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For the period January 1, 1966 through June 30, 1969



ENGINEERING RESEARCH

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COLLEGE OF ENGINEERING

Colorado State University
Fort Collins, Colorado

July 1, 1969

CER68-69DBS40

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COLLEGE OF ENGINEERING
ADMINISTRATIVE OFFICERS

Lionel V. Baldwin, Dean, College of Engineering
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Everett V. Richardson, Administrative Engineer

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J.W.N. Fead, Head, Department of Civil Engineering
Knox Millsaps, Head, Department of Mechanical Engineering
Elmar R. Reiter, Head, Department of Atmospheric Science



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 1966 may be found in previous catalogs, "Research Reports, Papers, Bulletins and Theses, Civil Engineering Numbers CER63RAS71 and CER65DKS52.

An annual supplement to this Catalog will be issued each year and a General Catalog will be issued in five years (1974).

The publications by members of various departments are listed alphabetically by senior author. Papers co-authored by members of different departments 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. Include postage: \$0.25 domestic, and \$1.00 foreign.

ABBREVIATIONS USED IN THIS CATALOG

AGARD	Advisory Group for Aerospace Research and Development
AGU	American Geophysical Union
AIAA	American Institute of Aeronautics and Astronautics
AMS	American Meteorological Society
ARS	Agricultural Research Service
ASAE	American Society of Architectural Engineers
ASCE	American Society of Civil Engineers
ASEE	American Society of Electrical Engineers
ASME	American Society of Mechanical Engineers
ATC	Air Traffic Control
AWWA	American Water Works Association
CAT	Clear-Air Turbulence
CREEL	Cold Region Environmental and Engineering Laboratory
CSU	Colorado State University
EDS	Environmental Data Service
ESSA	Environmental Sciences Services Administration
FDDL	Fluid Dynamics and Diffusion Laboratory
HEW	Health, Education and Welfare
IASH	International Association of Scientific Hydrology
ICID	International Commission on Irrigation and Drainage
IEEE	Institute of Electrical and Electronics Engineers
NASA	National Aeronautics and Space Administration
NBS	National Bureau of Standards
NCAR	National Center for Atmospheric Research
NSF	National Science Foundation
SCAT	Supersonic Commercial Air Transport
SEATO	South East Asia Treaty Organization
SEPM	Society of Economic Palentologists and Mineralogists
TAMS	Tippett-Abbett-McCarthy and Stratton
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USWB	United States Weather Bureau
WMO	World Meteorological Association

ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF AGRICULTURAL ENGINEERING

Norman A. Evans, Head

1968-69

BARMINGTON, R. D., Associate Agricultural Engineer: (power machinery).

Associate Agricultural Engineer: (farm structures and power machinery).

COREY, A. T., Professor and Agricultural Engineer: (flow through porous media).

MILES, D. L., Extension Assistant Professor: (irrigation specialist).

EVANS, N. A., Professor and Head of Department: (irrigation and drainage).

SKOGEROE, G. V., Assistant Professor: (irrigation and drainage).

HANSEN, R. W., Associate Professor and

STORY, A. G., Assistant Professor: (vegetable mechanization).

PUBLICATIONS

Agricultural Engineering Department

Adam, K.M. and A.T. Corey, Diffusion of entrapped gas from porous media. Hydrology Paper No. 27, April 1968. \$3.00.

Corey, A.T. and W.D. Kemper, Conservation of soil water by gravel mulches. Hydrology Paper No. 30, Sept., 1968. \$3.00

_____, G.L. Bloomsburg and A.T. Corey, Diffusion of trapped gas from porous media. Submitted to Water Resources Research Journal and American Geophysical Union. AEP68-69GLB-KA-ATC6.

_____, H.R. Duke, and W.E. Hedstrom, Two-dimensional models for drainage systems. A contribution to the Western Regional Research Committee, W-51, Oct., 1968.

Barmington, R.D., Precision planting of sugar beets. Scientific Journal Series No. 1192, March 1967.

