhorn, R. E., Chopping energy of forage harvestors. M.S. Thesis, June 1974. Adviser: J. L. Smith. AET73-74RET68.
- Vanderholm, D. H., Planning water quality surveillance. Ph.D. Dissertation, June 1972. Adviser: G. V. Skogerboe. AED71-72DHW66.
- VijayaRaghaven, G. S., Heat transfer studies using granular media. Ph.D. Dissertation, June 1973. Adviser: J. M. Harper. AED72-73GSV80.
- Walker, W. R., Mathematical modeling of urban water management strategies. Ph.D. Dissertation, August 1973. Adviser: G. V. Skogerboe. AED73-74WRW75.
- Wu, T. Y., Effect of settlement on flume ratings. M.S. Thesis, August 1971. 99 p. Adviser: G. V. Skogerboe. AET71-72TYW14. \$3.00.

For copies of publications from the Department of Agricultural Engineering contact the senior author or the Publications Office, Engineering Research Center, Colorado State University, Foothills Campus, Fort Collins, Colorado 80523.

ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF ATMOSPHERIC SCIENCE

T. H. Vonder Haar, Head

1971-74

- ADLER, R. F., Research Associate: (general circulation, satellite applications).
- BAER, F., Associate Professor: (theoretical and numerical problems of atmospheric flow).
- BARRETT, E. V., Affiliate Professor: (meteorological instrumentation, general circulation).
- BEAN, B. R., Affiliate Associate Professor: (radio-meteorology, tropospheric telecommunications).
- BETTS, A. K., Research Associate: (convective transport, atmospheric boundary layer, theoretical meteorology).
- BRIER, G. W., Research Associate: (statistics, weather forecasting, weather modification).
- CHEN, T. S., Research Associate: (theoretical meteorology, fluid mechanics).
- CORRIN, M. L., Professor: (air pollution, atmospheric chemistry).
- COX, S. K., Associate Professor and Department Student Counselor: (radiative transfer, remote sensing, atmospheric physics, general circulation).
- DICKINSON, R. E., Visiting Associate Professor: (theoretical and dynamic meteorology, numerical weather prediction, general circulation, planetary atmospheres).
- ESSENWANGER, O. M., Affiliate Professor: (statistical methods of meteorology and climatology).
- GALLET, R., Affiliate Professor: (upper atmosphere, geophysics, radio meteorology).
- GARVEY, D. M., Research Associate: (cloud physics, ice nucleation).
- GRANT, L. O., Professor: (precipitation physics, weather modification, mountain meteorology).
- GRAY, W. M., Professor: (tropical meteorology, atmospheric vortices, cumulus convection).
- HALL, F. F., Affiliate Professor: (instrumentation, remote sensing (radar, lidar, laser, acoustic)).
- HAURWITZ, B., Professor: (geophysics, hydrodynamics).
- HENMI, T., Research Associate: (cloud physics, atmospheric diffusion).
- KNOLLENBERG, R. G., Visiting Associate Professor: (meteorological instrumentation and cloud physics).
- KORFF, H. C., Research Associate: (radiation in the atmosphere).
- LENSCHOW, D. H., Visiting Associate Professor: (micrometeorology, air-mass transformation, aircraft instrumentation).
- McKEE, T. B., Associate Professor, State Climatologist: (climatology, radiative transfer, remote sensing).
- MELTESEN, G. T., Research Associate: (statistics).
- POLAND, H. M., Assistant Professor: (atmospheric chemistry, spectroscopy).
- RASMUSSEN, J. L., Assistant Professor: (synoptic meteorology, hydrometeorology, atmospheric water resources).
- REITER, E. R., Professor: (high-altitude winds, aerospace science, turbulence, air pollution, general circulation).
- RIEHL, H., Professor: (atmospheric dynamics, jet streams, tropical meteorology, air pollution).
- RUPRECHT, E., Research Associate: (tropical meteorology, radar).
- SCHUBERT, W. H., Assistant Professor: (dynamic and theoretical meteorology, parameterization of cumulus convection, planetary circulations).
- SINCLAIR, P. C., Associate Professor: (severe storms, cumulus dynamics, aircraft instrumentation).
- SOMERVELL, W. L., Jr., Research Associate: (synoptic meteorology, maritime meteorology, weather forecasting).
- VONDER HAAR, T. H., Associate Professor and Head: (remote atmospheric sensing from satellites, atmospheric energetics, radiative physics).
- WEBB, W. L., Visiting Professor: (physicist, atmospheric electrodynamics).

PUBLICATIONS

Department of Atmospheric Science

- Abbey, R. F., Spectra of atmospheric motions in the upper-troposphere and lower-stratosphere over North America and Australia: Experimental results and theoretical considerations. Atmospheric Science Paper No. 211, Colorado State University, July 1972.
- Adler, R. F., A comparison of the structure and flow characteristics of the upper troposphere and stratosphere of the northern and southern hemispheres. Atmospheric Science Paper No. 216, Colorado State University, April 1974.
- _____, see E. R. Reiter, Department of Atmospheric Science, (2 coauthorships).
- Albrecht, B. A., The large scale response of the tropical atmosphere with radiative heating. Atmospheric Science Paper No. 215, Colorado State University, March 1974.
- _____, M. Poellot, and S. Cox, Pyrgeometer measurements from aircraft. Review of Scientific Instruments, V. 45, No. 1, pp. 33-38. January 1974.
- _____, see M. Poellot, Department of Atmospheric Science.
- Alyea, F. N., Numerical simulation of an ice age paleoclimate. Atmospheric Science Paper No. 193, Colorado State University, August 1972.
- Barchet, W. R. and M. L. Corrin, Water vapor adsorption by pure silver iodide above ice saturation. Journal of Physical Chemistry, Vol. 76, pp. 2280-2285. August 1972.
- Betts, A. K., Draft of the convection subprogram for the GATE. Prepared for the International Scientific Management Group for the GARP Atlantic Tropical Experiment, 88 p. 1973.
- _____, A relationship between stratification, cloud-depth and permitted cloud radii. Journal of Applied Meteorology, 12, pp. 890-893. August 1973.
- _____, and F. J. Dugan, Empirical formula for saturation pseudoadiabats and equivalent potential temperature. Journal of Applied Meteorology, Vol. 12, pp. 731-732. 1973.
- _____, A composite mesoscale cumulonimbus budget. Journal of the Atmospheric Sciences, Vol. 30, pp. 597-610. 1973.
- _____, Precalibration of the VIZ-NWS radiosonde. Bulletin of American Meteorological Society, Vol. 54, pp. 222-223. 1973.
- _____, Non-precipitating convection and its parameterization. Quarterly Journal of the Royal Meteorological Society, Vol. 99, pp. 178-196. 1973.
- Betts, A. K., Relating the non-precipitating convective boundary layer to the large-scale motion field. Presented at the 52nd annual joint meeting of the AGU and AMS. 1971.
- _____, see H. Riehl, Department of Atmospheric Science, (2 coauthorships).
- Brier, G. W., see L. O. Grant, Department of Atmospheric Science, (2 coauthorships).
- Chappell, C. F., L. O. Grant, and P. W. Mielke, Jr., Cloud seeding effects on precipitation intensity and duration on wintertime orographic clouds. Journal of Applied Meteorology, Vol. 10, No. 5, pp. 1006-1010. October 1971.
- _____, see:
1. L. O. Grant, Department of Atmospheric Science.
 2. P. W. Mielke, Jr., Department of Atmospheric Science, (2 coauthorships).
- Corrin, M. L., Heterogeneous chemistry of the natural stratosphere. CIAP, Natural Stratosphere, Vol. 1, 1973.
- _____, The role of water vapor adsorption in heterogeneous ice nucleation. Paper presented at the Second International Conference on Weather Modification, Canberra, Australia, September 1971.
- _____, see:
1. W. R. Barchet, Department of Atmospheric Science.
 2. L. O. Grant, Department of Atmospheric Science.
- Cox, S. K. and T. H. Vonder Haar, Measurements of solar energy for the study of time dependent meteorological systems. Proceedings of Symposium on Solar Radiation and Instrumentation. November 1973.
- _____, A method to derive large scale heating rates. Appendix E, The Radiation Subprogram for GATE, International Council of Scientific Unions, World Meteorological Organization. October 1973.
- _____, Radiation components of the BOMEX energy budget. Atmospheric Science Paper No. 208, Colorado State University. October 1973.
- _____, Infrared heating calculations with a water vapor pressure broadened continuum. Quarterly Journal of the Royal Meteorological Society. October 1973.
- _____, D. Thomson, and M. Bader, A report of the aviation evaluation committee. NCAR Aviation Flight Facility. June 1973.

Department of Atmospheric Science - continued

- Cox, S. K., T. H. Vonder Haar and V. Soumi, Measurements of absorbed shortwave energy in a tropical atmosphere. Solar Energy. January 1973.
- _____, Radiative energy components for the BOMEX core experiment. Conference on Atmospheric Radiation Preprint Volume, American Meteorological Society, 1972.
- _____, Cirrus clouds and the climate. Journal of Atmospheric Science, Vol. 28, No. 8. November 1971.
- _____, see:
1. B. Albrecht, Department of Atmospheric Science.
 2. T. B. McKee, Department of Atmospheric Science.
 3. M. Poellot, Department of Atmospheric Science.
 4. D. W. Reynolds, Department of Atmospheric Science.
 5. T. H. Vonder Haar, Department of Atmospheric Science.
- Dittenberner, G. J. and T. H. Vonder Haar, Large-scale precipitation estimates using satellite data; application to the Indian Monsoon. Arch. Met. Geoph. Biokl., Ser. B, 12, pp. 317-334. 1973.
- Downey, P. H., S. J. Lassman, and T. H. Vonder Haar, A study of extreme and persistent cloudiness based on satellite observations 1969-1970. Technical Report. May 1972.
- Dugan, F. J., The thermodynamic structure of the cumulus subcloud layer, Atmospheric Science Paper No. 205, Colorado State University. August 1973.
- Durham, R., Warm cumulus cloud seeding potential. Atmospheric Science Paper No. 202, Colorado State University. July 1973.
- Fields, A., see E. R. Reiter, Department of Atmospheric Science.
- Fleming, J. R., Radiative effects of cirrus clouds. Atmospheric Science Paper No. 207, Colorado State University. August 1973.
- Frank, W. M., Characteristics of carbon black dust as a tropospheric heat source for weather modification. Atmospheric Science Paper No. 195, Colorado State University, 55 p. 1973.
- _____, and W. M. Gray, Characteristics of carbon black as a possible large scale weather modification agent. Paper presented before AMS Eighth Technical Conference on Hurricanes and Tropical Meteorology, Miami, Florida, May 14-17. 1973.
- _____, see W. M. Gray, Department of Atmospheric Science.
- Fritsch, J. M., see L. O. Grant, Department of Atmospheric Science, (2 coauthorships).
- Glasser, M. E. and E. R. Reiter, Radioactive fallout and disturbances in the mid-latitude westerlies. Progress Report under USAEC Contract AT(11-1)-1340. Report No. C00-1340-24. 37 p. 1971.
- Grant, L. O. and R. E. Elliott, The cloud seeding temperature window. Journal of Applied Meteorology, V. 13, No. 3, pp. 355-363. April 1974.
- _____, G. W. Brier, and P. W. Mielke, Jr., Cloud seeding effectiveness for augmenting precipitation from continental convective clouds. Printed in Proceedings of the International Tropical Meteorological Meeting AMS, Nairobi, Kenya, 31 January-7 February 1974.
- _____, and A. M. Kahan, Weather modification for augmenting orographic precipitation. Chapter 7, Weather and Climate Modification, ed. by Wilmut Hess, Wiley-Interscience, 1974.
- _____, and O. J. Rhea, Topographic influences on snowfall patterns in mountainous terrain. Presented at the Interdisciplinary Symposium on Advanced Concepts and Techniques in the Study of Snow and Ice Resources held in Monterey, California, and sponsored by the National Academy of Sciences National Research Council, December 2-6, 1973.
- _____, and O. J. Rhea, Elevation and meteorological controls on the density of new snow. Presented at the Interdisciplinary Symposium on Advanced Concepts and Techniques in the Study of Snow and Ice Resources held in Monterey, California, and sponsored by the National Academy of Sciences National Research Council, December 2-6, 1973.
- _____, Priority problems for modifying cumulus precipitation. Presented at the ASCE Specialty Conference, Agricultural and Urban Considerations in I and D, in Fort Collins, Colorado, August 22-24, 1973.
- _____, Inadvertent weather modification-VI. Lead Report, 1973.
- _____, and M. L. Corrin, Raw and iodine treated automobile exhaust as a source of ice nuclei. Journal of Weather Modification, Vol. 5, No. 1, pp. 238-248. May 1973.
- _____, and J. M. Fritsch, Summary of weather conditions relating to accident and field tests--Gardner et al., versus General Motors Corporation et al. Prepared for Weller, Friedrich, Hickisch and Hazlitt, February 22, 1973.
- _____, G. W. Brier, and P. W. Mielke, Jr., Summary and conclusions of an independent analysis of the weather modification program in the San Luis Valley. Prepared for the Colorado Advisory Committee on Weather Modification and the Colorado Director of Natural Resources, February 12, 1973.

Grant, L. O., J. M. Fritsch, and P. W. Mielke, Jr., Randomized seeding of continental convective clouds near Climax, Colorado. Paper presented at Third Conference on Weather Modification, Rapid City, South Dakota, June 26-29, 1972. pp. 216-221.

_____, C. F. Chappell, and P. W. Mielke, Jr., The Climax experiment for seeding cold orographic clouds. Proceedings of International Conference on Weather Modification, Canberra, Australia, pp. 78-84. September 6-11, 1971.

Howell, W. E. and _____, The role of weather modification in drought relief. Presented at Second International Symposium in Hydrology, Fort Collins, Colorado, September 11-16, 1972.

_____, see:

1. C. F. Chappell, Department of Atmospheric Science, (2 coauthorships).
2. P. W. Mielke, Jr., Department of Atmospheric Science, (2 coauthorships).
3. L. Vardiman, Department of Atmospheric Science, (2 coauthorships).

Gray, W. M. and B. Mendenhall, A statistical study of frictional wind veering in the planetary boundary layer. Published in the Hermann Flohn 60th Anniversary Volume, Bonner Met. Afhand., Heft 17. 1974.

_____, W. M. Frank, M. L. Corrin, and C. A. Stokes, Weather modification by carbon dust absorption of solar energy. Accepted for the Proceedings of the Fourth Conference on Weather Modification, Ft. Lauderdale, Florida, Atmospheric Science Paper No. 225, Colorado State University, 1974.

_____, R. E. Lopez, and W. M. Frank, Feasibility of precipitation augmentation by carbon dust seeding. Proceedings of the WMO/AMS International Tropical Meteorology Conference, Nairobi, Kenya, January 31-February 6, 1974. 18 p.

Ellsberry, R., E. Harrison, and _____, Simulation of development of mesoscale convection regions by artificial heat sources. Paper appearing in the WMO/AMS International Tropical Meteorology Conference, Nairobi, Kenya, January 31-February 6, 1974. 6 p.

_____ and E. Ruprecht, Mean characteristics and variability in satellite observed mesoscale tropical cloud clusters and clear areas. Proceedings of the WMO/AMS International Tropical Meteorological Conference, Nairobi, Kenya, January 31-February 6, 1974. 6 p.

_____ and D. J. Shea, The hurricane's inner core region, II. Thermal stability and dynamic characteristics. Journal of Atmospheric Science, 30, pp. 1565-1567. 1973.

Gray, W. M., Cumulus convection and larger-scale circulations, Part I, broadscale and mesoscale considerations. Monthly Weather Review, 101, 839-855. December 1973.

_____, Vertical redistribution of horizontal momentum in tropical latitudes by sub-synoptic processes. Paper presented at AMS Second Conference on Numerical Prediction, Monterey, California, October 1-4, 1973.

_____, Feasibility of meso- and synoptic-scale weather modification from carbon black dusting. Proceedings of the WMO/IAMAP Scientific Conference on Weather Modification, Tashkent, Russia, October 1-7, 1973.

_____, Structure of satellite observed tropical cloud clusters and surrounding clear regions. Paper presented before AMS Eighth Technical Conference on Hurricanes and Tropical Meteorology, Miami, Florida, May 14-17, 1973.

_____ and S. L. Rosenthal, Proposed use of carbon black as a hurricane modification agent. Paper presented before AMS Eighth Technical Conference on Hurricanes and Tropical Meteorology, Miami, Florida, May 14-17, 1973.

_____, Feasibility of beneficial hurricane modification by carbon black seeding. Atmospheric Science Paper No. 196, Colorado State University. 130 p. 1973.

_____, The magnitude and character of the radiation induced vertical circulation of the troposphere. Paper presented at AMS Conference on Atmospheric Radiation, Fort Collins, Colorado, August 7-9, 1972.

_____, Atmospheric boundary-layer kinetic energy generation-dissipation over the oceans as revealed by wind veering measurements. Paper presented at AMS Conference on the Interaction of the Sea and the Atmosphere, Ft. Lauderdale, Florida, December 1-3, 1971.

_____, The magnitude of and the fundamental role of the up-moist and down-dry vertical circulation of the troposphere. Paper presented at the AMS Seventh Technical Conference on Hurricanes and Tropical Meteorology, Barbados, West Indies, December 6-9, 1971.

_____, Observations and ideas on tornado genesis. Paper presented at Seventh Conference on Severe Local Storms, Kansas City, Missouri, October 5-7, 1971.

_____, Observed wind veering over the oceans and implication for air-sea momentum exchange. Paper presented at XV General Assembly of IUGG, Moscow, USSR, 30 July-August 14, 1971.

_____, Research methodology, observations and ideas on tornado genesis. Proceedings of the Seventh Conference on Severe Local Storms. AMS Publication, pp. 292-298. 1971.

Department of Atmospheric Science - continued

Gray, W. M., A climatology of tropical cyclones and disturbances of the Western Pacific with a suggested theory for their genesis/maintenance. NAVWEARSCHFAC Technical Paper No. 19-70, 1971. 225 p.

_____, see:

1. W. M. Frank, Department of Atmospheric Science.
2. R. A. Maddox, Department of Atmospheric Science.
3. A. C. Modahl, Department of Atmospheric Science, (2 coauthorships).
4. D. V. Novlan, Department of Atmospheric Science.
5. D. J. Shea, Department of Atmospheric Science.

Grobecker, A. J., G. Yamamoto, J. Blamont, A. J. Dyer, H. Johnston, E. R. Reiter, and W. Kellogg, Panel Discussion: The climatic impact of pollutants injected into the stratosphere. Conference on the Climatic Impact Assessment Program, 2nd, Proceedings, 1973.

Haurwitz, B., Oscillations in a basin of cold air. Atmosphere, 1973.

_____ and A. D. Cowley, The diurnal and semi-diurnal barometric oscillations, global distribution and annual variation. Pure and Applied Geophysics, 102, pp. 193-222. 1973.

_____, Noctilucent cloud wave structure. Chap. 6, pp. 109-116; Thermospheric Circulations, Willis L. Webb, Ed., Prog. Astronautics and Aeronautics, 17, MIT Press, 1972.

_____ and B. Fogle, Long-term variations in noctilucent cloud activity. Bonner Meteorologische Abhandlungen, 17, pp. 1-14, 1972.

_____, see E. R. Reiter, Department of Atmospheric Science.

Heikes, K. E., Steady convection in stratified fluid. Atmospheric Science Paper No. 177, Colorado State University, February 1972.

Henmi, T., Secondary ice particle production from rimed ice, Atmospheric Science Paper No. 220, Colorado State University, May 1974.

Hoxit, L. R., Variability of planetary boundary layer winds. Atmospheric Science Paper No. 199, Colorado State University, May 1973.

Katen, P. C., see E. R. Reiter, Department of Atmospheric Science.

Korff, H. C. and T. H. Vonder Haar, The albedo of snow in relation to the sun position. Conference on Atmospheric Radiation, Colorado State University, pp. 236-239, August 7-9, 1972.

Lopez, R. E., A parametric model of cumulus convection. Journal of Atmospheric Science, 30, pp. 1354-1373, 1973.

_____, Cumulus convection and larger-scale circulations Part II, cumulus and mesoscale interactions. Monthly Weather Review, 101, December 1973.

_____, see W. M. Gray, Department of Atmospheric Science.

Lovill, J. E., Characteristics of the general circulation of the atmosphere and the global distribution of total ozone as determined by the NIMBUS III satellite infrared interferometer spectrometer, Atmospheric Science Paper No. 180, Colorado State University, February 1972.

_____, see E. R. Reiter, Department of Atmospheric Science, (2 coauthorships).

MacDonald, B. C., Stratospheric flow and solar variability, Atmospheric Science Paper No. 223, Colorado State University, April 1974.

_____ and E. R. Reiter, On possible interactions between the upper and lower atmosphere. Paper presented at Symposium on Possible Relationships between Solar Activity and Meteorological Phenomena, November 7-8, 1973.

_____, see E. R. Reiter, Department of Atmospheric Science.

Madden, R., H. Miller, M. Polifka, and T. H. Vonder Haar, Computer programs for direct read-out satellite data use. Technical Report, Department of Atmospheric Science, Colorado State University, May 1972.

Maddox, R., A study of tornado proximity data and an observationally derived model of tornado genesis. Atmospheric Science Paper No. 212, Colorado State University, 1973. 101 p.

_____, A severe thunderstorm surface potential index (SPOT). Proceedings of the Eighth AMS Technical Conference on Severe Local Storms, Denver, Colorado, pp. 252-256. October 15-17, 1973.

_____ and W. M. Gray, A frictionally driven model for tornado genesis with similarities to hurricane genesis. Proceedings of the Eighth AMS Technical Conference on Severe Local Storms, Denver, Colorado, pp. 203-206. October 15-17, 1973.

McKee, T. B., Inference of stratospheric temperature and water vapor structure from limb radiance profiles, Atmospheric Science Paper No. 178, Colorado State University, February 1972.

_____ and S. K. Cox, Stratospheric temperature profiles from limb radiance measurements. Journal of Applied Meteorology, Vol. 12, pp. 867-873. August 1973.

Department of Atmospheric Science - continued

- Mielke, P. W., Jr., Another family of distributions for describing and analyzing precipitation data. *Journal of Applied Meteorology*, Vol. 12, No. 2, pp. 275-280. March 1973.
- _____, Asymptotic behavior of two-sample tests based on powers of ranks for detecting scale and location alternatives. *Journal of the American Statistical Association*, Vol. 67, No. 340, pp. 850-854. 1972.
- _____, C. F. Chappell, and L. O. Grant, On precipitation sensor network densities for evaluating wintertime orographic cloud seeding experiments. *Water Resources Bulletin*, Vol. 8, No. 6, pp. 1219-1224. December 1972.
- Wu, S., J. S. Williams, and _____, Some designs and analyses for temporally independent experiments involving correlated bivariate responses. *Biometrics* 28, pp. 1043-1061. December 1972.
- _____, L. O. Grant, and C. F. Chappell, An independent replication of the Climax wintertime orographic cloud seeding experiment. *Journal of Applied Meteorology*, Vol. 10, pp. 1198-1212. December 1971.
- _____, Seeding effects at Climax from upwind seeding in the park range. *Transactions of the Seminar on Extended Area Effects on Cloud Seeding*, Santa Barbara, California, pp. 90-102. February 15-17, 1971.
- _____, see:
1. C. F. Chappell, Department of Atmospheric Science.
 2. L. O. Grant, Department of Atmospheric Science, (2 coauthorships).
- Miller, H. J. and T. H. Vonder Haar, Real-time direct read-out satellite support to meteorological research programs and forecasting units. *Atmospheric Science Paper No. 181*, Colorado State University, March 1972.
- Modahl, A. C. and W. M. Gray, Thunderstorm hazards to aircraft and their relation to the large scale environment setting. Paper presented at the International Conference on Aerospace and Aeronautical Meteorology, Washington, D.C., May 22-26, 1972.
- Moore, D. A., Diagnostic tests of models for the thermal structure of the non-precipitating convective boundary layer, *Atmospheric Science Paper No. 217*, Colorado State University, March 1974.
- Novlan, D. J., Hurricane spawned tornadoes. *Atmospheric Science Research Report No. 200*, Colorado State University, 1973. 57 p.
- _____, and W. M. Gray, Environmental condition differences between hurricane and Great Plains induced tornadoes. *Proceedings of the Eighth AMS Technical Conference on Severe Local Storms*, Denver, Colorado, pp. 108-114. October 15-17, 1973.
- Poellot, M., B. Albrecht, S. Cox, and R. Ellingson, Aircraft utilization by the GATE radiation sub-program. Appendix F, The Radiation Subprogram for GATE, International Council of Scientific Unions, World Meteorological Organization, October 1973.
- _____, see B. Albrecht, Department of Atmospheric Science.
- Poland, H. M. and G. M. Lawrence, Doppler broadening of OI 1304 Å multiplet in dissociative excitation of CO₂ and O₂. *J. Chem. Phys.*, 58, p. 1425. 1973.
- Anderson, L. B., C. S. Parmenter, and _____, Collision-induced intersystem crossing. The primary photophysics of glyoxal vapor excited at 3458 Å, *J. Chem. Phys.*, 1, pp. 401-417. 1973.
- _____, and H. P. Broida, Fluorescence of nitric oxide excited by 2139 Å zinc resonance line. *J. Chem. Phys.*, 54, pp. 4515-4517. 1971.
- _____, and H. P. Broida, Fluorescence of the γ, ε, and σ systems of nitric oxide; polarization and use of branching ratios for spectrometer calibration. *J.S.Q.R.T.*, 11, pp. 1863-1876. 1971.
- Polifka, M., see R. Madden, Department of Atmospheric Science.
- Ramos, R. P. L., Precipitation Characteristics of the Northeast Brazil dry region, *Atmospheric Science Paper No. 224*, Colorado State University. May 1974.
- Raschke, E., T. H. Vonder Haar, W. R. Bandeen, and M. Pasternak, The annual radiation balance of the earth-atmosphere system during 1969-70 from NIMBUS III measurements. *Journal of Atmospheric Science*, 30, 3, pp. 341-364. 1973.
- _____, T. H. Vonder Haar, M. Pasternak, and W. R. Bandeen, The radiation balance of the NIMBUS III radiation measurements. *NASA Tech. Note TN D-7249*. April 1973.
- _____, and T. H. Vonder Haar, Strahlungsbilanz des systems erde-atmosphäre. *Promet*, Vol. 3, pp. 4-7. 1972.
- Rasmussen, J. L., see C. B. Winn, Department of Mechanical Engineering.
- Reiter, E. R. and J. E. Lovill, The longitudinal movement of stratospheric ozone waves as determined by satellite. *Arch. Met. Geoph. Biokl.*, Ser. A, Vol. 23, No. 1, pp. 13-27 plus 4 figures. 1974.
- _____, A multivariate treatment of kinetic energy. *Klimatologisch Forschung, Climatological Research*, No. 17, Report C00-1340-25, Contract AT(11-1)-1340 U.S. Atomic Energy Commission, pp. 11-20. 1974.
- _____, Ozone aerosols, and solar radiation in the stratosphere. *Journal of Aircraft*, 10, (12), pp. 710-716. December 1973.

- Reiter, E. R., Data comparison for Fort St. Vrain, Part II. Report to Public Service Company, 1973. 9 p. plus 5 figures.
- _____, T. H. Vonder Haar, R. Adler, S. Srivatsangam, and A. Fields, Interhemispheric comparison of atmospheric circulation features as evaluated from NIMBUS satellite data. Colorado State University, Department of Atmospheric Science Annual Report from 1 July 1972 through 30 June 1973, Grant NGR-06-002-098. 1973. 74 p.
- _____, Age estimates of stratospheric air. Atmospheric Science Paper No. 206, Colorado State University, AEC Report C00-1340-35, 1973. 12 p.
- _____, R. J. Engelmann, and R. W. Beadle, Chemist-meteorologist workshop. USAEC, Report WASH 1217-73, C-11, 1973. 45 p.
- _____ and B. Haurwitz, Internal gravity waves and turbulence in the atmosphere. Report to U.S. Army Electronics Command, White Sands Missile Range, May 1973. 20 p.
- _____, Trace gases, aerosols, and solar radiation in the stratosphere - explored and unexplored problem areas. AIAA/AMS International Conference on Environmental Impact of Aerospace Operations in the High Atmosphere, Denver, Colorado. AIAA Paper No. 73-509, 9 p. Atmospheric Science Paper No. 214, Colorado State University. June 1973.
- _____, R. J. Engelmann, R. W. Beadle, Chemist-meteorologist workshop, USAEC, Report WASH 1217-73, C-11, 45 p. 1973.
- _____, The role of the general circulation of the atmosphere in radioactive debris transport. Summary of research conducted between February 1, 1972 and January 31, 1973, Tech. Progress Report C00-1340-34, 1972.
- _____ and R. J. Engelmann, Chemist-meteorologist workshop, USAEC, WASH-1217, UC-4, UC-53, Ft. Lauderdale, Florida, January 1972. 63 p.
- _____, Objective derivation of Pasquill's and Turner's stability categories from measurements at the site of the Fort St. Vrain Nuclear Generating Station. Report to Public Service Company of Colorado, April 1972. 22 p.
- _____, Data comparison for Fort St. Vrain. Report to Public Service Company of Colorado, June 1972. 10 p. plus figures.
- _____, Interhemispheric comparison of atmospheric circulation features as evaluated from NIMBUS satellite data. Semi-annual Report, 1 July 1972 through 31 December 1972, NASA Grant NGR-06-002-098, 1972. 9 p.
- _____, T. H. Vonder Haar, J. E. Lovill, R. Adler, S. Srivatsangam, and A. Fields, Interhemispheric comparison of atmospheric circulation features as evaluated from NIMBUS satellite data. Annual Report for Grant NGR-06-002-098, 1972.
- Reiter, E. R. and B. C. MacDonald, Quasi-biennial variations in the wintertime circulation at high latitudes. USAEC Technical Paper, Report C00-1340-33, Archives of Meteorology, Geophysics and Bioclimatology, 1972.
- _____, The spectrum of atmospheric motions. Weather, 1972.
- _____, Meteorologie gestern, heute und morgen. In: Bundesgymnasium Ried i. I., Jahresbericht, pp. 69-74, Mai 1972.
- _____, Fundamental problems of atmospheric science, Chapter II. NOAA Lectures, 1972.
- _____, Atmospheric transport processes, Part 3: Hydrodynamic tracers, 212 p. 1972.
- _____ and P. C. Katen, Transport of lead from atmospheric sources through the environment. Paper presented at the AGU First Annual Meeting, San Francisco, California, December 6, 1971. 17 p.
- _____, Fallout estimates for accidental releases. Working paper and diagrams for Public Service Company of Colorado, November 19, 1971.
- _____, see:
1. M. E. Glasser, Department of Atmospheric Science.
 2. A. J. Grobecker, Department of Atmospheric Science.
 3. B. C. MacDonald, Department of Atmospheric Science.
- Reynolds, D. W., T. H. Vonder Haar, and S. K. Cox, The effect of solar radiation absorption in the tropical troposphere. Atmospheric Science Paper No. 210, Colorado State University, November 1973.
- _____ and T. H. Vonder Haar, A comparison of radar-determined cloud height and reflected solar radiance measured from the geosynchronous satellite ATS-3. Journal of Applied Meteorology, 12, 6, pp. 1082-1085. 1973.
- Riehl, H. and A. K. Betts, Humidity observations with the 1972 U.S. radiosonde instrument. Bulletin of the American Meteorological Society, 53, No. 9, pp. 887-888. 1972.
- Shea, D. J. and W. M. Gray, The hurricane's inner core region I. Symmetric and asymmetric structure. Journal of Atmospheric Science, 30, pp. 1544-1564. 1973.
- _____, see W. M. Gray, Department of Atmospheric Science.
- Sikula, G. J. and T. H. Vonder Haar, Very short range local area weather forecasting using measurements from geosynchronous meteorological satellites. Arch. Met. Geoph. Biokl., Ser. A, 22, pp. 227-256. 1973.

Department of Atmospheric Science - continued

- Sikula, G. J. and T. H. Vonder Haar, Very short range local area weather forecasting using measurements from geosynchronous meteorological satellites. Atmospheric Science Paper No. 185, Colorado State University, April 1972.
- Sinclair, P. C., The lower structure of dust devils. Journal of Atmospheric Science, V. 30, No. 8, pp. 1599-1619. November 1973.
- _____, Severe storm air velocity and temperature structure deduced from penetrating aircraft. Preprint Volume, Eighth Conference on Severe Local Storms, AMS, Boston, October 15-17, 1973.
- _____, The design of descriptive and theoretical cloud models of hailstorms and thunderstorms in the high plains and joint hail suppression research program in Northeastern Colorado. Annual Progress Report No. 1-71 to the National Science Foundation on Grants GA-1561 and GA-1522. November 1971.
- _____ and G. A. Fisher, Jr., CSU severe storms and hail research. CSU Public Relations Presentation, Denver, Colorado. September 1971.
- _____, see P. J. Wetzel, Department of Atmospheric Science.
- Srivatsangam, S., see E. R. Reiter, Department of Atmospheric Science.
- Vardiman, L. and L. O. Grant, A case study of ice crystal multiplication by mechanical fracturing. Presented at International Cloud Physics Conference, London, England. August 1972.
- _____, Ice crystal multiplication in convective elements of winter orographic clouds. Atmospheric Science Paper No. 191, Colorado State University. July 1972.
- _____ and L. O. Grant, A study of ice crystal concentrations in convective elements of winter orographic clouds. Presented at Third Conference on Weather Modification, Rapid City, South Dakota, pp. 113-118. June 26-29, 1972.
- Vonder Haar, T. H., Measurement of albedo over polar snow and ice fields using NIMBUS III satellite data. Presented, Interdisciplinary Symposium on Advanced Concepts and Techniques in the Study of Snow and Ice Resources, Asilomar Conference Grounds, Monterey, California, December 2-6, 1973.
- _____ and A. H. Cort, New estimate of annual poleward energy transport by northern hemisphere oceans. J. Phys. Ocean., 3, 2, pp. 169-172. 1973.
- _____, E. Raschke, W. Bandeen, and M. Pasternak, Measurements of solar energy reflected by the earth and atmosphere from meteorological satellites. Solar Energy, Vol. 14, No. 2, pp. 175-184. January 1973.
- Vonder Haar, T. H., E. Raschke, M. Pasternak, and W. Bandeen, The radiation budget of the earth-atmosphere system as measured from the NIMBUS III satellite (1969-70). Space Research, Vol. 12, Akademie-Verlag, Berlin-New York. 1972.
- _____, Natural variation of the radiation budget of the earth-atmosphere system as measured from satellites. Conference on Atmospheric Radiation, Colorado State University, pp. 211-221. August 7-9, 1972.
- _____ and S. K. Cox, Simultaneous measurements of solar radiation from aircraft and satellites during BOMEX. Conference on Atmospheric Radiation, Colorado State University, pp. 128-134. August 7-9, 1972.
- _____, A proposal for the radiation portion of the GARP Atlantic tropical experiment. Annex X to GATE Report No. 1, ICSU/WMO, 12 p. June 1972.
- _____ and E. Raschke, Measurements of the energy exchange between earth and space from satellites during the 1960's. Annalen Meteor., 6-NR-711. Atmospheric Science Paper No. 184, Colorado State University. April 1972.
- _____, Global radiation budget and cloud cover from satellite measurements. Proceedings of the Miami Workshop on Remote Sensing, March 1971. U.S. Department of Commerce, NOAA, ERL Publication, July 1971.
- _____, see:
1. S. K. Cox, Department of Atmospheric Science, (2 coauthorships).
 2. G. J. Dittenberner, Department of Atmospheric Science.
 3. P. H. Downey, Department of Atmospheric Science.
 4. H. C. Korff, Department of Atmospheric Science.
 5. R. Madden, Department of Atmospheric Science.
 6. H. J. Miller, Department of Atmospheric Science.
 7. E. Raschke, Department of Atmospheric Science (4 coauthorships).
 8. E. R. Reiter, Department of Atmospheric Science.
 9. D. Reynolds, Department of Atmospheric Science.
 10. G. J. Sikula, Department of Atmospheric Science, (2 coauthorships).
- Wetzel, P. J. and P. C. Sinclair, Moisture sources and flow patterns during the northeast Colorado hail season. Preprint Volume, Eighth Conference on Severe Local Storms, AMS, Boston. October 15-17, 1973.

Department of Atmospheric Science

Theses

- Abbey, R. F., Spectra of atmospheric motions in the upper-troposphere and lower-stratosphere over North America and Australia: experimental results and theoretical considerations. M.S. Thesis, December 1973. Atmospheric Science Paper No. 211.
- Adler, R. F., A comparison of the structure and flow characteristics of the upper troposphere and stratosphere of the northern and southern hemispheres. Ph.D. Dissertation, June 1974. Atmospheric Science Paper No. 216.
- Albrecht, B. A., The large scale response of the tropical atmosphere with radiative heating. M.S. Thesis, March 1974. Atmospheric Science Paper No. 215.
- Almeyda, G. F., Grassland climatology. M.S. Thesis, August 1972.
- Alyea, F. N., Numerical simulation of an ice age paleoclimate. Ph.D. Dissertation, December 1972. Atmospheric Science Paper No. 193.
- Balick, L. K., A study of orographic clouds. M.S. Thesis, October 1971.
- Clark, W. E., Analysis of point seeding pyrotechnics. M.S. Thesis, June 1973.
- Connell, J. R., Entrainment by turbulent jets of air. Ph.D. Dissertation, March 1973.
- Cruz, L. A., Venezuelan rainstorms as seen by radar. M.S. Thesis, June 1972.
- Dahl, D. A., The washout of atmospheric lead. M.S. Thesis, June 1973.
- Downey, P. H., Solar energy in the atmosphere. M.S. Thesis, August 1972.
- Dugan, F. J., The thermodynamic structure of the cumulus sub-cloud layer. M.S. Thesis, August 1973. Atmospheric Science Paper No. 205.
- Durham, R., Warm cumulus cloud seeding potential. M.S. Thesis, August 1973. Atmospheric Science Paper No. 202.
- Ellis, J. S., Applied radiation budget measurements. M.S. Thesis, August 1972.
- Fleming, J. R., Radiative effects of cirrus clouds. M.S. Thesis, December 1973. Atmospheric Science Paper No. 207.
- Frank, W. M., Characteristics of carbon black dust as a scale tropospheric heat source. M.S. Thesis, June 1973. Atmospheric Science Paper No. 195.
- Gerber, H., Freezing water with sized AgI particles. Ph.D. Dissertation, August 1973.
- Grossman, R. L., An aircraft investigation of turbulence in the lower layers of a marine boundary layer. Ph.D. Dissertation, August 1973.
- Haines, R. S., Poisoning of silver iodide ice-nucleants. M.S. Thesis, June 1974.
- Heikes, K. E., Steady convection in stratified fluid. M.S. Thesis, February 1972. Atmospheric Science Paper No. 177.
- Henmi, T., Secondary ice particle production from rimed ice. Ph.D. Dissertation, June 1974. Atmospheric Science Paper No. 220.
- Henz, J. F., Colorado High Plains thunderstorm systems. M.S. Thesis, June 1974.
- Hoxit, L. R., Variability of planetary boundary layer winds. Ph.D. Dissertation, June 1973. Atmospheric Science Paper No. 199.
- Lopez, R. E., A parametric model of cumulus convection. Ph.D. Dissertation, August 1972.
- Loranger, D. C., Convective ring structures in the tropics. M.S. Thesis, March 1974.
- Lovill, J. E., Characteristics of the general circulation of the atmosphere and the global distribution of total ozone as determined by the NIMBUS III satellite infrared interferometer spectrometer. Ph.D. Dissertation, June 1972. Atmospheric Science Paper No. 180.
- MacDonald, B. C., Stratospheric flow and solar variability. M.S. Thesis, June 1974. Atmospheric Science Paper No. 223.
- Maddox, R. A., A study of tornado proximity data and an observationally derived model of tornado genesis. M.S. Thesis, December 1973. Atmospheric Science Paper No. 212.
- Mata, M., Modeling Venezuelan weather systems. M.S. Thesis, June 1972.
- McKee, T. B., Inference of stratospheric temperature and water vapor structure from limb radiance profiles. Ph.D. Dissertation, February 1972. Atmospheric Science Paper No. 178.
- Miller, H. J., Real-time direct read-out satellite support to meteorological research programs and forecasting units. M.S. Thesis, February 1972. Atmospheric Science Paper 181.
- Moore, D. A., Diagnostic tests of models for the thermal structure of the non-precipitating convective boundary layer. M.S. Thesis, March 1974. Atmospheric Science Paper No. 217.
- Nelson, D. W., PPM level gas-particulate interactions. M.S. Thesis, December 1973.

Department of Atmospheric Science - continued

- Novlan, D. J., Hurricane spawned tornadoes, M.S. Thesis, June 1973. Atmospheric Science Paper No. 200.
- Pacheco, P. P., The subcloud layer of Venezuelan storms, M.S. Thesis, June 1972.
- Puckett, W. R., Weather modification climatology at Climax, Colorado, M.S. Thesis, June 1973.
- Ramanathan, N., Ageostrophic combined instability study, M.S. Thesis, March 1972.
- Ramos, R. P. L., Precipitation characteristics of the Northeast Brazil dry region, M.S. Thesis, March 1974. Atmospheric Science Paper No. 224.
- Reinking, R. F., Empirical assessment of accretion microphysics, Ph.D. Dissertation, December 1973.
- Reynolds, D. W., The effect of solar radiation absorption in the tropical troposphere, M.S. Thesis, June 1973. Atmospheric Science Paper No. 210.
- Rhea, J. O., Interpreting orographic snowfall patterns, M.S. Thesis, August 1972. Atmospheric Science Paper No. 197.
- Sagert, P. G., The tall stack, M.S. Thesis, June 1974.
- Shea, D. J., The structure and dynamics of the hurricane's inner core region, M.S. Thesis, June 1972.
- Sheaffer, J. D., Lithium doped silver iodine studies, M.S. Thesis, December 1972.
- Sikula, G. J., ATS III data as a forecasting aid, M.S. Thesis, December 1971.
- Vardiman, L., Ice crystal multiplication in convective elements of winter orographic clouds, M.S. Thesis, August 1972. Atmospheric Science Paper No. 191.
- Webb, W. L., Atmospheric neutral-electrical interaction, Ph.D. Dissertation, March 1972.
- Wetzel, P. J., The Eastern Colorado hail environment, M.S. Thesis, December 1973.

For copies of publications from this Department contact Senior Author or Mrs. Earlene Bradley, Atmospheric Science Reading Room, Colorado State University, Fort Collins, Colorado 80523.

ACADEMIC AND RESEARCH FACULTY

DEPARTMENT OF CIVIL ENGINEERING

J. W. N. Fead, Head

1971-74

- ALBERTSON, M. L., Professor: (hydraulics, fluid mechanics, water resources).
- BALDWIN, L. V., Professor and Dean, College of Engineering: (fluid mechanics, thermosciences).
- BALL, J. W., Research Associate: (hydraulics).
- BARNES, A. H., Associate Professor: (hydrology, hydraulics).
- BENDER, M. E., Professor and President, Asian Institute of Technology: (highways, engineering economics).
- CERMAK, J. E., Professor: (fluid mechanics, mechanics, hydraulics).
- CHAMBERLAIN, A. R., President of Colorado State University and Professor: (fluid mechanics, water resources).
- CHEN, Y. H., Research Associate: (hydraulics, water resources, mathematical modeling).
- CRISWELL, M. E., Assistant Professor: (structures, mechanics).
- FEAD, J. W. N., Professor and Head of Department of Civil Engineering: (structures, soil mechanics).
- GARRISON, J. A., Assistant Civil Engineer: (fluid dynamics).
- GESSELER, J., Associate Professor: (fluid mechanics, hydraulics).
- GLOVER, R. E., Faculty Affiliate.
- GOODMAN, J. R., Professor: (structures, mechanics).
- GRIGG, N. S., Associate Professor: (water resources systems, hydrology, urban engineering systems).
- HAYMAN, R. W., Associate Professor: (highways, soil mechanics, photogrammetry).
- HENDRICKS, D. W., Professor: (environmental engineering, sanitary engineering).
- KARAKI, S., Professor: (fluid mechanics, hydraulics, solar energy).
- KOELZER, V. A., Professor: (environmental management).
- KOLOSEUS, H. J., Professor: (hydraulics, fluid mechanics).
- LABADIE, J., Assistant Professor: (water resources systems, groundwater).
- LÖF, G. O. G., Professor: (fluid mechanics, sanitary engineering, solar energy).
- LONGENBAUGH, R. A., Assistant Professor: (groundwater, hydrology).
- MAHMOOD, K., Associate Professor: (hydraulics, river mechanics, mathematical modeling).
- MERCER, A. G., Associate professor: (hydraulics, structures, machinery).
- MERONEY, R. N., Associate Professor: (fluid dynamics).
- MILLER, L. D., Associate Professor: (remote sensing, watershed management).
- MOREL-SEYTOUX, H. J., Professor: (hydrology, mechanics).
- NIELSON, F. D., Associate Professor: (soil mechanics).
- OSTERYOUNG, J. G., Assistant Professor: (environmental engineering).
- PETERKA, J. O., Assistant Professor: (fluid mechanics).
- RICHARDSON, E. V., Professor: (hydraulics, water resources, river mechanics).
- RUFF, J. F., Assistant Professor: (hydraulics, hydrodynamics, remote sensing).
- SADEH, W. Z., Associate Professor: (fluid mechanics).
- SANDBORN, V. A., Professor: (fluid mechanics, aerodynamics).
- SCHULZ, E. F., Associate Professor: (hydrology).
- SCHWEIZER, H. H., Professor: (mechanics, structures).
- SHEN, H. W., Professor: (fluid mechanics, hydraulics).
- SIMONS, D. B., Professor and Associate Dean for Research: (hydraulics, water resources, river mechanics).
- SKINNER, M. M., Assistant Professor: (hydraulics, river systems, remote sensing).
- SMITH, G. L., Associate Professor: (hydraulics, fluid mechanics, hydrology).
- STEVENS, M. A., Associate Professor: (hydraulics, river mechanics, water resources).

(Academic and Research Faculty for Department of Civil Engineering is continued on next page.)

Department of Civil Engineering - continued

- SUNADA, D. K., Associate Professor: (groundwater).
- THOMAS, C. W., Professor: (water resources, hydrology, hydraulics).
- THOMPSON, E. G., Associate Professor: (soil mechanics).
- TULLIS, J. P., Associate Professor: (hydraulics, fluid mechanics, cavitation).
- VANDERBILT, M. D., Associate Professor: (structures, mechanics).
- WARD, D. C., Research Associate: (nuclear physics, solar energy application).
- WARD, J. C., Professor: (environmental engineering, sanitary engineering, solar energy).
- YEVJEVICH, V., Professor: (hydrology, hydraulics, water resources).

PUBLICATIONS

Department of Civil Engineering

- Albertson, M. L., The development process. East-West Center, Honolulu, 1972. American Society of Engineering Educator's Meeting, Georgia Institute of Technology, Atlanta, Georgia, Spring 1974. 20 p. CEP71-72MLA94.
- _____, Colorado State University institutional development grant. Research needs for on-farm water management, Proceedings, International Symposium sponsored by USAID, Technical Assistance Bureau Agriculture, Park City, Utah, October 1973. 22 p. CEP73-74MLA90.
- _____ and M. T. Chaudhry, Water resources training and information dissemination programs at Colorado State University. Eighth American Water Resources Conference, St. Louis, Missouri, November 2, 1972. 23 p. CEP72-73MLA-MTC92.
- _____, Integrated approach to irrigated agriculture. Seminar on Prospects for Irrigation in Africa, International Institute for Tropical Agriculture, Ibadan, Nigeria, October 24, 1972. 31 p. CEP72-73MLA94.
- _____ and M. T. Chaudhry, Research and education for development. First International Conference on Transfer of Water Resources knowledge, Fort Collins, Colorado, September 14-16, 1972. 16 p. CEP72-73MLA-MTC93.
- _____, L. S. Tucker and D. C. Taylor, editors, Treatise on urban water systems. Institute of Urban Water Systems, Colorado State University, June 1970. 856 p. Distributed by Water Resources Publications. CEP71-72MLA-LST-DCT52. \$12.00.
- Rouse, H. and _____, Report on the improvement of engineering education in Thailand. Prepared for United Nations Educational, Scientific, and Cultural Organization (UNESCO), July 1971. 38 p. CER71-72MLA57.
- _____, see:
1. M. T. Chaudhry, Department of Civil Engineering.
 2. V. A. Koelzer, Department of Civil Engineering.
 3. C. W. Thomas, Department of Civil Engineering.
- Al-Dabbagh, A., J. R. Goodman and J. Bodig, Finite element method for wood mechanics. Annual Structural Engineering Conference, Baltimore, Maryland, April 1971. ASCE Proceedings, Journal of Structural Division, Vol. 98, No. ST3, Paper 8784, March 1972. 12 p. CEP70-71AAD-JRG-JB118.
- Anyiwo, J. C. and R. N. Meroney, Effective-viscosity model for turbulent wall boundary layers. The Aeronautical Quarterly, Vol. XXIV, May 1973. 12 p. CEP72-73JCA-RNM64.
- _____ and R. N. Meroney, A force field theory, Part I - Laminar flow instability. AIAA 5th Fluid and Plasma Dynamics Conference, Boston, Massachusetts, June 26-28, 1972. AIAA Journal, Vol. 11, No. 1, January 1973. 7 p. CEP71-72JCA43.
- _____ and R. N. Meroney, A computer study of transition of wall boundary layers. National Science Foundation Grant No. GK-23989 (1971-73), January 1972. 198 p. CER71-72JCA-RNM21. \$4.00.
- _____ and R. N. Meroney, A force field theory, Part II - Laminar-to-turbulent flow transitions. National Science Foundation Grant No. GK-23989, Engineering Mechanics Division. 38 p. CEP71-72JCA-RNM53.
- _____ and E. C. Nickerson, Wind tunnel study of the Dugway Proving Ground tower grid. Technical Report. U.S. Army Test and Evaluation Command. USATECOM Project No. 5-CO-403-000-017. Contractor Project No. C-423-8. Contract No. DAAB07-68-C-0423. Deseret Test Center, Fort Douglas, Utah, November 1970. 27 p. ECOM No. 8. CER69-70JA-ECN39. \$1.00.
- Atesman, K. M., The dispersion of matter in neutral and stably stratified atmospheric surface layers. International Journal of Heat and Mass Transfer, Vol. 15, No. 11, 1972. 21 p. CEP71-72KMA93.
- Baldwin, L. V., Motivating engineering faculty. Southwest Regional Effective Teaching Institute of the American Society on Engineering Education, Texas A&M University, October 1, 1973. CEP73-74LVB92.

Department of Civil Engineering - continued

- Baldwin, L. V., Videotape applications in engineering education. Symposium on Educational Technology in High Education, State University of New York at Stony Brook, September 26, 1973. CEP73-74LVB91.
- _____, and G. R. Johnson, An estimate of space-time correlations. Boundary-Layer Meteorology, Vol. 5, 1973. 5 p. CEP72-73LVB-GRJ4.
- _____, Statistical methods in turbulent diffusion and dispersion. Institute for Application of Stochastic Methods in Civil Engineering, Colorado State University, August 1972. 34 p. CEP72-73LVB56.
- _____, P. Davis, L. Maxwell and J. P. Jordan, Innovative educational programs of Colorado State University. Status report on NSF Education Directorate sponsored programs. Special report to the Advisory Committee for Science Education, National Science Foundation, July 1973. 65 p. CER73-74LVB1.
- _____, P. Davis and L. M. Maxwell, Innovative, off-campus educational programs of Colorado State University. Special report, President's Science Advisory Committee Panel on Educational Research and Development. April 1972. CER71-72LVB43.
- _____, see K. M. Atesmen, Department of Mechanical Engineering.
- Ball, J. W. and C. E. Sweeney, Incipient cavitation damage in sudden enlargement energy dissipators. Paper C155/74, Institution of Mechanical Engineers Cavitation Conference, Heriot-Watt University, Edinburgh, Scotland, September 3-5, 1974. 7 p. CEP73-74JWB-CES23.
- _____, and J. P. Tullis, Report of hydraulic tests, 16-inch cold leg check valve. Prepared for Foster Wheeler Corporation, Dansville, New York and Atwood and Morrill Company, Salem, Massachusetts, June 1974. 97 p. Hydro-Machinery Laboratory Report No. 36.
- _____, Problems encountered with air entrapped in pipelines. Proceedings, Sprinkler Irrigation Association Technical Conference, Denver, Colorado, February 24-26, 1974. CEP73-74JWB101.
- _____, and J. P. Tullis, Cavitation damage scale effects for sudden enlargements in pipelines. Annual report, October 1973, National Science Foundation. 19 p. CER73-74JWB-JPT16.
- _____, and J. P. Tullis, Cavitation in butterfly valves. Paper 9993, ASCE Proceedings, Journal of the Hydraulics Division, Vol. 99, No. HY9, September 1973. 16 p. CEP72-73JWB-JPT32.
- _____, Report of hydraulic tests, 12-inch valve and primer butterfly valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, August 1972. 61 p. Hydro-Machinery Laboratory Report No. 26.
- Ball, J. W., Report of hydraulic tests, 24-inch swing check valve. Prepared for Crane Company, Chicago, Illinois, April 1972. 27 p. Hydro-Machinery Laboratory Report No. 23.
- _____, Report of hydraulic tests, combination control valve 12-inch valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, January 1972. 48 p. Hydro-Machinery Laboratory Report No. 18.
- _____, Report of flow tests, fiberglass nozzle. Prepared for Midwest Mechanical Contractors, Inc., Birmingham, Michigan, November 1971. 10 p. Hydro-Machinery Laboratory Report No. 19.
- _____, Report of hydraulic tests, rubber flapper swing check valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, September 1971. 9 p. Hydro-Machinery Laboratory Report No. 20.
- _____, see J. P. Tullis, Department of Civil Engineering, (3 coauthorships).
- Barnes, A. H. and R. S. Parker, Planar graph theory applied to computer analysis of drainage networks. Presented, American Geophysical Union, San Francisco, December 8, 1971. 11 p. CEP71-72AHB-RSP33.
- Haeffner, A. D. and _____, Photogrammetric determinations of snow cover extent from uncontrolled aerial photographs. American Society of Photogrammetry, ASP Technical Sessions Proceedings, Columbus, Ohio, October 1972. 23 p. CEP72-73AHB90.
- Poertner, H., _____, et al., Practices in detention of urban stormwater runoff. American Public Works Association Special Report No. 43. OWRR Project No. C-3380, OWRR Contract No. 14-31-0001-3722, June 1974. 243 p. CER73-74AHB55.
- _____, see M. M. Skinner, Department of Civil Engineering.
- Barnett, K. M. and J. E. Cermak, Turbulence induced changes in vortex shedding from a circular cylinder. Project THEMIS Technical Report No. 26, prepared for Office of Naval Research, Contract No. N00014-68-A-0493-0001, Project No. NR 062/414/6-6-68 (Code 438), January 1974. 236 p. CED73-74KMB9. CER73-74KMB-JEC27. \$4.00.
- _____, A wind-tunnel experiment concerning atmospheric vortex streets. Boundary-Layer Meteorology, Vol. 2, 1972. 19 p. CEP71-72KMB13.
- Beebe, P. S. and J. E. Cermak, Turbulent flow over a wavy boundary. Project THEMIS Technical Report No. 16, prepared for Office of Naval Research, Contract No. N00014-68-A-0493-0001, OWRR Contract No. 14-01-0001, May 1972. 129 p. CED71-72PSB37. CER71-72PSB-JEC44. \$3.00.
- Bell, P. W., Optimal control of flow in combined sewer systems. Metropolitan Water Intelligence Systems Technical Report No. 12, May 1974. 258 p. CER73-74PWB46.

Department of Civil Engineering - continued

- Bell, P. W., G. R. Johnson and C. B. Winn, Control logic for real time control flow in combined sewers. Proceedings, Ninth Symposium on Water Pollution in Canada, University of Western Ontario, February 1974. CEP73-74PWB-GRJ-CBW27.
- _____, G. R. Johnson and C. B. Winn, Simulation and control of flow in combined sewers. Proceedings, Sixth Annual Simulation Symposium, Tampa, Florida, June 1973. CEP72-73PWB-GRJ-CBW96.
- _____, and C. B. Winn, Minimization of pollution from combined stormsewer systems. Proceedings, International Systems Symposium, Purdue University, October 1972. CEP72-73PWB-CBW95.
- _____, C. B. Winn and G. L. Smith, Model of real-time automation and control systems for combined sewers. Metropolitan Water Intelligence Systems Technical Report No. 7, 1972. 94 p. CER72-73PWB-CBW-GLS41.
- Bhamidipaty, S. and H. W. Shen, Aggradation and degradation study in flume. ASCE Proceedings, Journal of Waterway and Harbor Division, September 1971. CEP71-72SB-HWS97.
- Bibby, R. and D. K. Sunada, Mathematical model of leaky aquifer. Paper 8350, ASCE Proceedings, Journal of Irrigation and Drainage Division, Vol. 97, No. IR3, September 1971. 5 p. CEP70-71RB-DKS107.
- Bidwell, V. J., A methodology for analyzing agricultural drought. Flood and Droughts, Proceedings, Second International Symposium in Hydrology, September 11-13, 1972. 6 p. CEP72-73VJB88.
- _____, Agricultural response to hydrologic drought. National Science Foundation Grant No. GK-11564, July 1972. 29 p. Hydrology Paper No. 53. \$3.00.
- Bradford, B. H. and D. C. Taylor, Urban size and its relation to need for automation and control. Metropolitan Water Intelligence Systems Technical Report No. 6. CER71-72BHB-DCT62.
- _____, see:
1. N. S. Grigg, Department of Civil Engineering.
2. J. W. Labadie, Department of Civil Engineering.
- Brookman, J. A., Colorado groundwater levels, spring 1974. Summary of changes in groundwater levels, spring 1974 compared to spring 1973. 2 maps. CER73-74JAB39.
- _____, Colorado groundwater trends. Colorado State University Experiment Station, June 1973. 107 p. CER72-73JAB32.
- _____, Colorado groundwater levels, spring 1972. Summary of changes in groundwater levels, spring 1972 compared to spring 1971. 2 maps. CER71-72JAB42.
- Brookman, J. A., see D. B. McWhorter, Department of Civil Engineering, 2 coauthorships.
- Brustkern, R. L. and H. J. Morel-Seytoux, Description of water and air movement during infiltration. Journal of Hydrology, Vol. 24, 1975. pp. 21-35. CEP70-71RLB-HJM48.
- Burt, W. W., see D. B. McWhorter, Department of Agricultural Engineering.
- Campbell, J. R. and J. E. Cermak, Wind loading of National Bureau of Standards Building number 226. Prepared for National Bureau of Standards, Gaithersburg, Maryland under Contract NBC-273-70, January 1972. 65 p. CER71-72JRC-JEC31. \$2.00.
- Cermak, J. E. and R. S. Thompson, Urban planning. In Tri-University Environmental Lead Report, Section 4, Control Strategy Chapter. NSF-RANN Program, December 1974. CEP73-74JEC-RST15.
- _____, D. J. Lombardi and R. S. Thompson, Applications of physical modeling to the investigations of air pollution problems in urban areas. National Science Foundation Grant GI-34813X, March 1974. Paper No. 74-160, 67th Annual Meeting of Air Pollution Control Association, Denver, Colorado, June 9-13, 1974. 29 p. CEP73-74JEC-DJL-RST36. \$1.00.
- _____, Study of the Navy Environmental Protection Data Base. Report to Navy Environmental Protection Study Group, Committee on Environmental Engineering, National Academy of Engineering, March 1974. CER73-74JEC37.
- _____, Publications list. Papers, reports, dissertations, Fluid Mechanics Program, Department of Civil Engineering, Colorado State University, 1974. 37 p. I.D. 74-75-1.
- _____, Wind effects on tall buildings. Conference, Designing to Survive Disaster, IIT Research Institute, Chicago, Illinois, November 6-8, 1973. 22 p. CEP73-74JEC6. \$1.00.
- _____, Wind-tunnel simulation of atmospheric flow and dispersion. Lecture presented for Short Course on Atmospheric Turbulence and Diffusion and its effect on pollution at University of Tennessee Space Institute, Tullahoma, Tennessee, April 2-6, 1973; von Karman Institute for Fluid Dynamics, Rhode-St.-Genese, Belgium, May 7-11, 1973; Workshop on Inadvertent Weather Modification, Utah State University, Logan, Utah, 13-31 August 1973. 42 p. CEP72-73JEC51. \$1.00.
- _____, Fluid-mechanics applications to problems of wind forces on structures and air-pollution. Developments in Mechanics, Vol. 7. Proceedings, 13th Midwestern Mechanics Conference, University of Pittsburgh, Pittsburgh, Pennsylvania, August 13-15, 1973. 17 p. CEP72-73JEC57.

Department of Civil Engineering - continued

Cermak, J. E., D. J. Lombardi and R. S. Thompson, Physical modeling of atmospheric diffusion. First Annual National Science Foundation Trace Contaminants Conference, Oak Ridge National Laboratory, Oak Ridge, Tennessee, August 8-10, 1973. 40 p. CEP73-74JEC-DJL-RST4. \$1.00.

_____, Physical modeling of atmospheric flow for air pollution studies. Presented, ASME Symposium on Flow Studies in Air and Water Pollution, Georgia Tech., Atlanta, Georgia, June 20-21, 1973. 23 p. CEP72-73JEC45.

_____, Simulation of wind effects on buildings by means of wind tunnels. Presented, IES-AIAA-ASTM Conference, Goddard Space Flight Center, April 30-May 4, 1972. Revised paper presented at Honolulu Reconvened Session, ASCE National Structural Engineering Meeting, April 15-17, 1973. 14 p. CEP71-72JEC62.

_____ and S. K. Nayak, Wind tunnel model study of downwash from stacks at Maui Electric Company Power Plant, Kahuli, Hawaii. Prepared for Stearns-Roger Incorporated, Denver, Colorado, March 1973. 66 p. CER72-73JEC-SKN28.

_____, The inevitable wind. Tape recording for radio program, Search--Encounters with Science, National Science Foundation Recording--NSFP-4. 2 p. I.D. 73-74-4.

_____, Industrial fluid mechanics conclave. Civil Engineering Magazine, ASCE, December 1972. 1 p. CEP72-73JEC36.

_____, Wind effects on buildings and structures. Institute on Application of Stochastic Methods, Colorado State University, August 21-September 1, 1972. 24 p. CEP72-73JEC1. \$1.00.

_____, Wind effects on tall buildings--areas for research. Proceedings, International Conference on the Planning and Design of Tall Buildings, Vol. DS, Leigh University, Bethlehem, Pennsylvania, August 21-26, 1972. 8 p. CEP72-73JEC3. \$1.00.

_____, F. H. Chaudhry and J. A. Bagala, Urban and architectural planning for air-pollution control. Paper No. 72-135, 65th Annual Meeting of Air Pollution Control Association, Session 2, Technical Sessions on Meteorology, Miami Beach, Florida, June 18-22, 1972. 27 p. CEP71-72JEC-FHC54. \$1.00.

_____, F. H. Chaudhry, A. C. Hansen and J. A. Garrison, Wind and air-pollution-control study of Yerba Buena Center. Prepared for McCue-Boone-Tomsick, San Francisco, California, June 1972. 84 p. CER71-72JEC-FHC-ACH-JAG15. \$3.00.

_____, Laboratory simulation of the atmospheric boundary layer. AIAA Journal, Vol. 9, No. 9, September 1971. 9 p. CEP69-70JEC80.

Cermak, J. E.

Kawamura, S. and _____, Aerodynamic response of bluff body. Colorado State University, August 1971. 15 p. CEP71-72SK-JEC7.

Kawamura, S. and _____, Aerodynamic response of hanging roof. Technical Report prepared for ASCE, Structures Division, July 1971. 10 p. CEP71-72SJ-JEC5.

_____, see:

1. K. M. Barnett, Department of Civil Engineering.
2. P. S. Beebe, Department of Civil Engineering.
3. J. R. Campbell, Department of Civil Engineering.
4. F. H. Chaudhry, Department of Civil Engineering, (2 coauthorships).
5. K. J. Dreher, Department of Civil Engineering.
6. H. W. Edwards, Department of Mechanical Engineering.
7. W. H. Edling, Department of Civil Engineering.
8. A. C. Hansen, Department of Civil Engineering.
9. K. Mahmood, Department of Civil Engineering.
10. R. N. Meroney, Department of Civil Engineering.
11. S. K. Nayak, Department of Civil Engineering.
12. M. M. Orgill, Department of Civil Engineering, (2 coauthorships).
13. J. A. Peterka, Department of Civil Engineering, (7 coauthorships).
14. S. N. Putta, Department of Civil Engineering, (2 coauthorships).
15. W. Z. Sadeh, Department of Civil Engineering, (2 coauthorships).
16. S. Sethuraman, Department of Civil Engineering, (3 coauthorships).
17. S. B. Verma, Department of Civil Engineering, (4 coauthorships).

Chaudhry, F. H. and R. N. Meroney, Comments on "The dispersion of matter in neutral and stably stratified atmospheric surface layers" by K. Atesman. International Journal of Heat and Mass Transfer, spring 1973. 5 p. CEP72-73FHC-RNM77.

_____ and R. N. Meroney, Similarity theory of diffusion and the observed vertical spread in diabatic surface layer. Boundary Layer Meteorology, Vol. 3, 1973. 11 p. CEP71-72FHC-RNM44.

_____ and R. N. Meroney, A laboratory study of diffusion in stably stratified flow. U.S. Army Electronics Command Contract No. DAAB07-68-C-0423. Atmospheric Environment, Vol. 7, 1973. 12 p. CEP70-71FHC-RNM63.

_____ and J. E. Cermak, Wind tunnel modeling of flow and diffusion over an urban complex. Technical report, Deseret Test Center, U.S. Army Test and Evaluation Command, Contract No. DAAB07-68-C-0423, Contractor Project No. C-423-7, May 1971. 83 p. ECOM No. 7. CER70-71FHC-JEC24. \$3.00.

Department of Civil Engineering - continued

Chaudhry, F. H., see:

1. J. E. Cermak, Department of Civil Engineering, (2 coauthorships).
2. R. N. Meroney, Department of Civil Engineering.

Chaudhry, M. T., J. W. Labadie, W. A. Hall and M. L. Albertson, Optimal conjunctive use model for Indus Basin. Paper 10550, ASCE Proceedings, Journal of the Hydraulics Division, Vol. 100, No. HYS, March 1974. 21 p. CEP73-74MTC-WAH-MLA56.

_____, Conjunctive use of Indus Basin waters - Pakistan: a general summary of Ph.D. Dissertation. Prepared under U.S. Agency for International Development Contract No. AID/csd-2162, December 1973. 40 p. Water Management Technical Report No. 30. CER73-74MTC24. \$3.00.

_____, see M. L. Albertson, Department of Civil Engineering, (2 coauthorships).

Chen, Y. H., see:

1. D. B. Simons, Department of Civil Engineering.
2. M. A. Stevens, Department of Civil Engineering.

Cheong, H. F. and H. W. Shen, Statistical analysis of bed forms for flume and river data. First International Symposium on River Mechanics, Asian Institute of Technology, Bangkok, Thailand, January 1973. CEP72-73HFC-HWS106.

_____, see H. W. Shen, Department of Civil Engineering, (4 coauthorships).

Chieh, S., E. C. Nickerson and V. A. Sandborn, Study of plane Couette flow in stratified fluid. National Science Foundation Grant No. GK-30556, May 1973. 158 p. CER72-73SC-ECN-VAS33. \$4.00.

Chin, W. Q. and V. Yevjevich, Almost-periodic, stochastic process of long-term climatic changes. Inland Waters Directorate, Canada Department of Environment and National Science Foundation Grant No. GK-31521X, March 1974. 72 p. Hydrology Paper No. 65. \$3.00.

Chou, F. K. and V. A. Sandborn, Prediction of the turbulent boundary layer separation. Project THEMIS Technical Report No. 22, prepared for Office of Naval Research, Contract No. N00014-68-A-0493-0001. Project No. NR 062-414/6-6-68 (Code 438), July 1973. 112 p. CER73-74FKC-VAS3.

Cliff, W. C. and V. A. Sandborn, Measurements and a model for convective velocities in the turbulent boundary layer. NASA Technical Note TN D-7416. Marshall Space Flight Center, October 1973. CEP73-74WCC-VAS74.

_____, C. E. Fuller, III and V. A. Sandborn, Simultaneous comparison of gas turbulent fluctuations measured with a laser Doppler velocimeter and a hot-wire anemometer. Aero-Astrodynamics Laboratory, Marshall Space Flight Center, AIAA Journal, Vol. 11, No. 5, 1973. 12 p. CEP72-73VAS33. \$1.00.

Cliff, W. C. and V. A. Sandborn, Correlation between the outer flow and the turbulent production in a boundary layer. Research Note, October 1972. 4 p. CER72-73WCC-VAS5. \$1.00.

Connell, J. R.

Corrin, M. L., _____ and A. J. Gero, An assessment of warm fog--nucleation, control and recommended research. Final report, NASA Contract No. NAS 8-28953, SA No. 1, Marshall Space Flight Center, April 1974. 143 p. CER73-74MLC-JRC-AJG30. \$3.00.

Criswell, M. E., Static and dynamic response of reinforced concrete slab-column connections. Paper 31, American Concrete Institute Special Publication SP-42, Vols. I and II, "Shear in Reinforced Concrete," 1974. 26 p. CEP73-74MEC78.

_____, and N. W. Hawkins, Shear strength of slabs: basic principles and their relation to current methods of analysis. Paper 29, American Concrete Institute Special Publication SP-42, Vols I and II, "Shear in Reinforced Concrete," 1974. 36 p. CEP73-74MEC76.

_____, and S. C. Anand, Teaching of structural design - results of a survey. Proceedings, ASCE Conference on Civil Engineering Education, Columbus, Ohio, February 28-March 2, 1974. 10 p. CEP73-74MEC-SCA34.

_____, et al., The shear strength of reinforced concrete members. Report by ACI-ASCE Committee 426, Summary Paper, Title No. 70-46. ACI Journal, July 1973. 3 p. CEP73-74MEC44.

_____, et al., The shear strength of reinforced concrete members. Prepared by Joint ASCE-ACI Task Committee 426 on Shear and Diagonal Tension of the Committee on Masonry and Reinforced Concrete of the Structural Division. ASCE Proceedings, Journal of the Structural Division, Paper 9791, Vol. 99, No. ST 6, June 1973. 97 p. CEP72-73MEC28.

_____, Discussion of "Yield Line Analysis of the Punching Problem at Slab/Column Intersections" by Hans Gesund and O. P. Dikshit. Disc. SP 30-8, ACI Journal, January 1973. 2 p. CEP72-73MEC55.

_____, Design and testing of a blast-resistant reinforced concrete slab system. U.S. Army Engineer Waterways Experiment Station Technical report N-72-10. Defense Civil Preparedness Agency, November 1972. 316 p. CER72-73MEC25.

Anand, S. C. and _____, Evaluation of a university industry interaction program. ASCE Conference on Civil Engineering Education, Ohio State University, February 28-March 2, 1974. Civil Engineering Education, Vol. 1, Part 2, 1974. 7 p. CEP73-74MEC45.

Hawkins, N. M., _____ and F. Roll, Shear strength of slabs without shear reinforcement. Paper 30, American Concrete Institute Special Publication SP-42, Vols. I and II, "Shear in Reinforced Concrete," 1974. 44 p. CER73-74MEC77.

Department of Civil Engineering - continued

Criswell, M. E., see:

1. J. R. Goodman, Department of Civil Engineering, (3 coauthorships).
2. V. K. A. Gopu, Department of Civil Engineering.
3. M. F. Ko, Department of Civil Engineering.
4. M. L. Kuo, Department of Civil Engineering.
5. B. G. Penner, Department of Civil Engineering.
6. M. D. Vanderbilt, Department of Civil Engineering, (3 coauthorships).

Cunge, J. A., Mathematical modeling of open channel flow. Lecture notes, 1973. Vol. I. 332 p. Vol. II. 256 p. Class Notes 73-74-2.

Dass, P. and H. J. Morel-Seytoux, Subsurface drainage solutions by Galerkin's method. ASCE Proceedings Journal of the Irrigation and Drainage Division, Vol. 100, No. IR 1, Paper 10397, March 1974. pp. 1-15. CEP73-74PD-HJM10.

Dellah, A., see G. O. G. Löf, Department of Civil Engineering.

Derickson, R. G. Jr., E. C. Nickerson and J. A. Peterka, The influence of computational boundary conditions on orographic flow simulations. Proceedings, 1973 Summer Computer Simulation Conference, Montreal, Canada, July 17-19, 1973. 11 p. CEP72-73RGD-ECN-JAP74. \$1.00.

_____, E. C. Nickerson and J. A. Peterka, A numerical simulation of a cold orographic cloud system. National Science Foundation Grant No. GA-26580, February 1973. 139 p. CER72-73RGD-ECN-JAP19. \$3.00.

Dorratcague, D. E., see:

1. J. F. Ruff, Department of Civil Engineering.
2. M. M. Skinner, Department of Civil Engineering, (2 coauthorships).

Dreher, K. J. and J. E. Cermak, Wind loads on a house roof. Technical Report, National Bureau of Standards Contract No. NBS 273-70, March 1973. 111 p. CER72-73KJD-JEC22. \$3.00.

Duke, J. H., see D. B. Simons, Department of Civil Engineering, (3 coauthorships).

Duke, V. C., see D. B. Simons, Department of Civil Engineering, (2 coauthorships).

Dyhr-Nielsen, M., Loss of information by discretizing hydrologic series. National Science Foundation Grant No. GK-11564 and OWRR Projects B-030-COLO and A-009-COLO, October 1972. 63 p. Hydrology Paper No. 54. \$3.00.

_____, see V. Yevjevich, Department of Civil Engineering.

Edling, W. H. and J. E. Cermak, Three-dimensional turbulent boundary layer flow on roughness strip of finite width. Project THEMIS Technical Report No. 27, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), April 1972. 259 p. CER73-74WHE-JEC34. \$5.00.

Fawkes, P. E., see E. F. Schulz, Department of Civil Engineering.

Fead, J. W. N., Engineering education for public participation. Proceedings, ASCE Conference on Civil Engineering Education, Vol. 1, Ohio State University, February 28-March 2, 1974. p. 525. CEP73-74JWNF138.

_____, Proceedings, 13th Annual Bridge Engineering Conference. Department of Civil Engineering, Colorado State University, 1972. 94 p. CER60JWNF57.

_____, Proceedings, 12th Annual Bridge Engineering Conference. Department of Civil Engineering, Colorado State University, 1971. 120 p. CER60JWNF57.

Garcia, L. E., D. R. Dawdy and J. M. Mejia, Long memory monthly streamflow simulation by a broken line model. Water Resources Research, Vol. 8, No. 4, August 1972. 6 p. CEP72-73LEG-DRD-JMM18.

_____, see Rodriguez-Iturbe, Department of Civil Engineering.

Garrison, J. A., see:

1. J. E. Cermak, Department of Civil Engineering.
2. R. N. Meroney, Department of Civil Engineering.
3. S. K. Nayak, Department of Civil Engineering.

Gessler, J., Research needs as related to the development of sediment standards in rivers. OWRR Grant No. 14-31-0001-4006, June 1974. 18 p. CER73-74JG41.

_____, SPI, good-bye education...? Engineering Education, ASEE, Colorado State University, January 1974. 15 p. CEP73-74JG71.

_____, Vectors in dimensional analysis. ASCE Proceedings, Journal of the Engineering Mechanics Division, February 1973. 17 p. CEP71-72JG46.

_____, Behavior of sediment mixtures in rivers. IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 9-12, 1973. 12 p. CEP71-72JG88.

_____, Monte-Carlo simulation of an elevator system. Paper B-12, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. 12 p. CEP72-73JG115.

_____, Stability of sediment grains on river beds. Paper C-15, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. 13 p. CEP72-73JG116.

_____, Stochastic processes II. Paper A-11, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. 12 p. CEP72-73JG114.

- Gessler, J., Estimation and hypothesis testing. Paper A-7, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. 8 p. CEP72-73JG113.
- _____, Probability theory. Paper A-4, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. 19 p. CEP72-73JF112.
- _____, Introductory statistics. Paper A-2, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, Fort Collins, Colorado, August 1972. CEP72-73JG111.
- _____, Discussion of "Directional Analysis in Model Design." ASCE Proceedings, Journal of the Engineering Mechanics Division, December 1971. CEP71-72JG95.
- _____, see:
1. D. B. Simons, Department of Civil Engineering.
 2. K. S. Su, Department of Civil Engineering.
- Glover, R. E., Transient ground water hydraulics. Department of Civil Engineering, Colorado State University, January 1974. 417 p. CEP73-74REG68. \$12.00.
- _____, Deep percolation in a sand hill area. Paper No. TN2039, Water Resources Bulletin, Vol. 8, No. 2, April 1972. 2 p. CEP71-72REG91.
- _____, Parallel drains from the Laplace standpoint. Water Resources Bulletin, Journal of the American Water Resources Association, Vol. 8, No. 1, February 1972. 5 p. CEP71-72REG90.
- Goodman, J. R., M. D. Vanderbilt and M. E. Criswell, Composite and two-way action in wood joist floor systems. Forest Products Research Society Annual Meeting, June 1973. Wood Science, Vol. 7, No. 1, July 1974. CEP72-73JRG-MDV-MEC119.
- _____, J. Bodig, M. E. Criswell and M. D. Vanderbilt, Verification of a mathematical model of wood joist floor systems. Forest Products Research Society Annual Meeting, June 1974. CEP73-74JRG-JB-MEC-MDV114.
- _____, M. E. Criswell, M. D. Vanderbilt and J. Bodig, Implications of rational analysis of wood joist housing floor systems. Third International Symposium of International Association for Housing Science, Montreal, Canada, May 1974. CEP73-74JRG-MEC-MDV-JB113.
- _____, W. M. Henghold and H. Y. Rassam, Design aspects of mechanically connected composite systems. ASCE Specialty Conference on Selection, Design and Fabrication of Composite Materials for Civil Engineering, Carnegie-Mellon University, Pittsburgh, Pennsylvania, November 1972. 32 p. CEP72-73JRG-WMH-HYR22.
- _____, and J. Bodig, Orthotropic strength of wood in compression. Forest Products Research Society Meeting, 1970, Miami, Florida. Wood Science, Vol. 4, No. 2, October 1971. 12 p. CEP69-70JRG-JB78.
- Goodman, James R.
Bodig, J. and _____, Prediction of elastic parameters for wood. Session 6, Wood Engineering and Mechanical Properties and Mechanical Fastening, Forest Products Research Society Annual Meeting, June 20, 1972, Dallas, Texas. Wood Science, Vol. 5, No. 4, April 1973. 16 p. CEP72-73JB-JRG75.
- _____, see:
1. A. Al-Dabbagh, Department of Civil Engineering.
 2. V. K. A. Gopu, Department of Civil Engineering, (2 coauthorships).
 3. R. A. Gunnerson, Department of Civil Engineering.
 4. W. M. Henghold, Department of Civil Engineering.
 5. M. F. Ko, Department of Civil Engineering.
 6. M. L. Kuo, Department of Civil Engineering.
 7. B. G. Penner, Department of Civil Engineering.
 8. H. Y. Rassam, Department of Civil Engineering.
 9. M. D. Vanderbilt, Department of Civil Engineering, (3 coauthorships).
- Gopu, V. K. A. and J. R. Goodman, Analysis of double-tapered, pitched, and curved laminated beam section. Forest Products Research Society Annual Meeting, June 1973, Wood Science, Vol. 7, No. 1, July 1974. CEP72-73VKAG-JRG120.
- _____, J. R. Goodman, M. D. Vanderbilt, M. E. Criswell and J. Bodig, Analysis of double-tapered curved glued-laminated beams. Structural Research Report No. 9. National Science Foundation Grant No. GK 15785 A-1, December 1972. 163 p. CER72-73VKAG-JRG-MDV-MEC-JB39.
- Govindarajan, R., see J. P. Tullis, Department of Civil Engineering.
- Grigg, N. S. and M. C. Bryson, Dynamics of urban water systems. ASCE Annual Environmental Meeting, Kansas City, Missouri, October 21-24, 1974. CEP73-74NSG-MCB97.
- _____, L. R. Rice, L. H. Bothan and W. J. Shoemaker, Evaluation and implementation of urban drainage and flood control projects. Environmental Resources Center Completion Report Series No. 56. OWRR Project No. B-086-COLO, June 1974. 138 p. CER73-74NSG45.
- _____, Legal constraints on urban water systems. Western Regional Science Association Annual Meeting, Monterey, California, February 1973. ASCE Proceedings, Journal of the Urban Planning and Development Division, September 1973. 18 p. CEP72-73NSG100.
- _____, W. R. Giessner, R. T. Cockburn, H. C. Coffee, Jr., F. H. Moss, Jr. and M. E. Noonan, Planning and wastewater management of a combined sewer system in San Francisco. Metropolitan Water Intelligence Systems Technical Report No. 10, OWRR, June 1973. 56 p. CER73-74NSG57.
- _____, J. W. Labadie, G. L. Smith, D. W. Hill and B. H. Bradford, Metropolitan Water Intelligence Systems Completion Report - Phase II. OWRR Grant No. 14-31-0001-3685, June 1973. 159 p. CER72-73NSG-JWL-GLS-DWH-BHB37.

Department of Civil Engineering - continued

- Grigg, N. S., Do we drink it, bathe in it--or both? Perspective, The Denver Post, March 25, 1973. 2 p. CEP72-73NSG101.
- Hill, D. and _____, A solid waste problem: a portrait. In Environment and Colorado: A Handbook. (P. O. Foss, editor). Environmental Resources Center, Colorado State University, 1973. 5 p. I.D.73-74-16.
- _____, see:
1. J. W. Labadie, Department of Civil Engineering, (3 coauthorships).
 2. E. F. Schulz, Department of Civil Engineering.
 3. G. L. Smith, Department of Civil Engineering.
- Gunnerson, R. A., J. R. Goodman and J. Bodig, Plate tests for determination of elastic parameters of wood. Session 6, Forest Products Research Society Annual Meeting, June 20, 1972, Dallas, Texas. National Science Foundation Grant No. 15785. Wood Science, Vol. 5, No. 4, April 1973. 8 p. CEP71-72RAG-JRG-JB65.
- Gupta, V. K., Transposition of storms for estimating flood probability distributions. National Science Foundation Grant No. GK-11444, November 1972. 40 p. Hydrology Paper No. 59. \$3.00.
- Hall, W. A., see M. T. Chaudhry, Department of Civil Engineering.
- Hansen, A. C., J. A. Peterka and J. E. Cermak, Wind-tunnel measurements in the wake of a simple structure in a simulated atmospheric flow. Prepared for Marshall Space Flight Center, Contract No. NAS-8-29583, National Aeronautics and Space Administration, Huntsville, Alabama, June 1974. 42 p. CER73-74ACH-JAP-JEC43. \$1.00.
- _____, see J. E. Cermak, Department of Civil Engineering.
- Hansen, W. W., Optimization of a wastewater treatment--groundwater recharge system for industry. A Case Study of Water Reuse by a Sugar Refinery. ASCE, 19th Annual Specialty Conference, Hydraulics Division, Iowa City, Iowa, August 19, 1971. 14 p. CEP71-72WWH6.
- Hao, O. J., see G. O. G. Löf, Department of Civil Engineering.
- Haque, M. I., see:
1. A. C. Mercer, Department of Civil Engineering.
 2. E. G. Thompson, Department of Civil Engineering.
- Hayman, R. W. and H. Levin, Economic analysis and historical summary of educational technology costs. Appendix 1 in Federal Council for Science and Technology Panel on Productivity in Education Report, Computer Managed Learning System Laboratory Technical Report TR 73-2, Colorado State University, February 1973. CER72-73RWH-HL47.
- _____, Computer managed learning--projections for operational status. Computer Managed Learning System Laboratory Technical Report TR 73-1, Colorado State University, January 1973. CER72-73RWH46.
- Hayman, R. W. and W. Lord, A technology-based educational system. Computer Managed Learning System Laboratory Technical Report TR 72-3, Colorado State University, April 1972. Published under title "A Technology Based Education System Using Computer Management" in Educational Technology, Vol. XII, No. 12, December 1972. 31 p. CEP72-73RWH-WL87.
- _____, and C. A. Howard, Maintenance station location through operations research at the Wyoming State Highway Department. Annual meeting of the Highway Research Board, January 1972. Highway Research Record, No. 391, 1972. 37 p. CER70-71RWH81.
- _____, Interim status report. Computer Managed Learning System Laboratory Technical Report TR 72-10, Colorado State University, September 1972. CER73-74RWH45.
- _____, Implementation of computer based instruction at Colorado State University. Computer Managed Learning System Laboratory Technical Report TR 72-9, August 1972. CER72-73RWH44.
- _____, and G. Leach, Operating system software report. Computer Managed Learning System Laboratory Technical Report TR 71-3, Colorado State University, August 1971. CER71-72RWH59.
- _____, see:
1. W. Lord, Department of Electrical Engineering, (2 coauthorships).
 2. J. C. O'Neil, Department of Electrical Engineering.
- Hendrick, J., Techniques for modeling reservoir salinity. U.S. Bureau of Reclamation and National Science Foundation Grants GK-11444 and GK-31512X, August 1973. 58 p. Hydrology Paper No. 62. \$3.00.
- Hendricks, D. W. and W. D. Pote, Thermodynamic analysis of a primary waste stabilization pond. Water Pollution Control Federation 8th Annual Conference, October 10, 1972. Journal of Water Pollution Control Federation, Vol. 2, February 1974. CEP73-74DWH100.
- _____, Technological impacts and their inter-relationship. ASCE National Symposium on Environmental Impact Research, New York, November 1, 1973. CEP73-74DWH112.
- _____, E. Vlachos, L. S. Tucker and J. C. Kellogg, editors, Environmental design and public projects. NSF-RANN Monograph, 1973. 827 p. CEP72-73DWH-EV-LST102.
- _____, et al., Traditions and transitions. Chapter I in Environmental Design and Public Projects, edited by D. W. Hendricks, E. Vlachos, L. S. Tucker and V. C. Kellogg, NSF-RANN Monograph, June 1973. CEP72-73DWH-EV-LST102.

Department of Civil Engineering - continued

- Hendricks, D. W., Water supply and quality. In Environment and Colorado: A Handbook. (P. O. Foss, editor). 1973. 5 p. I.D. 73-74-16.
- _____, Notes on process design fundamentals: Part I - Thermodynamic foundations, Part II - Unit process principles, Part III - Unit process design. Course syllabus CE 638, 739, 640. Civil Engineering Department, Colorado State University, March 1972. Class Notes 71-72-5.
- _____, Sorption in flow through porous media. In Fundamentals of Transport Phenomena in Porous Media, Proceedings, February 1969 IAHR Symposium, Haifa, Israel, 1972. CEP71-72DWH96.
- Bishop, A. B. and _____, Analysis of water reuse alternatives in an integrated urban and agricultural area. In Systems Planning and Design, R. deNeufville and D. H. Marks, editors, Prentice Hall, Englewood Cliffs, 1974. CEP73-74DWH99.
- Bishop, A. B. and _____, Analysis of water reuse alternatives in an integrated urban and agricultural area. Chapter 13, in Analytic Formulation of Engineering Problems: Case Studies in Systems Analysis, R. deNeufville and D. H. Marks, editors. Department of Engineering, Massachusetts Institute of Technology, Report R72-56, September 1972. CEP72-73DWH117.
- Pollard, W. S., Jr. and _____, Environmental engineering. Section IV, Part 2 in Research Needs in Civil Engineering Relevant to Goals in Society. Colorado State University and ASCE. June 1971. 33 p. CER71-72CWT8.
- Vlachos, E. and _____, Technology assessment for new water supplies. American Water Resources Association National meeting, November 2, 1972. CEP72-73EV-DWH103.
- Vlachos, E. and _____, Environmental impact assessment - emerging models and methods. Midwest Sociological Society meeting, Milwaukee, Wisconsin, April 1973. CEP72-73EV-DWH104.
- Henghold, W. M. and J. R. Goodman, Static and dynamic behavior of layered beams including slip. Proceedings, 6th St. Louis Symposium on Composite Materials in Engineering Design, May 1972. In Composite Materials in Engineering Design, American Society for Metals, November 1973. CEP71-72WMH-JRG17.
- _____, Layered beam vibrations including slip. Structural Research Report No. 6. Air Force Institute of Technology, U.S. Air Force, and U.S. Air Force Academy, June 1972. 185 p. CER71-72WMH56.
- _____, see J. R. Goodman, Department of Civil Engineering.
- Holland, M. E., see D. A. Woolhiser, Agricultural Research Service.
- Hoot, T. G. and R. N. Meroney, The behavior of negatively buoyant stack gases. Air Pollution Control Association 67th Annual meeting, Denver, Colorado, June 9-13, 1974. 21 p. CEP73-74RNM-TGH33.
- _____, R. N. Meroney and J. A. Peterka, Wind tunnel tests of negatively buoyant plumes. Environmental Protection Agency, Grant AP-01186, Washington, D.C., Ecological Research Series, EPA-650/3-74-003, October 1973. 102 p. CER73-74TGH-RNM-JAP13. \$3.00.
- _____, see R. N. Meroney, Department of Civil Engineering, (2 coauthorships).
- Huang, C. and E. C. Nickerson, Stratified flow over nonuniform surface conditions: mixing length model. Project THEMIS Technical Report, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, July 1972. Boundary Layer Meteorology, Vol. 5, 1974. 30 p. CEP71-72CH-ECN63. \$1.00.
- _____, and E. C. Nickerson, Numerical simulation of wind, temperature, shear stress and turbulent energy over nonhomogeneous terrain. Project THEMIS Technical Report No. 12, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), March 1972. 274 p. CED71-72CH11. CER71-72CH-ECN23. \$5.00.
- Hung, C. S. and H. W. Shen, Analysis of sampling techniques for sediment-particle random walks. Sedimentation Symposium, University of California, Berkeley, June 17-19, 1971. Chapter 13 in Sedimentation, 1972. 42 p. CEP70-71CSH-HWS115.
- _____, and H. W. Shen, Research in stochastic models for bed-load transport. Appendix B, Proceedings, Institute of River Mechanics, 1971. Symposium on Statistical Hydrology, International Association for Statistics in Physical Science, Tucson, Arizona, August 29-September 2, 1971. 49 p. CEP70-71CSH-HWS130.
- _____, see H. W. Shen, Department of Civil Engineering.
- Hunter, J. S. and J. C. Ward, The effects of water temperature and evaluation upon aeration. Part I in Colorado State University Environmental Resources Center Completion Report Series No. 34, August 1972. Symposium on Wastewater Treatment in Cold Climates, University of Saskatchewan, Canada, Economic and Technical Review Report EPA3-WP-74-3, Water Pollution Control Directorate, Environment Canada, March 1974. 49 p. CEP72-73JSH-JCW71.
- _____, see J. C. Ward, Department of Civil Engineering.
- Jacobi, S. and E. V. Richardson, Economic value of sediment discharge data. Colorado State University Experiment Station, April 1974. 41 p. Hydrology Paper No. 67. \$3.00.

Department of Civil Engineering - continued

- Jawed, K., R. Ragavendran and E. F. Schulz, Deriving a unit hydrograph in the absence of detailed rainfall data. Colorado State University Experiment Station Project 114 and OWRR Grant No. A-31-0001-3565, June 1973. 20 p. CER72-73KJ-RR-EFS34.
- _____, A study of relationships between watershed parameters and peak discharge. Submitted in fulfillment of the requirements for the course CE 795-X, Special Study in Hydrology, December 1972. 74 p. CER72-73KJ35.
- Johansen, R. P., see J. C. Ward, Department of Civil Engineering, (2 coauthorships).
- Jolly, J. P. and V. Yevjevich, Amplification criterion of gradually varied, single peaked waves. Federal Highway Administration, December 1971. 47 p. Hydrology Paper No. 51. \$3.00.
- Kahawita, R. A. and R. N. Meroney, The vortex mode of instability in natural convection flow along inclined plates. International Journal of Heat and Mass Transfer, Vol. 17, 1974. 8 p. CEP73-74RAK-RNM66.
- _____, and R. N. Meroney, Taylor-Goertler vortices in laminar wall jets along curved surfaces. Accepted for the Canadian Symposium on Theoretical Fluid Dynamics, University of Western Ontario, London, Ontario, Canada, June 17-20, 1974. 9 p. CEP73-74RK-RNM40.
- _____, and R. N. Meroney, The stability of parallel, quasi-parallel and stationary flows. Project THEMIS Technical Report No. 24, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), September 1973. 175 p. CER73-74RJ-RNM12. \$4.00.
- _____, and R. N. Meroney, Penetrative convective instabilities in parallel flows. Project THEMIS Technical Report No. 13, prepared for Office of Naval Research Contract No. N0001-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), May 1972. 26 p. CER71-72RAK-RNM24. \$1.00
- Karaki, S., Solar thermal electric power systems. Second Quarter Progress Report for the period April 1, 1974 to June 30, 1974. Report: NSF/RANN/SE/GI-37815/PR/74/2, National Science Foundation Grant GI-37815, July 1974. 30 p. CER73-74SK54.
- _____, D. S. Ward and G. O. G. Löf, Utilization of solar energy today. Presented, IEEE Power Engineering Society Conference, Anaheim, California, July 1974. 7 p. CEP73-74SK-DW-GOGL83.
- _____, and G. O. G. Löf, Analysis of solar thermal-electric power station. Joint US-USSR Symposium on Solar Thermal-Electric Power Systems. National Science Foundation, June 28, 1974. 22 p. CEP73-74SK-GOGL82.
- _____, Solar thermal electric power systems. First Quarter Progress Report for the period January 1, 1974-March 31, 1974. NSF/RANN/SE/GI-37815/PR/74/1, April 1974. 180 p. CER73-74SK53.
- Karaki, S., Solar thermal electric power systems. Annual Progress Report ending December 31, 1973. Colorado State University/Westinghouse. NSF/RANN/SEGI-37815/PR/73/4, January 1974. CER73-74SK60.
- _____, Solar thermal electric power systems. Third Quarter Progress Report for the period July 1, 1973 to September 30, 1973. NSF/RANN/SE/GI-37815/PR/73/3, October 1973. 133 p. CER73-74SK52.
- _____, Solar thermal electric power systems. Progress Report for the period May 1, 1973 to June 30, 1973. Report: NSF/RANN/SE/GI-37815/PR/73/2, National Science Foundation Grant No. GI-37815, July 1973. 122 p. CER73-74SK50.
- _____, A comparison of a coaxial focused laser Doppler system in atmospheric measurements. Final report, National Aeronautic and Space Administration Contract No. NAS8-26234, Marshall Space Flight Center, Huntsville, Alabama, June 1973. 164 p. CER71-72SK35.
- _____, Service gates for tunnels 3 and 4; hydraulic model study. Final report. West Pakistan Water and Power Development Authority, Tarbela Dam Project, Indus River, West Pakistan, prepared for Tippetts-Abbett-McCarthy-Stratton, New York, September 1972. 87 p. CER71-72SK34.
- _____, see:
1. H. T. Liu, Department of Civil Engineering, (3 coauthorships).
 2. G. O. G. Löf, Department of Civil Engineering, (2 coauthorships).
 3. E. V. Richardson, Department of Civil Engineering, (2 coauthorships).
 4. S. C. Shieh, Department of Civil Engineering.
 5. S. D. Veenhuizen, Department of Civil Engineering.
 6. J. C. Ward, Department of Civil Engineering.
- Karplus, A. K., see V. Yevjevich, Department of Civil Engineering.
- Kavvas, M. L. and E. F. Schulz, Removal of unit hydrograph oscillations by filtering. Second International Hydrology Symposium, September 11-15, 1972. CEP72-73MLK-EFS99.
- Kawatani, T. and W. Z. Sadeh, Velocity variation above model forest canopies. American Meteorological Society 11th National Conference on Agricultural and Forest Meteorology, Session II: Windbreaks and Turbulence, Duke University, Durham, North Carolina, January 8-10, 1973. 57 p. CEP72-73TK-WZS10.
- _____, and W. Z. Sadeh, An investigation of flow over high roughness. Project THEMIS Technical Report No. 11, prepared for Atmospheric Sciences Laboratory, U.S. Army Electronics Command Contract No. DAAB07-68-C-0423, and Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 0620414/6-6-68 (Code 438), August 1971. 174 p. CED71-72TK1. CER71-72TK-WZS3. ECOM No. 10, \$4.00.

Department of Civil Engineering - continued

- Khan, H. R.
S. A. Schumm and _____, Model study of river patterns. National Science Foundation Grant No GA-4450, July 1971. 40 p. CEP71-72AS-HRK92.
- Kilinc, M. and E. V. Richardson, Mechanics of soil erosion from overland flow generated by simulated rainfall. Colorado State University Experiment Station and the Government of Turkey, September 1973. 57 p. Hydrology Paper No. 63. \$3.00.
- Knisel, W. G., Response of karst aquifers to recharge. National Science Foundation, December 1972. 53 p. Hydrology Paper No. 60. \$3.00.
- Ko, M. F., J. R. Goodman, M. D. Vanderbilt, M. E. Criswell and J. Bodig, Layered beam systems with interlayer slip. Structural Research Report No. 8. Civil Engineering Department, Colorado State University, December 1972. 138 p. CER72-73MFK-JRG-MDV-MEC-JB27.
- Koelzer, V. A., A future in accord with national needs. Presented at Population and Development - Alternative Futures in the West Conference, Colorado State University, August 1-3, 1973. In Conference Proceedings, 1974. pp. 72-98. CEP73-74VAK117.
- _____, M. L. Albertson and J. Subramaniam, editors, Population and development - alternative futures in the west. Proceedings of a Conference, August 1-3, 1973, Colorado State University. 1974. 368 p. CEP73-74VAK-MAL-JS80. \$12.00
- _____, A proposed national organizational structure for water resources planning. Presented at Eighth Annual Water Resources Conference, St. Louis, Missouri, October 31, 1972. Water Resources Bulletin, Vol. 9, No. 1, February 1973. CEP72-73VAK128.
- _____ and R. C. Tucker, Water use and management aspects of steam electric generation. Presented at Symposium on Energy, the Environment, and Education, University of Arizona, 1971. In Energy Needs and the Environment, edited by Robert L. Seale and Raymond A. Sierka, The University of Arizona Press, 1973. CEP72-73VAK126.
- _____, Inadequate data - reservoir system analysis. General report, a summary and discussion of papers presented at Session III, Second International Symposium in Hydrology, September 1972. In Decisions with Inadequate Hydrologic Data, edited by David A. Woolhiser. Water Resources Publications, Fort Collins, Colorado, 1973. pp. 266-283. CEP72-73DAW67.
- _____, Urban water management. Presented at Annual Conference of American Water Works Association, June 8, 1972. American Water Works Association Journal, September 1972. CEP72-73VAK127.
- _____, see E. F. Schulz, Department of Civil Engineering.
- Koloseus, H. J., Channel changes. In The Readers Write, Civil Engineering, Vol. 42, No. 2, February 1972. 1 p. CEP71-72HJK35.
- _____, Metrication. Letters and Comment, Mechanical Engineering, Vol. 98, No. 12, December 1971. 1 p. CEP71-72HJK58.
- _____, Discussion of "Effects of Mechanical Cleaning Operations on Flow in Large Conduits" by George F. Horowitz and Nelson N. Lee. ASCE Proceedings, Journal of the Hydraulics Division, Vol. 97, No. HY12, December 1971. 2 p. CEP71-72HJK56.
- _____, Rigid boundary hydraulics for steady flow. Chapter 3, in River Mechanics, edited by H. W. Shen, Colorado State University, November 1971. 51 p. CEP71-72HWS98.
- Kuo, M. L., M. E. Criswell, J. R. Goodman, J. Bodig, E. G. Thompson and M. D. Vanderbilt, Verification of a mathematical model for layered T-beams. Structural Research Report No. 10. National Science Foundation Grant No. GK-30853, March 1974. 195 p. CER73-74MLK-MEC-JRG-JB-EGT-MDV28.
- Labadie, J. W., N. S. Grigg and B. H. Bradford, Automatic control of large-scale combined sewer systems. ASCE Proceedings, Journal of the Environmental Division, February 1975. 31 p. CEP73-74JWL-NSG-BHB57.
- _____, N. S. Grigg and P. D. Trotta, Minimization of combined sewer overflows by large-scale mathematical programming. Presented, International Symposium on Applications of Computers and Operations Research to Problems of World Concern, Washington, D.C., August 20-21, 1973. Journal of Computers and Operations Research, Vol. 1, December 1974. 15 p. CEP73-74JWL-NSG-PDT58.
- _____, A surrogate-parameter approach to modeling groundwater basins. Water Resources Bulletin, Vol. 11, No. 1, February 1975. 18 p. CEP73-74JWL43.
- _____, Optimization techniques for minimization of combined sewer overflow. Metropolitan Water Intelligence Systems Technical Report No. 11, OWRR, June 1973. 87 p. CER73-74JWL56.
- _____, N. S. Grigg and P. D. Trotta, Automated control in large-scale metropolitan water intelligence systems. Operations Research Society of America 43rd National Meeting, Milwaukee, Wisconsin, May 9-11, 1973. 31 p. CEP72-73JWL-NSG-PDT83.
- _____, Decomposition of a large-scale, nonconvex parameter identification problem in geohydrology. Operations Research Society of America 41st Annual Meeting, New Orleans, Louisiana, April 26-28, 1972. 36 p. CEP71-72JWL67.
- _____, see:
1. M. T. Chaudhry, Department of Civil Engineering.
2. N. S. Grigg, Department of Civil Engineering.
3. S. Tuffuor, Department of Civil Engineering.