_____, R.O. Slatyer and W.D. Kemper, Comparative terminologies for water in the soil-plant-atmosphere system. Chapter 22, Irrigation of Agricultural Lands, Agronomy No. 11, edited by R.M. Hage, H. Haise and T.W. Edminster, published by American Soc. Agronomy, Madison, Wis., 1967. 18 p. AEP67-68ATC2.

_____, Seed planters. Canning Crops Notes 5(3), 1966.

Bloomsburg, G.L., see:

1. K.M. Adam, Department of Agricultural Engineering.
2. A.T. Corey, Department of Agricultural Engineering.

_____, and G.E. Laliberte, Hydraulic properties of disturbed and undisturbed soil. Reprint from copyrighted Permeability and Capillarity of Soils, Special Tech. Publication No. 417, American Society for Testing and Materials, 1967. 16 p. AER67-68ATC-CEL10.

Clark, S.J., Instrumentation for vehicle mobility testing in a tropical environment. CSU-Thailand Trafficability Instrumentation Team under contract with Dept. of the Army, Waterways Experiment Station, Vicksburg, Mississippi and Advanced Research Projects Agency, Contract No. DA-22-079-eng-378, June 1966. 41 p. AER66-67SJC4.

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_____, Discussion of "Permeability and Capillarity in Petroleum Reservoir Engineering" by Oren C. Baptist. Presented at ASTM meeting in Atlantic City, July 1966. 3 p. CEP66ATC9.

_____, see:

1. G.E. Laliberte, Dept. of Agricultural Engineering (2 coauthorships).
2. R.H. Brooks, Agricultural Research Service.
3. G.L. Corey, Department of Civil Engineering.
4. D.B. McWhorter, Department of Agricultural Engineering.
5. N.F. White, Department of Agricultural Engineering (2 coauthorships)
6. K.E. Adam, Department of Agricultural Engineering.
7. H.R. Duke, Agricultural Research Service.
8. D.K. Sunada, Department of Civil Engineering.
9. R.W. Filmer, Department of Civil Engineering.
10. G.L. Bloomsburg, Department of Agricultural Engineering.

Corey, G.L. and A.T. Corey, Similitude for drainage of soils. Proc. ASCE, J. Irrigation and Drainage Div., Sept. 1967, IR3. AER67-68GLC-ATC11.

De Roock, B., Relation between propagation velocity of mechanical waves through soil and soil strength. Presented ASAE meeting, Chicago, Ill., Dec. 6-9, 1966. 18 p. AER66-67BD5.

Eaton, F.E., Mechanical separation of stones from potatoes by means of rotary brushes. Presented 1969 annual meeting ASAE, Purdue Univ., W. Lafayette, Indiana, June 22-25, 1969. Paper No. 69-108, 15 p. AEP68-69FEE7.

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_____, see T.E. Norton, Department of Civil Engineering.

Heerman, D.F., see United States Department of Agricultural Research Service.

Laliberte, G.E., A.T. Corey and R.H. Brooks, Properties of unsaturated porous media. Hydrology Paper No. 17, Nov. 1966. \$3.00

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_____, see A.T. Corey, Department of Agricultural Engineering.

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McWhorter, D.B., see:

1. G.E. Laliberte, Department of Agricultural Engineering.
2. A.T. Corey, Department of Agricultural Engineering.

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Story, A.G., W.H. Johnson and R.E. Stewart, Remote measurement of concentration and height of heads of standing grain with microwave energy. Presented 1968 Annual Meeting ASAE, June 1968, Paper 68-113. 30 p. AER67-68AGS12.