Department of Civil Engineering - continued

Lane, K. S., Tunneling and underground construction. Encyclopaedia Britannica, 1972 Yearbook, August 20, 1971. 106 p. I.D. 71-72-2.

Law, A. G., Stochastic analysis of groundwater level time series in the western United States. National Science Foundation Grants GK-11444 and GK-11564, May 1974. 30 p. Hydrology Paper No. 68. \$3.00.

Lewis, G. L., see:

1. D. B. Simons, Department of Civil Engineering.
2. M. A. Stevens, Department of Civil Engineering.

Li, R. M., Stream morphology in small watersheds. American Geophysical Union 55th Annual Meeting, Washington, D.C., April 1974. CEP73-74RML38.

_____, D. B. Simons and M. A. Stevens, Nonlinear kinematic wave approximation for water routing. OWRR Report, Vol. 11, No. 2, April 1975. pp. 245-252. CEP73-74RML-DBS-MAS37.

_____ and D. B. Simons, Discussion of "Sediment Yield Computed with Universal Equation" by J. R. Williams and H. D. Berndt. ASCE Proceedings Paper 10109, Journal of Hydraulics Division, Vol. 99, No. HY11, November 1973. CEP72-73RML-DBS109.

_____, H. W. Shen and D. B. Simons, Mechanics of soil erosion by overland flow. Proceedings, 15th Congress, International Association of Hydraulic Research, State Hydraulic Works of Turkey, Istanbul, Turkey, September 1973. CEP72-73RML-HWS-DBS63.

_____ and H. W. Shen, Effect of tall vegetations on flow and sediment. ASCE Proceedings Paper 9748, Journal of Hydrology Division, Vol. 99, No. HY5, May 1973. 22 p. CEP72-73RML-HWS37.

_____, D. B. Simons and M. A. Stevens, Cooperative study on development of models for predicting sediment yield from small watersheds. Review of Literature, U.S. Rocky Mountain Forest and Range Experiment Station, Flagstaff, Arizona, January 1973. CER72-73RML-DBS-MAS14.

_____, see H. W. Shen, Department of Civil Engineering, (2 coauthorships).

Lindeman, L. F., see J. P. Tullis, Department of Civil Engineering.

Liu, H. T. and S. Karaki, Studies of particulate plume diffusion over laboratory wind-generated water waves. Atmospheric Environment, Vol. 7. NCAR Reprint No. 1784, March 1973. pp. 869-890. CEP72-73HTL-SK121.

_____ and S. Karaki, An optical system for measurement of mean and fluctuating concentrations in a turbulent air stream. Journal of Physics E: Scientific Instruments, Vol. 5, 1972. 4 p. CEP72-73HTL-SK43.

Liu, H. T. and S. Karaki, Mass diffusion over wind waves. Prepared for Atomic Energy Commission Contract No. AT(11-1)-1813, May 1972. 159 p. CER71-72HTL-SK46.

Löf, G. O. G. and D. S. Ward, Design, construction, and testing of residential solar heating and cooling systems. Annual Progress Report for period September 1, 1973-January 31, 1974. NSF/RANN Grant No. GI-40457. Report: NSF/RANN/SE/GI-40457/PR/74/4, prepared by Colorado State University Solar Energy Applications Laboratory, University of Wisconsin, and Honeywell, Inc., March 1974. 88 p. CER73-74GOGL-DSW33.

_____, Solar energy for heating and cooling of buildings. Presented at NSF/RANN Symposium, November 19, 1973. CEP73-74GOGL123.

_____, Solar energy: on infinite source of clean energy. In, Annals of the American Academy of Political and Social Science, Vol. 410, November 1973. pp. 52-64. CEP73-74GOGL124.

_____ and R. Tybout, Cost of house heating with solar energy. Solar Energy, Vol. 14, 1973. pp. 253-278. CEP72-73GOGL130.

_____, W. H. Hearon and B. T. Bower, Residuals management in pulp and paper manufacture. In Forest Products and the Environment, AIChE Symposium Series No. 133, Vol. 69, 1973. p. 141. CEP73-74GOGL133.

_____ and D. S. Ward, Solar heating and cooling: untapped energy put to use. ASCE, Civil Engineering, September 1973. 5 p. CEP73-74GOGL-DSW18.

_____ and S. Karaki, A rational method for evaluating solar power generation concepts. Paris Conference, Sun in the Service of Mankind, Paris, France, July 1973. 10 p. CEP73-74GOGL-SK81.

_____, Solar air heaters. In Proceedings of the Solar Heating and Cooling for Buildings Workshop, Washington, D.C., March 1973. NSF/RANN-73-004, July 1973. p. 52. CEP73-74GOGL134.

_____ and R. Tybout, The design and cost of optimized systems for residential heating and cooling by solar energy. To be published in Solar Energy. Presented at Solar Energy Conference, Paris, July 1973. CEP73-74GOGL122.

_____, Solar energy development in the USSR. In Proceedings of the Solar Heating and Cooling for Buildings Workshop, Washington, D.C., March 1973. NSF/RANN-73-004, July 1973. p. 140. CEP73-74GOGL137.

_____, Solar cooling design and cost study. In Proceedings of the Solar Heating and Cooling for Buildings Workshop, Washington, D.C., March 1973. NSF/RANN-73-004, July 1973. p. 119. CEP73-74GOGL136.

_____, Solar energy for heating and cooling. Hearings before Subcommittee on Energy of the Committee on Science and Astronautics of the U.S. House of Representatives, June 7, 1973. CEP72-73GOGL131.

Department of Civil Engineering - continued

- L8f, G. O. G., An experimental solar air conditioning system. In Proceedings of the Solar Heating and Cooling for Buildings Workshop, Washington, D.C., March 1973. NSF/RANN-73-004, July 1973. CEP73-74GOGL135.
- _____, J. C. Ward, S. Karaki and A. Dellah, Concentration of brines by spray evaporation. Office of Saline Water, Contract No. 14-01-0001-2276, December 1971. Research and Development Progress Report No. 764, January 1972. 200 p. CER71-72GOGL-JCW-SK-AD17. \$1.50.
- _____, Thermal energy for buildings. In Solar Energy as a National Energy Resource. NSF/NASA Solar Energy Panel, University of Maryland, December 1972. pp. 13-21. CEP72-73GOGL129.
- _____, Statement (on solar energy for buildings). In Energy Research and Development, No. 24, hearings before the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics of the U.S. House of Representatives, 92nd Congress, May 1972. pp. 580-582. CEP71-72GOGL104.
- _____, B. T. Bower and W. M. Hearon, Integrated residuals management in the pulp and paper industry. Presented, February 1972. Accepted for publication in AIChE publication. CEP71-72GOGL100.
- _____, and R. Tybout, A model for optimizing solar heating design. Presented, ASME Winter Annual Meeting, 1972. CEP71-72GOGL103.
- _____, and P. E. Glaser, The potential of solar power and heat. IEEE Power Engineering Society Winter Meeting, February 1971. CEP70-71GOGL119.
- _____, B. T. Bower and W. M. Hearon, Residuals generation in the pulp and paper industry. Presented October 1971. Accepted for publication in ASCE Journal. CEP71-72GOGL101.
- Bower, B. T., _____, and W. M. Hearon, Residuals management in the pulp and paper industry. Natural Resources Journal, Vol. 11, No. 4, October 1971. pp. 605-623. CEP71-72GOGL102.
- Bower, B. T., _____, and W. H. Hearon, Residuals in manufacture of paper. ASCE Proceedings, Journal of the Environmental Engineering Division, Vol. 99, No. EE 1, February 1973. pp. 1-16. CEP72-73GOGL132.
- _____, see:
1. S. Karaki, Department of Civil Engineering, (2 coauthorships).
 2. J. C. Ward, Department of Civil Engineering.
- Lombardi, D. J., see J. E. Cermak, Department of Civil Engineering, (2 coauthorships).
- Longenbaugh, R. A., Annual summary report, Colorado water data bank project, fiscal 1972-73, prepared for State Engineer's Office, State of Colorado, July 1973. 14 p. CER73-74RAL6.
- Longenbaugh, R. A., see M. Nalluswami, Department of Civil Engineering.
- Lopez, O. G., see E. F. Schulz, Department of Civil Engineering.
- Mahmood, K., Variation of regime coefficients in Pakistan canals. ASCE National Transportation Engineering Conference, July 9-13, 1973, Tulsa, Oklahoma. Meeting preprint 2039. ASCE Proceedings, Journal of Waterway and Harbors Division, Vol. 100, No. WW2, May 1974. 32 p. CEP72-73KM60.
- _____, Sediment routing in irrigation canal systems. ASCE National Meeting, Water Resource Engineering, January 29-February 2, 1973, Washington, D.C. Meeting preprint 1905. ASCE Proceedings, Journal of Irrigation and Drainage Division, Vol. 100, No. IR1, March 1974. 32 p. CEP72-73KM30.
- _____, Fish facilities at river development projects. Second Institute of River Mechanics, Colorado State University, Fort Collins, Colorado, August 11, 1972. Chapter 18, in Environmental Impact on Rivers (River Mechanics III), edited by H. W. Shen, 1973. 55 p. CEP72-73HWS65.
- _____, Planning sediment distribution in surface irrigation systems. U.S. Agency for International Development Contract No. AID/csd-2162, November 1973. 72 p. Water Management Technical Report No. 26. CER73-74KM19. \$3.00.
- _____, Lognormal size distribution of particulate matter. Journal of Sedimentary Petrology, The Society of Economic Paleontologists and Mineralogists. The American Association of Petroleum Geologists, Vol. 43, No. 4, December 1973. 6 p. CEP72-73KM59.
- _____, C. E. Sweeney and J. E. Cermak, Report of hydraulic tests--basket strainer. Prepared for Chicago Bridge and Iron Company, Oakbrook, Illinois, December 1973. CER73-74KM-CES-JEC21.
- _____, and D. B. Simons, Flow and resistance characteristics of sand bed channels. Proceedings, IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 9-12, 1973. 13 p. CEP71-72KM-DBS83.
- _____, and D. B. Simons, Bed material transport in sand bed channels. Proceedings, IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 1973. 13 p. CEP71-72KM-DBS82.
- _____, Sediment equilibrium considerations in the design of irrigation canal networks. Proceedings, IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 1973. 13 p. CEP71-72KM81.
- _____, Particle size distribution. Presented, Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 31, 1972. 17 p. CEP72-73KM13.

Department of Civil Engineering - continued

- Mahmood, K. and P. H. Blinco, Discussion of "Flow over Triangular Elements Simulating Dunes" by M. F. Rifai and K. V. H. Smith. ASCE Proceedings, Journal of Hydraulics Division, Vol. 98, No. HY3, March 1972. 16 p. CEP71-72KM-PB20.
- _____ and H. W. Shen, The regime concept of sediment-transporting canals and rivers. Chapter 30, in River Mechanics, Vol. 11, edited by H. W. Shen, November 1971. 39 p. CEP71-72HWS98.
- _____, Discussion of "Efficiency of Hydraulic Jump" by S. P. Garg and H. R. Sharma. ASCE Proceedings, Journal of Hydraulics Division, Vol. 97, No. HY10, October 1971. 14 p. CEP70-71KM79.
- _____, see:
1. P. H. Blinco, Agricultural Research Service.
 2. A. G. Mercer, Department of Civil Engineering, (2 coauthorships).
 3. S. A. Rana, Department of Civil Engineering.
 4. E. V. Richardson, Department of Civil Engineering, (2 coauthorships).
 5. E. F. Schulz, Department of Civil Engineering.
 6. D. B. Simons, Department of Civil Engineering.
- Margheim, G. A., see J. C. Ward, Department of Civil Engineering.
- Mejia, J. M., I. Rodriguez-Iturbe and D. R. Dawdy, Streamflow simulation. 2. The broken line process as a potential model for hydrologic simulation. Water Resources Research, Vol. 8, No. 4, August 1972. 11 p. CEP72-73JMM-IRI-DRD16.
- _____, see:
1. L. E. Garcia, Department of Civil Engineering.
 2. C. F. Nordin, United States Geological Survey.
 3. I. Rodriguez-Iturbe, Department of Civil Engineering.
- Mercer, A. G. and K. Mahmood, Sediment transport in alluvial channels. Proceedings, Symposium on Recent Developments and Trends in Mechanics of Alluvial Channels, ACOP Project, Water and Power Development Authority, Lahore, Pakistan, February 1974. 17 p. CEP73-74AGM-KM21.
- _____ and K. Mahmood, Bed forms and resistance in alluvial channels. Proceedings, Symposium on Recent Developments and Trends in Mechanics of Alluvial Channels, ACOP Project, Water and Power Development Authority, Lahore, Pakistan, February 1974. 27 p. CEP73-74AGM-KM20.
- _____, Irrotational flow with irregular boundary shapes. ASCE Proceedings Paper 9937, Journal of Hydraulics Division, Vol. 99, No. 8, August 1973. 9 p. CEP72-73AGM29.
- _____ and M. I. Haque, Ripple profiles modeled mathematically. ASCE Proceedings Paper 9618, Journal of the Hydraulics Division, Vol. 99, No. HY3, March 1973. 19 p. CEP72-73AGM-MIH6.
- Mercer, A. G., Performance tests for the SRL and SRL-C 20 x 18 Frame 7 centrifugal pumps. Final report, Denver Equipment Division, Joy Manufacturing Company, March 1972. 57 p. CER71-72AGM39.
- _____, Performance tests for the SRL split case Frame 5 centrifugal pumps. Denver Equipment Division, Joy Manufacturing Company, March 1972. 67 p. CER71-72AGM37.
- _____, Study of hydraulic characteristics of the 3-inch Denver SRL-V pump. Final report, Denver Equipment Division, Joy Manufacturing Company, March 1972. 19 p. CER71-72AGM33.
- _____, Tests of a 3-inch hydraulically operated gate valve. Darling Valve and Manufacturing Company, Williamsport, Pennsylvania, August 1971. 18 p. CER71-72AGM6.
- _____, Tests of a 2-inch hydraulically operated gate valve. Darling Valve and Manufacturing Company, Williamsport, Pennsylvania, July 1971. 18 p. CER71-72AGM4.
- _____, see E. V. Richardson, Department of Civil Engineering.
- Meroney, R. N., Buoyancy effects on a turbulent shear flow. AMS/WMO Symposium on Atmospheric Diffusion and Air Pollution. Session: Structure of Atmospheric Turbulence I. Santa Barbara, California, September 9-13, 1974. 6 p. CEP73-74RNM52.
- _____, Turbulent boundary layer growth over a longitudinally curved surface. Prepared for Office of Naval Research Contract No. N00014-68-A-0495-0001. Accepted by AIAA Journal, June 1974. 37 p. CEP73-74RNM61. \$1.00.
- _____, Buoyancy effects on a turbulent shear flow. Project THEMIS Technical Report No. 28, prepared for National Science Foundation Grant No. GK-33800 (1972-1974), and Office of Naval Research Contract No. N00014-58-A-0493-0001, April 1974. 105 p. CER73-74RNM38. \$3.00.
- _____, J. E. Cermak, J. A. Garrison, B. T. Yang and S. K. Nayak, Wind tunnel study of stack gas dispersal at the Avon Lake Power Plant. Commonwealth Associates, Inc., Jackson, Michigan, April 1974. 249 p. CER73-74RNM-JEC-JAG-BTY-SKN35. \$4.00.
- _____, Measurements of turbulent boundary layer growth over a longitudinally curved surface. I.C. Aero Technical Note 74, Imperial College of Science and Technology, Department of Aeronautics, England. Project THEMIS Technical Report No. 25, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), January 1974. 76 p.
- _____, Report on activities during tenure of air pollution fellowship from the Environmental Protection Agency under the Clean Air Act (P.L. 88-206). Colorado State University, October 1973. 9 p. CER73-74RNM15.

Department of Civil Engineering - continued

- Meroney, R. N., "Where we are?"--International air pollution. Great Britain. Journal of the Air Pollution Control Association, Vol. 23, No. 7, July 1973. 3 p. CEP73-74RNM5.
- _____, J. A. Peterka and T. G. Hoot, Wind tunnel site analysis of Dow Chemical facility at Rocky Flats, Colorado, Part II. Supplement. Prepared for Research and Ecology, Rocky Flats Division, Dow Chemical Company, Golden, Colorado, March 1973. 89 p. CER72-73RNM-JAP-TGH16. \$3.00.
- _____ and E. J. Plate, Wind tunnel and field investigations of shapes for balloon shelters. Prepared for NCAR Scientific Balloon Facility, August 1972. NCAR Technical Note NCAR-TN/EDD-82, 1972. 60 p. CER72-73RNM-EJP36. \$2.00.
- _____ and E. J. Plate, Wind tunnel investigation of shapes for balloon shelters. NCAR subcontract NCAR-75-68. Journal of Applied Meteorology, Vol. 11, No. 5, August 1972. 9 p. CEP71-72RNM-EJP37.
- _____ and T. Yamada, Numerical and physical simulation of stratified air-flow over a series of heated islands. Proceedings, Summer Simulation Conference, San Diego, California, June 15-16, 1972. 12 p. CEP71-72RNM-TY64. \$1.00.
- _____ and F. H. Chaudhry, Wind tunnel site analysis of Dow Chemical facility at Rocky Flats, Colorado. Research and Ecology, Rocky Flats Division, Dow Chemical Company, Golden, Colorado, May 1972. 135 p. CER71-72RNM-FHC45. \$3.00.
- _____, Gaseous plume diffusion about isolated structures of simple geometry. Final report, period June 14, 1969-December 21, 1971. Atomic Energy Commission Report No. AEC-C00-2053-7, December 1971. 15 p. CER71-72RNM19. \$1.00.
- _____ and B. T. Yang, Wind tunnel study on gaseous mixing due to various stack heights and injection rates above an isolated structure. Atomic Energy Commission Report No. C00-2053-6, November 1971. 48 p. CER71-72RNM-BTY16. \$2.00.
- _____, see:
1. J. C. Anyiwo, Department of Civil Engineering, (4 coauthorships).
 2. F. H. Chaudhry, Department of Civil Engineering, (3 coauthorships).
 3. R. D. Haberstroh, Department of Mechanical Engineering.
 4. T. G. Hoot, Department of Civil Engineering, (2 coauthorships).
 5. R. A. Kahawita, Department of Civil Engineering, (4 coauthorships).
 6. S. D. Veenhuizen, Department of Civil Engineering.
 7. T. Yamada, Department of Civil Engineering.
 8. B. T. Yang, Department of Civil Engineering, (3 coauthorships).
- Millan, J., Drought impact on regional economy. National Science Foundation Grant No. GK-11564, October 1972. 76 p. Hydrology Paper No. 55. \$3.00.
- Miller, A. C., see E. V. Richardson, Department of Civil Engineering.
- Morel-Seytoux, H. J. and J. Khanji, Derivation of an equation of infiltration. Water Resources Research, Vol. 10, No. 4, August 1974. pp. 795-800. CEP73-74HJM30.
- _____, Pour une theorie modifiee de l'infiltration. 4^e partie: le drainage vu comme une infiltration d'air. Cahiers d'Hydrologie, ORSTOM, ser. Hydrol., Vol. XI, No. 2, 1974. pp. 181-188. CEP73-74HJM119.
- _____, Derivation and extension of the law of infiltration of Green and Ampt. American Geophysical Union Conference, Washington, D.C., April 8-12, 1974. CEP73-74HJM107.
- _____, Pour une theorie modifiee de l'infiltration. 3^e partie: effets de compression et de contre-courant. Cahiers d'Hydrologie, ORSTOM, ser. Hydrol., Vol. XI, No. 1, 1974. pp. 51-59. CEP73-74HJM120.
- _____, Sur l'interet d'une correction a la loi infiltration de Green et Ampt. CRAS de Paris, serie A., October 1973. pp. 629-631. CEP73-74HJM106.
- _____, Two-phase flows in porous media. Chapter in Advances in Hydrosience, V. T. Chow, editor, Vol. 9, August 1973. pp. 119-202. CEP71-72HJM79.
- _____, R. A. Young and G. E. Radosevich, Systematic design of legal regulations for optimal surface-groundwater usage - Phase I. Colorado State University Environmental Resources Center Completion Report No. 53. OWRR Grant No. 14-31-0001-3866, Project No. B-076-COLO, for period July 1, 1972-August 31, 1973. 88 p. CEP73-74HJM-RAY-GER18.
- _____, J. Khangi and G. Vachaud, Prediction errors due to uncertainties in the determination and extrapolation of the diffusivity function. Soil Science Journal, July 1973. 32 p. CEP72-73HJM48.
- _____, Systematic treatment of infiltration with applications. Colorado State University Environmental Resources Center Completion Report No. 50. OWRR Project No. B-070-COLO, for period July 1, 1971-June 30, 1973. 73 p. CEP73-74HJM5.
- _____, Pour une theorie modifiee de l'infiltration. 2^e partie: comment? Cahiers d'Hydrologie, ORSTOM, ser. Hydrol., Vol. X, No. 3, 1973. pp. 199-209. CEP73-74HJM48.
- _____ and F. Saheli, Test of runoff increase due to precipitation management for the Colorado River Basin pilot project. Journal of Applied Meteorology, Vol. 12, No. 2, March 1973. pp. 322-337. CEP71-72HJM-FS34a.

Department of Civil Engineering - continued

Morel-Seytoux, H. J., Pour une theorie modifiee de l'infiltration. 1^{re} partie: pourquoi? Cahiers d'Hydrologie, ORSTOM, ser. Hydrol., Vol. X, No. 2, 1973. pp. 185-194. CEP73-74HJM17.

_____, Sur la signification des parametres de la loi d'infiltration de Green et Ampt. Proceedings, Academy of Science of Paris, Vol. 276, June 13, 1973. pp. 322-337. CEP72-73HJM76.

_____ and A. Noblanc, Infiltration predictions by a moving strained coordinates method. Symposium on Soil-Water Physics and Technology, Rehovot, Israel, August 19-September 4, 1971. Physical Aspects of Soil Water and Salts in Eco-systems, Ecological Studies, Analysis and Synthesis, Vol. 4, Springer-Verlag, New York, 1973. pp. 29-42. CEP70-71HJM-AN43.

_____ and J. Khanji, Prediction of imbibition in a horizontal column. Accepted for publication in Proceedings of Soil Science Society of America, May 1973. 36 p. CEP72-73HJM47.

_____, Modéle d'infiltration polyhasique, OWRR Grant No. 14-31-0001-3566. Presented, in French, French-English Symposium on Unsaturated Flow in Porous Media, Reading, England, January 24-25, 1973. Bulletin du B.R.G.M. (deuxieme serie) Section III, No. 2, 1974. pp. 221-226. CEP73-74HJM7.

_____, Selection of test variable for minimal time detection of basin response to natural or induced changes. Colorado State University Environmental Resources Center Completion Report No. 40. OWRR Project No. A-001-COLO, period July 1, 1969-June 30, 1972. 19 p. CER72-73HJM7.

_____, A new analytical treatment for the infiltration problem. Proceedings, Second Symposium on Fundamentals of Transport Phenomena in Porous Media, International Association for Hydraulic Research and International Society of Soil Science, University of Guelph, Guelph, Ontario, Canada, August 7-11, 1972. pp. 257-265. CEP71-72HJM55.

_____ and F. Saheli, A system approach to minimal time detection of changes in watersheds. Proceedings, Symposium on Watersheds in Transition, Water Resources Association, Fort Collins, Colorado, June 19-23, 1972. 8 p. CEP71-72HJM-FS41.

_____, Techniques of statistical evaluation of runoff results of precipitation modification. Final report for period July 1, 1968-August 31, 1971. Bureau of Reclamation, Division of Atmospheric Water Resources Management, Denver, PROJECT SKY-WATER Contract No. 14-06-D-6597, March 1972. 54 p. CEP71-72HJM34b.

_____, Foundations of engineering optimization. Lecture notes for CE 795 CX, winter quarter 1972. 124 p. Class Notes 71-72-2.

Morel-Seytoux, H. J., see:

1. R. L. Brustkern, Department of Civil Engineering.
2. P. Dass, Department of Civil Engineering.
3. H. Nakamichi, Department of Civil Engineering.
4. A. Noblanc, Department of Civil Engineering.
5. L. Phuc, Department of Civil Engineering.

Mukherji, S. and W. Z. Sadeh, Interaction of wall-jet with a shear flow. Project THEMIS Technical Report No. 15, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), March 1972. 85 p. CER70-71SM-WZS82. \$3.00.

_____, Pitot probe and free jet interactions in the potential flow zone. Paper No. 71-998, AIAA 8th Annual Meeting and Technical Display, Washington, D.C., October 25-28, 1971. 6 p. CEP71-72SM26.

Mulhern, P. F., see M. M. Skinner, Department of Civil Engineering.

Nakamichi, H. and H. J. Morel-Seytoux, Runoff grouping for detection of change in runoff. ASCE Proceedings Paper 8201, Vol. 97, IR 2, June 1971. pp. 275-290. CEP71-72HJM40.

Nalluswami, M., R. A. Longenbaugh and D. K. Sunada, Finite element method for the hydrodynamic dispersion equation with mixed partial derivatives. Water Resources Research, Vol. 8, No. 5, October 1972. 13 p. CEP70-71MN-RAL-DKS73.

Nayak, S. K., J. A. Garrison and J. E. Cermak, Wind engineering study of Johns-Manville world headquarters. Johns-Manville Corporation, Denver, Colorado, October 1974. 102 p. CER73-74SKN-JEC42.

_____ and V. A. Sandborn, New aspects of combined free and forced convection heat transfer from horizontal cylinders. Abstract In Research Report Abstracts, Southeastern Seminar on Thermal Sciences, Old Dominion University, Norfolk, Virginia, July 26-27, 1973. Technical Report 73-T-4. 1 p. CEP73-74SKN-VAS2.

_____ and V. A. Sandborn, Periodicity of combined heat transfer from horizontal cylinders. Project THEMIS Technical Report No. 21. Prepared for Office of Naval Research Contract No N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), March 1973. 133 p. CEP72-73SKN20. CER72-73SKN-VAS23. \$3.00.

_____, see:

1. J. E. Cermak, Department of Civil Engineering.
2. R. N. Meroney, Department of Civil Engineering.

Nelson, J. D. and S. H. Lee, Analysis of vibrations of embedded footings. ASCE Specialty Conference on Analysis and Design in Geotechnical Engineering, University of Texas, Austin, Texas, June 9-12, 1974. 11 p. CEP73-74JDN14.

Department of Civil Engineering - continued

- Nelson, J. D. and E. G. Thompson, Creep failure of slopes in clay and clay shale. 12th Annual Symposium on Engineering Geology and Soil Engineering, April 1974. CEP73-74JDN-EGT93.
- Nickerson, E. C., An upper bound on the stress in plane Couette flow. ASME Paper 73-FE8. ASME Transactions in 1973. 5 p. CEP71-72ECN87. \$1.00
- _____, see:
1. J. Anyiwo, Department of Civil Engineering.
 2. S. Chieh, Department of Civil Engineering.
 3. R. G. Derickson, Department of Civil Engineering, (2 coauthorships).
 4. C. Huang, Department of Civil Engineering, (2 coauthorships).
 5. H. Wang, Department of Civil Engineering.
- Nielson, F. D. and N. D. Stathis, Design of circular soil-culvert systems. Highway Research Record No. 413, National Academy of Science, 1972. 35 p. CEP71-72FDN68.
- _____, Behavior of cohesive materials from a soil engineer's viewpoint. Second Institute of River Mechanics, Colorado State University, August 1972 Chapter 14 in Environmental Impact on Rivers, edited by H. W. Shen. 29 p. CEP72-73HWS65.
- _____, Experimental studies in soil structure interaction. 51st Annual Meeting of Highway Research Board, December 1971. Highway Research Bulletin, summer 1972. 55 p. CEP71-72FDN21.
- Noblanc, A. and H. J. Morel-Seytoux, Closure of "A Perturbation Analysis of Two-Phase Infiltration," Journal of Hydraulics Division, ASCE, Vol. 100, No. HY4, April 1974. pp. 598-608. CEP7-71AN-HJM38.
- Orgill, M. M. and J. E. Cermak, Atmospheric flow and diffusion over mountainous terrain. Bureau of Reclamation, Atmospheric Water Resources Division Contract No. 14-06-D-6455. AIAA 5th Fluid and Plasma Dynamics Conference, Paper 72-648, June 26-28, 1972. 12 p. CEP71-72MMO-JEC69. \$1.00.
- _____, J. E. Cermak and L. O. Grant, Research and development technique for estimating airflow and diffusion parameters related to the atmospheric water resources program. Final report for period September 1969-September 1971. Bureau of Reclamation, Division of Atmospheric Water Resources Management Contract No. 14-06-D-6842. 112 p. CER71-72MMO-JEC-LOG20. \$3.00.
- Penner, B. G., M. E. Criswell, J. Bodig, J. R. Goodman and M. D. Vanderbilt, Experimental behavior of wood flooring systems. Structural Research Report No. 7, December 1972. 130 p. CER72-73BGP-MEC-JB-JRG-MDV26.
- Peterka, J. A. and J. E. Cermak, A wind model for an elevated STOL-port configuration. Ames Research Center, NASA Contract No. NAS2-7396, October 1973. NASA CR-2450, July 1974. 46 p. CER73-74JAP-JEC10. \$2.00.
- Peterka, J. A. and J. E. Cermak, Simulation of atmospheric flows in short wind tunnel test sections. Prepared for Center for Building Technology, IAT, National Bureau of Standards, June 1974. 56 p. CER73-74JAP-JEC32. \$2.00.
- _____, and J. E. Cermak, Probability distributions of wind-pressure fluctuations on buildings. ASCE Specialty Conference, Probabilistic Methods in Engineering, Stanford University, June 24-26, 1974. 25 p. CEP73-74JAP-JEC60.
- _____, and J. E. Cermak, Wind engineering study of First National Bank of Denver building. Prepared for Urban Investment and Development Company, Denver, First National Bank of Denver, and Welton Becket and Associates, Los Angeles, December 1973. 88 p. CER73-74JAP-JEC20. \$3.00.
- _____, and J. E. Cermak, Wind engineering study of Federal Reserve Bank, Richmond. Prepared for Skilling, Helle, Christiansen and Robertson, New York, August 1973. 165 p. CER73-74JAP-JEC8. \$4.00.
- _____, and J. E. Cermak, A study of wind effects on Houston twin office buildings. Prepared for Ellisor Engineers, Inc., Houston, Texas, September 1972. 76 p. CER72-73JAP-JEC4. \$3.00.
- _____, see:
1. R. G. Derickson, Department of Civil Engineering, (2 coauthorships).
 2. A. C. Hansen, Department of Civil Engineering.
 3. T. G. Hoot, Department of Civil Engineering.
 4. R. N. Meroney, Department of Civil Engineering.
- Phuc, L. and H. J. Morel-Seytoux, Effect of soil air movement and compressibility on infiltration rates. Proceedings, Soil Science Society of America, Vol. 36, No. 2, March-April 1972. pp. 237-241. CEP70-71LVP-HJMS3.
- Prakash, A., see D. B. McWhorter, Department of Agricultural Engineering.
- Putta, S. N. and J. E. Cermak, Mass dispersion from an instantaneous line source in a turbulent shear flow. Project THEMIS Technical Report No. 19, prepared for Office of Naval Research Contract No. N00014-68-A-0943-0001, Project No. NR 062-414/6-6-68 (Code 438), June 1971. 100 p. ECOM No. 9. CED70-71SNP39. CER71-72SNP-JEC1. \$3.00.
- _____, and J. E. Cermak, Diffusion from an instantaneous line source in the atmospheric surface layer. Proceedings, Symposium on Air Pollution Turbulence and Diffusion, Las Cruces, New Mexico, December 7-9, 1971. 9 p. CEP71-72SNP-JEC25. \$1.00.
- Ragavendran, R., see K. Jawed, Department of Civil Engineering.
- Ramu, K. L. V., Discussion of "River Bed Degradation after Closure of Dams: by Hammad Y. Hammad." ASCE Proceedings Paper 9580, Vol. 99, No. HY3, March 1973. CEP72-73KLV11.

Department of Civil Engineering - continued

- Ramu, K. L. V., see J. P. Tullis, Department of Civil Engineering, (3 coauthorships).
- Rana, S. A., D. B. Simons and K. Mahmood, Analysis of sediment sorting in alluvial channels. ASCE Proceedings Paper 10168, Journal of the Hydraulics Division, Vol. 99, No. HY11, November 1973. 14 p. CEP72-73SAR-DBS-KM34.
- Rassam, H. Y. and J. R. Goodman, Spaced columns with non-rigid connectors. Forest Products Laboratory, Madison, Wisconsin. Wood Science, Vol. 4, No. 3, January 1972. 12 p. CEP70-71JRG5.
- _____, see J. R. Goodman, Department of Civil Engineering.
- Reinecke, S. E., see J. C. Ward, Department of Civil Engineering.
- Richardson, E. V., S. Karaki, K. Mahmood, A. G. Mercer, D. B. Simons, and M. A. Stevens, Highways in the river environment--hydraulic and environmental design considerations. Training and design manual, Chapters I to V. Federal Highway Administration, National Highway Institute, Office of Research and Development, Office of Engineering, August 1974. 276 p. CER73-74EVR-SK-KM-AGM-DBS-MAS49.
- _____ and A. C. Miller, Diffusion and dispersion in open channel flow. ASCE Proceedings, Journal of Hydraulics Division, January 1974. 29 p. CEP73-74EVR-ACM19.
- _____ and D. B. Simons, Stage discharge relations in sand channels, Proceedings, XVth IAHR Congress, Istanbul, Turkey, August 1973. pp. 123 - 130. CEP73-74EVR-DBS116.
- _____, Sediment Properties, Chapter 6 in River Mechanics, Vol. 1, edited by H. W. Shen, Colorado State University, November 1971. CEP71-72HWS98.
- _____, see:
1. S. Jacobi, Department of Civil Engineering.
 2. M. Kilinc, Department of Civil Engineering.
 3. D. B. Simons, Department of Civil Engineering, (4 coauthorships).
 4. M. A. Stevens, Department of Civil Engineering, (2 coauthorships).
- Rodriguez-Iturbe, I., J. M. Mejia and D. R. Dawdy, Streamflow simulation. 1. A new look at Markovian models, fractional Gaussian noise, and crossing theory. Water Resources Research, Vol. 8, No. 4, August 1972. 10 p. CEP72-73IRI-JMM-DRD15.
- _____, D. R. Dawdy and L. E. Garcia, Adequacy of Markovian models with cyclic components for stochastic streamflow simulation. National Science Foundation Grant No. 11444. OWRR, Vol. 7, No. 5, October 1971. 17 p. CEP71-72IRI-DRD-LEG70.
- _____ and C. F. Nordin, Frequency domain analysis of hydrologic systems with monthly data. Proceedings, International Symposium on Mathematical Models in Hydrology, Warsaw, Poland, July 26-31, 1971, Vol. 1, Part 2. 26 p. CEP71-72IRI-CFH75.
- Rodriguez-Iturbe, I., see J. M. Mejia, Department of Civil Engineering.
- Rovey, E., see D. A. Woolhiser, Agricultural Research Service.
- Ruff, J. F., J. W. Keys, III and M. M. Skinner, Clarks Fork Yellowstone River remote sensing study. ASCE Proceedings Paper 10584, Journal of the Hydraulics Division, Vol. 100, No. HY6, June 1974. 11 p. CEP73-74JFR-JWK-MMS79.
- _____, M. M. Skinner, B. R. Winkley, D. B. Simons and D. E. Dorratcague, Identification of Mississippi River characteristics from remotely sensed data. ASCE National Environmental Engineering meeting, New York, October 1973. CEP72-73JFR-MMS-DBS-DED39.
- _____, A feasibility study of using remotely sensed data for water resource models. Marshall Space Flight Center Contract No. NAS8-28590, NASA Contractor Report CR-129001, February 1973. 35 p. CEP72-73JFR46.
- _____ and M. M. Skinner, Remote sensing study of salt cedar on the Pecos River near Roswell, New Mexico, March 1973. CER72-73JFR-MMS24. \$18.00.
- _____, M. M. Skinner, J. W. Keys, III and D. Waugaman, A remote sensing study of sediment in the Clarks Fork Yellowstone River. Bureau of Reclamation, Denver, Colorado, November 1972. 100 p. CER72-73JFR-MMS6. \$12.00.
- _____ and L. W. Gelhar, Turbulent shear flow in a porous boundary. ASCE Water Resources Engineering Conference, Phoenix, Arizona, 1971 under title "Porous Boundary Effects in a Turbulent Shear Flow." ASCE Proceedings Paper 9144, Journal of Engineering Mechanics Division, Vol. 99, No. EM 4, August 1972. 17 p. CEP71-72JFR47.
- _____, J. F., see:
1. E. V. Richardson, Department of Civil Engineering.
 2. W. Z. Sadeh, Department of Civil Engineering.
 3. M. M. Skinner, Department of Civil Engineering, (3 coauthorships).
 4. C. B. Winn, Department of Mechanical Engineering.
- Sadeh, W. Z., Turbulence effects on structures. ASCE National Structural Engineering Meeting, Cincinnati, Ohio, April 22-26, 1974. CEP73-74WZS75.
- _____, Feasibility of remote evaporation and precipitation estimates. Marshall Space Flight Center Contract No. NAS8-28590, NASA Contractor Report CR-129023, April, 1974. 29 p. CEP73-74WZS44. \$1.00.
- _____, Simulation of flow above forest canopies. International Seminar on Heat and Mass Transfer in the Environment of Vegetation, Dubrovnik, Yugoslavia, August 26-30, 1974. Transactions, International Centre for Heat and Mass Transfer. 13 p. CEP73-74WZS46.

Department of Civil Engineering - continued

Sadeh, W. Z. and J. E. Cermak, Simulation of roughness effects on atmospheric flow. Proceedings of the 10th Anniversary Meeting of the ASCE, Raleigh, North Carolina, November 5-7, 1973. 10 p. CEP73-74WZS-JEC118.

_____, Stereoscopic remote sensing of pollutants. Proceedings, Third International Clean Air Congress sponsored by the International Union of Air Pollution Prevention Associations, Dusseldorf, Federal Republic of Germany, October 8-12, 1973. 5 p. CEP72-73WZS69.

_____, Preliminary investigation of feasibility of remote stereoscopic survey of polluted air masses. Prepared for Marshall Space Flight Center, Aerospace Environment Division, National Aeronautics and Space Administration, TR NAS-MSFC-1, May 1973. CER72-73WZS31.

_____ and J. E. Cermak, Turbulence over urban roughness. ASCE National Structural Engineering Meeting, Session No. 54, Safety and Performance of Tall Buildings. San Francisco, California, April 9-13, 1973. 35 p. CEP72-73WZS-JEC53. \$1.00.

_____ and J. E. Cermak, Turbulence effect on wall pressure fluctuations. ASCE Proceedings Paper 9445, National Structural Engineering meeting, Cleveland, Ohio, April 24-28, 1972. Journal of Engineering Mechanics Division, Vol. 98, No. EM6, December 1972. 14 p. CEP71-72WZS-JEC50. \$1.00.

_____, Statistical methods in turbulent flow. Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. CEP72-73WZS8.

_____, Flow analysis: correlation techniques and spectral analysis. Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. CEP72-73WZS7.

_____ and J. F. Ruff, Remote sensing of pollutants by means of stereo analysis. Proceedings, First International Meeting on Pollution: Engineering and Scientific Solutions, Tel Aviv, Israel, June 12-17, 1972. In Environmental Science Research, Vol. 2, Plenum Publishing Corp., February 1973. 17 p. CEP71-72WZS-JFR8.

_____, Vorticity amplification in forward stagnation flow. Project SQUID Workshop on Fluid Dynamics of Unsteady, Three-Dimensional and Separated Flows, Georgia Institute of Technology, Atlanta. In Proceedings of Workshop, October 1971. 15 p. CEP71-72WZS3. \$1.00.

_____, see:

1. T. Kawatani, Department of Civil Engineering, (3 coauthorships).
2. S. Mukherji, Department of Civil Engineering.

Salas-La Cruz, J. D., Range analysis for storage problems of periodic-stochastic processes. Agricultural Research Service and National Science Foundation, November 1972. 87 p. Hydrology Paper No. 57. \$3.00.

_____ and V. Yevjevich, Stochastic structure of water use time series. National Science Foundation Grant No. GK-11444, June 1972. 75 p. Hydrology Paper No. 52. \$3.00.

Sandborn, V. A., Class notes for experimental methods in fluid mechanics. Course material for a first year graduate course entitled "Experimental Methods in Fluid Mechanics," Colorado State University, February 1972. 345 p. Class Notes 71-72-3.

_____, Note on velocity measurements with hot wire and piezo-electric anemometers. Workshop on Flow Visualization and Flow Measurement Techniques, Silver Spring, Maryland, October 21-22, 1971. 13 p. CEP71-72VAS22. \$1.00.

_____, Boundary layer separation studies. Report to SQUID, No. 4965-30, September 1971. CER71-72VAS14.

_____, see:

1. S. Chieh, Department of Civil Engineering.
2. F. Chou, Department of Civil Engineering.
3. W. C. Cliff, Department of Civil Engineering, (3 coauthorships).
4. S. K. Nayak, Department of Civil Engineering, (2 coauthorships).

Santos-Cayade, J. and D. B. Simons, River response. Second River Mechanics Institute, Colorado State University, 1972. Chapter 1, in Environmental Impact on Rivers, edited by H. W. Shen, 1973. 25 p. CEP72-73HWS65.

Schulz, E. F. and O. G. Lopez, Determination of urban watershed response time. Hydrologic Engineering Center, Corps of Engineers, Department of the Army Contract DACW05-73-C-0029, December 1973. Revised July 1974. 155 p. CER73-74EFS-OGL27. \$5.00.

_____, Problems in applied hydrology. A workbook in hydrology, revised edition, Water Resources Publication, Fort Collins, 1974. CEP73-74EFS95a. \$16.00.

_____, Harvesting glacier ice. An old idea revisited. 42nd Annual Meeting, Western Snow Conference, Anchorage, Alaska, April 16-20, 1974. 15 p. CEP73-74EFS41.

_____, N. S. Grigg, L. S. Tucker and J. Shoemaker, Flood measurements in an urban environment. (A data user's viewpoint.) Symposium on Flash Floods during Tercentenary of Scientific Hydrology, International Association of Hydrological Sciences, International Union of Geodesy and Geophysics, Paris, France, September 9-12, 1974. 9 p. CEP73-74EFS31.

Department of Civil Engineering - continued

- Schulz, E. F., Correlation analysis of unit hydrograph, storm and watershed parameters. Status report, Hydrologic Engineering Center, Corps of Engineers, Department of the Army Contract DACW05-73-C-0029, August 1973. 8 p. CER73-74EFS7.
- _____, K. Mahmood and V. Koelzer, editors, Floods and droughts. Book 1, Proceedings, Second International Symposium in Hydrology, Colorado State University, September 11-13, 1972. Water Resources Publication, June 1973. 687 p. CEP72-73EFS-KM-VK66. \$12.00.
- _____, Physical watershed parameters and derived unit hydrographs from Denver Metropolitan Watersheds. Status report, Hydrologic Engineering Center, Corps of Engineers, Department of the Army Contract DACW05-73-C-0039, May 1973. 10 p. CER72-73EFS30.
- _____, Availability of flood data from Denver metropolitan watersheds. Status report, Hydrologic Engineering Center, Corps of Engineers, Department of the Army Contract DACW05-73-C-0029, January 1973. 16 p. CER72-73EFS18.
- _____ and P. E. Fawkes, A comparison of overland flow models. 1972 Annual Fall Meeting, American Geophysical Union, San Francisco, December 4-7, 1972. Transactions, Vol. 53, No. 4. 27 p. CEP72-73EFS-PEF26.
- _____ and V. Yevjevich, Experiments in small watershed response. OWRR Project No. B-054-COLO, period July 1, 1970-December 31, 1972. 18 p. CER72-73EFS-VY12.
- _____ and W. A. Wilson, Small watershed response time. Technical report, Colorado State University Experiment Station Project 114, December 1972. CER72-73EFS-WAW10.
- _____ and V. Yevjevich, Theory and experiments in the prediction of small watershed response. OWRR Project No. B-064-COLO, period July 1, 1971 to December 31, 1972. 14 p. CER72-73EFS-VY13.
- _____ and C. M. Hislope, Suitability of gaged watersheds in Colorado for research in small watershed floods. Colorado State University Experiment Station Project 114. OWRR Grant No. 14-31-0001-3565, December 1972. 33 p. CER72-73EFS9.
- _____, Artificial ground water recharge. Chinese Society of Agricultural Engineers, Republic of China, Journal of Chinese Agricultural Engineering, Vol. 18, No. 1, April 1972. 9 p. Lecture, Chinese Institution of Engineers, JCRR Auditorium, Taipei, Taiwan, April 22, 1971. 17 p. CEP70-71EFS95.
- _____, Recent developments in urban hydrology. Journal of Institution of Civil Engineers, Chinese Society of Civil Engineers, Taipei, Taiwan, 1971. 24 p. CEP71-72EFS2.
- Schulz, E. F., see:
1. K. Jawed, Department of Civil Engineering.
 2. M. L. Kavvas, Department of Civil Engineering.
 3. D. A. Woolhiser, Agricultural Research Service.
 4. V. Yevjevich, Department of Civil Engineering.
- Schweizer, H. H., see C. C. Britton, Department of Electrical Engineering.
- SethuRaman, S. and J. E. Cermak, Mean temperature distribution over a physically modelled three-dimensional heat island for different stability conditions. AMS-WMO Symposium on Atmospheric Diffusion and Air Pollution, Santa Barbara, September 9-13, 1974. 6 p. CEP73-74SS-JEC54. \$1.00.
- _____ and J. E. Cermak, Stratified shear flows over a simulated three-dimensional urban heat island. Project THEMIS Technical Report No. 23, Prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), August 1973. 206 p. CED73-74SS2. CER73-74SS-JEC4. \$4.00.
- _____ and J. E. Cermak, Physical modeling of flow and diffusion over an urban heat island. Proceedings, Second UITAM-IUGG Symposium on Turbulent Diffusion in Environmental Pollution, University of Virginia, April 8-14, 1973. Advances in Geophysics, Vol. 18, Academic Press. 18 p. CEP73-74SS-JEC1.
- Shen, H. W. and H. F. Cheong, Spectral properties of alluvial bed forms in rivers and flumes. Paper A55, Vol. 1, Sediment Transportation, Proceedings, IAHR International Symposium on River Mechanics, January 9-12, 1973. Asian Institute of Technology, Bangkok, Thailand. CEP72-73HWS-HFC62.
- _____ and H. F. Cheong, Dispersion of contaminated sediment bed-load. ASCE Proceedings Paper 10138, Journal of Hydraulics Division, November 1973. CEP73-74HWS-HFC103.
- _____ and R. M. Li, Analysis of resistance over staggered roughness. Technical Note, ASCE Proceedings Paper 10147, Journal of the Hydraulics Division, 1973. CEP73-74HWS-RML102.
- _____, Sediment transport mechanism I. General report to the First International Symposium on River Mechanics, Asian Institute of Technology, Bangkok, Thailand, January 1973. CEP72-73HWS107.
- _____ and H. F. Cheong, Dispersion of contaminants attached to sediment bed load. Chapter 13, in Environmental Impact on Rivers, Colorado State University, 1973. 48 p. CEP72-73HWS65.

Department of Civil Engineering - continued

- Shen, H. W., Flow over alluvial bed. Chapter 2, in Environmental Impact on Rivers, Colorado State University, 1973. 31 p. CEP72-73HWS65.
- _____ and R. M. Li, Rainfall effect on sheet flow over smooth surface. ASCE Proceedings Paper 9733, Journal of Hydraulics Division, Vol. 99, No. HY5, May 1973. 22 p. CEP72-73HWS-RML38.
- _____, editor, Environmental impact on rivers. (River Mechanics III). Proceedings, Second Institute on River Mechanics, Colorado State University, July 31-August 11, 1972. Water Resources Publications, March 1973. 695 p. CEP72-73HWS65. \$15.00.
- _____, Flow resistance over short simulated vegetation and various tall vegetation groupings on flow resistance and sediment yield. Chapter 3, in Environmental Impact on Rivers, Colorado State University, 1973. 51 p. CEP72-73HWS65.
- _____ and C. S. Hung, An engineering approach to total bed-material load by regression analysis. Sedimentation Symposium, University of California Berkeley, June 17-19, 1971. Chapter 14 in Sedimentation, 1972. 17 p. CEP70-71HWS-CSH114.
- _____, Inadequate data - network design and regional studies. General report, International Symposium in Hydrology, Colorado State University, September 1972. CEP72-73HWS105.
- _____, Sedimentation and contaminant criteria for watershed planning and management. Colorado State University Environmental Resources Center Completion Report No. 31. OWRR Project No. B-041-COLO, June 1972. 185 p. CER71-72HWS48.
- _____, Scour near piers. Chapter 23, in River Mechanics, Colorado State University, November 1971. 25 p. CEP71-72HWS98.
- _____, Stability of alluvial channels. Chapter 16, in River Mechanics, Colorado State University, November 1971. 33 p. CEP71-72HWS98.
- _____, editor, River Mechanics, Vols. I and II. Proceedings, First Institute on River Mechanics. Colorado State University, June 15-16, 1970. Water Resources Publications, November 1971. 1322 p. CEP71-72HWS98.
- _____, Wash load and bed load. Chapter 11, in River Mechanics, Colorado State University, November 1971. 30 p. CEP71-72HWS98.
- _____, Total sediment load. Chapter 13, in River Mechanics, Colorado State University, November 1971. 26 p. CEP71-72HWS98.
- _____ and H. F. Cheong, Dispersion of contaminated bed-load particles. Proceedings, Symposium on Statistical Hydrology, International Association for Statistics in Physical Science, Tucson, August 29-September 2, 1971. USDA, ARS Miscellaneous Publication. 36 p. CEP71-72HWS-HFC19.
- Shen, H. W., editor, Sedimentation. Symposium to honor Professor H. A. Einstein, University of California, Berkeley, June 17-19, 1971. Water Resources Publications. CEP71-73HWS51. \$15.00.
- _____, see:
1. S. Bhamidipaty, Department of Civil Engineering.
 2. H. F. Cheong, Department of Civil Engineering.
 3. C. S. Hung, Department of Civil Engineering, (2 coauthorships).
 4. R. M. Li, Department of Civil Engineering, (2 coauthorships).
 5. K. Mahmood, Department of Civil Engineering.
- Shieh, S. C. and S. Karaki, Turbulence in developing boundary layer with polymer additives. Technical report, National Science Foundation Grant GK-25339 and Department of Civil Engineering, Colorado State University, June 1974. 118 p. CER73-74SCS-SK36.
- Simons, D. B. and Y. H. Chen, Math modeling of rivers. Symposium on Contribution of Irrigation and Drainage to World Food Supply, Biloxi, Mississippi, August 14-16, 1974. CEP73-74DBS-YHC111.
- _____, S. A. Schumm and M. A. Stevens, Geomorphology of the Middle Mississippi River. Prepared for U.S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg, Mississippi, Contract No. DACW29-73-C-0026, January 1974. 87 p. CER73-74DBS-SAS-MAS9. \$8.00.
- _____ and K. Mahmood, Principles of sediment exclusion and ejection. Sixth Technical Conference on Irrigation Drainage and Flood Control, Sacramento, California, 1973. CEP73-74DBS-KM104.
- _____, M. A. Stevens and J. H. Duke, Jr., Predicting stages on sand-bed rivers. ASCE Proceedings Paper 9731, Journal of Waterways, Harbors and Coastal Engineering Division, Vol. 99, No. WW2, May 1973. 13 p. CEP72-73DBS-MAS-JHD40.
- _____ and M. A. Stevens, Equations for the physical process simulation model. Cooperative study on development of models for predicting sediment yield from small watershed. U.S. Rocky Mountain Forest and Range Experiment Station, Flagstaff, Arizona, March 1973. 16 p. CER72-73DBS-MAS38.
- _____, Sediment yield and deposition. General report. Proceedings, IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 1973. CEP72-73DBS25.
- _____, River mechanics and research needs. ASCE Environmental Meeting, Houston, Texas, October 1972, Journal of Hydraulics Division. CEP72-73DBS110.
- _____, River system response to the proposed upper auxiliary channel, Yazoo Basin, Mississippi. Prepared for U.S. Corps of Engineers, Vicksburg District, September 1972. CER72-73DBS50.

Department of Civil Engineering - continued

Simons, D. B. and G. L. Lewis, Flood protection at bridge crossings. Prepared for Wyoming State Highway Department Planning and Research Division in cooperation with U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads, 1971. 172 p. CER71-72DBS-GLL10. \$5.00.

_____ and M. A. Stevens, Response of sand bed rivers to changing discharge. ASCE National Water Resources Engineering meeting, Atlanta, January 24-28, 1972. Proceedings, Journal of Waterways, Harbors and Coastal Engineering Division, Preprint 1632. 27 p. CEP71-72DBS-MAS48.

_____ and J. Gessler, Research needs in fluvial processes. Chapter 32, in River Mechanics, edited by H. W. Shen, November 1971. 13 p. CEP71-72HWS98.

_____ and M. A. Stevens, Scour control in rock basins at culvert outlets. Chapter 24, in River Mechanics, edited by H. W. Shen, November 1971. 63 p. CEP71-72HWS98.

_____, River and canal morphology. Chapter 20, in River Mechanics, edited by H. W. Shen, November 1971. 60 p. CEP71-72HWS98.

_____ and E. V. Richardson, Flow in alluvial sand channels. Chapter 9, in River Mechanics, edited by H. W. Shen, November 1971. 89 p. CEP71-72HWS98.

_____, E. V. Richardson, M. A. Stevens, J. H. Duke and V. C. Duke, Geometric and hydraulic properties of the rivers. Volume III, Venezuelan International Meteorological and Hydrological Experiment (VIMHEX) Hydrology Report. Sponsored by the Department of Defense through the THEMIS program, October 1971. 149 p. CER70-71DBS-EVR-MAS-JHD-MCD50.

_____, E. V. Richardson, M. A. Stevens, J. H. Duke and V. C. Duke, Streamflow, groundwater and ground response data. Volume II, Venezuelan International Meteorological and Hydrological Experiment (VIMHEX) Hydrology Report. Sponsored by the Department of Defense through the THEMIS program, August 1971. 369 p. CER70-71DBS-EVR-MAS-JHD-VCD50.

Henley, J. E., B. R. Winkley and _____, Design of multistage channels to accommodate predicted states of flow. Paper S.1-4, Section 1, Inland Navigation. Subject 4. XXIIIrd International Navigation Congress, Ottawa, 1973. 19 p. CEP73-74DBS35.

Winkley, B. R., _____ and S. A. Schumm, Rivets as dynamic systems. ASCE Task Committee paper, National Water Resources Engineering meeting, Washington, D.C., 1973. 25 p. CEP72-73BRW-DBS-SAS35.

Simons, D. B., see:

1. P. H. Blinco, Agricultural Research Service, (4 coauthorships).
2. R. M. Li, Department of Civil Engineering, (4 coauthorships).
3. K. Mahmood, Department of Civil Engineering, (2 coauthorships).
4. C. F. Nordin, United States Geological Survey.
5. S. A. Rana, Department of Civil Engineering.
6. E. V. Richardson, Department of Civil Engineering, (3 coauthorships).
7. J. F. Ruff, Department of Civil Engineering.
8. J. Santos-Cayade, Department of Civil Engineering.
9. M. M. Skinner, Department of Civil Engineering.
10. M. A. Stevens, Department of Civil Engineering, (7 coauthorships).

Singh, V. P., Discussion of "Predicting Sediment Yield in Western United States" by Elliott M. Flaxman. ASCE Proceedings, Journal of the Hydraulics Division, Vol. 99, No. HY10, October 1973. 5 p. CEP73-74VPS64.

_____, On the management of an enterprise for irrigation systems. ASCE Annual Meeting, Victoria, BC, Paper No. 73-408, August 22, 1973. CEP73-74VPS63.

_____, Discussion of "University of Cincinnati Urban Run-off Model" by Constantine Papadakis and Herbert C. Preul. ASCE Proceedings, Journal of the Hydraulics Division, Vol. 99, No. HY7, July 1973. 4 p. CEP73-74VPS65.

Skinner, M. M. and P. F. Mulhern, Thematic mapping for use in an environmental evaluation of potential reservoir sites on the lower Laramie River near Wheatland, Wyoming. Prepared for Bureau of Reclamation, Denver, Colorado, June 1974. CER73-74MMS-PFM40.

_____, D. E. Dorratcague, D. B. Simons and J. F. Ruff, The use of color infrared aerial photography for describing the Mississippi River. Phase II.- (High-water survey). Prepared for Potamology Section, River Stabilization Branch, Army Corps of Engineers, Vicksburg, March 1974. 54 p. CER73-74MMS-DED-DBS-JFR2. \$22.00.

_____, D. E. Dorratcague and R. L. Hansen, Remote sensing for interpreting some aspects of the environment related to the Mt. Elbert pumped-storage power plant. Prepared for Bureau of Reclamation, Denver, September 1973. 20 p. CER73-74MMS-DED11. \$20.00.

_____, J. F. Ruff and A. H. Barnes, The use of remote sensing to obtain data for describing the large river. Phase I - (Low water survey). Prepared for Potamology Section, River Stabilization Branch, Army Corps of Engineers, Vicksburg, November 1972. 40 p. plus appendix. CEP72-73MMS-JFR-AHB20. \$250.00.

Department of Civil Engineering - continued

Skinner, M. M., editor, Proceedings of River Mechanics Seminar, Bozeman, Montana, October 11-12, 1972. CEP72-73MMS89.

_____, Remote sensing for land use evaluation in Colorado. Research Advisory Committee, Colorado State University, July 11, 1972. 4 p. CEP72-73MMS2.

_____ and J. F. Ruff, Color infrared photography and thermal infrared imagery of selected locations along the Missouri River between Omaha and Blair, Nebraska. Prepared for Department of the Army, Corps of Engineers Omaha District, June 1972. 21 p. CER71-72MMS-JFR49. \$50.00.

_____, River bed formation. Proceedings, HATS Space Congress, Space for Mankind's Benefit, Huntsville, Alabama. Session IV, Earth Resources Observation through Orbital Surveys, November 17, 1971. NASA SP-313, 1972. 24 p. CEP71-72MMS12. \$2.00.

_____, see J. R. Ruff, Department of Civil Engineering, (4 coauthorships).

Smith, C. C. and D. S. Ward, Harnessing the sun for heating and cooling. Colorado Society of Engineers. Western Engineer, April 1974. 4 p. CEP73-74CCS-DSW94.

Smith, G. L., N. S. Grigg, L. S. Tucker and D. W. Hill, Metropolitan Water Intelligence Systems Completion Report - Phase I. Prepared for U.S. Department of the Interior, OWRR Grant No. 14-31-0001-3410, June 1972. 100 p. CER71-72GLS-NSG-LST-DWH52.

_____, see:

1. W. Bell, Department of Civil Engineering.
2. N. S. Grigg, Department of Civil Engineering.
3. D. A. Woolhiser, Agricultural Research Service.

Stevens, M. A., D. B. Simons and G. L. Lewis, Safety factors for riprap protection. ASCE meeting, Montreal, Canada, July 15-19, 1974. CEP73-74MAS-DBS-GLL69.

_____, D. B. Simons and Y. H. Chen, Hydraulic model study, River Bend Station - Units 1 and 2, Gulf States Utilities Company. Prepared for Stone and Webster Engineering Corporation, Boston, Massachusetts, March 1974. 170 p. CER73-74MAS-DBSOYHC25.

_____ and D. B. Simons, Discussion of "Erosion of Sand Beds Around Spur Dikes" by Mahammad Akram Gill. ASCE Proceedings Paper 9961, Journal of the Hydraulics Division, Vol. 99, No. HY9, September 1973. 3 p. CEP72-73MAS-DBS49.

_____ and D. B. Simons, Manning's roughness coefficients for the Padma River. Proceedings, XVth IAHR Congress, Ankara, Turkey, August 1973. CEP73-74MAS-DBS109.

_____, D. B. Simons and E. V. Richardson, Non-equilibrium river form. ASCE National Transportation Engineering Meeting, Tulsa, Oklahoma, July 9-12, 1973. CEP73-74MAS-DBS108.

Stevens, M. A., D. B. Simons and E. V. Richardson, Soil temperatures and heat content. Volume IV, Venezuelan International Meteorological and Hydrological Experiment (VIMHEX) Hydrology Report. Sponsored by the Department of Defense through the THEMIS program, November 1971. 41 p. CER70-71MAS-DBS-EVR50.

_____ and D. B. Simons, Stability analysis for coarse granular material on slopes. Chapter 17, in River Mechanics, edited by H. W. Shen, November 1971. 27 p. CEP71-72HWS98.

Schumm, S. A. and _____, Abrasion in place: a mechanism for rounding and size reduction of coarse sediments in rivers. Geology, Vol. 1, No. 1, September 1973. CEP73-74SAS-MAS110.

_____, see:

1. R. M. Li, Department of Civil Engineering, (2 coauthorships).
2. E. V. Richardson, Department of Civil Engineering, (2 coauthorships).
3. D. B. Simons, Department of Civil Engineering, (8 coauthorships).

Su, K. S. and J. Gessler, Wind waves and diffusion in open channels. Atomic Energy Commission Contract No. AT91101-1813, May 1972. 121 p. CER71-72KSS-JG47. \$3.00.

Subramaniam, J., see V. A. Koelzer, Department of Civil Engineering.

Sunada, D. K., Monte Carlo simulation application in groundwater analysis. Institute on Application of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. 19 p. CEP72-73DKS91.

Waltz, J. P. and _____, Geohydraulics at the unconformity between bedrock and alluvial aquifers. Environmental Resources Center Completion Report No. 30. OWRR Project No. B-022-COLO, June 1972. 176 p. CER71-72JPW-DKS50.

_____, see:

1. R. Bibby, Department of Civil Engineering.
2. D. B. McWhorter, Department of Agricultural Engineering.
3. M. Nalluswami, Department of Civil Engineering.

Sweeney, C. E., see:

1. J. W. Ball, Department of Civil Engineering.
2. K. Mahmood, Department of Civil Engineering.

Tamburi, A. J., A bibliography and literature review of groundwater geology studies in the Indus River basin. U.S. Agency for International Development Contract No. AID/csd-2162, April 1973. 40 p. Water Management Technical Report No. 25. CER72-73AJT29. \$3.00.

Taylor, D. C., see:

1. M. L. Albertson, Department of Civil Engineering.
2. B. H. Bradford, Department of Civil Engineering.

Department of Civil Engineering - continued

Taylor, J. H., see:

1. R. S. Bennett, Department of Agricultural Engineering.
2. T. L. Hall, Department of Agricultural Engineering.
3. G. V. Skogerboe, Department of Agricultural Engineering.
4. W. R. Walker, Department of Civil Engineering.

Thomas, C. W. and M. L. Albertson, Research needs in civil engineering relevant to the goals of society. Prepared jointly by Colorado State University and ASCE. National Science Foundation, June 1971. 341 p. CER71-72CWT8. \$8.00.

_____, Operation and maintenance of irrigation systems. Class notes for AE 553, Agricultural Engineering Department, Colorado State University, 1971. 141 p. Class Notes 71-72-4.

Thompson, E. G., Average and complete incompressibility in the finite element method. International Journal for Numerical Methods in Engineering, June 1974. 16 p. CEP73-74EGT67.

_____ and M. I. Haque, A high order finite element for completely incompressible creeping flow. International Journal for Numerical Methods in Engineering, Vol. 6, 1973. pp. 315-321. CEP72-73EGT-MIH124.

_____ and F. H. Sayles, In situ creep analysis of room in frozen soil. ASCE Proceedings, Journal of Soil Mechanics and Foundations Division, Vol. 98, No. SM 9, paper 9202, September 1972. 17 p. CEP72-73EGT125.

Mack, L. R. and _____, Perturbation method for slow viscous flow with a free surface. Quarterly Journal of Mechanics and Applied Mathematics, Vol. XXV, part 1, February 1972. pp. 105-123. CEP71-72EGT99.

_____, Slow viscous flow in geological engineering. Annual report, National Science Foundation Grant No. GK-20651, December 1971. 8 p. CER71-72EGT22.

_____, Discussion of the paper by A. E. Scheidegger "On the Rheology of Rock Creep." Rock Mechanics, Journal of the International Society for Rock Mechanics, Vol. 3, No. 3, Springer-Verlag, September 1971. 3 p. CEP71-72EGT57.

_____, see:

1. M. L. Kuo, Department of Civil Engineering.
2. J. D. Nelson, Department of Civil Engineering.
3. C. W. Wilmsen, Department of Electrical Engineering.

Thompson, R. S., see:

1. J. E. Cermak, Department of Civil Engineering, (3 coauthorships).
2. H. W. Edwards, Department of Mechanical Engineering.

Todorovic, P. and D. A. Woolhiser, A stochastic model of n-day precipitation. Journal of Applied Meteorology, Vol. 14, No. 1, February 1975. 8 p. CEP73-74PT-DAW85.

Todorovic, P., On some limit theorems for a random number of random variables. January 1973. CEP72-73PT141.

_____ and D. A. Woolhiser, On the time when the extreme flood occurs. OWRR, Vol. 8, No. 6, December 1972. 6 p. CEP72-73PT-DAW42.

_____, A mathematical model for longitudinal diffusion in porous media I. October 1972. SIAM Journal of Applied Mathematics, Philadelphia, Pennsylvania. 35 p. CEP72-73PT23.

_____ and D. A. Woolhiser, Stochastic model of daily rainfall. Proceedings, Symposium on Statistical Hydrology, Tucson, Arizona, August 31-September 2, 1971. USDA Miscellaneous Publication No. 1275, June 1974. 16 p. CEP71-72PT-DAW4.

_____, On extremal problems in hydrology. Joint Statistical Meetings of the American Statistical Association, Biometric Society (Eastern and Western North American Regions), Colorado State University. 32 p. CEP71-72PT1.

_____ and D. R. Dawdy, Stochastic point rainfall simulation. Proceedings, International Symposium on Mathematical Models in Hydrology, Warsaw, Poland, July 26-31, 1971. Vol. 1, Part k. 15 p. CEP71-72PT-DRD77.

_____, On the time when supremum is achieved. Colorado State University. 10 p. CEP71-72PT59.

_____, see D. A. Woolhiser, Agricultural Research Service, (2 coauthorships).

Torrain, P., Applicability of conical correlation in hydrology. National Science Foundation Grant No. GK-11564, November 1972. 34 p. Hydrology Paper No. 58. \$3.00.

Trotta, P. D., see J. W. Labadie, Department of Civil Engineering, (2 coauthorships).

Tucker, L. S. and D. W. Hill, Guidelines for the consideration of automation and control systems. Metropolitan Water Intelligence Systems Technical Report No. 8, Water Resource Systems Program, Colorado State University, 1972. CER71-72LST-DWH63.

_____, Control of combined sewer overflows in Minneapolis-St. Paul. Metropolitan Water Intelligence Systems Technical Report No. 3, Water Resources Systems Program, Colorado State University. CER71-72LST60.

Hill, D. W. and _____, Social and political feasibility of automated urban water systems. Metropolitan Water Intelligence Systems Technical Report No. 5, Water Resource Systems Program, Colorado State University. CER71-72DWH-LST61.

_____, see:

1. M. L. Albertson, Department of Civil Engineering.
2. D. W. Hendricks, Department of Civil Engineering.
3. E. F. Schulz, Department of Civil Engineering.
4. G. L. Smith, Department of Civil Engineering.

Department of Civil Engineering - continued

- Tuffnour, S. and J. W. Labadie, A nonlinear time-variant rainfall runoff model for augmenting monthly data. Agency for International Development Contract No. AID/csd-2460 and National Science Foundation, March 1974. American Geophysical Union Journal of Water Resources Research, Vol. 10, No. 6, December 1974. 28 p. CEP73-74ST-JWL89.
- Tullis, J. P. and K. L. V. Ramu, Drag reduction in developing pipe flow with polymer injection. Proceedings for the International Conference on Drag Reduction, British Hydraulics Research Association, Cambridge, England, September 4-5, 1974, Paper G3. 10 p. CEP73-74JPT-KLVR29.
- _____ and J. W. Ball, Cavitation data for valves and its application. Proceedings for the Conference on Cavitation, The Institution of Mechanical Engineers, Heriot-Watt University, Edinburgh, Scotland, September 3-5, 1974. 9 p. CEP73-74JPT-JWB25.
- _____, Testing valves for cavitation. Proceedings for the Conference on Cavitation, The Institution of Mechanical Engineers, Heriot-Watt University, Edinburgh, Scotland, September 3-5, 1974. 10 p. CEP73-74JPT24.
- _____ and K. L. V. Ramu, Viscous drag reduction in developing pipe flow. Naval Ship Systems Command, General Hydromechanics Research Program, sub-project SR 009 01 01, Naval Ship Research and Development Center Contract No. N00014-67-A-0299-0021, November 1973. 58 p. Hydro-Machinery Laboratory Report No. 34.
- _____, Flow test of the 28-inch HLI valve. Prepared for Foster Wheeler Corporation, November 1973. 18 p. Hydro-Machinery Laboratory Report No. 33.
- _____, Performance of a 24-inch wafer sphere valve. Prepared for Jamesbury Corporation, September 1973. 14 p. Hydro-Machinery Laboratory Report No. 30.
- _____, Cavitation scale effects for valves. ASCE Proceedings Paper 9874, Journal of the Hydraulics Division, Vol. 99, No. HY7, July 1973. 20 p. CEP72-73JPT31.
- _____, Line loss and rupture tests of nylon tubing. Prepared for Carlisle Corporation, Tire and Rubber Division, April 1973. 19 p. Hydro-Machinery Laboratory Report No. 29.
- _____ and J. W. Ball, Model study of a 48-inch needle valve. Prepared for the City of New York Board of Water Supply, March 1973. 61 p. Hydro-Machinery Laboratory Report No. 28.
- _____ and R. Govindarajan, Cavitation and size scale effects for orifices. ASCE Proceedings Paper 9605, Journal of the Hydraulics Division, Vol. 99, No. HY3, March 1973. 14 p. CEP72-73JPT-RG9.
- Tullis, J. P. and J. W. Ball, Report of flow tests, 18-inch stainless steel gate valve. Prepared for Crane Company, October 1972. 12 p. Hydro-Machinery Laboratory Report No. 27.
- _____ and L. F. Lindeman, Polymer injection for drag reduction. Naval Ship Systems Command General Hydromechanics Research Program, SR 2301001, Naval Ship Research and Development Center Contract No. N00014-67-A00299-0013, July 1972. 97 p. CER72-73JPT-LFL1.
- _____ and J. S. Wang, Mean turbulent flow in the entry region of a rough pipe. Naval Ship Systems Command General Hydromechanics Research Program, SR 2301001, Contract No. N00014-67-A-0299-0013, July 1972. CER72-73JPT-JSW2.
- _____, Hydraulic tests on 8- and 12-inch ball valves. Prepared for Jamesbury Corporation, July 1972. 20 p. Hydro-Machinery Laboratory Report No. 25.
- _____, Calibration of sluice gates. Prepared for Armco Steel Corporation, May 1972. 26 p. Hydro-Machinery Laboratory Report No. 24.
- _____, Flow tests on a 24-inch stainless steel gate valve. Prepared for Crane Company, March 1972. 5 p. Hydro-Machinery Laboratory Report No. 22.
- _____, Calibration of 6" and 14" ballast valves. Prepared for Golden Anderson Valve Specialty Company, March 1972. 12 p. Hydro-Machinery Laboratory Report No. 21.
- _____, Choking and supercavitating valves. ASCE Proceedings Paper 8593, Journal of Hydraulics Division, Vol. 97, No. HY12, December 1971. 15 p. CEP70-71JPT78.
- _____, Discussion of "Cavitation Parameters for Outlet Valves" by W. Paul Winn and David E. Johnson. ASCE Proceedings, Journal of Hydraulics Division, Vol. 97, No. HY9, September 1971. 14 p. CEP70-71JPT68.
- _____, Hydraulic testing of a 16-inch butterfly valve. Prepared for Clow Corporation, October 1971. 32 p. Hydro-Machinery Laboratory Report No. 16.
- _____, Hydraulic testing of 6- and 10-inch Xomox butterfly valves. Prepared for Xomox Corporation, October 1971. 20 p. Hydro-Machinery Laboratory Report No. 15.
- _____, Hydraulic testing of a 6-inch butterfly valve. Prepared for Center Line Incorporated, August 1971. 20 p. Hydro-Machinery Laboratory Report No. 17.
- _____, see:
1. J. W. Ball, Department of Civil Engineering, (3 coauthorships).
 2. J. S. Wang, Department of Civil Engineering.

Department of Civil Engineering - continued

- Unger, B., Data assembly program and documentation for Colorado small watershed flood data file. Colorado State University Small Watershed Flood Documentation, August 1973. 16 p. CEP73-74BU17.
- Vanderbilt, M. D., Matrix structural analysis. Quantum Publishers, Inc., New York, 1974. 397 p. CEP73-74MDV115.
- _____, J. R. Goodman and M. E. Criswell, Service and overload behavior of wood joist floor systems. ASCE Proceedings Paper 10274, Journal of the Structural Division, Vol. 100, No. ST 1, January 1974. 19 p. CEP72-73MDV-JRG-MEC80.
- _____, J. R. Goodman, M. E. Criswell and J. Bodig, Development and verification of a mathematical model of wood joist floors using computer analysis and closed-loop structural testing. Closed Loop, The Magazine of Mechanical Testing, MTS Systems Corporation, Vol. 4, No. 1, Fall/Winter 1973. 6 p. CEP73-74MDV-JRG-MEC-JB26.
- _____, J. R. Goodman, M. E. Criswell and J. Bodig, A rational analysis and design procedure for wood joist floor systems. ASCE Annual National Meeting, Houston, Texas, October 1972. CEP72-73MDV-JRG-MEC-JB85.
- _____, Deflection calculations: Two-way slabs. Proceedings, ACI Canadian Capital Chapter Symposium on "Deflections of Structural Concrete," Montreal, Quebec, October 22, 1971. 28 p. CEP71-72MDV27.
- _____, Shear strength of continuous plates. ASCE Proceedings, Journal of the Structural Division, Vol. 98, No. ST 5, May 1972. CEP71-72MDV23.
- _____, see:
1. J. R. Goodman, Department of Civil Engineering, (3 coauthorships).
 2. V. K. A. Gopu, Department of Civil Engineering.
 3. M. F. Ko, Department of Civil Engineering.
 4. M. L. Kuo, Department of Civil Engineering.
 5. B. G. Penner, Department of Civil Engineering.
- Veenhuizen, S. D. and S. Karaki, Turbulent air flow over wind excited laboratory water waves. Atomic Energy Commission Contract No. AT(11-1)-1813, February 1973. 127 p. CEP72-73SDV-SK11.
- _____, and R. N. Meroney, Secondary flow in the entrance region boundary layers of an expanding square duct. ASME Winter Annual Meeting, New York, November 26-30, 1972. 13 p. CEP69-70SDV-RNM82.
- Verma, S. and J. E. Cermak, Mass transfer from aerodynamically rough surfaces. International Journal of Heat and Mass Transfer, Vol. 17, 1974. 13 p. CEP73-74SV-JEC16.
- Verma, S. and J. E. Cermak, Wind-tunnel investigation of mass transfer from soil corrugations. American Meteorological Society 11th Conference on Agricultural and Forest Meteorology, Duke University, Durham, North Carolina, January 8-10, 1973. Journal of Applied Meteorology, Vol. 13, No. 5, August 1974. CEP73-74SV-JEC9.
- _____, and J. E. Cermak, Soil corrugations for reduction of moisture loss from grass seedbeds. Colorado State University, November 1971. 12 p. CEP71-72SBV-JEC24. \$1.00.
- _____, and J. E. Cermak, Evaporation of water as related to wind barriers. Environmental Resources Center Completion Report No. 25. OWRR Agreement No. 14-01-0001-1435, Project No. B-015-COLO, June 30, 1971. 227 p. CEP71-72SBV-JEC11. \$4.00.
- _____, see R. D. Haberstroh, Department of Mechanical Engineering.
- Wang, J. S. and J. P. Tullis, Turbulent flow in the entry region of a rough pipe. Paper No. 73-WA-FE-3, ASME Winter Meeting, November 11-15, 1973. ASME Transactions, Journal of Fluids Engineering, March 1974. 7 p. CEP71-72JSW-JPT78.
- _____, and E. C. Nickerson, Response of a turbulent boundary layer to lateral roughness discontinuities. Project THEMIS Technical Report No. 18, prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR-62-414/6-6-68 (Code 438), July 1972. 70 p. CEP71-72JSW-ECN51. \$2.00.
- _____, see J. P. Tullis, Department of Civil Engineering.
- Ward, D. S., see:
1. S. Karaki, Department of Civil Engineering.
 2. G. O. G. Löf, Department of Civil Engineering, (2 coauthorships).
 3. C. C. Smith, Department of Civil Engineering.
- Ward, J. C., Origin and effect of pollutants in water. In Environment and Colorado: A Handbook. (P.O. Foss, editor) Environmental Resources Center, Colorado State University, 1974. 11 p. I.D.73-74-16.
- _____, and S. Karaki, Evaluation of the effect of impoundment on water quality in Cheney Reservoir. Geophysical Monograph Series, Vol. 17, Man-Made Lakes: Their Problems and Environmental Effects. American Geophysical Union, 1973. 7 p. CEP73-74JCV-SK62.
- _____, Water pollution potential of snowfall on spent oil shale residues. Western Snow Conference, Grand Junction, Colorado, April 1973. 12 p. CEP72-73JCV52.
- _____, Surface water temperature. Institute on Application of Stochastic Methods in Civil Engineering, Colorado State University, August 24, 1972. CEP72-73JCV86.

Department of Civil Engineering - continued

- Ward, J. C., Salinity in lakes and streams. Institute on Application of Stochastic Methods in Civil Engineering, Colorado State University, August 24, 1972. CEP72-73JCW84.
- _____, J. S. Hunter and R. P. Johansen, The mechanism of waste treatment at low temperature. Part B: Sanitary engineering. Environmental Resources Center Completion Report No. 34. OWRR Project No. A-007-COLO, August 1972. 77 p. CER72-73JCW-JSH-RPJ21.
- _____, and S. E. Reinecke, Water pollution potential of snowfall on spent oil shale residues. Environmental Engineering Program, Colorado State University. Prepared for Laramie Energy Research Center, U.S. Bureau of Mines, Laramie, Wyoming Grant No. G-0111280, June 1972. 56 p. plus 2 charts. CER71-72JCW-SER53. NTIS Accession No. PB 210 930. \$3.00.
- _____, Water temperature as a quality factor in the use of streams and reservoirs. Environmental Resources Center Completion Report No. 26. OWRR Projects A-003-COLO and A-006-COLO, December 6, 1971. 25 p. CER71-72JCW18.
- _____, G. A. Margheim and G. O. G. Löf, Water pollution potential of rainfall on spent oil shale residues. Water Pollution Control Research Series 140 30 EDB, December 1971. 123 p. CER71-72JCW-GAM-GOGL13. Supt. of Doc. stock no. 5501 0197. \$1.25.
- _____, Unit operations and treatment kinetics of water purification and wastewater treatment. Urban Water Systems Institute, Colorado State University, June 15-26, 1970. Chapter XB of Treatise on Urban Water Systems, July 1971. 22 p. CEP69-70JCW125.
- _____, see:
1. J. S. Hunter, Department of Civil Engineering.
 2. G. O. G. Löf, Department of Civil Engineering, (2 coauthorships).
- Waugaman, D., see J. F. Ruff, Department of Civil Engineering.
- Woolhiser, D. A., editor, Decisions with inadequate hydrologic data. Book II, Proceedings, Second International Symposium in Hydrology, Water Resources Publication, September 1972. 297 p. CEP72-73DAW67.
- Yamada, T. and R. N. Meroney, A wind tunnel facility for simulating mountain and heat island gravity waves. Boundary-Layer Meteorology, Vol. 7, 1974. 16 p. CEP71-72TY-RNM45.
- _____, see R. N. Meroney, Department of Civil Engineering.
- Yang, B. T. and R. N. Meroney, A portable laser light-scattering probe for turbulent diffusion studies. Review of Scientific Instruments, Vol. 45, No. 2, February 1974. 6 p. CEP72-73BTY-RNM50.
- Yang, B. T. and R. N. Meroney, Construction of a Lagrangian similarity distribution function for a non-stationary atmospheric diffusion process. Preprint Volume, Third Conference on Probability and Statistics in Atmospheric Science, Boulder, Colorado, June 19-22, 1973. 6 p. CEP72-73BTY-RNM73.
- _____, and R. N. Meroney, On diffusion from an instantaneous point source in a neutrally stratified turbulent boundary layer with a laser light scattering probe. Project THEMIS Technical Report No. 20. Prepared for Office of Naval Research Contract No. N00014-68-A-0493-0001, Project No. NR 062-414/6-6-68 (Code 438), October 1972. 234 p. CER72-73BTY-RNM14. \$4.00.
- _____, see R. N. Meroney, Department of Civil Engineering, (2 coauthorships).
- Yevjevich, V., Determinism and stochasticity in hydrology. Journal of Hydrology, Vol. 22, No. 3/4, August 1974. pp. 225-238. CEP73-74VY121.
- _____, and A. K. Karplus, Area-time structure of the monthly precipitation process. Research project "Large Continental Droughts," National Science Foundation Grant GK-11564, August 1973. 49 p. Hydrology Paper No. 64. \$3.00.
- _____, Analysis of risks and uncertainties in flood control. In Floods and Droughts, Proceedings, Second International Symposium in Hydrology, September 1972. 12 p. CEP72-73VY98.
- _____, Structural analysis of hydrologic time series. National Science Foundation Grant No. GK-11444, November 1972. 64 p. Hydrology Paper No. 56. \$3.00.
- _____, M. Dyhr-Nielsen and E. F. Schulz, An application of multi-variate analysis in hydrology. Environmental Resources Center Completion Report Series No. 35. OWRR Project No. A-009-COLO, August 31, 1972. 41 p. CER72-73VY-MD-EFS3.
- _____, Stochasticity in geophysical and hydrological time series. Nordic Symposium on Stochastic Hydrology, Uppsala, Sweden, September 1971. Nordic Hydrology - An International Journal, Vol. II, No. 4, 1971. 13 p. CEP71-72VY89.
- _____, Significance tests of periodicity in hydrologic time series. International Symposium on Mathematical Models in Hydrology, Warsaw, Poland, July 1971. 13 p. CEP71-72VY32.
- _____, Structure of inputs and outputs of hydrologic systems. First US-Japan Bilateral Seminar in Hydrology, Honolulu, January 1971. In Systems Approach to Hydrology, Water Resources Publication, 1971. 21 p. CEP7-71VY31.
- _____, General report. International Symposium on Mathematical Models in Hydrology, Warsaw, Poland, July 26-31, 1971. 12 p. CEP71-72VY31.

Department of Civil Engineering - continued

Yevjevich, V., Stochastic processes in hydrology.
Class text book, CE 822. Water Resources Publi-
cation, November 1971. 276 p. I.D.71-72-17.

_____, Probability and statistics in hydrology.
Class text book, CE 622. Water Resources
Publication, November 1971. 302 p. I.D.71-72-16.

_____, see:

1. W. Q. Chin, Department of Civil Engineering.
2. J. P. Jolly, Department of Civil Engineering.

3. J. D. Salas-La Cruz, Department of Civil Engineering.
4. E. F. Schulz, Department of Civil Engineering, (2 coauthorships).

Zuberi, F. A. and D. B. McWhorter, Practical skimming well design. U.S. Agency for International Development Contract No. AID/csd-2162, November 1973. 65 p. Water Management Technical Report No. 27. \$3.00. CER73-74FAZ-DBM23.

For copies of publications of this department contact the senior author or Engineering Research Center, Publications Office, Colorado State University, Fort Collins, Colorado 80523.

Department of Civil Engineering

Theses

Anyiwo, J. C., A computer study of wall boundary layers. Ph.D. Dissertation, September 1971. 200 p. Adviser: R. N. Meroney. CED71-72JCA3.

Arber, R. P., Production of low reflection glass for solar energy collectors. M.S. Thesis, June 1974. 92 p. Adviser: J. G. Osteryoung. CET73-74RPA30.

Barnett, K. M., Turbulence induced changes in vortex shedding from a circular cylinder. Ph.D. Dissertation, December 1973. 237 p. Adviser: J. E. Cermak. CED73-74KMB9.

Beebe, P. S., Turbulent flow over a wavy boundary. Ph.D. Dissertation, April 1972. 134 p. Adviser: J. E. Cermak. CED71-72PSB37. \$3.00.

Bell, P. W. W., Optimal control of flow in combined sewer systems. Ph.D. Dissertation, March 1974. 251 p. Adviser: M. L. Albertson. CED73-74PWWB34.

Berlant, A., Water hammer produced during pipeline filling. M.S. Thesis, June 1974. 124 p. Adviser: M. L. Albertson. CET73-74AV11.

Brooks, T. E., Lateral bracing systems in high rise steel frames. M.S. Thesis, June 1974. 140 p. Adviser: M. E. Criswell. CET73-74TEB28.

Chaudhry, M. T., Conjunctive use of Indus Basin waters--Pakistan. Ph.D. Dissertation, March 1972. 322 p. Adviser: M. L. Albertson. CED72-73TEB28.

Chen, Y. H., Mathematical modeling of water and sediment routing in natural channels. Ph.D. Dissertation, March 1973. 269 p. Adviser: D. B. Simons. CED72-73YHC18.

Cheong, H. F., Stochastic analysis of sediment bed-forms. Ph.D. Dissertation, March 1973. 170 p. Adviser: H. W. Shen. CED72-73HFC17.

Chieh, S., Study of plane Couette flow in stratified fluid. Ph.D. Dissertation, May 1973. 162 p. Adviser: E. C. Nickerson. CED72-73SC34.

Chin, W. Q., A deterministic-stochastic model of long-term climatic changes. Ph.D. Dissertation, August 1973. 201 p. Adviser: V. Yevjevich. CED73-74WQC4. \$7.50.

Chou, F. K., Prediction of the turbulent boundary layer separation. Ph.D. Dissertation, August 1973. 113 p. Adviser: V. A. Sandborn. CED72-73FKC38.

Cliff, W. C., Convective velocities in the turbulent boundary layer. Ph.D. Dissertation, December 1972. 165 p. Adviser: V. A. Sandborn. CED72-73WCC23.

Corey, P. D., A combined left ventricular-arterial mathematical model. M.S. Thesis, August 1973. 73 p. Adviser: R. R. Wemple. CET73-74PDC8.

Cress, M. D., Stabilization of alluvial rivers. M.S. Thesis, August 1973. 132 p. Adviser: D. B. Simons. CET72-73MC27.

Croley, T. E., II, Sequential stochastic optimization in water resources. Ph.D. Dissertation, September 1972. 149 p. Adviser: V. Yevjevich. CED72-73TEC7.

Degenhardt, E. A., Channel stabilization of the middle Mississippi River. M.S. Thesis, August 1973. 108 p. Adviser: D. B. Simons. CET73-74EAD7.

Dellah, A., Evaporation from swirl spray nozzles. Ph.D. Dissertation, December 1971. 240 p. Adviser: G. O. G. Löf. CED71-72AD32.

Dérédec, A., A systematic approach to the water supply of a large urban area. M.S. Thesis, May 1972. 114 p. plus map. Adviser: H. J. Morel-Seytoux. CET71-72AD17. \$3.00.

Derickson, R. G., Jr., A numerical simulation of a cold orographic cloud system. M.S. Thesis, September 1972. 120 p. Adviser: E. Nickerson. CET72-73RGD10.

Department of Civil Engineering - continued

- Diaz, J. E., Water hammer produced by release of air from water pipes. M.S. Thesis, April 1972. 162 p. Adviser: M. L. Albertson. CET71-72JED46.
- Dorratcague, D. E., Digital processing of thermal infrared scanner data. M.S. Thesis, May 1974. 86 p. Adviser: M. M. Skinner. CET73-74DED33.
- Dreher, K. J., Wind loads on a house roof. M.S. Thesis, March 1973. 112 p. Adviser: J. E. Cermak. CET72-73KJD19.
- Dyhr-Nielsen, M., Loss of information by discretizing hydrologic series. Ph.D. Dissertation, May 1972. 151 p. Adviser: V. Yevjevich. CED71-72MDN39.
- Edling, W. H., Three-dimensional turbulent boundary layer flow on rough strip of finite width. Ph.D. Dissertation, April 1974. 261 p. Adviser: J. E. Cermak. CED73-74WHE18.
- Emmanuel, C. B., Observations of Helmholtz waves in the lower atmosphere with an acoustic sounder. Ph.D. Dissertation, February 1972. 109 p. Adviser: V. A. Sandborn. CED71-72CBE31.
- Evans, R. G., Hydrologic budget of the Poudre Valley. M.S. Thesis, September 1971. 248 p. Adviser: G. V. Skogerboe. CET71-72RGE18.
- Fawkes, P. E., Roughness in a model of overland flow. M.S. Thesis, June 1972. 122 p. Adviser: E. F. Schulz. CET71-72PEF48. \$5.00.
- Flug, M., Optimal design of stormwater detention storage. M.S. Thesis, March 1974. 66 p. Adviser: J. W. Labadie. CET73-74MF12.
- Frevort, D. K., Predication of unit hydrograph parameters. M.S. Thesis, May 1974. 82 p. Adviser: V. Yevjevich. CET73-74DKF23. \$3.00.
- Garg, M. M., River classification by photos and map. M.S. Thesis, April 1972. 222 p. Adviser: D. B. Simons. CET71-72MMG10.
- Gopu, V. K. A., Analysis of double-tapered curved glued-laminated beams. M.S. Thesis, December 1972. 166 p. Adviser: J. R. Goodman. CET72-73VKAG45.
- Govindarajan, R., Cavitation size scale effects. Ph.D. Dissertation, August 1972. 117 p. Adviser: J. P. Tullis. CED72-73RG3.
- Guerrero-Salazar, R. L. A., Statistical modeling of droughts. Ph.D. Dissertation, September 1973. 167 p. Adviser: V. Yevjevich. CED73-74PLAG5.
- Gunnerson, R. A., Plate tests for orthotropic materials. M.S. Thesis, December 1971. 84 p. Adviser: J. R. Goodman. CET71-72RAG33.
- Haque, M. I., Convergence of the finite element method under the constraint of material incompressibility. Ph.D. Dissertation, June 1973. 153 p. Adviser: E. Thompson. CED72-73MIH32.
- Hardin, D. J., Triaxial compression tests on a clean quartz sand. M.S. Thesis, January 1972. 94 p. Adviser: J. M. Bell. CET71-72DJH36.
- Hendrick, J. D., Techniques for modeling reservoir salinity. Ph.D. Dissertation, November 1972. 182 p. Adviser: V. Yevjevich. CED72-73JDH21.
- Henghold, W. M., Layered beam vibrations including slip. Ph.D. Dissertation, June 1972. 188 p. Adviser: J. R. Goodman. CET71-72WMH53.
- Huang, C. H., Numerical simulation of wind, temperature, shear stress and turbulent energy over nonhomogeneous terrain. Ph.D. Dissertation, December 1971. 276 p. Adviser: E. C. Nickerson. CED71-72CH11.
- Hurley, R. D., Three dimensional stress-strain soil apparatus. M.S. Thesis, May 1972. 145 p. Adviser: J. M. Bell. CET71-72RDH55.
- Jacobi, S., Economic worth of sediment load data in a statistical decision framework. Ph.D. Dissertation, January 1974. 162 p. Adviser: C. Nordin. CED73-74SJ14.
- Jawed, K., Comparison of methods of deriving unit hydrographs. M.S. Thesis, August 1973. 179 p. Adviser: E. F. Schulz. CET72-73KJ39. \$5.00.
- Kahawita, R. A., The stability of parallel, quasi-parallel and stationary flows. Ph.D. Dissertation, December 1973. 176 p. Adviser: R. N. Meroney. CED72-73RAK25.
- Karplus, A. K., Simulation of precipitation series in a region. Ph.D. Dissertation, November 1972. 188 p. Adviser: V. Yevjevich. CED72-73AKK11.
- Kavvas, M. L., Derivation of stable non-oscillating unit hydrographs. M.S. Thesis, July 1972. 113 p. Adviser: E. F. Schulz. CET72-73MLK1.
- Kawatani, T., An investigation of turbulent boundary layer on high roughness. Ph.D. Dissertation, August 1971. 152 p. Adviser: W. Z. Sadeh. CED71-72TK1. \$3.00.
- Keefer, T. N., The relation of turbulence to diffusion in open-channel flows. Ph.D. Dissertation, July 1971. 157 p. Adviser: E. V. Richardson. CED71-72TNK20.
- Kilinc, M. Y., Mechanics of soil erosion from overland flow generated by simulated rainfall. Ph. D. Dissertation, May 1972. 206 p. Adviser: E. V. Richardson. CED71-72MYK42.
- Ko, C., Failure theories for orthotropic materials. M.S. Thesis, March 1972. 122 p. Adviser: J. R. Goodman. CET71-72CK52.
- Ko, M., Layered beam systems with interlayer slip. M.S. Thesis, December 1972. 140 p. Adviser: J. R. Goodman. CET72-73MK24.
- Kraeger, C. E., Numerical modeling of groundwater contamination. M.S. Thesis, June 1972. 85 p. Adviser: D. K. Sunada. CET71-72CEK28. \$6.00.
- Kuo, M., Verification of a mathematical model for layered T-beams. M.S. Thesis, February 1974. 197 p. Adviser: M. E. Criswell. CET73-74MK10.

Department of Civil Engineering - continued

- Kuse, W. C., Wastewater disposal by evaporation. M.S. Thesis, June 1973. 110 p. Adviser: J. C. Ward. CED72-73WCK44.
- Laufer, F., Multivariate detection of flow changes in high mountain watersheds. M.S. Thesis, August 1972. 85 p. Adviser: H. J. Morel-Seytoux. CET72-73FL4.
- Lee, B. K., Stochastic analysis of particle movement over a dune bed. Ph.D. Dissertation, February 1973. 235 p. Adviser: E. V. Richardson. CED72-73BKL22.
- Lefevre, B., Experiments of infiltration with air effects in a vertical rectangular slab of soil. M.S. Thesis, December 1973. 134 p. Adviser: H. J. Morel-Seytoux. CET73-74BL6. \$10.00.
- Lewis, G. L., Riprap protection of bridge footings. Ph.D. Dissertation, March 1972. 232 p. Adviser: D. B. Simons. CED71-72GLL25.
- Li, R. M., Sheet flow under simulated rainfall. M.S. Thesis, April 1972. 123 p. Adviser: H. W. Shen. CET71-72RML50.
- Lindeman, L. F., Polymer injection for drag reduction. M.S. Thesis, June 1972. Adviser: J. P. Tullis. CET71-72LFL38.
- Liu, H. T., Mass diffusion over wind waves. Ph.D. Dissertation, April 1972. 161 p. Adviser: S. Karaki. CED70-71HTL54. \$4.00
- Lopez, O. G., Response time in urban Colorado basins. M.S. Thesis, July 1973. 128 p. Adviser: E. F. Schulz. CET73-74OGL1. \$5.00.
- Mejia, J. M., On the generation of multivariate sequences exhibiting the Hurst phenomenon and some flood frequency analysis. Ph.D. Dissertation, November 1971. 149 p. Adviser: D. B. Simons. CET71-72JMM12.
- Millan, J., Drought impact on regional economy. Ph.D. Dissertation, April 1972. 182 p. Adviser: V. Yevjevich. CED71-72JM40.
- Miller, A. C., Turbulent diffusion and longitudinal dispersion measurements in a hydrodynamically rough open channel flow. Ph.D. Dissertation, December 1971. 140 p. Adviser: E. V. Richardson. CED71-72ACM22.
- Moss, M. E., Serial-correlation structure of discretized streamflow. Ph.D. Dissertation, July 1972. 96 p. Adviser: E. V. Richardson. CED72-73MEM9.
- Mukherji, S., An experimental investigation of a wall jet interacting with a shear flow. M.S. Thesis, March 1972. 84 p. Adviser: W. Z. Sadeh. CET70-71SKM25.
- Nalluswami, M., Numerical simulation of general hydrodynamic dispersion in porous medium. Ph.D. Dissertation, August 1971. 147 p. Adviser: R. A. Longenbaugh. CED71-72MN4. \$5.00.
- Nambudripad, K. D., Flow over non-uniform surface roughness. M.S. Thesis, July 1971. 86 p. Adviser: J. E. Cermak. CET71-72KDN2. \$3.00.
- Nayak, S. K., Periodicity of combined heat transfer. Ph.D. Dissertation, December 1972. Adviser: V. A. Sandborn. CED72-73SKN20.
- Nazar, A. M., A laboratory study of bed material withdrawal in farm turnouts. M.S. Thesis, May 1973. 96 p. Advisers: M. L. Albertson and A. G. Mercer. CET72-73AMN28.
- Olson, A. F., A digital model of a stream-aquifer system on the South Platte River near Sterling, Colorado. M.S. Thesis, June 1973. 78 p. Adviser: R. A. Longenbaugh. CET72-73AFO40. \$5.00.
- Ortiz-Brennan, D., Local scour at river constrictions. M.S. Thesis, December 1972. 89 p. Adviser: D. B. Simons. CET72-73DO14.
- Penner, B. G., Experimental behavior of wood flooring systems. M.S. Thesis, December 1972. 132 p. Adviser: M. D. Vanderbilt. CET72-73BGP13.
- Peterson, C. R., Flood routing with a diffusion equation. M.S. Thesis, November 1971. 77 p. Adviser: D. B. Simons. CET71-72CRP13.
- Phull, K. K., Surface water heat balance experiments. M.S. Thesis, June 1973. 147 p. Adviser: J. C. Ward. CET72-73KKP43.
- Prakash, A., Galerkin simulation of hydrodynamic dispersion. Ph.D. Dissertation, April 1974. 192 p. Advisers: R. A. Longenbaugh and J. W. N. Fed. CED73-74AP17. \$5.00.
- Rabot, J., Measurement of turbulence intensity with a propeller current meter. M.S. Thesis, February 1972. 65 p. Adviser: E. V. Richardson. CET71-72JR24.
- Rakha, A., Sediment conduction of turnouts. M.S. Thesis, December 1971. 150 p. Adviser: A. G. Mercer. CET71-72AR34.
- Rana, S. A., Sediment sorting in alluvial channels. M.S. Thesis, August 1971. 132 p. Adviser: D. B. Simons. CET71-72SAR5.
- Reinecke, S. E., Quality of snowmelt from oil shale residue. M.S. Thesis, December 1971. 44 p. Adviser: J. C. Ward. CET71-72SER35.
- Rousselle, J., On some problems of flood analysis. Ph.D. Dissertation, August 1972. 243 p. Adviser: P. Todorovic. CED72-73JR5.
- Sabol, G. V., Estimation of sediment discharge from short term and intermittent samples of stream sediment gaging stations. M.S. Thesis, November 1972. 76 p. Adviser: E. V. Richardson. CET72-73GVS12.
- _____, River dispersion: a skewed distribution. Ph.D. Dissertation, May 1974. 109 p. Adviser: C. F. Nordin. CED73-74GVS35.