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ACADEMIC AND RESEARCH FACULTY
DEPARTMENT OF ATMOSPHERIC SCIENCE

Elmar R. Reiter, Head

1968-69

BAER, F., Associate Professor: (theoretical and numerical problems of atmospheric flow).	meteorology, atmospheric vortices, cumulus convection).
BARRETT, E. W., Affiliate Professor: (meteorological instrumentation, general circulation).	HAURWITZ, B., Visiting Professor: (geophysics, hydrodynamics).
BEAN, B. R., Affiliate Associate Professor: (radio meteorology, tropospheric telecommunications).	MARLATT, W. E., Professor: (radiation physics related to satellite observations, agricultural and forest climates).
CORRIN, M. L., Professor: (air pollution, atmospheric chemistry).	RAO, D. B., Assistant Professor: (dynamic meteorology, oceanography).
COX, S. K., Assistant Professor: (radiation, general circulation).	RASMUSSEN, J. L., Assistant Professor: (synoptic meteorology, hydrometeorology).
GALLET, R., Affiliate Professor: (upper atmosphere).	REITER, E. R., Professor and Head: (high altitude winds, aerospace science, turbulence and air pollution).
GRANT, L. O., Professor: (precipitation physics, weather modification, mountain weather).	RIEHL, H., Professor: (atmospheric dynamics, jet streams, hurricanes).
GRAY, W. M., Associate Professor: (tropical	SINCLAIR, P. C., Associate Professor: (severe storms).

PUBLICATIONS

Atmospheric Science Department

"Atmosphere and the Water Cycle" class of 1969, Weather disturbances over tropical continents and their effects on ground conditions. Comments on the Northeast Brazil Project. Report No. 3, March 1969.	Technical report, NSF Grant No. GA-761, August 1968.
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- Chappell, C.F., Cloud seeding opportunity recognition. Atmospheric Science Technical Paper, NSF Grant GA-847, 1967.
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- _____, see L.O. Grant, Department of Atmospheric Science.
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1. L.O. Grant, Department of Atmospheric Science.
 2. R.L. Steele, Department of Mechanical Engineering.
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- _____ and E.R. Reiter, The prediction of clear-air turbulence over mountainous terrain. Presented American Institute of Aeronautics and Astronautics, 5th Aerospace Sciences Meeting, Paper No. 67-184, New York, January 1967.
- _____, see E.R. Reiter, Department of Atmospheric Science.
- Fosberg, M.A., see W.E. Marlatt, Department of Atmospheric Science.
- Furman, R.W., II, Radar characteristics of wintertime storms in the Colorado Rockies. NSF Grant GP-4750, July 1967. Atmospheric Science Paper 112.
- Glasser, M.E., see E.R. Reiter, Department of Atmospheric Science (2 coauthorships).
- Grant, L.O., P.W. Mielke, Jr., and C.F. Chappell, Elevation and spatial variation in seeding effects from wintertime orographic cloud seeding. Journal of Applied Meteorology, 1969.
- _____, CSU presentation at Fourth Skywater Conference, Optimization of Operational Weather Modification. Proceedings, Fourth Skywater Conference, Denver, Colorado, May 21-22, 1968.
- _____, J.E. Cermak, and M.M. Orgill, Delivery of nucleating material to cloud system from individual ground generator. Proceedings of the Third Skywater Conference, Fort Collins, Colorado, Feb. 14-16, 1968.
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- _____, The role of ice nuclei in the formation of precipitation. Proceedings of the International Conference of Cloud Physics, Toronto, Canada, August 26-30, 1968.
- Grant, L.O., Statement on weather modification. Committee on Interior and Insular Affairs, U.S. House of Representative Hearings, Washington, D.C., July 22, 1968.
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- _____, Designing programs involving ground-based seeding. Proceedings of Bureau of Reclamation Planning Conference, Denver, Colorado, October 11-13, 1967.
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- _____ and J.D. Marwitz, The Colorado State University weather modification program. Presented to WMRA meeting at Sacramento, California, March 16, 1967.
- _____ and R.L. Steele, The calibration of silver iodide generators. Bull. Amer. Meteor. Soc., 47, 713-717, September 1966.
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2. R.L. Steele, Department of Mechanical Engineering.
3. R.A. Schleusener, Department of Atmospheric Science.
4. A.R. Chamberlain, Department of Civil Engineering.

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_____, On the scales of motion and internal stress characteristics of the hurricane. Jour. Atmos. Sci., 23:278-288, 1966.

_____, Use of satellite APT pictures for tropical storm analysis. Written for use and reference by U.S. Air Force Personnel at the Far East Weather Forecasting Central, Fuchu, Japan, 1966. 14p.