Department of Civil Engineering - continued

- Sagar, B. T. A., Downpull in high head gate installations. Ph.D. Dissertation, August 1973. 184 p. Adviser: J. P. Tullis. CED72-73BTAS36.
- Salas-La Cruz, J. D., Range analysis for storage problems of periodic-stochastic processes. Ph.D. Dissertation, May 1972. 227 p. Adviser: V. Yevjevich. CED71-72JDS41.
- Santeford, H. S., Jr., Management of windblown alpine snows. Ph.D. Dissertation, December 1972. 194 p. Adviser: M. L. Albertson. CED72-73HSS41.
- Santos-Cayado, J., Stage determination for high discharge. Ph.D. Dissertation, July 1972. 181 p. Adviser: D. B. Simons. CED71-72JS30.
- Schiefer, M. C., The organization of Thai irrigators. M.S. Thesis, May 1973. 84 p. Adviser: M. L. Albertson. CET72-73MCS37.
- SethuRaman, S., Stratified shear flows over a simulated three dimensional urban heat island. Ph.D. Dissertation, August 1973. 207 p. Adviser: J. E. Cermak. CED73-74SS2.
- Shieh, S. C., Turbulence in developing boundary layer with polymer additives. Ph.D. Dissertation, June 1974. 121 p. Adviser: S. Karaki. CED73-74SCS21.
- Singh, V. P., A nonlinear kinematic wave model of surface run-off. Ph.D. Dissertation, May 1974. 305 p. Adviser: W. A. Woolhiser. CED73-74VPS29.
- Sonu, J., Water and air movement in bounded layered soil. Ph.D. Dissertation, April 1973. 167 p. Adviser: H. J. Morel-Seytoux. CED72-73JS31. \$10.00
- Su, K., Wind waves and diffusion in open channels. Ph.D. Dissertation, April 1972. 121 p. Adviser: J. Gessler. CED71-72KS47. \$3.00.
- Sweeney, C. E., Cavitation damage in sudden enlargement. M.S. Thesis, May 1974. 93 p. Adviser: J. P. Tullis. CET73-74CES19.
- Tao, P., Distribution of hydrologic independent stochastic components. Ph.D. Dissertation, August 1973. 139 p. Adviser: V. Yevjevich. CED73-74PT3.
- Taylor, J. H., Irrigation scheduling for salinity control. M.S. Thesis, May 1974. 102 p. Adviser: G. V. Skogerboe. CET73-74JHT31.
- Thaemert, R. L., Steep channel water surface profiles. M.S. Thesis, July 1971. 103 p. Adviser: E. V. Richardson. CET71-72RLT6.
- Torranin, P., Application of canonical correlation in hydrologic predictions. Ph.D. Dissertation, June 1972. 164 p. Adviser: V. Yevjevich. CED72-73PT2.
- Tsao, T., Cattle feedlot wastewater salinity. M.S. Thesis, March 1972. 93 p. Adviser: J. C. Ward. CET71-72TT27.
- Tuffuor, S., Optimal parameter identification of nonlinear, time-variant hydrologic system models. Ph.D. Dissertation, June 1973. 178 p. Adviser: M. L. Albertson. CED72-73ST26.
- Veenhuizen, S. D., Turbulent air flow over wind excited laboratory water waves. Ph.D. Dissertation, February 1973. 129 p. Adviser: S. Karaki. CED72-73SDV15.
- Wacker, A. M., Highway impact on mountain streams. M.S. Thesis, June 1974. 296 p. Adviser: D. B. Simons. CET73-74AMW15.
- Wang, H., Response of a turbulent boundary layer to lateral roughness discontinuities. Ph.D. Dissertation, July 1972. 72 p. Adviser: E. C. Nickerson. CED71-72HW49. \$2.00.
- Wang, J., Turbulent flow in a pipe inlet region. Ph.D. Dissertation, June 1972. 118 p. Adviser: J. P. Tullis. CED71-72JW23.
- Wendim-Agegnehu, L., Methodology for the selection and timing of water resources projects (to promote national economic development). Ph.D. Dissertation, July 1974. 218 p. Adviser: M. L. Albertson. CED73-74LW32.
- Wilson, W. A., Unit hydrograph response times. M.S. Thesis, June 1972. 112 p. Adviser: E. F. Schulz. CET71-72WAW26. \$5.00.
- Wu, F., Conjunctive use of surface water and groundwater with different salinities in the Indus Basin of Pakistan. Ph.D. Dissertation, June 1974. 194 p. Adviser: R. A. Longenbaugh. CED73-74FW20.
- Yang, B. T., Study of turbulent diffusion from a ground released puff by a laser light-scattering method. Ph.D. Dissertation, August 1972. 232 p. Adviser: R. N. Meroney. CED72-73BTY8.
- Zakely, W. L., The effect of the intermediate principal stress on the strength of sand. M.S. Thesis, February 1972. 97 p. Adviser: J. M. Bell. CET71-72WLZ51.

For copies of publications of this department contact the senior author or Engineering Research Center, Publications Office, Colorado State University, Fort Collins, Colorado 80523.

ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF ELECTRICAL ENGINEERING

R. J. Churchill, Head

1971-74

ALLEN, J. L., Associate Professor: (electromagnetic fields and magnetic materials).	JONES, T. B., Associate Professor: (electrohydrodynamics and environmental engineering).
ALSPACH, D. L., Associate Professor: (stochastic processes and space systems).	LINDON, P. H., Associate Professor: (circuits, energy conversion and power systems).
AUS, H. M., Assistant Professor: (digital systems).	LOBBIA, R. N., Assistant Professor: (control systems and aerospace applications).
BRITTON, C. C., Associate Professor: (electromechanics).	LORD, W., Associate Professor: (computer systems and magnetic devices).
BRUBAKER, T. A., Associate Professor: (computer systems).	MAXWELL, L. M., Professor: (network and graph theory).
BUDAK, A., Professor: (active network theory).	MORGAN, R. J., Associate Professor: (bioengineering and systems).
CHAN, P. W., Associate Professor: (laser-plasma interactions and laser sensing techniques).	SCHARF, L. L., Associate Professor: (detection and estimation theory).
CHINBURG, C. H., Associate Professor: (electrical machinery and power systems).	SMITH, F. L., Assistant Professor: (ionospheric physics).
CHURCHILL, R. J., Professor and Head: (gaseous electronics and plasma dynamics).	VICKERS, R. S., Associate Professor: (electro-optical systems and remote sensing).
COLLINS, G. J., Associate Professor: (quantum electronics and laser systems).	WILMSEN, C. W., Associate Professor: (solid-state materials and thin film devices).
DEAN, J. E., Professor: (communications).	WRIGHT, D. L., Assistant Professor: (electromagnetics and plasma diagnostics).
EDWARDS, D., Professor: (quantum electronics and solid-state devices).	YADLOWSKY, E. J., Assistant Professor: (plasma dynamics).
GRAUPE, D., Professor: (control systems and bioengineering).	

PUBLICATIONS

Department of Electrical Engineering

Abiri, A.

_____, see D. L. Alspach, Department of Electrical Engineering.

Allen, J. L.

_____, Magnetic losses in remanent state ferrites. Journal of the Franklin Institute, Vol. 295, No. 1, January 1973. 14 p. EEP72-73JLA20.

_____ and M. F. Estes, Broadside-coupled strips in a layered dielectric medium. IEEE Transactions on Microwave Theory and Techniques, Vol. MTT-20, No. 10, October 1972. 8 p. EEP72-73JLA-MFE19.

Allender, M. C.

_____ and C. W. Wilmsen, Conductance switching of silicon dioxide. American Vacuum Society meeting, Boulder, Colorado, August 1973. EEP73-74MCA-CWW56.

_____, see C. W. Wilmsen, Department of Electrical Engineering.

Alspach, D. L.

_____, L. L. Scharf and A. Abiri, A Bayesian solution to the problem of state estimation in an unknown noise environment. International Journal of Control, Vol. 19, No. 2, 1974. 23 p. EEP 73-74DLA-LLS-AA24.

Department of Electrical Engineering - continued

_____, Comments on "On the identification of variances and adaptive Kalman filtering" by R. K. Mehra. IEEE Transactions on Automatic Control, Vol. AC-17, No. 6, December 1972. 3 p. EEP72-73DLA16.

_____, Dual control based on approximated a posteriori density functions. IEEE Transactions on Automatic Control, Vol. AC-17, No. 5, October 1972. 5 p. EEP72-73DLA14.

_____, Identification of rotating assembly inertial and bearing parameters. IEE Transactions of Aerospace and Electronic Systems, Vol. AES-8, No. 5, September 1972. 7 p. EEP72-73DLA15.

_____ and H. W. Sorenson, Nonlinear Bayesian estimation using Gaussian sum approximations. IEEE Transactions on Automatic Control, Vol. AC-17, No. 4, August 1972. 10 p. EEP72-73DLA13.

_____, see T. A. Brubaker, Department of Electrical Engineering.

Apichatanon, O.

_____, see P. W. Chan, Department of Electrical Engineering.

Aronhime, P. B.

_____, see:

1. A. Budak, Department of Electrical Engineering.
2. J. P. Rybak, Department of Electrical Engineering.

Britton, C. C.

_____ and H. H. Schweizer, Freshman engineering program at Colorado State University. Engineering Education, Vol. 65, No. 2, November 1974. 14 p. EEP73-74CCB-HHS1.

_____, An early electric power facility in Colorado. The Colorado Magazine, Vol. XLIX, No. 3, Summer 1972. 11 p. EEP72-73CCB37.

Brubaker, T. A.

_____, Specification and implementation of digital control algorithms in chemistry automation. Presented at the 1974 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, March 1974. To be published in a monograph by the American Society for Testing and Materials, 1974. EEP73-74TAB32.

_____, Coefficient quantization in digital control algorithms. Accepted for publication in Computers and Electrical Engineering, 1974. EEP73-74TAB31.

_____ and J. N. Gowdy, Computation of the discrete autocovariance. Accepted for publication in the International Journal of Electronics, 1974. EEP73-74TAB-JNG30.

_____ and W. Loendorf, Implementation of digital controllers. Computers and Electrical Engineering, Vol. 1, No. 3, December 1973. 13 p. EEP73-74TAB-WL10.

_____, Design of recursive digital filters for processing chemistry data. 1973 Pacific Conference on Chemistry and Spectroscopy, November 2, 1973. EEP73-74TAB34.

_____ and D. L. Alspach, Hardware considerations for the implementation of a parallel nonlinear filter. Proceedings of the Fourth Symposium on Nonlinear Estimation and its Applications, September 1973. EEP73-74TAB-DLA33.

_____, Accuracy specifications in chemistry data processing. Presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, March 1973. American Laboratory Journal, March 1973. 7 p. EEP72-73TAB12.

_____ and D. L. Harper, Time-domain synthesis of recursive digital filters. International Journal of Control, Vol. 18, No. 4, 1973. 10 p. EEP72-73TAB11.

_____ and W. B. Risley, Sampling interval drift in digital filters. International Journal of Electronics, Vol. 35, No. 4, 1973. 9 p. EEP72-73TAB10.

_____, Energy distributions for sampled and reconstructed periodic signals. International Journal of Control, Vol. 17, No. 4, 1973. 6 p. EEP72-73TAB9.

_____, Application of modern signal theory to the analysis of chemical data. Final Report, Lawrence Livermore Laboratory, July 31, 1972. EER72-73TAB2.

_____ and H. Levin, A note on the spectral analysis of periodic functions. Computer-Managed Learning System Laboratory Technical Report TR72-2, Colorado State University. IEEE Transactions on Audio and Electroacoustics, Vol. AU-20, No. 1, March 1972. 3 p. EEP71-72TAB-HL1.

_____, A study of computer hardware-software structures for improved man-machine interface. Final Report, Lawrence Livermore Laboratory, July 30, 1971. EER71-72TAB2.

_____, see P. R. Risch, Department of Electrical Engineering.

Budak, A.

_____, Solutions manual for passive and active network analysis and synthesis. Houghton Mifflin Co., 1974. EEP73-74AB37.

_____, Passive and active network analysis and synthesis. Houghton Mifflin Co., 1974. EEP73-74AB36.

Department of Electrical Engineering - continued

R. E. Daigle, R. J. Morgan, and _____, Window discrimination using integrated circuits. IEEE Transactions on Biomedical Engineering, Vol. BME-20, No. 4, July 1973. 4 p. EEP73-74RED-RJM-AB15.

_____ and E. R. Zeller, Practical design considerations for a variable center frequency, constant bandwidth, and constant peak-value active filter. IEEE Journal of Solid-State Circuits, Vol. SC-7, No. 4, August 1972. 4 p. EEP71-72AB-ERZ9.

_____ and D. M. Petrela, Frequency limitations of active filters using operational amplifiers. IEEE Transactions on Circuit Theory, Vol. CT-19, No. 4, July 1972. 8 p. EEP72-73AB-DMP36.

_____ and P. Aronhime, Universal curves for bandpass filters. Proceedings of the IEEE, Vol. 59, No. 9, September 1971. 2 p. EEP71-72AB-PA34.

_____, see D. M. Petrela, Department of Electrical Engineering.

Chan, P. W.

_____, O. Apichatanon and C. Y. She, Particle size measurement by forward scattering of laser light. Presented, 67th Annual Meeting of APCA, Denver, Colorado, June 10-13, 1974. EEP73-74PWC-OA-CYS48.

_____, Resonant Raman scattering from water vapor. Scientific Report No. 8, Project THEMIS, Air Force Cambridge Research Laboratories, September 1973. EER73-74PWC7.

_____ and M. Niimura, Effect of electric fields on the energy transport across the plasma-solid interface. Bulletin of American Physical Society, Vol. 18, 1973. EEP72-73PWC-MN49.

_____, R. J. Churchill, and M. S. Gautam, Radial recovery of high current spark channels. International Journal of Electronics, Vol. 34, No. 6, 1973. 8 p. EEP72-73PWC-RJC-MSG31.

_____, R. J. Churchill, and R. M. Clements, Temperature determination of a recovering spark channel from conductivity probe measurements. International Journal of Electronics, Vol. 35, No. 5, 1973. 5 p. EEP72-73PWC-RJC-RMC30.

_____ and R. J. Churchill, Determination of temperatures of high current spark channels. International Journal of Electronics, Vol. 35, No. 6, 1973. 11 p. EEP72-73PWC-RJC29.

_____ and R. J. Churchill, Thermal reignition of a high current spark channel. Japanese Journal of Applied Physics, Vol. 11, No. 3, March 1972. 4 p. EEP71-72PWC-RJC11.

_____, S. D. Day, J. H. Hwang, and G. A. Morris, Antenna simulation using optical analogs. Presented at the 48th Annual Meeting of the Southwestern and Rocky Mountain Division of the AAAS, April 1972. EEP71-72PWC-SDD-JHH-GAM46.

_____, see:

1. W. R. Larsen, Department of Electrical Engineering.
2. M. Niimura, Department of Electrical Engineering, (11 coauthorships).
3. R. S. Vickers, Department of Electrical Engineering.

Churchill, R. J.

C Y. She, D. F. Edwards and _____, The Doppler-shift laser anemometer. THEMIS Scientific Report No. 10, May 1974. EER73-74CYS-DFE-RJC9.

_____, see:

1. P. W. Chan, Department of Electrical Engineering, (4 coauthorships).
2. M. Niimura, Department of Electrical Engineering, (6 coauthorships).
3. G. C. Rose, Department of Electrical Engineering, (2 coauthorships).
4. J. P. Rybak, Department of Electrical Engineering, (4 coauthorships).

Clements, R. M.

_____, see P. W. Chan, Department of Electrical Engineering.

Cline, W. K.

_____, see D. Graupe, Department of Electrical Engineering, (3 coauthorships).

Collins, G. J.

_____, S. Hattori, H. Kano, T. Goto, and T. Tokutome, CW oscillation in singly ionized iodine. IEEE Journal of Quantum Electronics, Vol. 10, 1974. EEP73-74GJC50.

W. R. Bennett, Jr., D. B. Carlin, and _____, Picosecond time-interval measurement and intensity correlations using the two-quantum photoelectric effect. Correspondence, IEEE Journal of Quantum Electronics, Vol. QE-10, No. 1, January 1974. 3 p. EEP73-74GJC8.

S. Hattori, H. Kano, K. Tokutome, _____, and T. Goto, CW iodine-ion laser in a positive-column discharge. IEEE Journal of Quantum Electronics, Vol. QE-10, No. 6, June 1974. 2 p. EEP73-74GJC6.

_____, Charge exchange excitation in the He-Cd and He-Zn lasers. Journal of Applied Physics, Vol. 44, October 1973. EEP73-74GJC49.

- _____, Excitation mechanisms in He-Cd and He-Zn ion lasers. 26th Annual Gaseous Electronics Conference, October 1973. Journal of Applied Physics, Vol. 44, No. 10, October 1973. 20 p. EEP73-74GJC7.
- J. M. Green, _____, and C. E. Webb, Collisional excitation and destruction of excited Zn II levels in a helium afterglow. Journal of Physics, B: Atomic Molecular Physics, Vol. 6, August 1973. 6 p. EEP73-74GJC9.
- J. A. Piper, _____, and C. E. Webb, CW laser oscillation in singly ionized iodine. Applied Physics Letters, Vol. 21, No. 5, September 1, 1972. 3 p. EEP72-73GJC6.
- _____, H. Kuno, S. Hattori, K. Tokutome, M. Ishikawa, and N. Kamiide, CW laser oscillation of 6127 Å in singly ionized iodine. IEEE Journal of Quantum Electronics, Vol. QE-8, No. 7, July 1972. 2 p. EEP72-73GJC7.
- J. M. Green, _____, and C. E. Webb, The role of thermal energy charge-exchange in rare gas-metal vapor lasers. VII International Conference on Quantum Electronics, 1972. EEP72-73GJCS2.
- J. M. Green, _____ and C. E. Webb, The role of thermal-energy charge-energy in rare gas-metal vapor lasers. IEEE Journal of Quantum Electronics, Vol. 8, 1972. EEP72-73GJCS1.
- _____, Properties of He-Ne-Zn laser. Journal of Applied Physics, Vol. 42, No. 10, September 1971. 4 p. EEP71-72GJC20.
- _____, R. C. Jensen, and W. R. Bennett, Jr., Charge-exchange excitation in the He-Cd laser. Applied Physics Letters, Vol. 19, No. 5, September 1, 1971. 4 p. EEP71-72GJC21.
- T. Goto, A. Kawahara, _____, and S. Hattori, Electron temperature and density in positive column He-Cd⁺ lasers. Journal of Applied Physics, Vol. 42, No. 10, September 1971. 3 p. EEP71-72GJC19.
- Cook, K. R.
- _____, see G. C. Rose, Department of Electrical Engineering.
- Day, S. S.
- _____, see P. W. Chan, Department of Electrical Engineering.
- Edwards, D. F.
- C. Y. She, _____, and R. J. Churchill, The Doppler-shift laser anemometer. THEMIS Scientific Report No. 10, May 1974. EER73-74CYS-DFE-RJC9.
- _____, Effect of anharmonic interactions on the Raman spectra. Presented at the meeting of the Rocky Mountain Chapter of the Optical Society of America, May 1973. EEP72-73DFE44.
- J. Lisboa and _____, Computerized crystal orientation. Review of Scientific Instruments, Vol. 44, 1973. EEP73-74DFE51.
- C. T. Meneely, C. Y. She, and _____, Measurement of flow and turbulence distribution of a free jet by laser photon correlation spectroscopy. Optics Communications, Vol. 6, No. 4, December 1972. 3 p. EEP72-73CTM-CYS-DFE25.
- T. W. Broberg, C. Y. She, L. S. Wall, and _____, Long-wavelength polarization fluctuations in antiferroelectric NH₄H₂PO₄. Physical Review B, Vol. 6, No. 9, November 1, 1972. 5 p. EEP72-73TWB-CYS-LSW-DFE26.
- _____, Interaction gradients, concurrent light scattering experiments and bulk laser damage in solids. American Society of Testing and Materials, Boulder, Colorado, 1972. EEP72-73DFE43.
- _____, Raman scattering in crystals. Scientific Report, Instituto de Fisica, Universidade Federal do Rio Grande do Sul, Porto Alegre-RS-Brasil, June 1972. EEP71-72DFE37.
- V. G. Draggoo, C. Y. She, G. L. McAllister, and _____, Effects of laser mode structure on damage in quartz. IEEE Journal of Quantum Electronics, Vol. QE-8, No. 2, February 1972. 4 p. EEP71-72VGD-CYS-GLM-DFE18.
- _____, Laser-excited Raman spectroscopy, American Journal of Physics, Vol. 40, 1972. EEP72-73DFE42.
- _____, The effect of proton-phonon coupling on the phase transition in KDP-type crystals. Post-deadline paper, VII International Quantum Electronics Conference, Montreal, Canada, May 1972. EEP71-72DFE39.
- C. Y. She, T. W. Broberg, L. S. Wall, and _____, Effect of proton-phonon coupling on the ferroelectric mode in KH₂PO₄. Physical Review B, Vol. 6, 1972. EEP71-72CYS-TWB-LSW-DFE50.
- _____, Investigation of cumulative effects in microscopically damaged quartz. American Society of Testing and Materials, Conference on Damage in Laser Materials, Boulder, Colorado, 1971. EEP71-72DFE38.
- _____, C. Y. She, V. G. Draggoo, T. W. Broberg, and G. L. McAllister, Investigation of cumulative effects in microscopically damaged quartz. In Damage in Laser Materials, NBS Special Publication 356, September 1971. EEP71-72DFE-CYS-VGD-TWB-GLM47.
- T. W. Broberg, C. Y. She, and _____, Raman scattering applied to solid state physics. Rocky Mountain Applied Spectroscopy Conference, August 1971. EEP71-72TWB-CYS-DFE49.

Department of Electrical Engineering - continued

C. T. Meneely, C. Y. She, and _____, Applications of self-beat spectroscopy. Rocky Mountain Applied Spectroscopy Conference, August 1971. EEP71-72CTM-CYS-DFE48.

Ehrlich, P.

_____, see C. W. Wilmsen, Department of Electrical Engineering.

Estes, M. F.

_____, see J. L. Allen, Department of Electrical Engineering.

Farden, D. C.

_____ and L. L. Scharf, Statistical design of nonrecursive digital filters. IEEE Transactions on Acoustics, Speech, and Signal Processing, Vol. ASSP-22, No. 3, June 1974. 9 p. EEP73-74LLS29.

_____ and L. L. Scharf, Adaptive array simulation results. Prepared for Naval Undersea Research and Development Center, San Diego, California under Contract N66001-72-C-0479, July 20, 1972. EER72-73DCF-LLS10.

_____, see L. L. Scharf, Department of Electrical Engineering, (2 coauthorships).

Gautam, M. S.

_____, see P. W. Chan, Department of Electrical Engineering.

Gowdy, J. N.

_____, see T. A. Brubaker, Department of Electrical Engineering.

Graupe, D.

_____, Control of artificial upper extremity prosthesis in several degrees of freedom. VA Conference on Prosthetics and Sensory Aids Research, Chicago, 1974. EEP73-74DG46.

_____, Separation of limb functions via ARMA identification of EMG signals. Invited Review Paper, 6th IEEE Southeastern Conference, 1974. EEP73-74DG45.

_____, Identification by ARMA methods. Invited Review Paper, 5th Pittsburgh Modeling and Simulation Conference, 1974. EEP73-74DG44.

_____, Estimation of upper bounds of errors in identifying autoregressive models. Accepted for publication in International Journal of Systems Science, 1974. EEP73-74DG60.

_____ and J. Perl, Stochastic approximation algorithms for identifying ARMA processes. Accepted for publication in International Journal of Systems Science, 1974. EEP73-74DG-JP59.

R. Shinnar, U. G. Cegla, and _____, Performance analysis of linear regulators with non-Gaussian Markovian disturbances. Accepted for publication in International Journal of Control, 1974. EEP73-74DG58.

_____ and W. K. Cline, Derivation of ARMA parameters and orders from pure AR models. Accepted for publication in International Journal of Control, 1974. EEP73-74DG-WKC57.

_____, W. K. Cline, and T. E. Kaplan, Stochastic analysis of EMG signals for multi-functional prosthesis control. Proceedings of the 4th Carnahan Symposium on Electronic Prosthetics, Lexington, Kentucky, 1973. EEP72-73DG-EKC-TEK54.

_____ and W. K. Cline, Identification of multi-input-multi-output Kalman filters via ARMA formulations. Proceedings of 4th Symposium on Nonlinear Estimation Theory, San Diego, September 1973. EEP73-74DG-WKC52.

_____ and D. J. Krause, On the identification of input-output-noise models. International Journal of Systems Science, Vol. 4, April 1973. EEP72-73DG-DJK57.

_____, Control of an artificial upper limb in several degrees of freedom. Bulletin of Prosthesis Research, Vol. 10-18, 1973. EEP72-73DG47.

_____, Estimation of upper bounds of errors in identifying AR models. Proceedings of the 4th Symposium on Nonlinear Estimation Theory, San Diego, September 1973. EEP73-74DG43.

_____ and D. J. Krause, Identification and prediction of a class of non-Gaussian time-series via transformation. International Journal of Systems Science, Vol. 4, No. 3, 1973. 7 p. EEP72-73DG-DJK24.

_____, Derivation of weighting matrices towards satisfying eigenvalue requirements. International Journal of Control, Vol. 16, No. 5, 1972. 8 p. EEP71-72DG27.

A. Hammer, J. W. Lynn, and _____, Investigation of a learning control system with interpolation. IEEE Transactions on Systems, Man and Cybernetics, Vol. SMC-2, No. 3, July 1972. 8 p. EEP72-73DG22.

Y. Koren and _____, Closed loop sub-optimal control of linear processes without mode switching. International Journal of Control, Vol. 15, No. 3, 1972. 10 p. EEP71-72DG12.

_____, see D. J. Krause, Department of Electrical Engineering, (3 coauthorships).

Hwang, J. H.

_____ and W. Lord, Fast convergence of matrix equation solutions. Accepted for publication in Proceedings of the Institute of Electrical Engineers, 1974. EEP73-74JHH-WL65.

_____ and W. Lord, Finite element modeling of magnetic field/defect interactions. Accepted for publication in the ASME Journal of Testing and Evaluation, December 1973. 18 p. EEP73-74JHH-WL21.

_____ and W. Lord, Finite element analysis of the magnetic field distribution inside a rotating ferromagnetic bar. Accepted for publication in the IEEE Transactions on Magnetics, November 1973. 20 p. EEP73-74JHH-WL20.

_____, see:

1. P. W. Chan, Department of Electrical Engineering.
2. W. Lord, Department of Electrical Engineering, (5 coauthorships).

Jones, T. B.

_____, Lumped parameter electromechanics of electret transducers. IEEE Transactions on Acoustics, Speech, and Signal Processing, Vol. ASSP-22, No. 2, April 1974. 5 p. EEP73-74TBJ5.

_____, Hydrostatics and steady dynamics of spatially varying electromechanical flow structures. Journal of Applied Physics, Vol. 45, No. 4, April 1974. 5 p. EEP73-74TBJ22.

_____ and M. P. Perry, Electrohydrodynamic heat, pipe experiments. Journal of Applied Physics, Vol. 45, May 1974. EEP73-74TBJ-MPP38.

_____, An electrohydrodynamic heat pipe. ASME, Heat Transfer Division, publication 72-WA/HT-35, presentation at the Winter Annual Meeting, New York, November 26-30, 1972. Mechanical Engineering, ASME, Vol. 96, January 1974. 7 p. EEP72-73TBJ2.

D. A. Krueger and _____, Hydrostatic profile of ferrofluid around a vertical current-carrying wire. Accepted for publication in Physics of Fluids, 1974. EEP73-74DAK-TBJ39.

_____ and D. C. Vacanti, Conducting-paper-liquid-crystal fields displays. American Journal of Physics, Vol. 41/12, December 1973. 6 p. EEP73-74TBJ-DCV3.

M. P. Perry and _____, Electrohydrodynamically coupled Kelvin-Helmholtz instability. ASME publication 73-WA/FE-21. Accepted for publication in ASME Journal of Fluids Engineering. Presented at the Winter Annual Meeting, Fluids Engineering Division, ASME, Detroit, Michigan, November 11-15, 1973. 5 p. EEP73-74MPP-TBJ2.

_____, Electrohydrodynamic heat pipes, Shorter Communications, International Journal of Heat and Mass Transfer, Vol. 16, 1973. 4 p. EEP72-73TBJ4.

_____ and M. P. Perry, Electrohydrodynamic heat pipe research. Research Report No. 4, NASA CR-114646, National Aeronautics and Space Administration Grant No. NGR-06-002-127, July 1973. EER73-74TBJ-MPP4.

_____ and J. R. Melcher, Dynamics of electro-mechanical flow structures. The Physics of Fluids, Vol. 16, No. 3, March 1973. 8 p. EEP72-73TBJ3.

_____, Interfacial parametric electrohydrodynamics of insulating dielectric liquids. Journal of Applied Physics, Vol. 43, No. 11, November 1972. 5 p. EEP72-73TBJ1.

_____ and M. P. Perry, Experiments with an electrohydrodynamic heat pipe. Research Report No. 3, NASA CR-114498, National Aeronautics and Space Administration Grant No. NGR-06-002-127, September 1972. EER72-73TBJ-MPP7.

_____ and M. P. Perry, Entrainment in electrohydrodynamic heat pipes. Research Report No. 2, NASA CR-114499, National Aeronautics and Space Administration Grant No. NGR-06-002-127, August 1972. EER72-73TBJ-MPP6.

_____, M. P. Perry, and J. R. Melcher, Dielectric siphons. Science, Vol. 174, December 17, 1971. 2 p. EEP71-72TBJ7.

_____, The feasibility of electrohydrodynamic heat pipes. Research Report No. 1, NASA CR-114392, National Aeronautics and Space Administration Grant No. NGR-06-002-127, October 1971. EER71-72TBJ5.

Juras, R. C.

L. L. Scharf and _____, Experimental distribution studies for invariant detectors. Seventh Hawaii International Conference on System Sciences. EEP73-74LLS-RCJ42.

Kaplan, T. K.

_____, see D. Graupe, Department of Electrical Engineering.

Krause, D. J.

_____ and D. Graupe, Identification of predictor and filter parameters by ARMA methods. International Journal of Control, Vol. 17, No. 5, 1973. 7 p. EEP72-73DJK-DG23.

_____ and D. Graupe, Estimation of the statistical parameters of the Kalman-Bucy filter. Proceedings, Third Symposium on Nonlinear Estimation Theory and Its Applications, September 1972. EEP72-73DJK-DG53.

_____, J. W. Steadman and T. W. Williams, Effect of record length on noise-induced error in the cross correlation estimate. IEEE Transactions on Systems, Man, and Cybernetics, Vol. SMC-2, No. 2, April 1972. 7 p. EEP71-72DJK-JWS-TWW23.

Department of Electrical Engineering - continued

_____ and D. Graupe, Identification of autoregressive moving-average predictor models. Proceedings of the Second Symposium on Nonlinear Estimation Theory, San Diego, September 1971. 9 p. EEP71-72DJK-DG16.

_____, see D. Graupe, Department of Electrical Engineering, (2 coauthorships).

Krueger, D. A.

_____ and T. B. Jones, Hydrostatic profits of ferrofluid around a vertical current-carrying wire. Accepted for publication in Physics in Fluids, 1974. EEP73-74DAK-TBJ39.

Larsen, W. R.

_____, C. W. Wilmsen and P. W. Chan, Shape of cathode dark space of a sputtering plasma determined from probe measurements. Journal of Applied Physics, Vol. 44, No. 5, May 1973. 4 p. EEP72-73WRL-CWW-PWC35.

Levin, H.

_____ and W. Lord, Speech pitch frequency as an indicator of emotional state. Accepted for publication in IEEE Transactions on Systems, Man, and Cybernetics, 1974. EEP73-74HL-WL63.

_____ and W. Lord, The coherence function as a criterion for word recognition. Accepted for publication in IEEE Transactions on Audio and Electroacoustics, 1974. EEP73-74HL-WL62.

_____ and W. Lord, Portable data acquisition unit for word recognition research. Journal of the Audio Engineering Society, Vol. 20, No. 8, October 1972. 8 p. EEP73-74HL-WL38.

_____, Speech analysis and recognition for CAL. Technical Report TR-72-7, Computer Managed Learning System Laboratory, Colorado State University, July 1972. EEP72-73HL13.

_____, Flutter and its measurement. Computer Managed Learning System Laboratory Technical Report TR 72-1, Colorado State University. Instrumentation Technology, Journal of the Instrument Society of America, February 1972. 3 p. EEP71-72HL17.

_____, see:

1. T. A. Brubaker, Department of Electrical Engineering.
2. R. W. Hayman, Department of Civil Engineering.
3. W. Lord, Department of Electrical Engineering.

Loendorf, W.

_____, see T. A. Brubaker, Department of Electrical Engineering.

Lord, W.

_____ and J. H. Hwang, An iterative procedure for solving modified Pasek equations. Accepted for publication in the Proceedings of the Institute of Electrical Engineers, 1974. EEP73-74WL-JHH66.

_____ and J. H. Hwang, A note on the parameter determination of second order systems. Accepted for publication in the ASME Journal of Dynamic Systems, Measurement and Control, 1974. EEP73-74WL-JHH64.

_____ and J. H. Hwang, Pasek's technique for determining the parameters of high-performance dc motors. Third Annual Symposium on Incremental Motion Control Systems and Devices, University of Illinois, May 6-8, 1974. 10 p. EEP73-74WL-JHH19.

_____ and J. H. Hwang, Convergence and mesh subdivision for finite element analysis of non-linear magnetic fields. Accepted for publication in the International Journal of Computers and Electrical Engineering, 1974. 17 p. EEP73-74WL-JHH18.

_____ and J. H. Hwang, DC servomotors - modeling and parameter determination. Record of the 8th Annual Meeting of the IEEE Industry Applications Society, Milwaukee, IEEE publication No. 73 CHO 763-21A, October 1973. 9 p. EEP73-74WL-JHH17.

_____, R. W. Hayman and H. Levin, A scheme for computerized learning system modeling: are rigorous definitions really necessary? Educational Technology, Vol. XIII, No. 7, July 1973. 4 p. EEP73-74WL-RWH-HL16.

_____ and D. J. Oswald, Leakage field methods of defect detection. International Journal of Nondestructive Testing, Vol. 4, 1972. 26 p. EEP72-73WL-DJO39.

_____, T. W. Williams, and L. M. Maxwell, Statewide development of sophomore-level electrical engineering laboratories via project Colorado CO-TIE. IEEE Transactions on Education, Vol. E-15, No. 3, August 1972. 3 p. EEP70-71WL-TWW-LMM23.

_____, Coaxial buses help suppress power supply transients. Electronics, Vol. 45, No. 7, March 27, 1972. EEP71-72WL33.

_____ and R. W. Hayman, Classroom computer terminal/display system. Technical Report TR 72-6, Computer Managed Learning System Laboratory, Colorado State University, February 1972. EEP71-72WL-RWH7.

Department of Electrical Engineering - continued

_____, see:

1. R. W. Hayman, Department of Civil Engineering.
2. J. H. Hwang, Department of Electrical Engineering, (3 coauthorships).
3. H. Levin, Department of Electrical Engineering, (3 coauthorships).
4. J. S. O'Neil, Department of Electrical Engineering.

Maxwell, L. M.

_____, Final report for the instructional scientific equipment grant. National Science Foundation Grant No. GY-8197, Colorado State University, Fort Collins, Colorado, January 1973. EER72-73LMM8.

_____, The CO-TIE computer network. Interim Report prepared for National Science Foundation, January 1973. EER72-73LMM9.

_____, see:

1. L. V. Baldwin, Department of Civil Engineering.
2. W. Lord, Department of Electrical Engineering.
3. T. J. Vander Werff, Department of Mechanical Engineering.

Meissner, G. H.

_____, see C. W. Wilmsen, Department of Electrical Engineering.

Morgan, R. G.

R. E. Daigle, _____, and A. Budak, Window discrimination using integrated circuits. IEEE Transactions on Biomedical Engineering, Vol. BME-20, No. 4, July 1973. 4 p. EEP73-74RED-RJM-AB15.

_____, J. W. Steadman and P. D. Lambert, Measurement of the change in the normal canine EEG with age. Electroencephalography and Clinical Neurophysiology, Vol. 34. 10 p. EEP72-73RJM-JWS-PDL21.

C. C. Turbes, D. L. Jobe, G. T. Schneider and _____, Studies on brain programmed stimulation of the brain. Biomedical Sciences Instrumentation, Vol. 9, Proceedings of the Ninth Annual Rocky Mountain Bioengineering Symposium and Tenth International ISA Biomedical Sciences Instrumentation Symposium, May 1-3, 1972. 7 p. EEP71-72RJM26.

A. W. Winfield and _____, Measurement of cochlear microphonics with surface electrodes. Biomedical Sciences Instrumentation, Vol. 9, Proceedings of the Ninth Annual Rocky Mountain Bioengineering Symposium and Tenth International ISA Biomedical Sciences Instrumentation Symposium, May 1-3, 1972. 3 p. EEP71-72AWW-RJM25.

Morris, G. A.

_____, see P. W. Chan, Department of Electrical Engineering.

Niimura, M.

_____, P. W. Chan and R. J. Churchill, Non-equilibrium in a free-burning argon arc plasma. THEMIS Scientific Report No. 12, May 1974. EER73-74MN-PWC-RJC11.

_____, P. W. Chan and R. J. Churchill, Effects of electric fields on energy transport across plasma-solid interfaces. THEMIS Scientific Report No. 11, May 1974. EER73-74MN-PWC-RJC10.

_____ and P. W. Chan, Influences of Coulomb collisions on the spectra of collective scattered radiation from fully ionized plasmas. Scientific Report No. 7, Project THEMIS, Contract No. F19628-70-C-0035, prepared for Air Force Cambridge Research Laboratories, Air Force Systems Command, AFCRL-TR-73-0615. 100 p. EER73-74MN-PWC2.

_____ and P. W. Chan, Nonequilibrium in a free-burning argon arc plasma. Bulletin of American Physical Society, Vol. 18, 1973. EEP72-73MN-PWC50.

_____, P. W. Chan and R. J. Churchill, Coulomb-collision corrected electron-plasma line profiles. Journal of the Physical Society of Japan, Vol. 34, No. 6, June 1973. 9 p. EEP72-73MN-PWC-RJC27.

_____, P. W. Chan and R. J. Churchill, Effects of Coulomb collisions on the dispersion relation of longitudinal plasma oscillations. Presented, American Physical Society Annual Plasma Physics Meeting, Monterey, California, November 13-16, 1972, IEEE Transactions on Plasma Science, Vol. PS-1, No. 1, March 1973. 9 p. EEP72-73MN-PWC-RJC28.

_____, P. W. Chan and R. J. Churchill, Numerical computations of Landau and collisional damping of plasma lines. Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 12, 1972. 11 p. EEP71-72MN-PWC-RJC30.

_____, P. W. Chan and R. J. Churchill, Coulomb-collision corrected ion-acoustic line profiles. Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 12, 1972. 12 p. EEP71-72MN-PWC-RJC29.

_____ and P. W. Chan, Scattering of light from a low density plasma. Bulletin of American Physical Society, Vol. 16, 1971. EEP71-72MN-PWC45.

_____, see P. W. Chan, Department of Electrical Engineering.

Department of Electrical Engineering - continued

O'Neil, J. C.

_____, A CAI multi-media interface. Technical Report TR 72-5, Computer Managed Learning System Laboratory, Colorado State University, January 1972. EER71-72JCO6.

_____, W. Lord and R. W. Hayman, Hardware: A multi-media interface system. Computer Managed Learning System Laboratory Technical Report TR 72-4, Colorado State University, 1972. 80 p. EEP72-73JCO-WL-RWH5.

Oswald, D. J.

_____, see W. Lord, Department of Electrical Engineering.

Perl, J.

_____, see D. Graupe, Department of Electrical Engineering.

Perry, M. P.

_____ and T. B. Jones, Electrohydrodynamically coupled Kelvin-Helmholtz instability. ASME Journal of Fluids Engineering publication 73-WA/FE-21, presented at the Winter Annual Meeting, Detroit, Michigan, November 11-15, 1973. 5 p. EEP73-74MPP-TBJ2.

_____, see T. B. Jones, Department of Electrical Engineering, (4 coauthorships).

Petrela, D. M.

_____ and A. Budak, Design of single-voltage amplifier active filters for minimum open-loop gain sensitivity. IEEE Transactions on Circuit Theory, Vol. CT-18, No. 6, November 1971. 5 p. EEP71-72DMP-AB10.

_____, see A. Budak, Department of Electrical Engineering.

Risch, P. R.

_____ and T. A. Brubaker, Evaluation of data reconstruction using Walsh functions. Electronics Letters, Vol. 9, No. 21, October 18, 1973. 2 p. EEP73-74PRR-TAB11.

Rose, G. C.

_____, R. S. Vickers and R. J. Churchill, A study of loaded antennas for remote sensing applications. THEMIS Scientific Report No. 9, September 1973. EER73-74GCR-RSV-RJC8.

_____, R. J. Churchill and K. R. Cook, Determination of complex dielectric constant of high-loss materials. IEEE Transactions on Instrumentation and Measurement, Vol. IM-21, No. 3, August 1972. 2 p. EEP72-73GCR-RJC-KRC32.

_____, see R. S. Vickers, Department of Electrical Engineering, (2 coauthorships).

Rybak, J. P.

_____, P. B. Aronhime and R. J. Churchill, Laboratory testing of reentry plasma diagnostic devices. Microwave Physics Laboratory Scientific Report No. 6, Project THEMIS, Contract No. F19628-70-C00035, prepared for Air Force Cambridge Research Laboratories, Air Force Systems Command, AFCRL-TR-73-0614, September 1973. 66 p. EER73-74JPR-PBA-RJC1.

_____ and R. J. Churchill, Effects of ground plane absorption coefficient on the admittance of a slot antenna radiating into a warm lossy plasma. IEEE Transactions on Antennas and Propagation, Vol. AP-20, No. 2, March 1972. 3 p. EEP71-72JPR-RJC14.

_____ and R. J. Churchill, Admittance of a half-wavelength slot antenna radiating into a warm lossy two-layer plasma. IEEE Transactions on Antennas and Propagation, Vol. AP-20, No. 1, January 1972. 2 p. EEP71-72JPR-RJC13.

_____ and R. J. Churchill, Progress in reentry communications. IEEE Transactions on Aerospace and Electronic Systems, Vol. AES-7, No. 5, September 1971. 16 p. EEP71-72JPR-RJC15.

Scharf, L. L.

_____ and R. C. Juras, Experimental distribution studies for invariant detectors. Seventh Hawaii International Conference on System Sciences. EEP73-74LLS-RCJ42.

_____, P. H. Moose and W. P. Harthill, Matched filter signal design for reverberant acoustic channels. To appear in Journal of Acoustical Society of America, 1974. EEP73-74LLS40.

_____ and R. L. Swarts, Acoustic scattering from a stochastic sea surface. Journal of Acoustical Society of America, Vol. 55, No. 2, February 1974. 7 p. EEP73-74LLS28.

_____ and D. W. Lytle, Stability of parameter estimates for a Gaussian process. IEEE Transactions on Aerospace and Electronic Systems, Vol. AES-9, No. 6, November 1973. 5 p. EEP73-74LLS27.

_____, State model of a pseudoinnovations process. IEEE Transactions on Automatic Control, Vol. AC-18, No. 5, October 1973. 2 p. EEP73-74LLS26.

_____ and D. C. Farden, Optimum and adaptive array processing in frequency-wavenumber space. Multidimensional Spectral Analysis of Acoustic Fields, USAG/NUJSC Workshop, Woods Hole, Massachusetts, October 9-12, 1973. EER73-74LLS-DCF5.

R. D. Martin and _____, Simulation of processes with nonseparable covariances. IEEE Transactions on Automatic Control, Vol. AC-18, No. 5, October 1973. 2 p. EEP73-74LLS25.

_____, Invariant Gauss-Gauss detection. IEEE Transactions on Information Theory, Vol. IT-19, No. 4, July 1973. 6 p. EEP73-74LLS23.

_____ and D. C. Farden, Time domain optimum and adaptive array processing. Multiple Time Series Analysis NCSL/ONR Workshop, Panama City, Florida, June 11-15, 1973. EER72-73LLS-DCF11.

_____ and R. L. Swarts, Acoustic scattering from a stochastic sea surface. Consulting Report prepared for Honeywell, Inc., Marine Systems Center, Seattle, February 1, 1973. EER72-73LLS12.

_____, On stochastic approximation and the hierarchy of adaptive array algorithms. 1972 IEEE Conference on Decision and Control, December 14, 1972. EEP72-73LLS46.

_____, On stochastic approximation and an adaptive Kalman filter. 1972 IEEE Conference on Decision and Control, December 14, 1972. EEP72-73LLS45.

R. D. Martin and _____, Shaping filter realizations for a class of non-separable random processes. Sixth Annual Princeton Conference on Information and System Sciences, March 23-24, 1972. EEP71-72LLS44.

_____, On the hierarchy of adaptive structures. IEEE International Symposium on Information Theory, January 31-February 3, 1972. EEP71-72LLS43.

_____, A pseudo-innovations process and its importance in adaptive Kalman filtering. Fifth Hawaii International Conference on System Sciences, January 11-13, 1972. EEP71-72LLS42.

_____, On a spectral estimator-correlator and an approximate theory of invariant Gauss-Gauss detection and classification. Fifth Hawaii International Conference on System Sciences, January 11-13, 1972. EEP71-72LLS41.

_____ and W. P. Harthill, Signal design for reverberant acoustic channels. 82nd Meeting of Acoustical Society of America, Denver, Colorado, October 19-22, 1971. EEP71-72LLS40.

_____, Signal detection in Gaussian noise of unknown level: an invariance application. IEEE Transactions on Information Theory, Vol. IT-17, No. 4, July 1971. 8 p. EEP70-71LLS73.

_____, see:

1. D. L. Alspach, Department of Electrical Engineering.
2. D. C. Farden, Department of Electrical Engineering, (2 coauthorships).

Smith, C.

_____, see F. L. Smith, III, Department of Electrical Engineering.

Smith, F. L., III

_____ and C. Smith, Numerical evaluation of Chapman's grazing incidence integral $ch(X, \chi)$. American Geophysical Union, Journal of Geophysical Research, Vol. 77, No. 19, July 1, 1972. 6 p. EEP72-73FLS-CS17.

J. A. Klobuchar, M. Mendillo, _____, R. B. Fritz, A. V. daRosa, M. J. Davis, P. C. Yuen, T. H. Roelofs, K. C. Yeh and B. J. Flaherty, Ionospheric storm of March 8, 1970. American Geophysical Union, Journal of Geophysical Research, Vol. 76, No. 25, September 1, 1971. 6 p. EEP71-72FLS24.

Steadman, J. W.

_____, see:

1. D. J. Krause, Department of Electrical Engineering.
2. R. J. Morgan, Department of Electrical Engineering.

Stuehm, D. L.

_____ and C. W. Wilmsen, Diffraction patterns and vortex structure of asymmetrical and cross Josephson junctions. Journal of Applied Physics, Vol. 45, No. 1, January 1974. 5 p. EEP73-74DLS-CWW13.

_____ and C. W. Wilmsen, Multiple Josephson junction interference patterns. Bulletin of the American Physical Society, Vol. 18, 1973. EEP73-74DLS-CWW53.

_____ and C. W. Wilmsen, Josephson junction interference grating. Journal of Applied Physics, Vol. 44, No. 6, June 1973. 6 p. EEP72-73DLS-CWW34.

_____ and C. W. Wilmsen, A thin polymer insulator for Josephson junction applications. Technical Report prepared for National Aeronautics and Space Administration under Grant No. NGR-06-002-094, September 1972. EER72-73DLS-CWW5.

_____ and C. W. Wilmsen, Critical current periodicity of Josephson junction interferometers. Journal of Applied Physics, Vol. 43, No. 8, August 1972. 2 p. EEP71-72DLS-CWW8.

_____ and C. W. Wilmsen, Three-Josephson junction interferometer. Applied Physics Letters, Vol. 20, No. 11, June 1, 1972. 3 p. EEP71-72DLS-CWW31.

_____ and C. W. Wilmsen, The flux period of Josephson junction interferometers. Proceedings of 13th Low Temperature Physics Conference, 1972. 3 p. EEP72-73DLS-CWW33.

_____, see C. W. Wilmsen, Department of Electrical Engineering.

Department of Electrical Engineering - continued

Vacanti, D. C.

_____, see T. B. Jones, Department of Electrical Engineering.

Vasbinder, G. C.

_____, see C. W. Wilmsen, Department of Electrical Engineering.

Vickers, R. S.

_____, P. W. Chan and R. E. Johnsen, Laser excited Raman and fluorescence spectra of some important pesticides. Spectroscopy Letters, Vol. 6, No. 2, 1973. 7 p. EEP73-74RSV-PWC-REJ12.

_____ and G. C. Rose, High resolution measurements of snowpack stratigraphy using a short pulse radar. Environmental Research Institute of Michigan, Proceedings of the 8th International Symposium on Remote Sensing of Environment, October 2-6, 1972. 18 p. EEP72-73RSV-GCR18.

_____ and G. C. Rose, The use of complex dielectric constant as a diagnostic tool for the remote sensing of terrestrial materials. Microwave Physics Laboratory Scientific Report No. 5, Project THEMIS, Contract No. F19628-70-C-0035. Prepared for Air Force Cambridge Research Laboratories. AFCRL-71-0438, August 1971. 47 p. EER71-72RSV-GCR1.

_____, see G. C. Rose, Department of Electrical Engineering.

Williams, T. W.

_____, see:
1. D. J. Krause, Department of Electrical Engineering.
2. W. Lord, Department of Electrical Engineering.

Wilmsen, C. W.

_____ and M. C. Allender, Conductance switching of thermally grown SiO₂. Journal of Applied Physics, Vol. 45, No. 4, April 1974. 3 p. EEP73-74CWW-MCA14.

J. R. Sites and _____, eds., Electronics of compound semiconductor interfaces. Summary of Workshop Conference, Colorado State University, February 5-6, 1974. Report SF2, Office of Naval Research Technical Report, Contract N00014-67-A-0299-0017, Task NR 372-305, March 1, 1974. 85 p. EEP73-74JRS-CWW4.

R. S. Grossman, C. D. Ferris and _____, A conductive porous coating for membrane filters. 26th Annual Conference on Engineering in Medicine and Biology, Minneapolis, October 1973. EEP73-74CWW55.

_____, D. L. Stuehm and G. C. Vasbinder, Boundary conditions for the asymmetrical and crossed Josephson junction. Bulletin of the American Physical Society, Vol. 18, 1973. EEP73-74CWW-DLS-GCV54.

_____, A thin polymer insulator for Josephson tunneling applications. Final Report prepared for National Aeronautics and Space Administration under Grant No. NGR-06-002-094, July 1973. EER73-74CWW3.

_____ and J. C. Robertson, A thin polymer insulator for Josephson tunneling applications. Semi-Annual Report, February 1973. EER72-73CWW-JCR4.

_____ and J. C. Robertson, A thin polymer insulator for Josephson tunneling applications. Semi-Annual Report, NASA Grant No. NGR-06-002-094, July 1972. EER72-73CWW-JCR3.

_____ and P. Ehrlich, A photomask camera for university solid state laboratories. SWIEECO Record, April 1972. 4 p. EEP71-72CWW-PE32.

_____ and J. C. Robertson, A thin polymer insulator for Josephson tunneling applications. Semi-Annual Report, NASA Grant No. NGR-06-002-094, February 1972. EER71-72CWW-JCR4.

_____ and J. C. Robertson, A thin polymer insulator for Josephson tunneling applications. Semi-Annual Report, NASA Grant No. NGR-06-002-094, July 1971. EER71-72CWW-JCR5.

J. C. Robertson and _____, Preferential orientation of CO adsorption on Ni as determined by extended Hückel calculations. The Journal of Vacuum Science and Technology, Vol. 9, No. 2. 5 p. EEP71-72JCR-CWW28.

_____, E. G. Thompson and G. H. Meissner, Buckling of thermally grown SiO₂ thin films. Southwestern IEEE Record, 1970. 5 p. EEP69-70CWW-EGT-GHM11a.

_____, see:
1. M. C. Allender, Department of Electrical Engineering.
2. W. R. Larsen, Department of Electrical Engineering.
3. D. L. Stuehm, Department of Electrical Engineering, (7 coauthorships).

Yadlowsky, E. J.

_____ and P. D. Goldan, Experimental observations of the parametric decay instability. Accepted for publication in Physics of Fluids, 1974. EEP73-74EJY61.

_____ and P. D. Goldan, Laboratory investigations of driven low frequency plasma oscillations. National Oceanic and Atmospheric Administration Technical Memorandum ERL AL-5, prepared for the U.S. Atomic Energy Commission under Contract No. AT(49-8)-3006. Aeronomy Laboratory, Boulder, Colorado, January 1973. 15 p. EER72-73EJY1.

Department of Electrical Engineering - continued

P. D. Goldan, _____ and E. C. Whipple, Jr., Errors in ion and electron temperature measurements due to grid plane potential nonuniformities in retarding potential analyzers. Journal of Geophysical Research, Vol. 78, No. 16, June 1, 1973. 10 p. EEP72-73EJY8.

E. C. Whipple, Jr., P. D. Goldan and _____, Ion trajectory perturbations caused by potential nonuniformities in the grid plane of retarding potential analyzers. Presented at 53rd Annual Meeting, American Geophysical Union, Washington, D.C., 1972. EEP72-73EJY56.

P. D. Goldan, E. C. Whipple, Jr. and _____, Experimental determination of retarding potential analyzer errors caused by potential nonuniformities in the grid planes. Presented at 53rd Annual Meeting, American Geophysical Union, Washington, D.C., 1972. EEP72-73EJY55.

P. D. Goldan and _____, Plasma resonance and standing longitudinal electron waves. The Physics of Fluids, Vol. 14, No. 9, September 1971. 7 p. EEP71-72EJY22.

Zeller, E. R.

_____, see A. Budak, Department of Electrical Engineering.

Department of Electrical Engineering

Theses

Allender, M. C., Conductance switching in silicon dioxide, M.S. Thesis, July 1973. Adviser: C. W. Wilmsen. EET73-74MCA45.

Apichatanon, O., Measuring aerosol size distributions, M.S. Thesis, May 1974. Adviser: P. W. Chan. EET73-74QA44.

Aronhime, P. B., Three new low-pass filters, Ph.D. Dissertation, August 1971. Adviser: A. Budak. EED71-72PBA59.

Becker, J. C., Logarithmic multiplication in digital filters, M.S. Thesis, February 1974. Adviser: T. A. Brubaker. EET73-74JCB40.

Blanchard, A. J., Acoustic modeling of monocycle radar, M.S. Thesis, September 1973. Advisers: R. J. Churchill and R. S. Vickers. EET73-74AJB42.

Christopher, C. J., Software and applications for a calculator, M.S. Thesis, November 1973. Adviser: A. Budak. EET73-74CJC46.

Cline, W. K., System identification via ARMA models, Ph.D. Dissertation, June 1974. Adviser: D. Graupe. EED73-74WKC53.

Elliott, B. E., Multiplexed digital control systems, M.S. Thesis, April 1974. Adviser: T. A. Brubaker. EET73-74BEE41.

Harper, D. L., Time domain synthesis of digital filters, M.S. Thesis, August 1973. Adviser: T. A. Brubaker. EET73-74DLH37.

Harper, E. L., Interface designs for minicomputer expansion, M.S. Thesis, June 1972. Adviser: T. A. Brubaker. EET71-72ELH58.

Juras, R. C., Distribution studies for invariant detectors, M.S. Thesis, March 1974. Adviser: L. L. Scharf. EET73-74RCJ49.

Kaplan, T. K., Multi-functional prosthesis control system, M.S. Thesis, March 1974. Adviser: D. Graupe. EET73-74TKK52.

Krause, D. J., Predictor and filter identification, Ph.D. Dissertation, July 1972. Adviser: D. Graupe. EED72-73DJK52.

Kubischta, R. J., Performance measures for optimum arrays, M.S. Thesis, March 1974. Adviser: L. L. Scharf. EET73-74RJK50.

Larsen, W. R., Uniformity of dc sputtered films, M.S. Thesis, April 1972. Adviser: C. W. Wilmsen. EET71-72WRL63.

Lehman, D. H., Implementation of Kalman filters, M.S. Thesis, April 1974. Adviser: T. A. Brubaker. EER73-74DHL39.

Levin, H., Speech analysis and recognition for CAL, Ph.D. Dissertation, July 1972. Adviser: W. Lord. EED72-73HL81.

Loendorf, W. R., Implementation of digital controllers, M.S. Thesis, May 1973. Adviser: T. A. Brubaker. EET72-73WRL48.

McGuire, D. J., Active band-stop filters and their limitations, M.S. Thesis, May 1974. Adviser: A. Budak. EET73-74DJM48.

McLucas, J. W., Fourth order bandpass functions, M.S. Thesis, May 1974. Adviser: A. Budak. EET73-74JWM47.

Niimura, M., Plasma-solid interface energy transport, Ph.D. Dissertation, August 1973. Advisers: R. J. Churchill and P. W. Chan. EED73-74MN45.

O'Brien, A. H., Limitations of high Q active filters, M.S. Thesis, June 1973. Adviser: A. Budak. EET72-73AHO49.

O'Neil, J. S., A CAL multi-media interface. M.S. Thesis, January 1972. Adviser: W. Lord. EET71-72JCO67.

Packer, E. E., Active filter sensitivities to output impedance, M.S. Thesis, June 1972. Adviser: A. Budak. EET71-72EEP62.

Department of Electrical Engineering - continued

- Perl, J., Convergent identification algorithms, M.S. Thesis, February 1974. Adviser: D. Graupe. EET73-74JP51.
- Perry, M. P., Electrohydrodynamic heat pipe experiments, M.S. Thesis, June 1973. Adviser: T. B. Jones. EET72-73MPP51.
- Petrela, D. M., Minimum amplifier-sensitivity filters, Ph.D. Dissertation, August 1971. Adviser: A. Budak. EED71-72DMP60.
- Porter, D. R., Stochastic control for state- and control-dependent noise, M.S. Thesis, April 1974. Advisers: T. A. Brubaker and R. N. Lobbia. EET73-74DRP36.
- Risch, P. R., Signal reconstruction with Walsh functions, M.S. Thesis, June 1973. Adviser: T. A. Brubaker. EET72-73PRR47.
- Risley, W. B., A data acquisition system design, M.S. Thesis, April 1972. Adviser: T. A. Brubaker. EET71-72WBR57.
- Ryder, E. B., Resonance Raman scattering from H₂O vapor, M.S. Thesis, May 1973. Adviser: P. W. Chan. EET72-73EBR50.
- Stuehm, D. L., Analysis of Josephson junction interferometers, Ph.D. Dissertation, June 1972. Adviser: C. W. Wilmsen. EET71-72DLS64.
- Wagner, J. D., An equivalence relationship between stationary and periodic systems, Ph.D. Dissertation, June 1972. Adviser: A. Budak. EED71-72JDW61.
- Zieroth, L. W., A computer network terminal processor, M.S. Thesis, February 1974. Adviser: T. A. Brubaker. EET73-74LWZ38.

For copies of publications from the Department of Electrical Engineering contact the senior author or the Department Head, Colorado State University, Fort Collins, Colorado 80523.

ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF MECHANICAL ENGINEERING

Fred W. Smith, Head

1971-74

- DUFF, W. S., Assistant Professor: (industrial engineering).
- EDWARDS, H. W., Associate Professor: (surface chemistry, heterogeneous nucleation, electrostatic precipitator performance, atomic absorption spectroscopy).
- GRAVES, W. A., Assistant Professor: (thermodynamics, automatic controls, graphics).
- HABERSTROH, R. D., Professor: (heat transfer, convection, two-phase flow, drying of solids, boiling).
- HARDEE, A. G., Jr., Assistant Professor: (thermodynamics, fluid mechanics).
- HISTAND, M. B., Associate Professor: (biomechanics, cardiovascular dynamics).
- HOOKS, L. E., Associate Professor: (experimental gas dynamics, biomechanics, cardiovascular processes, biological fluid dynamics).
- JOHNSON, G. R., Assistant Professor: (systems engineering, water resources systems, fluid mechanics, numerical analysis).
- KAUFMAN, H. R., Professor: (space propulsion systems).
- LETCHER, J. S., Jr., Associate Professor: (aeronautics, hydrodynamics, thermodynamics).
- LOERKE, R. I., Assistant Professor: (convective heat transfer and fluid dynamics).
- MARSCHNER, B. W., Professor: (aeronautics and missile aerodynamics, and propulsion).
- MILLSAPS, K., Professor: (aerodynamics, applied mathematics and heat transfer).
- MITCHELL, C. E., Associate Professor: (combustion and shock phenomena).
- OLSON, H. G., Associate Professor: (utilization of nuclear energy, reactor theory, cavitation).
- RENNAT, H. O., Associate Professor: (thermodynamics, materials, relation between properties and microstructure).
- SHANER, W. W., Associate Professor: (engineering economic planning, project evaluation, economics of development in developing countries).
- SMITH, F. W., Professor and Head: (elasticity, thermoelasticity, fracture mechanics, dynamics and systems engineering).
- STANFEL, L. E., Associate Professor: (operations research, industrial engineering, mathematical modeling, industrial and mechanical systems).
- THAYER, S. B., Associate Professor: (engineering-economic feasibility, production and inventory control, quality and reliability analysis, industrial development in developing nations).
- VANDER WERFF, T. J., Assistant Professor: (fluid dynamics, biomechanics, cardiovascular processes, biological fluid dynamics).
- WELLS, N. K., Assistant Professor: (biomechanics).
- WEMPLE, R. R., Associate Professor: (biomechanics, cardiovascular processes, biological fluid dynamics).
- WILBUR, P. J., Associate Professor: (energy conversion, space propulsion systems, nuclear and electric propulsion).
- WINN, C. B., Associate Professor: (optimal control theory, space mechanics, continental drift).

PUBLICATIONS

Department of Mechanical Engineering

- Atesmen, K. M., L. V. Baldwin, and R. D. Haberstroh, The dispersion of matter in turbulent pipe flows. Paper No. 70-WA/FE-14, presented at ASME Winter Annual Meeting, New York, November 29-December 4, 1970. ASME Transactions, Journal of Basic Engineering, Vol. 93, Series D, No. 4, December 1971. 19 p. MEP69-70KMA-LVB-RDH4.
- Baer, M. R., C. E. Mitchell, and W. R. Espander. Stability of partially lined combustors with distributed combustion. AIAA Journal, Vol. 12, No. 4, April 1974. MEP73-74MRB-CEM-WRE35.
- _____ see C. E. Mitchell, Department of Mechanical Engineering, (4 coauthorships).

Department of Mechanical Engineering - continued

Barber, K. F., see A. G. Hardee, Department of Mechanical Engineering.

Corder, T. E., see C. B. Winn, Department of Mechanical Engineering.

Curtis, J. O. and F. W. Smith, Material property and boundary condition effects on stresses in avalanche snow-packs. In Proceedings, "Advances in North American Avalanche Technology: 1972 Symposium," USDA Forest Service General Technical Report RM-3, September 1973. Journal of Glaciology, Vol. 13, No. 27, 1974. 10 p. MEP72-73JOC-FWS11.

_____, see F. W. Smith, Department of Mechanical Engineering.

Desai, Y., G. R. Johnson, and C. B. Winn, An Application of a streamflow simulation model for mountainous watershed management. Summer Simulation Conference, Montreal, Quebec, July 1973. MEP73-74YD-GRJ-CBW17.

_____, see G. R. Johnson, Department of Mechanical Engineering.

Duff, W. S., Capital expenditure programming. Presented at the Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. MEP72-73WSD4.

_____, Lease buy planning decisions. Presented at the Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. MEP72-73WSD5.

_____, Randomness and constraints in management decisions. Presented at the Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. MEP72-73WSD3.

_____, Warehousing and inventory optimization. Presented at the Institute on Applications of Stochastic Methods in Civil Engineering, Colorado State University, August 21-September 1, 1972. MEP72-73WSD6.

Duong, N., G. R. Johnson, and C. B. Winn, An application of modern control to hydrology. Proceedings of the International Conference on Systems and Control, Coimbatore, India, August 1973. MEP73-74ND-GRJ-CBW16.

_____, G. R. Johnson, and C. B. Winn, Modern control concepts in hydrology. Accepted by IEEE Transactions on Systems, Man and Cybernetics, July 1973. MEP73-74ND-GRJ-CBW15.

_____, and C. B. Winn, Orbit determination by satellite-to-satellite range measurements. AIAA Journal of Spacecraft and Rockets, February 1973. MEP72-73ND-CBW16.

Edwards, H. W., Environmental contamination by automotive lead. Proceedings of the International Symposium on Recent Advances in the Assessment of the Health Effects of Environmental Pollution, Paper 139, Paris, June 1974. 7 p. MEP73-74HWE10.

_____, J. E. Cermak, J. C. Jennett, G. Provenzano, and R. S. Thompson, Control strategies. Chapter VII, Three-University Report on the Status of Environmental Contamination by Lead. January 1974. 120 p. MER73-74HWE-JEC-RST5.

_____, editor, Impact on man of environmental contamination caused by lead. Interim Report. For period July 1, 1972-December 31, 1973. National Science Foundation Grants GI-34813X and GI-34813X1. 1974. 326 p. MER73-74HWE4.

_____, Proposed addition of a 20 microgram per cubic meter air-lead regulation to the air quality control regulations and ambient air quality standards. A statement presented to Colorado Air Pollution Control Commission, Denver, Colorado, July 18, 1973. 11 p. MEP73-74HWE9.

_____, Heavy metals and atmospherics. University of Illinois Trace Metals Symposium, Urbana, November 1972. MEP72-73HWE8.

_____, Specific heat by gravimetric ice calorimetry. THER-072. In "Modular Laboratory Program in Chemistry," H. A. Neidig, editor, Willard Grant Press, Boston, 1972. 6 p. MEP70-71HWE15.

_____, M. L. Corrin, L. O. Grant, L. M. Hartman, P. C. Katen, E. R. Reiter, E. N. Saig, G. R. Schultz, R. K. Skogerboe, D. R. Vaitkus, W. R. Welch, C. G. Wilber, and R. L. Zimdahl, Impact on man of environmental contamination caused by lead. Interim Report. For period July 1, 1971-June 30, 1972. National Science Foundation, IRRPOS GI-4, RANN GI-34813X, 1972. 251 p. MER72-73HWE4.

_____, Interaction of nitric oxide with graphite. Symposium on Recent Advances in NO_x Control Technology, Paper 28d. 64th Annual Meeting, American Institute of Chemical Engineers, San Francisco, California, November 28-December 2, 1971. AIChE Symposium Series, Air Pollution and its Control, Vol. 68, No. 126, 1972. 12 p. MEP71-72HWE2.

_____, CSU interdisciplinary team investigates environmental lead. Slide Rule, Vol. 15, No. 1, Colorado State University, October 1971. 4 p. MEP71-72HWE8.

_____, M. L. Corrin, L. O. Grant, L. M. Hartman, E. R. Reiter, R. K. Skogerboe, C. G. Wilber, and R. L. Zimdahl, Impact on man of environmental contamination caused by lead. Interim Report. For period July 1, 1970-June 30, 1971. National Science Foundation Grant GI-4, 1971 178 p. MER71-72HWE-MLC-LOG-LMH-ERR-RKS-CGS-RLZ5.

Department of Mechanical Engineering - continued

Edwards, H. W.

Koirtyohann, S. R., B. G. Wixson, and _____, Discussion of "Environmental Lead Distribution in Relation to Automobile and Mine and Smelter Sources," by G. L. Rolfe and J. C. Jennett. Proceedings of the International Conference on Heavy Metals in the Aquatic Environment, Vanderbilt University, Nashville, Tennessee, December 1973. 14 p. MEP73-74HWE7

Tornabene, T. G. and _____, Effects of lead on bacterial membranes. In Trace Substances in Environmental Health - VII, University of Missouri, 1974. 4 p. MEP73-74TGT-HWE6.

Tornabene, T. G. and _____, Microbial uptake of lead. Science, Vol. 176, June 23, 1972. 3 p. MEP71-72TGT-HWE11.

_____, see:

1. D. R. Vaitkus, Department of Mechanical Engineering.
2. D. R. Watkins, Department of Mechanical Engineering.

Expander, W. R., see:

1. M. R. Baer, Department of Mechanical Engineering.
2. C. E. Mitchell, Department of Mechanical Engineering, (3 coauthorships).

Haberstroh, R. D. and R. D. Reinders, Conducting-sheet model for natural convection through density-stratified interface. International Journal of Heat and Mass Transfer, Vol. 16, 1973. MEP73-74RDH-RDH4.

_____, R. N. Meroney, I. K. Kim, and S. P. Verma, Spent-flow effects and mass transfer in air-impingement dryers. Progress report to Kodak Company, November 1971. 31 p. MER71-72RDH-RNM-IKK-SPV6.

_____, see:

1. K. M. Atesman, Department of Mechanical Engineering.
2. S. Nagpal, Department of Mechanical Engineering.
3. G. S. VijayaRaghavan, Department of Agricultural Engineering.

Hardee, A. G. and K. F. Barber, Diffusion of spermatozoa in human cervical mucus. Final Technical Report. Prepared for National Science Foundation Engineering Research Initiation Grant No. GK-5895. May 4, 1972. 40 p. MER71-72AGH-KFB8.

Anderson, R. C., _____, and K. Millsaps, Electrokinetic determination of turbulent transition. Accepted for publication in Zeitschrift fur Naturforschung, Part A, December 1971. 9 p. MEP71-72RCA-AGH-KM3.

Histand, M. B., R. Daigle, C. W. Miller, and F. D. McLeod, Evaluation of the pulsed Doppler with a fast Fourier transform. Proceedings of the Eleventh Annual Rocky Mountain Bioengineering Symposium, Vol. 11, 1974. MEP73-74MBH-RD-CWM-FDM32.

Histand, M. B. and C. W. Miller, Pulsed Doppler flowmetry. X International Conference on Medical and Biological Engineering, Dresden, 1973. MEP73-74MBH-CWM28.

_____, C. W. Miller, and F. D. McLeod, The transcutaneous measurement of blood velocity profiles and flow. Cardiovascular Research, Vol. 7, 1973. MEP73-74MBH-CWM-FDM25.

_____ and M. Anliker, The influence of flow and pressure on wave propagation in the canine aorta. Circulation Research, Vol. 32, 1973. MEP73-74MBH-MA24.

_____, C. W. Miller, and R. C. Nealeigh, A comparison of velocity profiles measured in unexposed and exposed arteries. Proceedings of the Ninth Annual Rocky Mountain Bioengineering Symposium, Vol. 9, May 1972. MEP71-72MBH-CWM-RCN23.

_____ and C. W. Miller, Transcutaneous measurement of blood velocity profiles and instantaneous flow. Proceedings of the 25th Annual Conference on Engineering in Medicine and Biology, Vol. 14, 1972. MEP72-73MBH-CWM22.

_____, Secondary flow in the aortic arch. Final Report GK-5572, National Science Foundation. 1972. MER72-73MBH10.

Daigle, R., C. W. Miller, and _____, An ultrasonic esophageal probe for measurement of aortic blood flow and wall motion. Proceedings of the Tenth Annual Rocky Mountain Bioengineering Symposium, Vol. 10, 1973. MEP73-74RD-CWM-MBH27.

McLeod, R. D., R. E. Daigle, C. W. Miller, R. J. Morgan, and _____, A digital Doppler velocity profile meter. Proceedings, Eleventh Annual Rocky Mountain Bioengineering Symposium, Vol. 11, 1974. MEP73-74RDM-RED-CWM-RJM-MBH31.

Miller, C. W., _____, D. E. Hokanson, and F. D. McLeod, Atherosclerosis and its effect on thoracic aorta wall motion and peripheral blood velocity patterns. IEEE Catalog No. 73, CH0807-8SU. 1973 Ultrasonics, Monterey, 1973. MEP73-74CWM-MBH-FDM30.

Miller, C. W. and _____, Nontraumatic measurement of blood flow, velocity, and wall motion in the thoracic aorta of dogs. X International Conference on Medical and Biological Engineering, Dresden, 1973. MEP73-74CWM-MBH29.

Miller, C. W., _____, and F. D. McLeod, The chronic measurement of local flow properties in the abdominal aorta of dogs. Medical Research Engineering, November 17, 1972. MEP72-73CWM-MBH-FDM18.

Miller, C. W. and _____, An evaluation of the measurement of flow rate using a pulsed Doppler velocity meter. Proceedings of the 25th Annual Conference on Engineering in Medicine and Biology, Vol. 14, 1972. MEP72-73CWM-MBH23.

Department of Mechanical Engineering - continued

Histand, M. B.

Miller, C. W., _____, and R. C. Nealeigh, The effect of arterial location upon arterial velocity distributions. Proceedings, Ninth Annual Rocky Mountain Bioengineering Symposium, Vol. 9, 1972. MEP72-73CWM-MBH-RCN21.

Miller, C. W., _____, R. B. Brewster, R. K. Brooks, and R. C. Nealeigh, The chronic measurement of local flow properties in the abdominal aorta of dogs. Colorado State University--Public Health Service Collaborative Radiological Health Laboratory Annual Report, 1972. MER72-73CWM-MBH-RDB-RKB-RCN7.

Miller, C. W., _____, and R. C. Nealeigh, The transcutaneous measurement of blood velocity profiles and flow. Colorado State University--Public Health Service Collaborative Radiological Health Laboratory Annual Report, 1972. MER72-73CWM-MBH-RCN6.

Miller, C. W., _____, R. E. Daigle, and R. C. Nealeigh, Nontraumatic measurement of blood flow velocity and wall motion in the thoracic aorta. Colorado State University--Public Health Service Collaborative Radiological Health Laboratory Annual Report, 1972. MER72-73CWM-MBH-RED-RCN5.

Miller, C. W., _____, and R. C. Nealeigh, Evaluation of a pulsed ultrasonic Doppler technique for assessment of cardiovascular function. Colorado State University--Public Health Service Collaborative Radiological Health Laboratory Annual Report, 1971. MER71-72CWM-MBH-RCN11.

_____, see R. L. Morris, Department of Mechanical Engineering.

Hsu, C., A special Galerkin method for a class of steady two-dimensional incompressible laminar boundary-layer flows. Technical Report. MWE73-74CCH2.

Isaacson, J., see P. Wilbur, Department of Mechanical Engineering.

Johnson, G. R. and C. B. Winn, On the simulation of solar heated and cooled buildings. Presented, International Solar Energy Society Annual Meeting, Fort Collins, Colorado, August 21-23, 1974. MEP73-74GRJ-CBW20.

_____, C. B. Winn, and Y. D. Desai, Feasibility of stream discharge forecasting. MER73-74GRJ-CBW-YBD1.

Bell, W. P., _____, and C. B. Winn, Control logic for real time control flow in combined sewers. Proceedings, Ninth Symposium on Water Pollution in Canada, University of Western Ontario, February 1974. CEP73-74WPB-GRJ-CBW27.

_____, see:

1. D. R. Vaitkus, Department of Mechanical Engineering.
2. C. B. Winn, Department of Mechanical Engineering, (4 coauthorships).

Kim, I. K., see R. D. Haberstroh, Department of Mechanical Engineering.

Kim, S. H. and H. E. Wilhelm, Stark effect and line broadening in three-dimensional stochastic fields. Journal of Applied Physics, Vol. 44, No. 2, February 1973. 9 p. MEP72-73SHK-HEW9.

_____ and W. H. Ellis, Voltage pulse profile characteristics with space charge of a loaded pulsed ionization chamber. Journal of Applied Physics, Vol. 43, No. 7, July 1972. 5 p. MEP72-73SHK1.

_____ and H. E. Wilhelm, Energy-density spectrum of electric field in a turbulent plasma. Physical Review A, Vol. 5, No. 4, April 1972. 7 p. MEP71-72SHK-HEW13.

_____ and H. E. Wilhelm, Statistical hydrodynamics of plasmas. Physical Review A, Vol. 4, No. 6, December 1971. 7 p. MEP71-72SHK-HEW4.

_____, see H. E. Wilhelm, Department of Mechanical Engineering.

Letcher, J. S., Jr., A new approach to numerical fairing and lofting. Marine Technology, April 1972. 8 p. MEP71-72JSL12.

Liron, N., see H. E. Wilhelm, Department of Mechanical Engineering.

Loehrke, R. I., see R. T. Mancini, Department of Mechanical Engineering.

Mancini, R. T., R. I. Loehrke, and R. D. Haberstroh, Experimental studies in a captive thermocline. Presented, 54th Annual Meeting of American Geophysical Union, April 1973. MEP72-73TRM-RIL-RDH14.

Marschner, B. W., see C. B. Winn, Department of Mechanical Engineering.

Menemeyer, P., see C. B. Winn, Department of Mechanical Engineering, (2 coauthorships).

Millsaps, K.
Anderson, R. C., A. G. Hardee and _____, Electrokinetic determination of turbulent transition. Accepted for publication in Zeitschrift fur Naturforschung, Part A, December 1971. 9 p. MEP71-72RCA-AGH-KM3.

Mitchell, C. E. and M. R. Baer, Stability of lined combustors with continuous combustion distribution. Proceedings of the 10th JANNAF Combustion Conference, Vol. II, December 1973. MEP73-74CEM-MRB36.

_____, M. R. Baer, and W. R. Espander, Combustion instability in chambers with distributed combustion. Proceedings of the 9th JANNAF Combustion Conference, Vol. I, November 1972. MEP72-73CEM-MRB-WRE19.

Department of Mechanical Engineering - continued

- Mitchell, C. E., Stability of combustors with partial length acoustic liners. Combustion Science and Technology, Vol. 6, 1972. 10 p. MEP71-72CEM10.
- _____, W. R. Espander, and M. R. Baer, Stability of combustors with partial length acoustic liners. NASA CR-120889. Prepared for National Aeronautics and Space Administration, Lewis Research Center, Grant NGR-06-002-095, March 1972. 68 p. MER71-72CEM-WRE-MRB7.
- _____, W. R. Espander, and M. R. Baer, Determination of decay coefficients for combustors with acoustic absorbers. NASA CR-120836. Prepared for National Aeronautics and Space Administration, Lewis Research Center, under Grant NGR-06-002-095, January 1972. 80 p. MER71-72CEM-WRE-MRB3.
- _____, see M. R. Baer, Department of Mechanical Engineering.
- Moore, J. B., see C. B. Winn, Department of Mechanical Engineering, (3 coauthorships).
- Morris, R. L., M. B. Hinstead, and C. W. Miller, The resolution of the ultrasound pulsed Doppler for blood velocity measurements. Journal of Biomechanics, Vol. 6, 1973. MEP73-74RLM-MBH-CWM26.
- Nagpal, S. and R. D. Haberstroh, A flow model air jets of air impinging perpendicular to a flat surface. In preparation for International Journal of Heat and Mass Transfer, March 1974. MEP73-74SN-RDH37.
- Prigmore, D. and P. J. Wilbur, Mobile Rankine cycle power plants, a system weight study. ASME paper 72-WA/Ener 4, November 26-30, 1972. MEP72-73DP-PJW12.
- Saheli, F., see H. J. Morel-Seytoux, Department of Civil Engineering, (2 coauthorships).
- Shaner, W. W., A course on project analysis in the LDCs. ASEE International Engineering Education Newsletter, Vol. II, No. 2, Fort Collins, Colorado, September 1973. MEP73-74WWS38.
- _____, Some problems associated with the use of foreign advisors in developing countries. In Transfer of Water Resources Knowledge Proceedings, First International Conference on Transfer of Water Resources Knowledge, E. Vlachos, ed., Fort Collins, Colorado, September 1972. Water Resources Publication, 1973. pp. 345-355. CEP72-73EVR-EV68.
- Smith, F. W. and D. R. Sorenson, The semielliptical surface crack--a solution by the alternating method. Technical Report No. 4, NASA Grant NGL-06-112-063, August 1, 1974. 25 p. MER73-74FWS-DRS6.
- Smith, F. W. and D. R. Sorenson, The elliptical crack subjected to nonuniform shear loading. Paper No. 73-APMW-42, presented at ASME Western Applied Mechanics Conference, Menlo Park, California, September 17-19, 1973. ASME Transactions, Journal of Applied Mechanics, Vol. 41, No. 2, June 1974. 5 p. MEP73-74FWS-DRS34.
- _____, and J. O. Curtis, Stress analysis and failure prediction in avalanche snowpacks. Presented at International Symposium on Snow Mechanics, Grindelwald, Switzerland, April 1974. MEP73-74FWS-JOC11.
- _____, The elliptical crack subjected to nonuniform shear loading. Technical Report No. 3, National Aeronautics and Space Administration. February 1973. MER72-73FWS9.
- _____, Elastic stresses in layered snowpacks. Presented at the Fall 1971 meeting of the American Geophysical Union, San Francisco, California, Journal of Glaciology, Vol. 11, No. 63, November 1972. 8 p. MEP72-73FWS10.
- _____, Fracture testing of penetrated surface flaws. Technical Report No. 2, National Aeronautics and Space Administration, September 1972. MER72-73FWS8.
- _____, The elastic analysis of the part-circular surface flaw problem by the alternating method. Invited paper, ASME publication "The Surface Crack, Physical Problem and Computational Solutions." Presented, Special Symposium on the Surface Flaw Problem, Applied Mechanics Division of ASME, November 30, 1971. MEP71-72FWS24.
- _____, Stress intensity factors for a surface flawed fracture specimen. Prepared for National Aeronautics and Space Administration, NASA Contract NGR-06-002-063, September 1971. MER71-72FWS12.
- _____, see J. O. Curtis, Department of Mechanical Engineering.
- Vaitkus, D. R., H. W. Edwards, and G. R. Johnson, Model for environmental transport of automotive lead. Presented, Symposium on Trace Substances in Environmental Health - VII. University of Missouri, Columbia, 1974. 13 p. MEP73-74DRV-HWE-GRJ5.
- _____, and H. W. Edwards, Model for environmental transport of automotive lead. In "Impact on Man of Environmental Contamination Caused by Lead," 1972. 15 p. MER72-73HWE4.
- _____, see H. W. Edwards, Department of Mechanical Engineering.
- Vander Werff, T. J., The pressure measured in ophthalmodynamometry. Arch. Ophthal, Vol. 87, March 1972. 2 p. MEP71-72TJV9.

Department of Mechanical Engineering - continued

- Vander Werff, T. J. and L. M. Maxwell, Videotaped university courses for high school students. Proceedings, Pan American Congress of Mechanical, Electrical, and Allied Engineering Branches, Lima, Peru, November 11-18, 1971. 8 p. MEP71-72TJV-LMM18.
- Watkins, D. R. and H. W. Edwards, Model for short-range transport of lead from traffic exhaust. MEP73-74DRW-HWE3.
- Wilbur, P. J., Hollow cathode restartable 15 cm diameter ion thruster. Annual Report. NASA CR-134532. Prepared for Lewis Research Center, National Aeronautics and Space Administration Grant NGR-06-002-112, December 1973. 97 p. MER73-74PJW3.
- _____, A mercury flow meter for ion thruster testing. AIAA Paper No. 73-1087, presented at AIAA 10th Electric Propulsion Conference, November 1973. MEP73-74PJW14.
- _____, Performance of a 15 cm ion thruster with reliable restart capability. AIAA Paper No. 73-1139, presented at AIAA 10th Electric Propulsion Conference, November 1973. MEP73-74PJW13.
- _____, Correlation of ion and beam current densities in Kaufman thrusters. Journal of Spacecraft and Rockets, Vol. 10, No. 9, September 1973. MEP73-74PJW12.
- _____, Performance of a 15 cm ion thruster with dish grids. Presented at Conference on Electric Propulsion of Space Vehicles, Culham Laboratory, Abingdon, Berkshire, England, April 10-12, 1973. MEP72-73PJW13.
- _____, and J. Isaacson, Plasma property contours in a 15 cm hollow cathode Kaufman thruster. Prepared under Grant NGR-06-002-112, Lewis Research Center, National Aeronautics and Space Administration, February 1973. MER72-73PJW20.
- _____, Effects of the hollow cathode discharge on throttled ion thruster performance. Paper No. 72-431, presented at the AIAA 9th Electric Propulsion Conference, Bethesda, Maryland, April 17-19, 1972. Journal of Spacecraft and Rockets, Vol. 10, No. 1, January 1973. 2 p. MEP72-73PJW7.
- _____, Experimental investigation of a throttleable 15 cm hollow cathode ion thruster. Annual Report. Prepared for Lewis Research Center, National Aeronautics and Space Administration, Grant NGR-06-002-112. NASA CR-121038, December 1972. 70 p. MER72-73PJW3.
- _____, An experimental investigation of a hollow cathode discharge. Annual Report. NASA DR-120847. Prepared for National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio, under Grant NGR-06-002-112, December 1971. 78 p. MER71-72PJW2.
- _____, see D. Prigmore, Department of Mechanical Engineering.
- Wilhelm, H. E. and N. Liron, Initial-boundary-value problem of the formation of an electrical discharge in a flow. The Physics of Fluids, Vol. 15, No. 7, July 1972. 10 p. MEP72-73HEW-LN2.
- _____, Nonlinear boundary-value problem for a conducting source flow in an inhomogeneous magnetic field. Canadian Journal of Physics, Vol. 50, 1972. 11 p. MEP71-72HEW16.
- _____, Nonlinear initial-boundary-value problem for convection, diffusion, ionization, and recombination processes. Journal of Mathematical Physics, Vol. 13, No. 2, February 1972. 5 p. MEP71-72HEW14.
- _____, Investigations on the dynamics of MHD flows. Technical Report No. 3, period January 1, 1971-December 31, 1971. Office of Naval Research, Contract N00014-67-A-0299-0008, Task No. NR 099-389/10-10/68, January 15, 1972. 101 p. MER71-72HEW4.
- _____, Nonlinear eigenvalue problem of a self-sustained electrical discharge. Canadian Journal of Physics, Vol. 50, No. 11, 1972. 7 p. MEP70-71HEW28.
- _____, Nonlinear initial-boundary value problem for ionization and recombination processes. Proceedings of the Xth International Conference on Phenomena in Ionized Gases, Oxford, England, 1971. 1 p. MEP71-72HEW17.
- _____, and S. H. Kim, Hamiltonian and statistical electrohydrodynamics. Proceedings of the Xth International Conference on Phenomena in Ionized Gases, Oxford, England, 1971. 1 p. MEP71-72HEW-SHK15.
- _____, see S. H. Kim, Department of Mechanical Engineering, (3 coauthorships).
- Winn, C. B., G. R. Johnson, and J. B. Moore, Optimal utilization of solar energy in the heating and cooling of buildings. Presented at the International Solar Energy Society Annual Meeting, Fort Collins, Colorado, August 21-23, 1974. MEP73-74CBW-GRJ-JBM21.
- _____, and G. R. Johnson, Dynamic simulation for performance analysis of solar heated and cooled buildings. Accepted by ASME, June 1974. MEP73-74CBW-GRJ23.
- _____, Optimal estimation of unmodeled accelerations on the ONERA Navigational Satellite, Accepted by Journal of Spacecraft and Rockets, June 1974. MEP73-74CBW22.
- _____, G. R. Johnson, and T. E. Corder, SIMSHAC-- A simulation program for solar heating and cooling of buildings. Accepted by Journal of Simulation, March 1974. MEP73-74CBW-GRJ-TEC18.
- _____, and J. B. Moore, The application of optimal linear regulator theory to a problem in water pollution. IEEE Transactions on Systems, Man, and Cybernetics, September 1973. MEP73-74CBW-JBM19.

Department of Mechanical Engineering - continued

- Winn, C. B., Optimal estimation of unmodeled accelerations on the ONERA Navigational Satellite. Office of National D;Etudes et de Aerospatiale Recherch, August 1973. MER73-74CBW7.
- _____, B. W. Marschner, and F. R. Krause, Conceptual feasibility studies on retrieval of regional stream discharge information from multi-spectral earth observations. ASCE National Meeting on Water Resources Engineering, Washington, D.C., January 1973. MEP72-73CBW-BWM20.
- _____, and J. B. Moore, An optimal regulator for a metropolitan storm-sewer system. Proceedings of the Sixth Hawaii International Conference on System Sciences, Honolulu, Hawaii, January 1973. MEP72-73CBW-JBM15.
- _____, The use of hydrological simulation and remote sensing in an integrated program for water resource systems. Journal of Simulation, July 1972. MEP72-73CBW17.
- _____, G. R. Johnson, and F. R. Krause, The application of remote sensing and simulation of streamflow runoff to the management of water resource systems. Summer Simulation Conference, San Diego, California, June 1972. MEP71-72CBW-GRJ22.
- _____, G. R. Johnson, J. F. Ruff, and J. L. Rasmussen, SNOSET final report. NASA NAS8-21049. Prepared for National Aeronautics and Space Administration, June 1972. 148 p. MER71-72CBW-GRJ-JFR-JLR9.
- _____, and P. Mennemeyer, Coverage obtained by controlled satellite constellations for regional communications. AIAA Journal of Spacecraft and Rockets, February 1972. 24 p. MEP70-71CBW-PM11.
- _____, and F. R. Krause, Applications of remote sensing to stream discharge predictions. Presented at HATS Space Congress, Huntsville, Alabama, November 15-19, 1971. MEP71-72CBW21.
- _____, and P. Mannemeyer, The application of simulation of mission planning for communication and data relay satellites. Systems and Simulation in the Service of Society, Vol. 1, No. 2, 1971. MEP71-72CBW-PM20.
- _____, see:
1. P. W. Bell, Department of Civil Engineering, (3 coauthorships).
 2. Y. Desai, Department of Mechanical Engineering.
 3. N. Duong, Department of Mechanical Engineering, (3 coauthorships).
 4. G. R. Johnson, Department of Mechanical Engineering, (2 coauthorships).

Department of Mechanical Engineering

Theses

- Baer, M. R., Distributed combustion instability. M.S. Thesis, August 1972. Adviser: C. E. Mitchell. MET72-73MRB54.
- Bakel, R. L., Material storage space forecast. M.S. Thesis, June 1974. Advisers: W. S. Duff and F. W. Smith. MET73-74RLB4.
- Bandon, E., Shrinkage due to welding. M.S. Thesis, August 1973. Adviser: S. B. Thayer. MET73-74EB43.
- Barth, F. C., Precision grinding automation. Ph.D. Dissertation, December 1973. Adviser: S. B. Thayer. MED73-74FCB49.
- Batton, W. D., The specular-diffuse spherical cavity. Ph.D. Dissertation, August 1972. Adviser: Knox Millsaps. MED72-73WDB46.
- Baxter, J. A., Dynamic programming application. M.S. Thesis, December 1973. Advisers: W. S. Duff and F. W. Smith. MET73-74JAB50.
- Broughton, J. M., Experiments in thermohaline convection. M.S. Thesis, August 1972. Adviser: R. D. Haberstroh. MET72-73JMB55.
- Brouwer, L. G., Reduction of nitric oxide by graphite. M.S. Thesis, April 1972. Adviser: H. W. Edwards. MED71-72LGB56.
- Brown, C. M., Computerized space flight planning. M.S. Thesis, June 1973. Adviser: S. B. Thayer. MET72-73CMB68.
- Brown, R. A., Penetrated surface flow testing. M.S. Thesis, December 1972. Adviser: F. W. Smith. MET72-73RAB64.
- Chatto, R. B., Reliability--an engineering tool. M.S. Thesis, August 1973. Advisers: W. S. Duff and S. B. Thayer. MET73-74RBC44.
- Clema, J. K., The simulation of decision making. Ph.D. Dissertation, March 1973. Advisers: S. B. Thayer and B. W. Marschner. MED72-73JKC65.
- Culot, M. V. J., Radon progeny control in buildings. Ph.D. Dissertation, May 1973. Adviser: H. G. Olson. MED72-73MVJC35.
- Curtis, J.O., Linear elastic analysis of dry slab avalanche release mechanisms. M.S. Thesis, June 1973. Adviser: F. W. Smith. MET72-73JOC29.
- Duong, N., Modern control concepts in hydrology. Ph.D. Dissertation, March 1973. Adviser: C. B. Winn. MED72-73ND66.
- Expander, W. R., Partial length liners in rocket motors. M.S. Thesis, August 1971. Adviser: C. E. Mitchell. MET71-72WRE8.

Department of Mechanical Engineering - continued

- Etherington, W. C., Experiment alignment in a spacecraft. M.S. Thesis, June 1973. Adviser: S. B. Thayer. MET72-73WCE69.
- Graf, R. A., Project selection and timing. M.S. Thesis, December 1973. Adviser: S. B. Thayer. MET73-74RAG51.
- Hestens, R., Design of real-time computer systems. M.S. Thesis, August 1972. Adviser: S. B. Thayer. MET72-73RH56.
- Hinnerichs, T. D., Directional stability of cracks. M.S. Thesis, June 1973. Adviser: F. W. Smith. MET72-73TDH70.
- Hoffman, R. L., Optimizing a project manpower schedule. M.S. Thesis, June 1974. Advisers: W. S. Duff and C. F. Warnock. MET73-74PLH55.
- Jiacoletti, R. J., Fission cross section of neptunium-237. Ph.D. Dissertation, August 1972. Adviser: H. G. Olson. MED72-73RJ57.
- Kim, S. H., Statistical mechanics of plasmas. Ph.D. Dissertation, August 1972. Adviser: H. E. Wilhelm. MED72-73SHK53.
- Koske, J. W., Radon mean residence time in buildings. M.S. Thesis, June 1973. Adviser: H. G. Olson. MET72-73JEK71.
- Ladd, E. R., A dynamic programming approach to goal programming. Ph.D. Dissertation, June 1973. Adviser: S. B. Thayer. MED72-73ERL72.
- Leon, H. I., Heat addition to supersonic nozzle. Ph.D. Dissertation, June 1973. Adviser: F. W. Smith. MED72-73HIL73.
- McBride, J. N., Effects of grinding magnetic tape heads. Ph.D. Dissertation, August 1972. Adviser: S. B. Thayer. MED72-73JNM58.
- Morris, R. L., Resolution of the pulsed Doppler for blood velocity measurements. M.S. Thesis, August 1972. Adviser: M. B. Hestand. MET72-73RML59.
- Nagpal, S. C., Analysis of the spent-flow effect in air-impingement heat transfer. Ph.D. Dissertation, March 1974. Adviser: R. D. Haberstroh. MET73-74SCN52.
- Ogley, G. A., Establishing reliability specifications. M.S. Thesis, August 1973. Adviser: S. B. Thayer. MET73-74GAO45.
- Panton, D. R., Convection through perforated plates. M.S. Thesis, August 1973. Adviser: R. D. Haberstroh. MET73-74DRP48.
- Parker, R. L., The carcass compression tests. M.S. Thesis, June 1973. Adviser: S. B. Thayer. MET72-73RLP4.
- Plumb, O. A., Natural convection of heat from horizontal circular disks. M.S. Thesis, August 1972. Adviser: R. D. Haberstroh. MET72-73OAP60.
- Reinders, R. D., Free convection between fluid layers. M.S. Thesis, June 1972. Adviser: R. D. Haberstroh. MET71-72RDR65.
- Richmond, C. E., Jr., Success profile for competitive bids. M.S. Thesis, August 1972. Adviser: S. B. Thayer. MET72-73CER61.
- Rothermel, R. C., An examination of radiation's role in rate of fire spread in wildland fuels. M.S. Thesis, August 1971. 61 p. Adviser: R. D. Haberstroh. MET71-72RCR9.
- Saheli, F. P., Minimization of time of detection of the effect of weather modification. Ph.D. Dissertation, May 1972. 128 p. Advisers: H. J. Morel-Seytoux and C. E. Mitchell. MED71-72FS7.
- Saito, G. E., Viscoelastic effects in blood flow. M.S. Thesis, August 1973. Adviser: T. J. Vander Werff. MET73-74GES46.
- Sek, K. S., Temperature distribution of hot-wire anemometer. M.S. Thesis, March 1973. Adviser: R. D. Haberstroh. MET72-73KSS67.
- Sorenson, D. R., Stress intensity factors for semi-elliptical cracks. Ph.D. Dissertation, May 1974. Adviser: F. W. Smith. MED73-74DRS24.
- Squire, H. A., Evolution of quality sampling. M.S. Thesis, August 1972. Adviser: S. B. Thayer. MET72-73HAS62.
- Stockebrand, W. W., An employee cost reduction program. M.S. Thesis, August 1973. Adviser: S. B. Thayer. MET73-74WWS47.
- Thornock, R. D., Computer simulation of design tolerances. M.S. Thesis, June 1974. Advisers: W. S. Duff and F. W. Smith. MET73-74RDT56.
- Townsend, D. W., Markov chains and reliability growth models. M.S. Thesis, June 1973. Advisers: S. B. Thayer and W. S. Duff. MET72-73DWT75.
- Watkins, D. R., Model for short-range transport of automotive lead. Ph.D. Dissertation, August 1974. Adviser: H. W. Edwards. MED73-74DRW26.
- Wilson, G. E., Thermal comfort of instrument panels. M.S. Thesis, August 1972. Adviser: S. B. Thayer. MET72-73GEW63.
- Wright, J. H., Observations of thermohaline convective instabilities. M.S. Thesis, March 1974. Advisers: R. I. Loehrke and F. W. Smith. MET73-74JHW53.
- Young, M. H., Engineering change order systems. M.S. Thesis, June 1973. Adviser: S. B. Thayer. MET72-73MHY76.

For copies of publications from the Department of Mechanical Engineering contact the senior author or the Department Head, Colorado State University, Fort Collins, Colorado 80523.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOIL, WATER AND AIR SCIENCES
COLORADO-WYOMING AREA

Staff Members
1971-74

C. E. Evans, Area Director

BLINCO, P. H., Hydraulic Engineer: (sediment transport, hydraulics).
DUKE, H. R., Agricultural Engineer: (drainage, pollution control, irrigation).
HAISE, H. R., Soil Scientist and Research Leader: (irrigation).
HEERMANN, D. F., Agricultural Engineer: (irrigation, dryland moisture conservation).
KRUSE, E. G., Agricultural Engineer: (hydraulics, irrigation, drainage).
LANE, L. J., Hydrologist: (surface runoff).
THOMAS, A. W., Agricultural Engineer: (irrigation).
WOOLHISER, D. A., Hydraulic Engineer and Research Leader: (hydrology, hydraulics, sedimentation).