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Grossman, R.L., A data reduction program for a NIMBUS MRIR field study. Res. Rep. 2566-2 to National Aeronautics and Space Administration, 1966.

_____, A laboratory study of the effect of evaporation and evaporation reduction on the surface temperature of water. Progress Report to Bureau of Reclamation, 1966.

_____, see W.E. Marlatt, Department of Atmospheric Science (3 coauthorships).

Hindman, E.E., II, Artificial stimulation of Colorado mountain snowfall. Prepared

for CSU Engineering students' publication "Slide Rule", February 1967.

Hindman, E.E., II and R.L. Rinker, Continuous snowfall replicator. Reprinted J. Appl. Meteor., Vol. 6, No. 1, pp. 126-133, February 1967.

_____, Snow crystal and ice nuclei concentrations in orographic snowfall. NSF Grant GP-4750, 1967. 83 p. Atmospheric Science Paper 109.

_____, and R. Reinking. Analysis of continua of snow crystal replicas from Colorado mountains and Yellowstone Park snowfall. Presented at Sixth Western National Meeting AGU, Los Angeles, September 7-9, 1966.

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Hjermstad, L.M. and P. St. Louis, Design of a field replicator network at Yellowstone Park. Seventh Yellowstone Field Research Expedition, April 1967.

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Langer, G., see R.L. Steele, Department of Mechanical Engineering.

LaRue, R.D., A tethered heavier than air vehicle for atmospheric sounding. Presented at Air Force Cambridge Research Laboratories Conference, Oct. 17-18, 1968.

Lester, F., see:

1. E.R. Reiter, Department of Atmospheric Science, (2 coauthorships).
2. G. Wooldridge, Department of Atmospheric Science.

Lopez, R.E., Investigation of the importance of cumulus convection and ventilation in early tropical storm development. Prepared with support from NSF GF-287 and ESSA E-22-80-68(G) grants, June 1968. Atmospheric Science Paper 124, 89 p.

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- Lovill, J.E., Transport processes in orographically induced gravity waves as indicated by atmospheric ozone. Prepared with support from ESSA Grant and Contract AT(11-1)-1340 with the U.S. Atomic Energy Commission, February 1969. 87 p.
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- _____, Remote and in situ temperature measurements of land and water surfaces. Journal of Applied Meteorology, April, 1966.
- _____, see:
1. E.R. Reiter, Department of Atmospheric Science (2 coauthorships).
 2. R.A. Dirks, Department of Atmospheric Science.
- Marlatt, W.E. and D.N. Hyder, Microridging for reduction of wind erosion from grass seedbeds. Submitted to Journal of Range Science, 1969.
- _____, M.A. Fosberg, and A. Rango, Wind computations from the temperature field in local circulations. Submitted to the Journal of Air Pollution, 1969.
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- _____, and V.V. Salomonson, Anisotropic solar reflectance over white sand, snow and stratus clouds. Journal of Applied Meteorology, Vol. 7, No. 3, June 1968. Atmospheric Science Paper 120.
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BELL, J. M., Associate Professor: (soil mechanics).	MOREL-SEYTOUX, Hubert J., Associate Professor: (hydrology, mechanics).
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1. R.W. Filmer, Department of Civil Engineering (3 coauthorships).
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ACADEMIC AND RESEARCH FACULTY
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1968-69

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ACADEMIC AND RESEARCH FACULTY
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1968-69

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MILLSAPS, Knox, Professor and Head of Depart- ment: (aerodynamics and heat transfer).	
MITCHELL, C. E., Assistant Professor: (Combustion and shock phenomena).	

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UNITED STATES DEPARTMENT OF AGRICULTURE
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2. T.A. Reid, Department of Civil Engineering.
3. H.Y. Chang, Department of Civil Engineering.

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2. A.T. Corey, Department of Agricultural Engineering.
3. M.W. Bitteringer, Department of Civil Engineering.

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- ____, see:
1. H.P. Guy, U.S. Geological Survey. (2 coauthorships)
 2. E.V. Richardson, Department of Civil Engineering.
 3. N.S. Grigg, U.S. Geological Survey.
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