PUBLICATIONS

USDA, ARS, Soil, Water and Air Sciences, Colorado-Wyoming Area

- Blinco, P. H. and D. B. Simons, Characteristics of turbulent boundary shear stress. Paper 10477, ASCE Proceedings, Journal of the Engineering Mechanics Division, Vol. 100, No. EM 2, April 1974. 18 p. CEP73-74PHB-DBS59.
- _____, K. Mahmood and D. B. Simons, Stochastic structure of the turbulent boundary shear stress process. Proceedings of the 15th Congress of the International Association for Hydraulic Research (IAHR), Vol. 1, Paper A47, September 1973. 10 p. CEP73-74PHB-KM-DBS8.
- _____, and D. B. Simons, Measurement of instantaneous boundary shear stress. Hydraulic Engineering and the Environment. Proceedings of the Hydraulic Division Specialty Conference, Bozeman, Montana, August 15-17, 1973. 12 p. CEP73-74PHB-DBS13.
- _____, see:
1. K. Mahmood, Department of Civil Engineering.
2. D. A. Woolhiser, Agricultural Research Service, (2 coauthorships).
- Duke, H. R. and H. R. Haise, Vacuum extractors to assess deep percolation losses and chemical constituents of soil water. Proceedings of Soil Science Society of America Note, Vol. 37, No. 6, November-December 1973. AEP73-74HRD-HRH76.
- _____, Drainage design based upon aeration. Supported by Western Regional Research Project W-51, June 1973. 65 p. Hydrology Paper No. 61.
- _____, Capillary properties of soil--influence upon specific yield. ASAE Transactions, Vol. 15, _____, see D. C. Kincaid, Agricultural Research Service.
- Evans, C. E., D. A. Woolhiser and F. Rauzi, Opportunity for harvesting water from and along highways in rangeland areas of Wyoming. To be published in Proceedings of Water Harvesting Symposium, Phoenix, Arizona, March 26-28, 1974. CEP73-74CEE-DAW-FR87.
- Haise, H. R. and F. G. Viets, Jr., Management of irrigation water in relation to degradation of streams by return flow. Proceedings of National Conference on Managing Irrigated Agriculture to Improve Water Quality, Grand Junction, Colorado, May 16-18, 1972. 10 p. AEP71-72HRH-FGV36.
- _____, see:
1. H. R. Duke, Agricultural Research Service.
2. E. G. Kruse, Agricultural Research Service, (2 coauthorships).
- Hanson, C. L., E. L. Neff and D. A. Woolhiser, Hydrologic aspects of water harvesting in the Northern Great Plains. To be published in Proceedings of Water Harvesting Symposium, Phoenix, Arizona, March 26-28, 1974. CEP73-74CLH-ELN-DAW88.
- Heermann, D. F., M. D. Finkner and E. A. Hiler, Probability of sequences of wet and dry days for 11 western states and Texas. Colorado State University Experiment Station Technical Bulletin 117. In cooperation with Agricultural Research Service and National Weather Service, U.S. Department of Commerce. A Western Regional Research Publication, December 1971. 306 p. AEP71-72DFH16.

Agricultural Research Service - continued

- Kibler, D. F. and D. A. Woolhiser, Mathematical properties of the kinematic cascade. *Journal of Hydrology*, Vol. XV, No. 2, 1972. CEP69-70DFK-DAW133.
- Kincaid, D. C. and D. F. Heermann, Scheduling irrigations using a programmable calculator. *Nebraska Agricultural Experiment Station Journal Series Paper No. 3604*. Agricultural Research Service in Cooperation with Colorado and Nebraska Agricultural Experiment Station. ARS-NC-12, February 1974. 57 p. AEP73-74DCK-DFH78.
- Kruse, E. G. and H. R. Haise, Water use by native grasses in high altitude Colorado meadows. Report ARS-W-6. Soil, Water and Air Sciences, Western Region, Agricultural Research Service, U.S. Department of Agriculture, in cooperation with Colorado State University Experiment Station, February 1974. 65 p. AER73-74EGK-HRH3.
- _____ and H. R. Haise, Effectiveness of precipitation in a mountain meadow. *Proceedings of the ASCE, Irrigation and Drainage Division Specialty Conference, Fort Collins, Colorado, April 22-24, 1973*. 20 p. AEP73-74EGK-HRH75.
- Nicolaescu, I. and _____, Automatic cutback furrow irrigation system design. Paper 8348. *Proceedings of American Society of Civil Engineering, Journal of the Irrigation and Drainage Division*, Vol. 97, No. IR 3, September 1971. 11 p. CEP71-72IN-EGK29.
- _____, see A. W. Thomas, Agricultural Research Service.
- Neff, E. L., see C. L. Hanson, Agricultural Research Service.
- Rauzi, F., see C. E. Evans, Agricultural Research Service.
- Smith, R. E. and D. A. Woolhiser, Overland flow on an infiltrating surface. *Water Resources Research*, Vol. 7, No. 4, August 1971. 15 p. CEP71-72RES-DAW28.
- _____, see D. A. Woolhiser, Agricultural Research Service.
- Thomas, A. W., E. G. Kruse and H. R. Duke, Steady infiltration from line sources buried in soil. Presented at 1973 Winter Meeting of the American Society of Agricultural Engineers, 1973. AEP73-74AWT-EGK-HRD68.
- Viets, F. G., Jr., see H. R. Haise, Agricultural Research Service.
- Woolhiser, D. A. and P. Todorovic, A stochastic model of sediment yield for ephemeral streams. *Proceedings of the Symposium on Statistics in Hydrology, Tucson, Arizona, August 31-September 2, 1971*. USDA Miscellaneous Publication No. 1275, June 1974. 15 p. CEP71-72DAW-PT15.
- Woolhiser, D. A., The watershed approach to understanding our environment. *Journal of Environmental Quality*, Vol. 4, No. 1, January-March 1975. pp. 17-21. CEP73-74DAW84.
- _____, Principles and methods for computerized management of water resource systems. *Symposium on the Use of Computer Techniques and Automation for Water Resource Systems, Washington, D.C., March 26-28, 1974*. CEP73-74DAW86.
- _____ and P. H. Blinco, Watershed sediment yield--a stochastic approach. *Proceedings, Sediment Yield Workshop, Oxford, Mississippi, November 28-30, 1972*. Accepted for publication as an Agricultural Research Service Series publication, 1974. CEP72-73DAW-PHB97.
- _____, Hydrologic and watershed modeling--state of the art. *ASAE Transactions*, Vol. 16, No. 3, 1973. 7 p. CEP72-73DAW82.
- _____ and E. F. Schulz, Large material models in watershed hydrology research. *Proceedings of the International Association for Hydraulic Research International Symposium on River Mechanics*. Asian Institute of Technology, Bangkok, Thailand, January 9-12, 1973. 12 p. CEP72-73DAW-EFS70.
- _____, General report on uncertainties in deterministic models. *Proceedings of the International Symposium on Uncertainties in Hydrologic and Water Resource Systems, Tucson, Arizona, December 11-14, 1972*. 1973. 7 p. CEP72-73DAW78.
- _____, see D. A. Woolhiser, Department of Civil Engineering.
- _____, E. Rovey and P. Todorovic, Temporal and spatial variation of parameters for the distribution of N-day precipitation. *Floods and Droughts, Book I of Proceedings of the Second International Symposium in Hydrology, September 11-13, 1972*. 10 p. CEP72-73DAW-ER-PT81.
- _____, M. E. Holland, G. L. Smith and R. E. Smith, Experimental investigation of converging overland flow. Presented at 1970 Winter Meeting, American Society of Agricultural Engineers, Chicago, December 8-11, 1970. ASAE Paper No. 70-713. *ASAE Transactions*, Vol. 14, No. 4, 1971. 21 p. CEP70-71DAW-MEH-GLS-RESS7.
- Chang, H. Y., D. B. Simons and _____, Flume experiments on alternate bar formation. *Closure. ASCE Proceedings, Journal of Waterways, Harbors and Coastal Engineering Division*, Vol. 99, No. WW1, 1973. CER69-70HYC-DBS-DAW45a.
- _____, see:
1. C. E. Evans, Agricultural Research Service
 2. C. L. Hanson, Agricultural Research Service.
 3. D. F. Kibler, Agricultural Research Service.
 4. R. E. Smith, Agricultural Research Service.
 5. P. Todorovic, Department of Civil Engineering, (3 coauthorships).

Agricultural Research Service - continued

USDA, ARS, Soil, Water and Air Sciences, Colorado-Wyoming Area

Theses

Blinco, P. H., Spatial structure of the viscous sublayer. Ph.D. Dissertation, May 1974. 204 p. Adviser: D. B. Simons. CED73-74PHB27.

Duke, H. R., Drainage design based upon aeration. Ph.D. Dissertation, August 1972. Adviser: A. T. Corey. AED71-72HRD45.

Thomas, A. W., Steady infiltration from line sources with application to subsurface irrigation. Ph.D. Dissertation, August 1972. 154 p. Adviser: E. Gordon Kruse. AED72-73AWT6.

Copies of Agricultural Research Service publications may be secured from the Washington office.

UNITED STATES GEOLOGICAL SURVEY

Staff Members
1971-74

C. F. Nordin, Head

BENNETT, J. P., Hydraulic Engineer: (mechanics of flow).	MCQUIVEY, R. S., Research Hydrologist: (turbulence measurement).
DAWDY, D. R., Research Hydrologist: (uncertainties in data).	MOSS, M. W., Hydraulic Engineer: (uncertainties in data).
JOBSON, H. E., Hydraulic Engineer: (heat transfer at water surfaces).	NORDIN, C. F., Research Hydrologist: (sediment measurement).
KEEFER, T. N., Hydraulic Engineer: (turbulence measurement).	RATHBUN, R. E., Research Hydrologist: (reaeration in open-channel flow).

PUBLICATIONS

United States Geological Survey

- Bennett, J. P., An investigation of the suspended load transport efficiency in the Bagnold equation. Proceedings of the IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 9-12, 1973. 9 p. CEP71-72JPB85.
- _____ and G. V. Sabol, Investigation of sediment transport curves constructed using periodic and aperiodic samples: Presented at IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 1973. 12 p. CEP71-72JPB-GVS84.
- _____ and R. E. Rathbun, Reaeration in open-channel flow. U.S. Geological Survey Professional Paper No. 737, 1972. 84 p. CEP72-73JPB-RER17.
- Culbertson, J. K., C. H. Scott, and _____, Summary of alluvial-channel data from Rio Grande conveyance channel, New Mexico, 1965-69. U. S. Geological Survey Professional Paper No. 562-J, 1972. 53 p. CEP72-73JPB27.
- Culbertson, J. K., C. H. Scott, and _____, Summary of alluvial-channel data from Rio Grande conveyance channel, New Mexico, 1965-69. Open-file Report, U. S. Geological Survey, Water Resources Division, August 1971. 168 p. CER71-72JPB30.
- _____, see I. I. Esen, United States Geological Survey.
- Dawdy, D. R., R. W. Lichty, and J. M. Bergmann, A rainfall-runoff simulation model for estimation of flow peaks for small drainage basins. U. S. Geological Survey Professional Paper No. 506-B, 1972. 32 p. CEP71-72DRD71.
- _____, Comment on "Analysis of Stochastic Hydrologic Systems" by Ven Te Chow and S. J. Kareliotis. Water Resources Research, Letters, Vol. 8, No. 1, February 1972. 3 p. CEP71-72DRD61.
- Dawdy, D. R., U. S. Geological Survey research program in stochastic hydraulics. Proceedings of the First International Symposium on Stochastic Hydraulics, University of Pittsburgh, May 31-June 2, 1971, Part 8. 5 p. CEP71-72DRD72.
- _____, see:
1. L. E. Garcia, Department of Civil Engineering.
 2. J. M. Mejia, Department of Civil Engineering.
 3. M. E. Moss, United States Geological Survey.
 4. I. Rodriguez-Iturbe, Department of Civil Engineering (2 coauthorships).
 5. P. Todorovic, Department of Civil Engineering.
- Esen, I. I. and J. P. Bennett, Probabilistic analysis of dissolved oxygen. Proceedings of the First International Symposium of Stochastic Hydraulics, University of Pittsburgh, May 31-June 2, 1971, Part 3. 8 p. CEP71-72IIE-JPB74.
- Jobson, H. E., Effect of using averaged data on the computed evaporation. Water Resources Research Vol. 8, No. 2, April 1972. 6 p. CEP71-72HEJ80.
- Brady, L. L. and _____, An experimental study of heavy mineral segregation under alluvial-flow conditions. Open-file Report, U. S. Geological Survey, March 1972. 144 p. CER71-72HEJ41.
- Keefer, T. N., see R. S. McQuivey, United States Geological Survey.
- McQuivey, R. S., T. N. Keefer, and M. A. Shirazi, Basic data report on the turbulent spread of heat and matter. Open-file Report, U. S. Geological Survey, Water Resources Division, in cooperation with the U. S. Environmental Protection Agency, National Thermal Pollution Research Program, August 1971. 176 p. CER71-72RSM-TNK9.

United States Geological Survey - continued

McQuivey, R. S., see C. F. Nordin, United States Geological Survey.

Moss, M. E., Serial-correlation structure of discretized streamflow. U.S. Department of the Interior, Geological Survey, Water Resources Division, Open-file Report, November 1972. 94 p. CER72-73MEM8.

_____ and D. R. Dawdy, Application of sensitivity analysis to reservoir design and worth of streamflow data. Presented at Symposium on Stochastic Hydrology, University of Arizona, Tucson, August 30-September 2, 1971. 28 p. CEP71-72MEM-DRD18.

Nordin, C. F., R. S. McQuivey, and J. M. Mejia, Hurst phenomenon in turbulence. Water Resources Research, Vol. 8, No. 6, December 1972. 7 p. CEP72-73CFN-RSM-JMM44.

_____ and D. B. Simons, Instrumentation and Measuring Techniques, Chapter 14, in River Mechanics, Vol. I, edited by H. W. Shen, Colorado State University, November 1971. CEP71-72HWS98.

_____, Sediment transport-bed load: general report. Proceedings of the First International Symposium on Stochastic Hydraulics, University of Pittsburgh, May 31-June 2, 1971, Part 4. 17 p. CEP71-72CFN73.

Nordin, C. F., A stationary Gaussian model of sand waves. Proceedings of the First International Symposium on Stochastic Hydraulics, University of Pittsburgh, May 31-June 2, 1971, Part 4. 17 p. CEP71-72CFN73.

_____, see:

1. R. E. Rathbun, United States Geological Survey (2 coauthorships).
2. I. Rodriguez-Iturbe, Department of Civil Engineering.

Rathbun, R. E., V. C. Kennedy, and C. F. Nordin, Transport and dispersion of fluorescent tracer particles for the dune-bed condition. Presented at IAHR International Symposium on River Mechanics, Bangkok, Thailand, January 9-12, 1973. CEP71-72REB-CFN86.

_____ and C. F. Nordin, Tracer studies of sediment transport processes. Paper 8364, Proceedings, ASCE, Journal of Hydraulics Division, Vol. 97, HY9, September 1971. 12 p. CEP71-72RER-CFN30.

_____, see J. P. Bennett, United States Geological Survey.

Sabol, G. V., see J. P. Bennett, United States Geological Survey.

Theses

Sabol, G. V., Estimation of sediment discharge from short term and intermittent samples of stream sediment gaging stations. M.S. Thesis, November 1972. 76 p. Adviser: E. V. Richardson. CET72-73GVS12.

Sabol, G. V., River dispersion: a skewed distribution. Ph.D. Dissertation, May 1974. 109 p. Adviser: C. F. Nordin. CED73-74GVS35.

Copies of United States Geological Survey publications may be secured from the Washington office.

COLORADO STATE UNIVERSITY
COLLEGE OF ENGINEERING

SERIES

FLUID MECHANICS PROGRAM

ECOM TECHNICAL REPORTS

- ECOM Technical Report No. 1. Meroney, R. N., D. Kesic and T. Yamada, Gaseous plume diffusion characteristics within model peg canopies. Task IIB Research Technical Report ECOM-C-0423-1, Deseret Test Center, U.S. Army Electronics Command contract DAAB07-68-C-0423, September 1968, 77 p., \$3.00.
- ECOM Technical Report No. 2. Plate, E. J., F. F. Yeh and R. Kung, Approximate joint probability distributions of the turbulence along a hypothetical missile trajectory downwind of a sinusoidal model ridge. Research and Development Technical Report ECOM-0423-2, U.S. Army Electronics Command contract DAAB07-68-C-0423, February 1969, 114 p., \$3.00.
- ECOM Technical Report No. 3. Sadeh, W. Z., J. E. Cermak and T. Kawatani, Flow field within and above a forest canopy. Task I: Study of airflow in simulated temperate and tropical forest canopies. Technical Report ECOM-C-0423-3, U.S. Army Electronics Command contract DAAB07-68-C-0423, July 1969, 67 p., \$2.00.
- ECOM Technical Report No. 4. Cermak, J. E., J. A. Garrison, R. N. Meroney, E. C. Nickerson, E. J. Plate and W. Z. Sadeh, Wind tunnel studies and simulations of turbulent shear flows related to atmospheric science and associated technologies. 1st Annual Report ECOM-C-0423-4, U.S. Army Electronics Command contract DAAB07-68-C-0423, June 30, 1969, 35 p., \$1.00.
- ECOM Technical Report No. 5. Chaudhry, F. H. and R. N. Meroney, Turbulent diffusion in a stably stratified shear layer. Task IIB Research Technical Report ECOM-C-0423-5, Deseret Test Center. Prepared for U.S. Army Electronics Command contract DAAB07-68-C-0423, September 1969, 204 p., \$4.00.
- ECOM Technical Report No. 6. Meroney, R. N. and B. T. Yang, Wind tunnel studies of the air flow and gaseous plume diffusion in the leading edge and downstream regions of a model forest. Task IIB Research and Development Technical Report ECOM-C-0423-6, Deseret Test Center. Prepared for Atmospheric Sciences Laboratory, U.S. Army Electronics Command contract DAAB07-68-C-0423, November 1969, 71 p. \$2.00.
- ECOM Technical Report No. 7. Chaudhry, F. H. and J. E. Cermak, Wind tunnel modeling of flow and diffusion over an urban complex. Technical report C-423-7 Deseret Test Center, U.S. Army Test and Evaluation Command, USATECOM Project No. 5-C0-403-000-017, contract DAAB07-68-C-0423, May 1971, 83 p., \$3.00.
- ECOM Technical Report No. 8. Anyiwo, J. and E. C. Nickerson, Wind tunnel study of the Dugway Proving Ground tower grid. U.S. Army Test and Evaluation Command, USATECOM project 5-C0-403-000-017, contractor project C-423-8, contract DAAB07-68-C-0423, November 1970, 27 p., \$1.00.
- ECOM Technical Report No. 9. Putta, S. N. and J. E. Cermak, Mass dispersion from an instantaneous line source in a turbulent shear flow. Technical Report prepared jointly for the U.S. Army Test and Evaluation contract DAAB07-68-C-0423 and Office of Naval Research contract N00014-68-A-0493-0001, Contractor project C-423-9, June 1971, 100 p. \$3.00.
- ECOM Technical Report No. 10. Kawatani, T. and W. Z. Sadeh, An investigation of flow over high roughness. Task I: Study of airflow in simulated temperate and tropical forest canopies. Fort Huachuca, Research and Development Technical Report ECOM-C-0423-10, Prepared for Atmospheric Sciences Laboratory, U.S. Army Electronics Command contract DAAB07-68-C-0423, and for Office of Naval Research contract N0014-68-A-0493-0001, August 1971, 174 p., \$4.00.

(Distribution of these documents is unlimited)

For copies of publications in this series contact the senior author or Engineering Research Center, Publications Office, Colorado State University, Fort Collins, Colorado 80523.

COLORADO STATE UNIVERSITY
DEPARTMENT OF ENGINEERING

SERIES

FLUID MECHANICS PROGRAM

FLUID MECHANICS PAPERS

- Fluid Mechanics Paper No. 1. Chao, J. L. and V. A. Sandborn, A resistance thermometer for transient temperature measurements. Prepared under Grant DA-SIG-36-039-62-G24 of the U.S. Army Electronics Research and Development Activity, Fort Huachuca, Arizona, January 1964, 27 p., \$3.00.
- Fluid Mechanics Paper No. 2. Cermak, J. E. and L. V. Baldwin, Measurement of turbulence in water by electrokinetic transducers. Presented at Symposium on Basic Research in Fluid Mechanics, 56th Annual Meeting of the American Institute of Chemical Engineers, Houston, Texas, December 3, 1963, supported by National Science Foundation Grants No. 10176 and GP789, April 1964, 34 p., \$3.00.
- Fluid Mechanics Paper No. 3. Finn, C. L. and V. A. Sandborn, Instrument for measuring the intermittency of quasi-steady signals. Prepared under Bureau of Ships Fundamental Hydromechanics Research Program S-R0090101, administered by David Taylor Model Basin, October 1964, 20 p., \$3.00.
- Fluid Mechanics Paper No. 4. Not available.
- Fluid Mechanics Paper No. 5. Plate, E. J. and C. W. Lin, Investigations of the thermally stratified boundary layer. Prepared under U.S. Army Materiel Command Grants DA-AMC-28-043-64-G-9 and DA-AMC-28-043-65-G20, February 1966, 49 p., \$3.00.
- Fluid Mechanics Paper No. 6. Not available.

For copies of publications in this series contact the senior author or Engineering Research Center Publications, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. The \$3.00 price is effective as long as the supply lasts. Xerox copies can be provided at 10 cents per page.

SERIES

FLUID MECHANICS PROGRAM

RESEARCH MEMORANDA

- Research Memorandum No. 1. Sandborn, V. A. and R. D. Marshall, Local isotropy in wind tunnel turbulence. Prepared for U.S. Army Research Grant DA-AMC-28-043-64-G9, February 1965, 24 p., CEM65VAS-RDM-1.
- Research Memorandum No. 2. Sandborn, V. S., C. Y. Liu and M. C. Tao, Measurements in a thermal boundary layer. Prepared for U.S. Army Research Grant DA-AMC-28-043-64-G9, February 1965, 55 p., CEM65VAS-CYL-MCT2.
- Research Memorandum No. 3. Not for distribution.
- Research Memorandum No. 4. Tieleman, H. and V. A. Sandborn, A three-dimensional single roughness element in a turbulent boundary layer. Prepared for U.S. Army Research Grant DA-AMC-28-043-64-G9, April 1965, 20 p., CEM65HT-VAS4.
- Research Memorandum No. 5. Liu, C. Y. and V. A. Sandborn, Evaluation of the turbulent energy dissipation from time derivative measurements. Prepared for U.S. Army Research Grant DA-AMC-28-043-64-G9, April 1965, 16 p., CEM65CYL-VASS, \$1.00.
- Research Memorandum No. 6. Sandborn, V. A., K. E. Cary and R. L. Atchley, A counter-current electron bombardment ion thruster. Prepared for National Aeronautics and Space Administration Grant Na G 570, May 1965, 10 p., CEM65-VAS-KEC-RLA6, \$1.00.
- Research Memorandum No. 7. Not for distribution.
- Research Memorandum No. 8. Plate, E. J. and V. A. Sandborn, Modeling of a thermally stratified boundary layer. Prepared for U.S. Army Research Grant DA-AMC-28-043-65-G20, April 1966, 28 p., CEM66EJP-VAS8, \$1.00.
- Research Memorandum No. 9. Arya, S. P. S. and E. J. Plate, Experiments in a thermally stratified boundary layer: A program. Prepared for U.S. Army Research Grant DA-AMC-28-043-65-G20, March 1967, 50 p., CEM66-67EJP9, \$2.00.
- Research Memorandum No. 10. Liu, C. Y., V. A. Sandborn and H. W. Tieleman, Turbulent spectral data in large-scale turbulent boundary layers, developed over different types of boundary roughness. Prepared for U.S. Army Research Grant DA-AMC-28-043-65-G20, November 1967, 24 p., CEM67-68CYL10, \$1.00.

Research Memoranda - continued

- Research Memorandum No. 11. Arya, S. P. S. and E. J. Plate, Hot-wire measurements of turbulence on a thermally stratified flow. Published in Instruments and Control Systems, Vol. 42, No. 3, March 1969 under title "Hot-wire measurements in an iso-thermal flow." Prepared for U.S. Army Research Grant DA-AMC-28-043-65-G20, February 1968, 29 p., CEM67-68SPSA-EJP11, \$1.00.
- Research Memorandum No. 12. Sandborn, V. A., H. W. Tieleman and C. Y. Liu, The similarity of large scale turbulent boundary layers. Prepared for U.S. Army Electronics Command contract DAAB07-68-0423, July 1968, 26 p., CEM68-69VAS-HWT-CYL12, \$1.00.
- Research Memorandum No. 13. Tieleman, H. W. and V. A. Sandborn, Turbulent shear measurements in large velocity gradients. Prepared for U.S. Army Electronics Command contract DAAB07-68-0423, July 1968, 22 p., CEM68-69HWT-VAS13, \$1.00.
- Research Memorandum No. 14. Sandborn, V. A., Characteristics of boundary layers at separation and reattachment. Prepared for Office of Naval Research contract N00014-68-A-0493-0001, project NR 062-414/6-6-68 (Code 438), February 1969, 57 p., CEM68-69VAS14, \$2.00.
- Research Memorandum No. 15. Sandborn, V. A., A. R. Bice, W. C. Cliff and B. C. Hablutzel, Preliminary analysis of cross-beam data from the Gun Barrel Hill site. Cross Beam Weather Watch Study, Monthly Progress Report, March 10-April 10, 1969. Prepared for NASA contract NAS8-21044, contract DCN 1-7-75-20042(IF), for Marshall Space Flight Center, April 1969, 68 p., CEM68-69VAS-ARB-WCC-BCH15, \$2.00.
- Research Memorandum No. 16. Sandborn, V. A. and D. J. Pickelner, Measurements of wind speeds with an optical cross-beam system. Prepared for NASA contract NAS8-21049, contract DCN 1-7-75-20042(IF) for the Marshall Space Flight Center, April 1969, IEEE Transactions on Geo-Science Electronics, Vol. GE7, No. 4, October 1969, 7 p., CEM68-69VAS-DJP16, \$1.00.
- Research Memorandum No. 17. Huff, L. L., V. A. Sandborn and K. E. Cary, Check out of rebuilt optical cross beam units. Prepared for NASA contract NAS8-21049, control DCN 1-7-75-20042(IF) for Marshall Space Flight Center, September 1969, 17 p., CEM69-70LLH-VAS-KEC17, \$1.00.
- Research Memorandum No. 18. Sandborn, V. A., Optical cross beam field tests at ESSA, Haswell Field Site, October 1969. Prepared for NASA contract NAS8-21049, control DCN 1-7-75-20042(IF), for the Marshall Space Flight Center, October 1969, 18 p., CEM69-70VAS18, \$1.00.
- Research Memorandum No. 19. Huff, L. L. and V. A. Sandborn, Analysis of cross beam runs taken at Haswell Field Site, October 1969. Prepared for NASA contract NAS8-21049, control DCN 1-7-75-20042(IF), for the Marshall Space Flight Center, November 1969, 42 p., CEM69-70LLH-VAS19, \$2.00.
- Research Memorandum No. 20. Huff, L. L. and V. A. Sandborn, Experimental probability density distributions for optical and infrared cross-beam units. Prepared for NASA contract NAS8-21049, control DCN 1-7-75-20042(IF), for the Marshall Space Flight Center, October 1970, 11 p., CEM70-71LLH-VAS20, \$1.00.
- Research Memorandum No. 21. Sandborn, V. A., Note on the boundary layer velocity distribution at turbulent separation. Prepared for Office of Naval Research contract N00014-68-A-0493-0001, project NE 062-414/6-6-68 (Code 438), November 1970, 11 p., CEM70-71VAS21, \$1.00.
- Research Memorandum No. 22. Sandborn, V. A., F. K. Chow, W. Z. Sadeh and L. L. Huff, Preliminary measurements in a turbulent boundary layer theory separation. CEM70-71VAS-FKC-WZS-LLH22.
- Research Memorandum No. 23. Koper, C. A., Jr. and W. Z. Sadeh, A preliminary study of a fan wake. Prepared for NASA contract NAS8-25236, for the Marshall Space Flight Center, March 1971, 19 p. CEM70-71CAK-WZS23, \$1.00.
- Research Memorandum No. 24. Sandborn, V. A., Cross beam weather watch study. Prepared for NASA contract NAS8-21049, control DCN 1-7-75-20042(IF), for Marshall Space Flight Center, December 1972, 184 p., CEM72-73VAS24.

For copies of publications in this series contact the senior author or Engineering Research Center Publications Office, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. The prices quoted above are effective as long as the supply lasts. Xerox copies can be provided for 10 cents per page.

COLORADO STATE UNIVERSITY

SERIES

HYDROLOGY PAPERS

- Hydrology Paper No. 1. Yevdjovich, V. M., Fluctuations of wet and dry years, Part I. Research data assembly and mathematical models. Sponsored by National Science Foundation, July 1963. 61 p. \$3.00.
- Hydrology Paper No. 2. Lee, R., Evaluation of solar beam irradiation as a climatic parameter of mountain watersheds. Research conducted through the Cooperative Watershed Management Unit, Colorado State University, August 1963. 56 p. \$3.00.
- Hydrology Paper No. 3. Brooks, R. H. and A. T. Corey, Hydraulic properties of porous media. Sponsored by Agricultural Research Service, National Science Foundation and Colorado State University, March 1964. 33 p. \$3.00.
- Hydrology Paper No. 4. Yevdjovich, V. M., Fluctuations of wet and dry years, Part II. Analysis by serial correlation. Sponsored by National Science Foundation, June 1964. 57 p. \$3.00.
- Hydrology Paper No. 5. Bloomsburg, G. L. and A. T. Corey, Diffusion of entrapped air from porous media. Supported by National Science Foundation, August 1964. 33 p. \$3.00.
- Hydrology Paper No. 6. Caffey, J. E., Inter-station correlations in annual precipitation and in annual effective precipitation. Supported by National Science Foundation, June 1965. 54 p. \$3.00.
- Hydrology Paper No. 7. Arbhahirama, A., H. R. Duke and A. T. Corey, Steady upward flow from water tables. Supported by Western Regional Projects W-32 and W-73, and by USAID funding, June 1965. 41 p. \$3.00.
- Hydrology Paper No. 8. Markovic, R. D., Probability functions of best fit to distributions of annual precipitation and runoff. Supported by National Science Foundation, August 1965. 38 p. \$3.00.
- Hydrology Paper No. 9. Corey, G. L., A. T. Corey and R. H. Brooks, Similitude for non-steady drainage of partially saturated soils. Supported by Western Regional Research Project W-51, August 1965. 47 p. \$3.00.
- Hydrology Paper No. 10. Yevdjovich, V. M., The application of surplus, deficit and range in hydrology. Supported by National Science Foundation, September 1965. 78 p. \$3.00.
- Hydrology Paper No. 11. Melentijevich, M. J., The analysis of range with output linearly dependent upon storage. Supported by National Science Foundation, September 1965. 36 p. \$3.00.
- Hydrology Paper No. 12. Pinkayan, S., Conditional probabilities of occurrence of wet and dry years over a large continental area. Supported by National Science Foundation, April 1966. 60 p. \$3.00.
- Hydrology Paper No. 13. Morrison, S. M. and J. F. Fair, Influence of environment on stream microbial dynamics. Supported by Public Health Service, Division of Water Supply and Pollution Control, April 1966. 28 p. \$3.00.
- Hydrology Paper No. 14. Jeng, R. I. and V. M. Yevdjovich, Stochastic properties of lake outflows. Supported by National Science Foundation, August 1966. 26 p. \$3.00.
- Hydrology Paper No. 15. Roesner, L. A. and V. M. Yevdjovich, Mathematical models for time series of monthly precipitation and monthly runoff. Supported by National Science Foundation, October 1966. 56 p. \$3.00.
- Hydrology Paper No. 16. Markovic, R. D., Statistical evaluation of weather modification attainments. Supported by Bureau of Reclamation, November 1966. 51 p. \$3.00.
- Hydrology Paper No. 17. Laliberte, G. E., A. T. Corey and R. H. Brooks, Properties of unsaturated porous media. Supported by Western Regional Research Project W-51, November 1966. 51 p. \$3.00.
- Hydrology Paper No. 18. Quimpo, R. G., Stochastic model of daily river flow sequences. Supported by National Science Foundation, February 1967. 35 p. \$3.00.
- Hydrology Paper No. 19. Hiemstra, L. A. V. and B. M. Reich, Engineering judgment and small area flood peaks. Partially supported by Bureau of Land Management, Contract No. 14-11-008-0590-62, Colorado Agricultural Experiment Station General Series Paper No. 848, April 1967. 35 p. \$3.00.
- Hydrology Paper No. 20. Dickinson, W. T., Accuracy of discharge determinations. Supported by Bureau of Reclamation Contract No. 14-06-D-6007, and by National Research Council, Ottawa, Canada, June 1967. 60 p. \$3.00.

Hydrology Papers - continued

- Hydrology Paper No. 21. Kunkle, S. H. and J. R. Meiman, Water quality of mountain watersheds. Colorado Agricultural Experiment Station General Series Paper 853. Partially supported by cities of Colorado Springs and Greeley, Colorado. Prepared under McIntire-Stennis Cooperative Forestry Research Program, June 1967. 67 p. \$3.00.
- Hydrology Paper No. 22. Julian, R. W., V. Yevjevich and H. J. Morel-Seytoux, Prediction of water yield in high mountain watersheds based on physiography. Supported by Bureau of Reclamation Contract No. BR 14-06-D-6007, August 1967. 26 p. \$3.00.
- Hydrology Paper No. 23. Yevjevich, V., An objective approach to definitions and investigations of continental hydrologic droughts. Supported by National Science Foundation Grant No. GK-169, August 1967. 24 p. \$3.00.
- Hydrology Paper No. 24. Rodriguez-Iturbe, I., The application of cross-spectral analysis to hydrologic time series. Supported by National Science Foundation Grant No. GK-1661, September 1967. 54 p. \$3.00.
- Hydrology Paper No. 25. Dickinson, W. T., M. E. Holland and G. L. Smith, An experimental rainfall-runoff facility. Colorado Agricultural Experiment Station General Series Paper No. 855. Supported by Office of Water Resources Research Grant No. 14-01-0001-1007 and Colorado Agricultural Experiment Station, September 1967. 89 p. \$3.00.
- Hydrology Paper No. 26. Rodriguez-Iturbe, I. and V. Yevjevich, The investigation of relationship between hydrologic time series and sunspot numbers. Supported by National Science Foundation Grant No. GK-1661, April 1968. 55 p. \$3.00.
- Hydrology Paper No. 27. Adam, K. M. and A. T. Corey, Diffusion of entrapped gas from porous media. Supported by National Science Foundation Research Grant No. GK-689, April 1968. 52 p. \$3.00.
- Hydrology Paper No. 28. Kunkle, S. H. and J. R. Meiman, Sampling bacteria in a mountain stream. Colorado Agricultural Experiment Station General Series Paper No. 863. Partially supported by cities of Colorado Springs and Greeley, Colorado. Prepared under McIntire-Stennis Cooperative Forestry Research Program, March 1968. 33 p. \$3.00.
- Hydrology Paper No. 29. Bell, F. C., Estimating design floods from extreme rainfall. Supported by Bureau of Land Management Contract No. 14-11-0008-0590-62, July 1968. 27 p. \$3.00.
- Hydrology Paper No. 30. Corey, A. T. and W. D. Kemper, Conservation of soil water by gravel mulches. Supported by Western Regional Projects W-32 and W-73, and by Office of Water Resources Research, September 1968. 30 p. \$3.00.
- Hydrology Paper No. 31. Bhuiya, R. D. and V. Yevjevich, Effects of truncation on dependence in hydrological time series. Supported by National Science Foundation Grant No. GK-1661, November 1968. 29 p. \$3.00.
- Hydrology Paper No. 32. Yevjevich, V. and R. I. Jeng, Properties of non-homogeneous hydrologic series. Supported by National Science Foundation Grant No. GK-1661, April 1969. 40 p. \$3.00.
- Hydrology Paper No. 33. Llamas, J. and M. M. Siddiqui, Runs of precipitation series. Supported by National Science Foundation Grant No. GK-1161, May 1969. 29 p. \$3.00.
- Hydrology Paper No. 34. Dumas, A. J. and H. J. Morel-Seytoux, Statistical discrimination of change in daily runoff. Supported by Bureau of Reclamation, Office of Atmospheric Water Resources Contract No. BR 14-06-D-6597, August 1969. 35 p. \$3.00.
- Hydrology Paper No. 35. Todorovic, P. and V. Yevjevich, Stochastic process of precipitation. Supported by National Science Foundation Grants No. GK-1661 and GK-11444, September 1969. 68 p. \$3.00.
- Hydrology Paper No. 36. Nakamichi, H. and H. J. Morel-Seytoux, Suitability of the upper Colorado River Basin for precipitation management. Supported by Bureau of Reclamation Contract No. BR 14-06-D-6897, October 1969. 68 p. \$3.00.
- Hydrology Paper No. 37. Nimmannit, V. and H. J. Morel-Seytoux, Regional discrimination of change in runoff. Supported by Bureau of Reclamation, Office of Atmospheric Water Resources Contract No. BR 14-06-D-6597, November 1969. 48 p. \$3.00.
- Hydrology Paper No. 38. Ward, J. C. and S. Karaki, Evaluation of the effect of impoundment on water quality in Cheney Reservoir. Supported by Bureau of Reclamation and by Office of Water Resources Research under Public Law 88-379, March 1970. 79 p. \$3.00.
- Hydrology Paper No. 39. Kibler, D. F. and D. A. Woolhiser, The kinematic cascade as a hydrologic model. Supported by Colorado State University Experiment Station Projects 114 and 124, by Northern Plains Branch, Agricultural Research Service, USDA and by Office of Water Resources Research Grant No. B-030-COLO, March 1970. 33 p. \$3.00.
- Hydrology Paper No. 40. Saldarriaga, J. and V. Yevjevich, Application of run-lengths to hydrologic series. Supported by National Science Foundation Grants No. GK-11444 and GK-11564, April 1970. 66 p. \$3.00.
- Hydrology Paper No. 41. Reddell, D. L. and D. K. Sunada, Numerical simulation of dispersion in groundwater aquifers. Supported by National Science Foundation, Office of Water Resources Research and by Colorado State University Experiment Station Project 110, June 1970. 87 p. \$3.00.

Hydrology Papers - continued

- Hydrology Paper No. 42. Zelenhasic, E., Theoretical probability distributions for flood peaks. Supported by National Science Foundation Grant No. GK-11444, November 1970. 43 p. \$3.00.
- Hydrology Paper No. 43. Yevjevich, V. and A. H. Barnes, Flood routing through storm drains. Part I: Solution of problems of unsteady free surface flow in storm drains. Supported by Bureau of Public Roads, Federal Highway Administration and by Public Health Service, November 1970. 117 p. \$3.00.
- Hydrology Paper No. 44. Yevjevich, V. and A. H. Barnes, Flood routing through storm drains. Part II: Physical facilities and experiments. Supported by Bureau of Public Roads, Federal Highway Administration and by Public Health Service, November 1970. 51 p. \$3.00.
- Hydrology Paper No. 45. Yevjevich, V. and A. H. Barnes, Flood routing through storm drains. Part III: Evaluation of geometric and hydraulic parameters. Supported by Bureau of Public Roads, Federal Highway Administration and by Public Health Service, November 1970. 44 p. \$3.00.
- Hydrology Paper No. 46. Yevjevich, V. and A. H. Barnes, Flood routing through storm drains. Part IV: Numerical computer methods of solution. Supported by Bureau of Public Roads, Federal Highway Administration and by Public Health Service, November 1970. 53 p. \$3.00.
- Hydrology Paper No. 47. Smith, R. E. and D. A. Woolhiser, Mathematical simulation of infiltrating watersheds. Supported by Northern Plains Branch, Agricultural Research Service, USDA and by the Colorado State University Agricultural Experiment Station, January 1971. 52 p. \$3.00.
- Hydrology Paper No. 48. Hedstrom, W. E., A. T. Corey and H. R. Duke, Models for subsurface drainage. Supported by Western Regional Research Project W-51, April 1971. 66 p. \$3.00.
- Hydrology Paper No. 49. McWhorter, D. B., Infiltration affected by flow of air. Supported by National Science Foundation Grant No. GK-2698, May 1971. 52 p. \$3.00.
- Hydrology Paper No. 50. Millan, J. and V. Yevjevich, Probabilities of observed droughts. Supported by National Science Foundation Grant No. GK-11564, June 1971. 58 p. \$3.00.
- Hydrology Paper No. 51. Jolly, J. P. and V. Yevjevich, Amplification criterion of gradually varied, single peaked waves. Sponsored by Federal Highway Administration, December 1971. 47 p. \$3.00.
- Hydrology Paper No. 52. Salas-La Cruz, J. D. and V. Yevjevich, Stochastic structure of water use time series. Sponsored by National Science Foundation Grant No. GK-11444, June 1972. 75 p. \$3.00.
- Hydrology Paper No. 53. Bidwell, V. J., Agricultural response to hydrologic drought. Sponsored by National Science Foundation Grant No. GK-11564, July 1972. 29 p. \$3.00.
- Hydrology Paper No. 54. Dyhr-Nielsen, M., Loss of information by discretizing hydrologic series. Sponsored by National Science Foundation Grant No. GK-11564 and Office of Water Resources Research, Projects B-030-COLO and A-009-COLO, October 1972. 63 p. \$3.00.
- Hydrology Paper No. 55. Millan, J., Drought impact on regional economy. Sponsored by National Science Foundation Grant No. GK-11564, October 1972. 76 p. \$3.00.
- Hydrology Paper No. 56. Yevjevich, V., Structural analysis of hydrologic time series. Sponsored by National Science Foundation Grant No. GK-11444, November 1972. 64 p. \$3.00.
- Hydrology Paper No. 57. Salas-La Cruz, J. D., Range analysis for storage problems of periodic-stochastic processes. Sponsored by Agricultural Research Service and by National Science Foundation, November 1972. 87 p. \$3.00.
- Hydrology Paper No. 58. Torranin, P., Applicability of canonical correlation in hydrology. Sponsored by National Science Foundation Grant No. GK-11564, November 1972. 34 p. \$3.00.
- Hydrology Paper No. 59. Gupta, V. K., Transposition of storms for estimating flood probability distributions. Supported by National Science Foundation Grant No. GK-11444, November 1972. 40 p. \$3.00.
- Hydrology Paper No. 60. Knisel, W. G., Response of karst aquifers to recharge. Sponsored by National Science Foundation, December 1972. 53 p. \$3.00.
- Hydrology Paper No. 61. Duke, H. R., Drainage design based upon aeration. Supported by Western Regional Research Project W-51, June 1973. 65 p. \$3.00.
- Hydrology Paper No. 62. Hendrick, J., Techniques for modeling reservoir salinity. Sponsored by U.S. Bureau of Reclamation and by National Science Foundation Grants No. GK-11444 and GK-31512X, August 1973. 58 p. \$3.00.
- Hydrology Paper No. 63. Kilinc, M. and E. V. Richardson, Mechanics of soil erosion from overland flow generated by simulated rainfall. Supported by Colorado State University Experiment Station and the Government of Turkey, September 1973. 57 p. \$3.00.

Hydrology Papers - continued

Hydrology Paper No. 64. Yevjevich, V. and A. K. Karplus, Area-time structure of the monthly precipitation process. Research project "Large Continental Droughts" sponsored by National Science Foundation Grant No. GK-11564, August 1973. 49 p. \$3.00.

Hydrology Paper No. 65. Chin, W. Q. and V. Yevjevich, Almost-periodic, stochastic process of long-term climatic changes. Supported by the Inland Waters Directorate, Canada Department of Environment, and National Science Foundation Grant No. GK-3152X, March 1974. 72 p. \$3.00.

Hydrology Paper No. 66. Dietrich, T. L. and J. R. Meiman, Hydrologic effects of patch cutting of lodgepole pine. Supported by U.S. Bureau of Reclamation Contract No. 14-06-D-6598, in cooperation with U.S. Forest Service and Colorado State University, April 1974. 34 p. \$3.00

Hydrology Paper No. 67. Jacobi, S. and E. V. Richardson, Economic value of sediment discharge data. Sponsored by Colorado State University Experiment Station, April 1974. 41 p. \$3.00.

Hydrology Paper No. 68. Law, A. G., Stochastic analysis of groundwater level time series in the western United States. Supported by National Science Foundation Grants No. GK-11444 and GK-11564, May 1974. 30 p. \$3.00

For copies of publications in this series contact Secretary, Hydrology Papers, Room B305, Engineering Research Center, Colorado State University, Fort Collins, Colorado 80523. The \$3.00 price applies to single copies. Volume I (Papers 1 through 25); Volume II (Papers 25 through 50); Volume III (Papers 51 through 75); and Volume IV (Papers 76 through 100) may be purchased for \$60.00 per volume.

SERIES

HYDRO-MACHINERY LABORATORY REPORTS

Hydro-Machinery Laboratory Report No. 1, Vol. 1. Albertson, M. L., J. P. Tullis and C. W. Thomas, Hydraulic and cavitation characteristics of valves. Final report. Prepared for Metropolitan Water District of Southern California through Bechtel Corporation. Foothill Feeder Project, Headworks Structure, June 1967, 406 p., \$10.00.

Hydro-Machinery Laboratory Report No. 1, Vol. 2. (Appendix). Albertson, M. L., J. P. Tullis and C. W. Thomas, Hydraulic and cavitation characteristics of valves. Final report. Prepared for Metropolitan Water District of Southern California through Bechtel Corporation. Foothill Feeder Project, Headworks Structure, June 1967, 378 p., \$8.00.

Hydro-Machinery Laboratory Report No. 2. Tullis, J. P., Discharge calibration and cavitation investigation of a 12-inch needle valve. Prepared for Darling Valve and Manufacturing Company, September 1967, 9 p.

Hydro-Machinery Laboratory Report No. 3. Tullis, J. P., Torque and discharge calibration of an 8-inch butterfly valve. Prepared for Jamesbury Corporation, May 1968, 33 p.

Hydro-Machinery Laboratory Report No. 4, Vol. 1. Tullis, J. P., Torque, cavitation and discharge calibration of 6, 12, and 20-inch butterfly valves. Prepared for DeZurik Corporation, July 1968, 12 p.

Hydro-Machinery Laboratory Report No. 4, Vol. 2. Tullis, J. P., Torque, cavitation and discharge calibration of 6, 12, and 20-inch butterfly valves. Prepared for DeZurik Corporation, July 1968, 89 p.

Hydro-Machinery Laboratory Report No. 5. Tullis, J. P., Torque, cavitation and discharge calibration of a 12-inch butterfly valve. Prepared for Jamesbury Corporation, August 1968, 39 p.

Hydro-Machinery Laboratory Report No. 6. Tullis, J. P., Torque, cavitation and discharge calibration of a 12 x 10-inch Larner Johnson needle valve. Prepared for Darling Valve and Manufacturing Company, August 1968, 41 p.

Hydro-Machinery Laboratory Report No. 7. Tullis, J. P., Flow characteristics of a 12-inch surge arrestor valve. Prepared for Golden Anderson Valve Specialty Company, January 1969, 20 p.

Hydro-Machinery Laboratory Reports - continued

- Hydro-Machinery Laboratory Report No. 8. Tullis, J. P., Cavitation and discharge characteristics of a 16-inch Willamette ball valve. Prepared for Willamette Iron and Steel Company, January 1969, 19 p.
- Hydro-Machinery Laboratory Report No. 9. Tullis, J. P., Discharge calibration of a 12-inch model butterfly valve. Prepared for Willamette Iron and Steel Company, January 1969, 20 p.
- Hydro-Machinery Laboratory Report No. 10. Tullis, J. P., Flow tests on a 24-inch swing check valve. Prepared for Blaw-Knox Company, February 1969, 25 p.
- Hydro-Machinery Laboratory Report No. 11. Hogan, R. A., Torque, discharge and cavitation characteristics of a 6-inch butterfly valve installed in a 12-inch pipe. Prepared for Jamesbury Corporation, September 1969, 22 p.
- Hydro-Machinery Laboratory Report No. 12. Hogan, R. A., Cavitation and discharge characteristics of a 12-inch ball valve. Prepared for Darling Valve and Manufacturing Company, September 1969, 12 p.
- Hydro-Machinery Laboratory Report No. 13. Tullis, J. P., Torque, cavitation and discharge calibration of 6- and 12-inch butterfly valves. Prepared for DeZurik Corporation, January 1970, 44 p.
- Hydro-Machinery Laboratory Report No. 14. Tullis, J. P., Hydraulic tests in 2-, 3- and 4-inch ball valves and 4- and 6-inch butterfly valves. Prepared for Jamesbury Corporation, October 1970, 45 p.
- Hydro-Machinery Laboratory Report No. 15. Tullis, J. P., Hydraulic testing of 6- and 10-inch Xomox butterfly valves. Prepared for Xomox Corporation, October 1971, 20 p.
- Hydro-Machinery Laboratory Report No. 16. Tullis, J. P., Hydraulic testing of a 16-inch butterfly valve. Prepared for Clow Corporation, October 1971, 32 p.
- Hydro-Machinery Laboratory Report No. 17. Tullis, J. P., Hydraulic testing of a 6-inch butterfly valve. Prepared for Center Line Incorporated, August 1971, 20 p.
- Hydro-Machinery Report No. 18. Ball, J. W., Report of hydraulic tests, combination control valve 12-inch valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, January 1972, 48 p.
- Hydro-Machinery Laboratory Report No. 19. Ball, J. W., Report of flow tests, fiberglass nozzle. Prepared for Midwest Mechanical Contractors, Inc., Birmingham, Michigan, November 1971, 10 p.
- Hydro-Machinery Laboratory Report No. 20. Ball, J. W. Report of hydraulic tests, rubber flapper swing check valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, September 1971, 9 p.
- Hydro-Machinery Laboratory Report No. 21. Tullis, J. P., Calibration of 6-inch and 14-inch ballast valves. Prepared for Golden Anderson Valve Specialty Company, March 1972, 12 p.
- Hydro-Machinery Laboratory Report No. 22. Tullis, J. P., Flow tests on a 24-inch stainless steel gate valve. Prepared for Crane Company, March 1972, 5 p.
- Hydro-Machinery Laboratory Report No. 23. Ball, J. W., Report of hydraulic tests, 24-inch swing check valve. Prepared for Crane Company, Chicago, Illinois, April 1972, 27 p.
- Hydro-Machinery Laboratory Report No. 24. Tullis, J. P., Calibration of sluice gates. Prepared for Armco Steel Corporation, May 1972, 26 p.
- Hydro-Machinery Laboratory Report No. 25. Tullis, J. P., Hydraulic tests on 8- and 12-inch ball valves. Prepared for Jamesbury Corporation, July 1972, 20 p.
- Hydro-Machinery Laboratory Report No. 26. Ball, J. W., Report of hydraulic tests, 12-inch valve and primer butterfly valve. Prepared for Valve and Primer Corporation, Chicago, Illinois, August 1972, 61 p.
- Hydro-Machinery Laboratory Report No. 27. Tullis, J. P. and J. W. Ball, Report of flow tests, 18-inch stainless steel gate valve. Prepared for Crane Company, Chicago, Illinois, October 1972, 12 p.
- Hydro-Machinery Laboratory Report No. 28. Tullis, J. P. and J. W. Ball, Model study of a 48-inch needle valve. Prepared for the City of New York Board of Water Supply, March 1973, 61 p.
- Hydro-Machinery Laboratory Report No. 29. Tullis, J. P., Line loss and rupture tests of nylon tubing. Prepared for Carlisle Tire and Rubber Division, Carlisle Corporation, April 1973, 19 p.
- Hydro-Machinery Laboratory Report No. 30. Tullis, J. P., Performance of a 24-inch wafer sphere valve. Prepared for Jamesbury Corporation, September 1973, 14 p.
- Hydro-Machinery Laboratory Report No. 31. Confidential.
- Hydro-Machinery Laboratory Report No. 32. Confidential.
- Hydro-Machinery Laboratory Report No. 33. Tullis, J. P., Flow test of the 28-inch HLI valve. Prepared for Foster Wheeler Corporation, November 1973, 18 p.
- Hydro-Machinery Laboratory Report No. 34. Tullis, J. P. and K. L. V. Ramu, Viscous drag reduction in developing pipe flow. Naval Ship Systems Command, General Hydromechanics Research Program, sub-project SR 009 01 01, administered by the Naval Ship Research and Development Center Contract No. N00014-67-A-0299-0021, November 1973, 58 p.

Hydro-Machinery Laboratory Reports - continued

Hydro-Machinery Laboratory Report No. 35.
Confidential.

Hydro-Machinery Laboratory Report No. 37.
Confidential.

Hydro-Machinery Laboratory Report No. 36. Ball, J. W. and J. P. Tullis, Report of hydraulic tests, 16-inch cold leg check valve. Prepared for Foster Wheeler Corporation, Dansville, New York and Atwood and Morrill Company, Salem, Massachusetts, June 1974, 97 p.

For copies of publications in this series contact J. Paul Tullis, Room A111, Engineering Research Center, Colorado State University, Fort Collins, Colorado 80523.

SERIES

SANITARY ENGINEERING PAPERS

Sanitary Engineering Paper No. 1. Filmer, R. W. and A. T. Corey, Transport and retention of virus-sized particles in porous media. Supported by Public Health Service grant, June 1966, 47 p., \$3.00.

Sanitary Engineering Paper No. 2. Ward, J. C., Prediction of beginning and duration of ice cover. Supported by U.S. Department of the Interior as authorized under the Water Resources Research Act of 1964, Public Law 88-379, and by Colorado Agricultural Experiment Station, 1967, 34 p., \$3.00.

Sanitary Engineering Paper No. 3. Ward, J. C., Particle to tower diameter ratio and tower packing. Supported by Public Health Service Research grant 00914-01, from the Division of Water Supply and Pollution Control, 1967, 29 p., \$3.00.

Sanitary Engineering Paper No. 4. Ward, J. C. and S. Karaki, Evaluation of the effect of impoundment on water quality in Cheney Reservoir. Final report to Bureau of Public Roads. Supported by U.S. Bureau of Reclamation and the U.S. Department of the Interior, Public Law 88-379, September 1969, 76 p., \$3.00.

Sanitary Engineering Paper No. 5. Boyd, J. W., T. Yoshida, L. E. Vereen, R. L. Cada and S. M. Morrison, Bacterial response to the soil environment. Supported by Office of Water Resources Research, allotment project A-001 Colorado, and by Federal Water Pollution Control Administration grant no. ST1-WP-127, June 1969, 28 p., \$3.00.

For copies of publications in this series contact the senior author or Engineering Research Center Publication Office, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. The \$3.00 price is effective as long as the supply lasts. Xerox copies can be provided for 10 cents per page.

SERIES

FLUID MECHANICS PROGRAM

THEMIS TECHNICAL REPORTS

THEMIS Technical Report No. 1. Lin, J., S. Panchev and J. E. Cermak, Turbulence spectra in the buoyancy subrange of thermally stratified shear flows. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), February 1969, 143 p., \$3.00.

THEMIS Technical Report No. 3. Veenhuizen, S. D., and R. N. Meroney, Secondary flow in a boundary layer. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), June 1969, 134 p., \$3.00.

THEMIS Technical Report No. 2. Not available.

THEMIS Technical Reports - continued

- THEMIS Technical Report No. 4. Lin, J. and J. E. Cermak, Dynamics of stably stratified flows. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), August 1969, 173 p., \$4.00.
- THEMIS Technical Report No. 5. Kesic, D. M., J. E. Cermak and S. Panchev, The spectrum of energy in turbulent shear flow. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), September 1970, 109 p., \$3.00.
- THEMIS Technical Report No. 6. Chou, F. and V. A. Sandborn, Flow separation in time varying flow. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), December 1969, 61 p., \$2.00.
- THEMIS Technical Report No. 7. Lin, J. and C. J. Apelt, Stratified flow over an obstacle: A numerical experiment. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), January 1970, 84 p., \$3.00.
- THEMIS Technical Report No. 8. Yeh, F. and E. C. Nickerson, Air flow over roughness discontinuity. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), July 1970, 140 p., \$3.00.
- THEMIS Technical Report No. 9. Yamada, T. and R. N. Meroney, Numerical and wind tunnel simulation of response of stratified shear layers to non-homogeneous surface features. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), June 1971, 312 p., \$3.00.
- THEMIS Technical Report No. 10. Anyiwo, J. C. and R. N. Meroney, An effective viscosity model for turbulent wall boundary layers. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), June 1971, 32 p., \$1.00.
- THEMIS Technical Report No. 11. Kawatani, T. and W. Z. Sadeh, An investigation of flow over high roughness. Prepared for Atmospheric Sciences Laboratory, U.S. Army Electronics Command contract no. DAAB7-68-C-0423, and for Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), August 1971, 174 p., \$4.00.
- THEMIS Technical Report No. 12. Huang, C. and E. C. Nickerson, Numerical simulation of wind, temperature, shear stress and turbulent energy over non-homogeneous terrain. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), March 1972, 274 p., \$5.00.
- THEMIS Technical Report No. 13. Kahawita, R. A. and R. N. Meroney, Penetrative convective instabilities in parallel flows. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), May 1972, 26 p., \$1.00.
- THEMIS Technical Report No. 14. Not available.
- THEMIS Technical Report No. 15. Mukherji, S. and W. Z. Sadeh, Interaction of a wall-jet with a shear flow. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), March 1972, 85 p., \$3.00.
- THEMIS Technical Report No. 16. Beebe, P. S. and J. E. Cermak, Turbulent flow over a wavy boundary. Sponsored by Office of Water Resources Research contract no. 14-01-0001, and Office of Naval Research contract no. N00014-68-A-0493-0001, May 1972, 129 p., \$3.00.
- THEMIS Technical Report No. 17. Chaudhry, F. H. and J. E. Cermak, Wind-tunnel modeling of flow and diffusion over an urban complex. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), May 1971, 90 p., \$3.00.
- THEMIS Technical Report No. 18. Wang, H. and E. C. Nickerson, Response of a turbulent boundary layer to lateral roughness discontinuities. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), July 1972, 70 p., \$2.00.
- THEMIS Technical Report No. 19. Putta, S. N. and J. E. Cermak, Mass dispersion from an instantaneous line source in a turbulent shear flow. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), June 1971, 100 p., \$3.00.
- THEMIS Technical Report No. 20. Yang, B. T. and R. N. Meroney, On diffusion from an instantaneous point source in a neutrally stratified turbulent boundary layer with a laser light scattering probe. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), October 1972, 234 p., \$4.00.
- THEMIS Technical Report No. 21. Nayak, S. K. and V. A. Sandborn, Periodicity of combined heat transfer from horizontal cylinders. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), March 1973, 133 p., \$3.00.

THEMIS Technical Reports - continued

- THEMIS Technical Report No. 22. Chou, F. and V. A. Sandborn, Prediction of the turbulent boundary layer separation. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), July 1973, 112 p., \$3.00.
- THEMIS Technical Report No. 23. SethuRaman, S. and J. E. Cermak, Stratified shear flows over a simulated three-dimensional urban heat island. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), August 1973, 206 p., \$4.00.
- THEMIS Technical Report No. 24. Kahawita, R. A. and R. N. Meroney, The stability of parallel, quasi-parallel and stationary flows. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), September 1973, 175 p., \$4.00.
- THEMIS Technical Report No. 25. Meroney, R. N., Measurements of turbulent boundary layer growth over a longitudinally curved surface. I.C. Aero Technical Note 74, Imperial College of Science and Technology, Department of Aeronautics, England, Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), January 1974, 76 p., \$3.00.
- THEMIS Technical Report No. 26. Barnett, K. M. and J. E. Cermak, Turbulence induced changes in vortex shedding from a circular cylinder. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), January 1974, 236 p., \$4.00.
- THEMIS Technical Report No. 27. Edling, W. H., Three-dimensional turbulent boundary layer flow on roughness strip of finite width. Prepared under Office of Naval Research contract no. N00014-68-A-0493-0001, project no. NR062-414/6-6-68 (Code 438), April 1972, 259 p., \$5.00.
- THEMIS Technical Report No. 28. Meroney, R. N., Buoyancy effects on a turbulent shear flow. Prepared under National Science Foundation Grant no. GK33800 (1972-1974) and Office of Naval Research contract no. N00014-68-A-0493-0001, April 1974, 105 p., \$3.00.

(These documents have been approved for public release and sale; their distribution is unlimited.)

For copies of publications in this series contact the senior author or Engineering Research Center Publications Office, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. The prices quoted above are effective as long as the supply lasts. Xerox copies can be provided for 10 cents per page.

COLORADO STATE UNIVERSITY
DEPARTMENT OF ENGINEERING

SERIES

WATER MANAGEMENT TECHNICAL REPORTS

- Water Management Technical Report No. 1. Mahmood, K., A. G. Mercer and E. V. Richardson, Bibliography, with annotations, on water diversion, conveyance and application for irrigation and drainage. Prepared under U. S. Agency for International Development contract no. AID/csd-2162, September 1969, 165 p., \$3.00.
- Water Management Technical Report No. 2. Foss, P. O., J. A. Straayer, R. Dildine, A. Dwyer and R. Schmidt, Organization of water management for agricultural production in West Pakistan. (A progress report.) Prepared for U.S. Agency for International Development contract no. AID/csd-2162, May 1970, 148 p., \$3.00.
- Water Management Technical Report No. 3. Liang, W. S. and E. V. Richardson, Dye dilution method of discharge measurement. Prepared under U.S. Agency for International Development contract no. AID/csd-2162. January 1971, 37 p., \$3.00.
- Water Management Technical Report No. 4. Withdrawn.
- Water Management Technical Report No. 5. Worku, D., The economics of water use, an inquiry into the economic behavior of farmers in West Pakistan. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, March 1971, 175 p., \$3.00.

Water Management Technical Reports - continued

- Water Management Technical Report No. 6. Jones, G. N., Pakistan government and administration: A comprehensive bibliography (Vol. 2). Bibliographical Series. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, March 1971, 116 p., \$3.00.
- Water Management Technical Report No. 7. Garcia-Martinez, L. E., The effect of data limitations on the application of systems analysis to water resources planning in developing countries. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, May 1971, 226 p., \$3.00.
- Water Management Technical Report No. 8. Jones, G. N. and R. L. Anderson, The problem of under-irrigation in West Pakistan: Research studies and needs. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, June 1971, 56 p., \$3.00.
- Water Management Technical Report No. 9. Skogerboe, G. V., V. T. Somoray and W. R. Walker, Check-drop-energy dissipator structures in irrigation systems. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, May 1971, 211 p., \$3.00.
- Water Management Technical Report No. 10. Duke, J. H., Maximum water delivery in irrigation. Prepared under U.S. Agency for International Development contract no. AID/csd-2162 and contract no. AID/csd-2460, August 1971, 213 p., \$3.00.
- Water Management Technical Report No. 11. Mahmood, K., Flow in sand-bed channels. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, February 1971, 294 p., \$3.00.
- Water Management Technical Report No. 12. Wu, T. Y., Effect of settlement on flume ratings. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, August 1971, 99 p., \$3.00.
- Water Management Technical Report No. 13. Jones, G. N., The problem of water scheduling in West Pakistan: Research studies and needs. With comment by W. D. Romig, Agency for International Development. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, November 1971, 41 p., \$3.00.
- Water Management Technical Report No. 14. Jones, G. N., Monastery model of development: Towards a strategy of large scale planned change. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, November 1971, 79 p., \$3.00.
- Water Management Technical Report No. 15. Barrett, J. W. H., Width constrictions in open channels. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, November 1971, 105 p., \$3.00.
- Water Management Technical Report No. 16. Bennett, R. S., Cutthroat flume discharge relations. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, March 1972, 134 p., \$3.00.
- Water Management Technical Report No. 17. Boonkird, V., Culverts as flow measuring devices. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, February 1972, 105 p., \$3.00.
- Water Management Technical Report No. 18. Sahni, B. M., Salt water coning beneath fresh water wells. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, April 1972, 176 p., \$3.00.
- Water Management Technical Report No. 19. Skogerboe, G. V., R. S. Bennett and W. R. Walker, Installation and field use of cutthroat flumes for water measurement. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, March 1972, 48 p., \$3.00.
- Water Management Technical Report No. 20. McWhorter, D. B., Steady and unsteady flow of fresh water in saline aquifers. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, June 1972, 53 p., \$3.00.
- Water Management Technical Report No. 21. Biggs, H. H., Dualism in Mexican agricultural development: Irrigation development and the Puebla project. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, June 21, 1972, 26 p., \$3.00.
- Water Management Technical Report No. 22. Biggs, H. H., The Puebla project: Progress and problems. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, July 18, 1972, 31 p., \$3.00.
- Water Management Technical Report No. 23. Jones, G. N., Pakistan government and administration: A comprehensive bibliography (Vol. 3). Bibliographical Series. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, May 1972, 262 p., \$3.00.
- Water Management Technical Report No. 24. Neal, W. L. and C. W. Stockmyer, Index for the eight Near East-South Asia irrigation practices seminars. Prepared under U.S. Agency for International Development contract no. AID/csd-2460, August 1972, 68 p., \$3.00.
- Water Management Technical Report No. 25. Tamburi, A. J., A bibliography and literature review of groundwater geology studies in the Indus River Basin, Prepared under U.S. Agency for International Development contract no. AID/csd-2162, April 1973, 40 p., \$3.00.

Water Management Technical Reports - continued

Water Management Technical Report No. 26. Mahmood, K., Planning sediment distribution in surface irrigation systems. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, November 1973, 72 p., \$3.00.

Water Management Technical Report No. 27. Zuberi, F. A. and D. B. McWhorter, Practical skimming well design. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, November 1973, 65 p., \$3.00.

Water Management Technical Report No. 28. Franklin, W. T. and W. R. Schmehl, Physical, salinity, and fertility analyses of selected Pakistan soils. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, August 1973, 33 p., \$3.00.

Water Management Technical Report No. 29. Rai, D. and W. T. Franklin, Program for computing equilibrium solution composition in CaCO_3 and CaSO_4 systems from irrigation water compositions. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, December 1973, 45 p., \$3.00.

Water Management Technical Report No. 30. Chaudhry, M. T., Conjunctive use of Indus Basin waters--Pakistan: A general summary of the Ph.D. Dissertation. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, December 1973, 40 p., \$3.00.

Water Management Technical Report No. 31, Jones, G. N., A. B. Rizwani, M. B. Malik and R. F. Schmidt, Informational sources on water management for agricultural production in Pakistan with special reference to institutional and human factors. 2 volumes. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, April 1974, 180 p., \$3.00.

Water Management Technical Report No. 32. Neghassi, H. M., Crop water use and yield models with limited soil water. Prepared under U.S. Agency for International Development contract no. AID/csd-2162, June 1974, 136 p., \$3.00.

For copies of publications in this series contact Engineering Research Center Publications Office, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. The \$3.00 price listed above is effective as long as the supply lasts. Xerox copies can be provided for 10 cents per page.

COLLEGE OF ENGINEERING

AUTHOR INDEX

(For titles of papers and reports by these authors
see pages indicated below.)

<u>Name and Department</u>	<u>Pages</u>
Abbey, R. F.--Atmospheric Science	17, 24
Abiri, A.--Electrical Engineering	58
Adam, K. M.--Agricultural Engineering	1, 8
Addink, J. W.--Agricultural Engineering	1, 14
Adler, R. F.--Atmospheric Science	17, 22, 24
Albertson, M. L.--Civil Engineering	26, 27, 31, 37, 50, 90
Albrecht, B. A.--Atmospheric Science	17, 21, 24
Allen, J. L.--Electrical Engineering	58
Allender, M. D.--Electrical Engineering	58, 68, 69
Almeyda, G. F.--Atmospheric Science	24
Alspach, D. L.--Electrical Engineering	58, 59
Alyea, F. N.--Atmospheric Science	17, 24
Anyiwo, J. C.--Civil Engineering	27, 54, 84, 93
Apichatanon, O.--Electrical Engineering	59, 60, 69
Arber, R. P.--Civil Engineering	54
Aronhime, P. B.--Electrical Engineering	59, 60, 66, 69
Atesmen, K. M.--Mechanical Engineering	71
Aus, H. M.--Electrical Engineering	58
Ayars, J. E.--Agricultural Engineering	1, 10, 14
Baer, F.--Atmospheric Science	16
Baer, M. R.--Mechanical Engineering	71, 74, 75, 77
Bakel, R. L.--Mechanical Engineering	77
Baldwin, L. V.--Civil Engineering	26, 27, 28, 71, 85
Balick, L. K.--Atmospheric Science	24
Ball, J. W.--Civil Engineering	26, 28, 51, 91, 92
Bandon, E.--Mechanical Engineering	77
Barber, K. F.--Mechanical Engineering	72, 73
Barchett, W. R.--Atmospheric Science	17
Bargsten, G.--Agricultural Engineering	1
Barnes, A. H.--Civil Engineering	26, 28, 48, 89
Barnett, K. M.--Civil Engineering	28, 54, 94
Barrett, E. V.--Atmospheric Science	16
Barrett, J. W. H.--Agricultural Engineering	1, 10, 14, 95
Barth, F. C.--Mechanical Engineering	77
Batton, W. D.--Mechanical Engineering	77
Baxter, J. A.--Mechanical Engineering	77
Bean, B. R.--Atmospheric Science	16
Becker, J. C.--Electrical Engineering	69
Beebe, P. S.--Civil Engineering	54
Beetner, G.--Agricultural Engineering	1, 2, 8, 12
Bell, P. W. W.--Civil Engineering	28, 29, 54
Bender, M. E.--Civil Engineering	26
Bennett, J. P.--United States Geological Survey	82, 83
Bennett, R. S.--Agricultural Engineering	2, 9, 10, 14, 95
Berlant, A.--Civil Engineering	54
Betts, A. K.--Atmospheric Science	16, 17, 22
Blanchard, A. J.--Electrical Engineering	69
Blinco, P. H.--Agricultural Research Service	40, 79, 80, 81
Boetger, M.--Agricultural Engineering	2
Boonkird, V.--Agricultural Engineering	2, 10, 14, 95
Brier, G. W.--Atmospheric Science	16, 17, 18
Britton, C. C.--Electrical Engineering	58, 59
Brooks, T. D.--Civil Engineering	54
Broughton, J. M.--Mechanical Engineering	77
Brouwer, L. G.--Mechanical Engineering	77
Brown, C. M.--Mechanical Engineering	77
Brown, R. A.--Mechanical Engineering	77

Author Index - continued

Brubaker, T. A.--Electrical Engineering	59, 66
Budak, A.--Electrical Engineering	58, 59, 60, 66
Cermak, J. E.--Civil Engineering	26, 28, 29, 30, 32, 34, 39, 40, 42, 43 45, 46, 52, 72, 84, 85, 92, 93, 94
Chamberlain, A. R.--Civil Engineering	26
Chan, P. W.--Electrical Engineering	58, 60, 64, 65, 66, 68
Chandler, R. L.--Agricultural Engineering	14
Chappell, C. F.--Atmospheric Science	17, 19, 21
Chatto, R. B.--Mechanical Engineering	77
Chaudhry, F. H.--Civil Engineering	30, 41, 84, 93
Chaudhry, M. T.--Civil Engineering	31, 54, 96
Chen, T. S.--Atmospheric Science	16
Chen, Y. H.--Civil Engineering	26, 31, 47, 49, 54
Cheong, H. F.--Civil Engineering	31, 46, 47, 54
Chieh, S.--Civil Engineering	31, 54
Chin, W. Q.--Civil Engineering	31, 54, 90
Chinburg, C. H.--Electrical Engineering	58
Chou, F. K.--Civil Engineering	31, 54, 92, 94
Christopher, C. J.--Electrical Engineering	69
Churchill, R. J.--Electrical Engineering	58, 60, 65, 66
Clark, W. E.--Atmospheric Science	24
Clema, J. K.--Mechanical Engineering	77
Clements, R. M.--Electrical Engineering	60
Cliff, W. C.--Civil Engineering	31, 54
Cline, W. K.--Electrical Engineering	60, 62, 69
Clyma, W.--Agricultural Engineering	2
Collins, G. J.--Electrical Engineering	58, 60, 61
Connell, J. R.--Atmospheric Science	24
Cook, K. R.--Electrical Engineering	61, 66
Corder, T. E.--Mechanical Engineering	72, 76
Corey, A. T.--Agricultural Engineering	1, 2, 8, 87, 88, 89, 92
Corey, G. L.--Agricultural Engineering	2, 87
Corey, P. D.--Civil Engineering	54
Corrin, M. L.--Atmospheric Science	16, 17
Cox, S. K.--Atmospheric Science	16, 17, 20, 22, 23
Cress, M. D.--Civil Engineering	54
Criswell, M. E.--Civil Engineering	26, 31, 32, 33, 37, 43, 52
Croley, T. E.--Civil Engineering	54
Cruz, L. A.--Atmospheric Science	24
Culot, M. V. J.--Mechanical Engineering	77
Cunge, J. A.--Civil Engineering	32
Curtis, J. O.--Mechanical Engineering	72, 75, 77
Dahl, D. A.--Atmospheric Science	24
Dass, P.--Civil Engineering	32
Dawdy, D. R.--United States Geological Survey	40, 44, 50, 82, 83
Day, S. S.--Electrical Engineering	60, 61
Dean, J. E.--Electrical Engineering	58
Degenhardt, E. A.--Civil Engineering	54
Dellah, A.--Civil Engineering	32, 39, 54
Dérédec, A.--Civil Engineering	54
Derickson, R. G., Jr.--Civil Engineering	32, 54
Desai, Y.--Mechanical Engineering	72, 74
Diaz, J. E.--Civil Engineering	55
Dickinson, R. E.--Atmospheric Science	16
Dittenberner, G. J.--Atmospheric Science	18
Dorratcague, D. E.--Civil Engineering	32, 44, 48, 55
Downey, P. H.--Atmospheric Science	18, 24
Downs, H. W.--Agricultural Engineering	1, 2, 3, 15
Dreher, K. J.--Civil Engineering	32, 55
Duff, W. S.--Mechanical Engineering	71, 72
Dugan, F. J.--Atmospheric Science	18, 24
Duke, H. R.--Agricultural Research Service	15, 79, 80, 81, 87, 90
Duong, N.--Mechanical Engineering	72, 77
Durham, R.--Atmospheric Science	18, 24
Dyhr-Nielsen, M.--Civil Engineering	32, 53, 55, 89

Author Index - continued

Early, A. C.--Agricultural Engineering	1, 3
Edling, W. H.--Civil Engineering	32, 55, 94
Edwards, D. F.--Electrical Engineering	58, 61, 62
Edwards, H. W.--Mechanical Engineering	71, 72, 75, 76
Ehrlich, P.--Electrical Engineering	62, 68
Elliott, B. E.--Electrical Engineering	69
Ellis, J. S.--Atmospheric Science	24
Emmanuel, C. B.--Civil Engineering	55
Esen, I. I.--United States Geological Survey	82
Espander, W. R.--Mechanical Engineering	71, 73, 74, 75, 77
Essenwanger, O. M.--Atmospheric Science	16
Estes, M. F.--Electrical Engineering	58, 62
Etherinton, W. C.--Mechanical Engineering	78
Evans, C. E.--Agricultural Research Service	79
Evans, N. A.--Agricultural Engineering	1, 3
Evans, R. G.--Civil Engineering	55
Farden, D. C.--Electrical Engineering	62, 66, 67
Fawkes, P. E.--Civil Engineering	32, 46, 55
Fead, J. W. N.--Civil Engineering	26, 32
Fields, A.--Atmospheric Science	18, 22
Fleming, J. R.--Atmospheric Science	18, 24
Flug, M.--Civil Engineering	55
Frank, W. M.--Atmospheric Science	18, 19, 24
Freeman, L. R.--Agricultural Engineering	3, 13
Frevert, D. K.--Civil Engineering	55
Frey, A. L.--Agricultural Engineering	1, 2, 3, 4, 6, 8, 11, 12
Fritsch, J. M.--Atmospheric Science	18, 19
Gallet, R.--Atmospheric Science	16
Garg, M. M.--Civil Engineering	55
Garrison, J. A.--Civil Engineering	26, 30, 32, 40, 42, 84
Gautam, M. S.--Electrical Engineering	60, 62
Garvey, D. M.--Atmospheric Science	16
Gerber, H.--Atmospheric Science	24
Gessler, J.--Civil Engineering	26, 32, 33, 48, 49
Glasser, M. E.--Atmospheric Science	18
Glover, R. E.--Civil Engineering	26, 33
Gold, R. C.--Agricultural Engineering	4, 11, 15
Goodman, J. R.--Civil Engineering	26, 27, 33, 34, 35, 37, 43, 44, 52
Gopu, V. K. A.--Civil Engineering	33, 55
Govindarajan, R.--Civil Engineering	33, 51, 55
Gowdy, J. N.--Electrical Engineering	59, 62
Graf, R. A.--Mechanical Engineering	78
Grant, L. O.--Atmospheric Science	16, 17, 18, 19, 21, 23
Graupe, D.--Electrical Engineering	58, 62, 63, 64
Graves, W. A.--Mechanical Engineering	71
Gray, W. M.--Atmospheric Science	16, 18, 19, 20, 21, 22
Grigg, N. S.--Civil Engineering	26, 33, 34, 37, 45, 49
Grobecker, A. J.--Atmospheric Science	20
Grossman, R. L.--Atmospheric Science	24
Guerrero-Salazar, R. L. A.--Civil Engineering	55
Gunnerson, R. A.--Civil Engineering	34, 55
Haberstroh, R. D.--Mechanical Engineering	12, 71, 73, 75
Haines, R. S.--Atmospheric Science	24
Haise, H. R.--Agricultural Research Service	79, 80
Hall, F. F.--Atmospheric Science	16
Hall, T. L.--Agricultural Engineering	4
Hansen, R. W.--Agricultural Engineering	1, 4, 5, 12
Hanson, C. L.--Agricultural Research Service	79
Haque, M. I.--Civil Engineering	34, 40, 50, 55
Hardee, A. G.--Mechanical Engineering	71, 73
Hardin, D. J.--Civil Engineering	55
Harmann, D. V.--Agricultural Engineering	5, 6
Harper, D. L.--Electrical Engineering	69
Harper, E. L.--Electrical Engineering	69
Harper, J. M.--Agricultural Engineering	1, 2, 3, 4, 5, 6, 11, 12
Harris, W. B.--Agricultural Engineering	15
Hart, W. E.--Agricultural Engineering	1, 7

Author Index - continued

Haurwitz, B.--Atmospheric Science	16, 20, 22
Hayman, R. W.--Civil Engineering	26, 34, 64, 66
Heermann, D. F.--Agricultural Research Service	1, 79, 80
Heikes, K. E.--Atmospheric Science	20, 24
Hendrick, J. D.--Civil Engineering	34, 90
Hendricks, D. W.--Civil Engineering	26, 34
Henghold, W. M.--Civil Engineering	33, 35, 55
Henmi, T.--Atmospheric Science	16, 20, 24
Hestens, R.--Mechanical Engineering	78
Henz, J. F.--Atmospheric Science	24
Hinnerichs, T. D.--Mechanical Engineering	78
Histand, M. D.--Mechanical Engineering	71, 73, 74, 75
Hoffman, R. L.--Mechanical Engineering	78
Holland, M. E.--Civil Engineering	35, 80
Hooks, L. E.--Mechanical Engineering	71
Hoot, T. G.--Civil Engineering	35, 41
Hoxit, L. R.--Atmospheric Science	20, 24
Hsu, C.--Mechanical Engineering	74
Huang, C. H.--Civil Engineering	35, 55, 93
Huang, K. T.--Agricultural Engineering	7, 15
Hung, C. S.--Civil Engineering	35, 47
Hunter, J. S.--Civil Engineering	35, 53
Huntzinger, T. L.--Agricultural Engineering	7, 12, 13, 15
Hurley, R. D.--Civil Engineering	55
Hwang, J. H.--Electrical Engineering	60, 62, 63, 64
Isaacson, J.--Mechanical Engineering	74, 76
Jacobi, S.--Civil Engineering	35, 55, 90
Jawed, K.--Civil Engineering	36, 55
Jensen, M. E.--Agricultural Engineering	7
Jiacollette, R. J.--Mechanical Engineering	78
Jobson, H. E.--United States Geological Survey	82
Johansen, R. P.--Civil Engineering	36, 53
Johnson, G. R.--Mechanical Engineering	71, 74, 75, 76, 77
Jolly, J. P.--Civil Engineering	36, 89
Jones, T. B.--Electrical Engineering	58, 63
Juras, R. C.--Electrical Engineering	63, 69
Kahawita, R. A.-- Civil Engineering	36, 55, 93, 94
Kaplan, T. K.--Electrical Engineering	62, 63, 69
Karaki, S.--Civil Engineering	26, 36, 38, 39, 44, 47, 52, 89, 92
Karplus, A. K.--Civil Engineering	36, 53, 55, 90
Katen, P. C.--Atmospheric Science	20
Kavvas, M. L.--Civil Engineering	36, 55
Kaufman, H. R.--Mechanical Engineering	71
Kawatani, T.--Civil Engineering	36, 55, 84, 93
Keefer, T. N.--United States Geological Survey	55, 82
Kemper, W. D.--Agricultural Engineering	1, 7, 8, 88
Khan, H. R.--Civil Engineering	37
Khan, Q. A.--Agricultural Engineering	15
Kibler, D. F.--Agricultural Research Service	79
Kilinc, M. Y.--Civil Engineering	37, 55, 90
Kim, I. K.--Mechanical Engineering	73, 74
Kim, S. H.--Mechanical Engineering	74, 76, 78
Kincaid, D. C.--Agricultural Research Service	80
Knisel, W. G.--Civil Engineering	37, 89
Knollenberg, R. G.--Atmospheric Science	16
Ko, C.--Civil Engineering	55
Ko, M. F.--Civil Engineering	37, 55
Koelzer, V. A.--Civil Engineering	26, 37, 46
Koloseus, H. J.--Civil Engineering	26, 37
Konrad, D. E.--Agricultural Engineering	8
Korff, H. C.--Atmospheric Science	16, 20
Koske, J. E.--Mechanical Engineering	78
Kraeger, C. E.--Civil Engineering	55
Krause, D. J.--Electrical Engineering	62, 63, 64, 69
Krueger, D. A.--Electrical Engineering	64
Kruse, E. G.--Agricultural Research Service	79, 80
Kubischta, R. J.--Electrical Engineering	69

Author Index - continued

Kuo, M.--Civil Engineering	37, 55
Kuse, W. C.--Civil Engineering	56
Labadie, J.--Civil Engineering	26, 31, 33, 37, 51
Ladd, E. R.--Mechanical Engineering	78
Lane, K. S.--Civil Engineering	38
Lane, L. J.--Agricultural Research Service	79
Larsen, W. R.--Electrical Engineering	64, 69
Laufer, F.--Civil Engineering	56
Law, A. G.--Civil Engineering	38, 90
Lee, B. K.--Civil Engineering	56
Lefevre, B.--Civil Engineering	56
Lehman, D. H.--Electrical Engineering	69
Lenschow, D. H.--Atmospheric Science	16
Leon, H. I.--Mechanical Engineering	78
Letcher, J. S.--Mechanical Engineering	71, 74
Levin, H.--Electrical Engineering	34, 59, 64, 69
Lewis, G. L.--Civil Engineering	38, 48, 49, 56
Li, R. M.--Civil Engineering	38, 46, 47, 56
Limjaroenrat, P.--Agricultural Engineering	8, 15
Lindeman, L. F.--Civil Engineering	38, 56
Lindon, P. H.--Electrical Engineering	58
Liu, H. T.--Civil Engineering	38, 56
Liron, N.--Mechanical Engineering	74, 76
Lobbia, R. N.--Electrical Engineering	58
Loendorf, W. R.--Electrical Engineering	59, 64, 69
Loerke, R. I.--Mechanical Engineering	71, 74
Lof, G. O. G.--Civil Engineering	26, 36, 38, 39, 52, 53
Lombardi, D. J.--Civil Engineering	29, 30, 39
Longenbaugh, R. A.--Civil Engineering	26, 39, 42
Longley, T. S.--Agricultural Engineering	1
Lopez, O. G.--Civil Engineering	39, 45, 56
Lopez, R. E.--Atmospheric Science	19, 20, 24
Loranger, D. C.--Atmospheric Science	24
Lord, W.--Electrical Engineering	34, 58, 62, 63, 64, 65, 66
Lovill, J. E.--Atmospheric Science	20, 24
Lurvey, C. F.--Agricultural Engineering	8
MacDonald, B. C.--Atmospheric Science	20, 24
McAllister, G. L.--Electrical Engineering	61, 65
McBride, J. N.--Mechanical Engineering	78
McQuire, D. J.--Electrical Engineering	69
McKee, T. B.--Atmospheric Science	16, 20, 24
McLucas, J. W.--Electrical Engineering	69
McQuivey, R. S.--United States Geological Survey	82, 83
McWhorter, D. B.--Agricultural Engineering	1, 4, 8, 11, 89, 95, 96
Madden, R.--Atmospheric Science	20
Maddox, R. A.--Atmospheric Science	20, 24
Mahmood, K.--Civil Engineering	26, 39, 40, 44, 46, 47, 94, 95, 96
Mancini, R. T.--Mechanical Engineering	74
Margheim, G. A.--Civil Engineering	40, 53
Marschner, B. W.--Mechanical Engineering	71, 74, 77
Martin, R. D.--Electrical Engineering	65
Mata, M.--Atmospheric Science	24
Maxwell, L. M.--Electrical Engineering	28, 58, 64, 65, 76
Mayfield, R. L.--Agricultural Engineering	15
Meissner, G. H.--Civil Engineering	65, 68
Mejia, J. M.--Civil Engineering	32, 40, 44, 56, 83
Meltesen, G. T.--Atmospheric Science	16
Meneely, C. T.--Civil Engineering	65
Mennemeyer, P.--Mechanical Engineering	74, 77
Mercer, A. G.--Civil Engineering	26, 40, 44, 94
Meroney, R. N.--Civil Engineering	26, 27, 30, 35, 36, 52, 53, 73, 84, 92, 93, 94
Meyer, D. J.--Agricultural Engineering	8, 10
Mielke, P. W., Jr.--Atmospheric Science	17, 18, 19, 21
Miles, D. L.--Agricultural Engineering	1, 8, 9
Millan, J.--Civil Engineering	41, 56
Miller, A. C.--Civil Engineering	41, 44, 56
Miller, H. J.--Atmospheric Science	21, 24

Author Index - continued

Miller, L. D.--Civil Engineering	26
Millsaps, K.--Mechanical Engineering	71, 74
Mitchell, C. E.--Mechanical Engineering	71, 74, 75
Modahl, A. C.--Atmospheric Science	21
Moore, D. A.--Atmospheric Science	21, 24
Moore, J. B.--Mechanical Engineering	75
Morel-Seytoux, H. J.--Civil engineering	26, 29, 32, 41, 42, 43, 88
Morgan, R. J.--Electrical Engineering	58, 65
Morris, G. A.--Electrical Engineering	60, 65
Morris, R. L.--Mechanical Engineering	75, 78
Moss, M. E.--United States Geological Survey	56, 82, 83
Mukherji, S.--Civil Engineering	42, 56, 93
Mulhern, P. F.--Civil Engineering	42, 48
Nagpal, S. C.--Mechanical Engineering	75, 78
Nakamichi, H.--Civil Engineering	42
Nallaswami, M.--Civil Engineering	42, 56
Nambudripad, K. D.--Civil Engineering	56
Nayak, S. K.--Civil Engineering	30, 40, 42, 56, 93
Nazar, A. M.--Civil Engineering	56
Neff, E. L.--Agricultural Research Service	79, 80
Neghassi, H. M.--Agricultural Engineering	9, 15, 96
Nelson, D. W.--Atmospheric Science	24
Nelson, J. D.--Civil Engineering	42, 43
Newlin, J. T.--Agricultural Engineering	9
Nichols, S. R.--Agricultural Engineering	9, 13, 15
Nickerson, E. C.--Civil Engineering	27, 31, 32, 35, 43, 52, 84, 93
Nielson, F. D.--Civil Engineering	26, 43
Niimura, M.--Electrical Engineering	60, 66, 69
Noblanc, A.--Civil Engineering	43
Nordin, C. F.--United States Geological Survey	82, 83
Novlan, D. J.--Atmospheric Science	21, 25
O'Brien, A. H.--Electrical Engineering	69
Ogley, G. A.--Mechanical Engineering	78
Olson, A. F.--Civil Engineering	56
Olson, H. G.--Mechanical Engineering	71
O'Neil, J. C.--Electrical Engineering	66, 69
Orgill, M. M.--Civil Engineering	43
Ortiz-Brennan, D.--Civil Engineering	56
Osteryoung, J. G.--Civil Engineering	26
Oswald, D. J.--Electrical Engineering	64, 66
Pacheco, P. P.--Atmospheric Science	25
Packer, E. E.--Electrical Engineering	69
Panton, D. R.--Mechanical Engineering	78
Parker, R. L.--Mechanical Engineering	78
Penner, B. G.--Civil Engineering	43, 56
Perl, J.--Electrical Engineering	62, 66, 70
Perry, M. P.--Electrical Engineering	63, 66, 70
Peterka, J. A.--Civil Engineering	26, 32, 34, 35, 41, 43
Peterson, C. R.--Civil Engineering	56
Petrela, D. M.--Electrical Engineering	60, 65, 66, 70
Phuc, L. V.--Civil Engineering	43
Phull, K. K.--Civil Engineering	56
Plumb, O. A.--Mechanical Engineering	78
Poellot, M.--Atmospheric Science	17, 21
Poland, H. M.--Atmospheric Science	16, 21
Polifka, M.--Atmospheric Science	20, 21
Porter, D. R.--Electrical Engineering	70
Prakash, A.--Civil Engineering	8, 43, 56
Prigmore, D.--Mechanical Engineering	75
Puckett, W. R.--Atmospheric Science	25
Putta, S. N.--Civil Engineering	43, 84, 93
Rabot, J.--Civil Engineering	56
Ragavendran, R.--Atmospheric Science	36, 43, 44
Rahka, A.--Civil Engineering	56
Ramanathan, N.--Atmospheric Science	25
Ramos, R. P. L.--Atmospheric Science	21, 25

Author Index - continued

Ramu, K. L. V.--Civil Engineering	43, 44, 51, 91
Rana, S. A.--Civil Engineering	44, 56
Raschke, E.--Atmospheric Science	21
Rasmussen, J. L.--Atmospheric Science	16, 21, 77
Rassam, H. Y.--Civil Engineering	33, 44
Rathbun, R. E.--United States Geological Survey	82, 83
Rauzi, F.--Agricultural Research Service	79, 80
Reinders, R. D.--Mechanical Engineering	78
Reinecke, S. E.--Civil Engineering	44, 53, 56
Reinking, R. F.--Atmospheric Science	25
Reiter, E. R.--Atmospheric Science	16, 18, 20, 21, 22
Rennat, H. O.--Mechanical Engineering	71
Reynolds, D. W.--Atmospheric Science	22, 25
Rhea, J. O.--Atmospheric Science	25
Richardson, E. V.--Civil Engineering	26, 35, 37, 44, 48, 49, 90, 94
Richmond, C. E., Jr.--Mechanical Engineering	78
Riehl, H.--Atmospheric Science	16, 22
Risch, P. R.--Electrical Engineering	66, 70
Risley, W. B.--Electrical Engineering	70
Rodriguez-Iturbe, I.--Civil Engineering	40, 44, 88
Rogers, E.--Agricultural Engineering	9, 11
Rose, G. C.--Electrical Engineering	66, 68
Rothermel, R. C.--Mechanical Engineering	78
Rousselle, J.--Civil Engineering	56
Rovey, E.--Civil Engineering	44, 80
Ruff, J. F.--Civil Engineering	26, 44, 45, 48, 49, 77
Ruprecht, E.--Atmospheric Science	16
Rybak, J. P.--Electrical Engineering	66
Ryder, E. B.--Electrical Engineering	70
Sabol, G. V.--United States Geological Survey	56, 82, 83
Sadeh, W. Z.--Civil Engineering	26, 36, 42, 44, 45, 84, 85, 93
Sagar, B. T. A.--Civil Engineering	57
Sagert, P. G.--Atmospheric Science	25
Saheli, F. P.--Mechanical Engineering	41, 42, 75, 78
Sahni, B. M.--Agricultural Engineering	9, 10, 15, 95
Saito, G. E.--Mechanical Engineering	78
Salas-LaCruz, J. D.--Civil Engineering	45, 57, 89
Sandborn, V. A.--Civil Engineering	26, 31, 42, 45, 85, 86, 92, 93, 94
Santeford, H. S., Jr.--Civil Engineering	57
Santos-Cayado, J.--Civil Engineering	45, 57
Scharf, L. L.--Electrical Engineering	58, 62, 66, 67
Schiefer, M. E.--Civil Engineering	57
Schubert, W. H.--Atmospheric Science	16
Schulz, E. F.--Civil Engineering	26, 36, 45, 46, 53, 80
Schweizer, H. H.--Civil Engineering	26, 40, 59
Sek, K. S.--Mechanical Engineering	78
SethuRaman, S.--Civil Engineering	46, 57, 94
Shaner, W. W.--Mechanical Engineering	71, 75
Shea, D. J.--Atmospheric Science	22, 25
Sheaffer, J. D.--Atmospheric Science	25
Shen, H. W.--Civil Engineering	26, 29, 31, 35, 38, 40, 46, 47
Shieh, S. C.--Civil Engineering	47, 57
Sikula, G. J.--Atmospheric Science	22, 23, 25
Simons, D. B.--Civil Engineering	26, 38, 39, 44, 45, 47, 48, 49, 79, 80, 81, 83, 87
Sinclair, P. C.--Atmospheric Science	16, 23
Singh, V. P.--Civil Engineering	48, 57
Skinner, M. M.--Civil Engineering	26, 44, 48, 49
Skogerboe, G. V.--Agricultural Engineering	1, 8, 9, 10, 11, 12, 13, 95
Smith, C.--Electrical Engineering	67
Smith, C. C.--Civil Engineering	49
Smith, F. L., III--Electrical Engineering	58, 67
Smith, F. W.--Mechanical Engineering	71, 72, 75
Smith, G. L.--Civil Engineering	26, 29, 33, 49, 80, 88
Smith, J. L.--Agricultural Engineering	1, 2, 4, 7, 12, 14
Smith, R. E.--Agricultural Research Service	80, 89
Somervell, W. L., Jr.--Atmospheric Science	16
Sonu, J.--Civil Engineering	57
Sorenson, D. R.--Mechanical Engineering	78

Author Index - continued

Squire, H. A.--Mechanical Engineering	78
Srivatsangam, S.--Atmospheric Science	22, 23
Stanfel, L. E.--Mechanical Engineering	71
Steadman, J. W.--Electrical Engineering	63, 65, 67
Stevens, M. A.--Civil Engineering	26, 38, 44, 47, 48, 49
Stockebrand, W. W.--Mechanical Engineering	78
Stone, M. L.--Mechanical Engineering	12
Story, A. G.--Agricultural Engineering	12
Stuehm, D. L.--Electrical Engineering	67, 68, 70
Su, K.--Civil Engineering	49, 57
Subramaniam, J.--Civil Engineering	37, 49
Sunada, D. K.--Civil Engineering	8, 27, 29, 42, 49
Sweeney, C. E.--Civil Engineering	28, 39, 49, 57
Tamburi, A. J.--Civil Engineering	49, 95
Tao, P.--Civil Engineering	57
Taylor, D. C.--Civil Engineering	27, 29, 49
Taylor, J. H.--Civil Engineering	2, 4, 9, 10
Thaemert, R. L.--Civil Engineering	57
Thayer, S. B.--Mechanical Engineering	71
Thomas, A. W.--Agricultural Research Service	79, 80, 81
Thomas, C. W.--Civil Engineering	27, 50, 90
Thompson, E. G.--Civil Engineering	27, 37, 43, 50, 69
Thompson, R. E.--Civil Engineering	29, 30, 50, 72
Thornock, R. D.--Mechanical Engineering	78
Todorovic, P.--Civil Engineering	50, 80, 88
Torranin, P.--Civil Engineering	50, 57, 89
Townsend, D. W.--Mechanical Engineering	78
Tribelhorn, R. E.--Agricultural Engineering	12, 15
Trotta, P. D.--Civil Engineering	37, 50
Tsao, T.--Agricultural Engineering	1, 2, 3, 6, 8, 12, 57
Tucker, L. S.--Civil Engineering	27, 34, 45, 49, 50
Tuffuor, S.--Civil Engineering	51, 57
Tullis, J. P.--Civil Engineering	27, 28, 51, 52, 90, 91, 92
Unger, B.--Civil Engineering	52
Vacanti, D. C.--Electrical Engineering	63, 68
Vaitkus, D. R.--Mechanical Engineering	72, 75
Vanderbilt, M. D.--Civil Engineering	27, 33, 37, 43, 52
Vanderholm, D. H.--Agricultural Engineering	12, 13, 15, 37, 43, 52
Vander Werff, T. J.--Mechanical Engineering	71, 75, 76
Vardiman, L.--Atmospheric Science	23, 25
Vasbinder, G. C.--Electrical Engineering	68
Veenhuizen, S. D.--Civil Engineering	52, 57, 92
Verma, S.--Civil Engineering	52, 73
Vickers, R. S.--Electrical Engineering	58, 66, 68
Viets, F. G.--Agricultural Research Service	79, 80
VijayaRaghavan, G. S.--Agricultural Engineering	12, 15
Vonder Haar, T. H.--Atmospheric Science	16, 17, 18, 20, 21, 22, 23
Wacker, A. M.--Civil Engineering	57
Wagner, J. D.--Electrical Engineering	70
Walker, W. R.--Agricultural Engineering	1, 9, 10, 11, 12, 13, 15, 95
Wang, H.--Civil Engineering	57, 93
Wang, J. S.--Civil Engineering	52, 57
Ward, D. S.--Civil Engineering	27, 36, 38, 49, 52
Ward, J. C.--Civil Engineering	27, 35, 39, 52, 53, 89, 92
Ward, R. C.--Agricultural Engineering	1, 9, 11, 12, 13, 14
Watkins, D. R.--Mechanical Engineering	76, 78
Waugaman, D.--Civil Engineering	44, 53
Webb, W. L.--Atmospheric Science	16, 25
Wells, N. K.--Mechanical Engineering	71
Wemple, R. R.--Mechanical Engineering	71
Wendim-Agegnehu, L.--Civil Engineering	57
Wetzel, P. J.--Atmospheric Science	23, 25
White, M. D.--Agricultural Engineering	1, 14
Wilbur, P. J.--Mechanical Engineering	71, 75, 76
Wilhelm, H. E.--Mechanical Engineering	74, 76
Williams, T. W.--Electrical Engineering	63, 68

Author Index - continued

Wilmsen, C. W.--Electrical Engineering	58, 64, 67, 68, 69
Wilson, G. E.--Mechanical Engineering	78
Wilson, W. A.--Civil Engineering	57
Winn, C. B.--Mechanical Engineering	29, 71, 72, 74, 76, 77
Woolhiser, D. A.--Agricultural Research Service	53, 79, 80, 89
Wright, D. L.--Electrical Engineering	58
Wright, J. H.--Mechanical Engineering	78
Wu, F.--Civil Engineering	57
Wu, T. Y.--Agricultural Engineering	11, 14, 15, 95
Yadlowsky, E. J.--Electrical Engineering	58, 69
Yamada, T.--Civil Engineering	41, 53, 93
Yang, B. T.--Civil Engineering	40, 53, 57, 84, 93
Yevjevich, V.--Civil Engineering	27, 31, 36, 45, 46, 53, 54, 87, 88, 89, 90
Young, M. H.--Mechanical Engineering	78
Yow, J.--Agricultural Engineering	14
Zakely, W. L.--Civil Engineering	57
Zeller, E. R.--Electrical Engineering	60, 69
Zieroth, L. W.--Electrical Engineering	70
Zuberi, F. A.--Civil Engineering	54, 96