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Water Resources News, Volume 3, No. 9, November 1971

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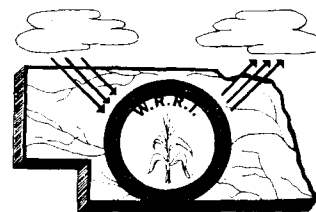
"Water Resources News, Volume 3, No. 9, November 1971" (1971). *Water Current Newsletter*. 60.
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WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68503



Volume 3 Number 9

November, 1971

PROGRAM FOR THE 1972 INTERDISCIPLINARY SEMINAR ON WATER RESOURCES

The Interdisciplinary Water Resources Seminar will be offered again during the 1972 Spring Semester. The intent of these seminars is to bring together upper classmen, graduate students, professional persons, faculty, and others interested in water topics.

The general theme will be the impact of various forms of water resources development on the

Nebraska Sandhills. Tentative topics are outlined below. Hopefully everyone will find the seminars educational and informative.

To receive credit, students should enroll under their own departmental Seminar number, as was done last year. A short paper will be required.

The Seminar is scheduled to be held from 4:00 - 5:00 p.m. on Mondays in room 206 Agricultural Engineering Building.

PROGRAM FOR THE 1972 INTERDISCIPLINARY WATER RESOURCES SEMINAR

THE SANDHILLS OF NEBRASKA

4:00 p.m. Mondays, 206 Agricultural Engineering Building

January 24	Geography - Physical and Human
January 31	History of Development
February 7	Geology
February 14	Hydrology
February 21	Ecology - Plant Aspects
February 28	Ecology - Fish and Wildlife
March 6	Rancher's View of the Sandhills
March 13	Preservationist's View of the Sandhills

March 20	State Water Plan and Implications
April 3	Irrigation Development and Implications
April 10	Recreational Potential
April 17	Economic Importance of the Sandhills
April 24	Film: "Where the Cornbelt Meets the Range"
April 29, 30	Field Trip -----

For further information contact:
Warren Viessman, Jr. - Extension
3307
Director, Nebraska Water Resources
Research Institute

Donald Edwards - Extension 3181
Assistant Dean of Engineering

Deon Axthelm - Extension 2824
Dept. of Agricultural Engineering

SIMULATION OF GROUNDWATER SYSTEMS

The Water Resources Research Institute will sponsor a one-week Summer Institute on Simulation of Groundwater Systems from July 9-14, 1972. This course will be designed to prepare practicing engineers, planners, and educators with the necessary background for development of groundwater systems models. Topics to be included are: groundwater geology, basic equations of groundwater flow, finite difference methods, finite element methods and a workshop which will produce an operational simulation model.

For further information contact:
Dr. Warren Viessman, Jr., Director
Water Resources Research Institute
212 Ag. Engineering Building
University of Nebraska - East Campus
Lincoln, Nebraska 68503

SUMMER SHORT COURSE PLANNED

The University of Nebraska, Department of Civil Engineering will sponsor a summer short course this summer. The program, entitled "Rivers Systems-Planning and Environmental Aspects", will be held July 24 - August 5, 1972 at the University of Nebraska. The fee for the program will be \$300 per person, which includes all costs for the river field trips.

Planning concepts from engineering, ecology and geomorphology will be used by participants to prepare a preliminary plan for river regulation. Theory and recent developments in the fields of sediment transport, channel stabilization, movable bed models, and river management will be applied to a team solution of a river problem.

Following presentation of basic theory, two days will be spent in the field to study river problems downstream from the Lewis and Clark Reservoir. An inspection of the river will be made by boat of the meandering channels above Sioux City. This trip will give the participants

"real" insightings of the river environment and an appreciation of the problems of planning river developments.

The course will conclude with work on large river models inspection of the navigation channel development through the Omaha area, and a presentation and critique of the workshop projects.

Participants will include ecologists, engineers, geologists, planners, and other professionals engaged in the planning, design, and operation of river controls, reservoirs, and related hydraulic systems and teachers in these fields.

Several river authorities will augment the staff from the 1970 course and will include:

James C. Brice, Professor of Geology, Washington University, St. Louis

Howard E. Christian, Chief, Channel Stabilization Section, Omaha District, Corps of Engineers

Gene E. Likens, Professor of Ecology and Systematics, Cornell University

Thomas Maddock, Jr., Research Hydrologist, U.S. Geological Survey, Tucson

James M. Malkowski, Director, Fontenelle Forest, Omaha

James W. Salyer, Refuge Manager, Fish and Wildlife Service, DeSota National Wildlife Refuge.

For additional information, please write to:

Professor R. R. Marlette
Department of Civil Engr.
University of Nebraska
Lincoln, Nebraska 68508

RECYCLING OF WATER

Environmental Protection Agency Administrator, William D. Ruckelshaus, stated in a recent speech to the National Water Company Conference that the nation can expect a trillion gpd water demand soon after the turn of the century. "Multiple reuse of water will be the order of the day before long," he said. He continued, "We are going to be hearing much about recycled water, desalination, and conservation. Pollution control will become essential, not just manifestly desirable." Ruckelshaus also touched on the Community Water Supply study recently made by the Public Health Service. He listed several steps his agency is taking to improve the national effort for better water quality, including a request for authority to set ground water standards for the first time.

OSW AWARDS FREEZING PLANT DESIGN CONTRACT

The Department of the Interior's Office of Saline Water has awarded a \$243,544 contract for the design of a 75,000 gpd pilot plant to desalt seawater by use of a low-cost freezing process developed by AVCO Corp., Wilmington, Mass.

Acting Director of OSW, J. W. O'Meara, said that the 10-month contract with AVCO's Systems Division calls for a complete

design package with detailed drawings and specifications for each component of the skid-mounted pilot plant.

CLOUD-SEEDING PROGRAM

Announced recently by the Bureau of Reclamation was the award of a \$948,188 5-year contract to the University of Illinois for research and planning of a year-round program of precipitation management designed to increase water supplies and crop moisture in southern Illinois. This is part of the Bureau of Reclamation's Project Skywater, an effort to develop cloud seeding as an efficient water resource. The Bureau of Reclamation has also announced the letting of a contract for a comprehensive study to assess the ecological effects of a proposed winter cloud-seeding research program in the Medicine Bow Mountains of southern Wyoming. The work will be conducted by the University of Wyoming Department of Botany under a \$228,000 contract.

WATER RIGHTS STUDY

The National Water Commission announced today the release of a legal study on federal-state relations in the law of water rights. The study was prepared by Professor Frank J. Trelease, University of Wyoming, College of Law and an international authority on water law.

The report provides technical background for the Commission's deliberations on national water policy, which is published and

distributed for the Commission by the National Technical Information Service (NTIS). This report has not been approved by the Commission, but is being made immediately available to the public through NTIS to stimulate general discussion of national water policy issues. The Commission invites the comments and suggestions of interested parties.

The report is entitled "Federal-State Relations in the Law of Water Rights" and deals with a number of controversial issues in water law. These include federal reserved rights for Indian Reservations, National Forests and other federal establishments; the immunity of the United States government from law suits; the coordination of state and federal practices and procedures in water resource development; and the compensability of water rights taken for navigation projects.

The National Water Commission was established by Act of Congress in 1968. Charles F. Luce of New York is Chairman of the Commission. During its five-year life, it must prepare a comprehensive and independent review of the nation's water policies; the scope of its review includes everything from pollution to inland navigation, from irrigation to ecology, from institutions to aesthetics. The commission's final report will be submitted to Congress and the President in 1973.

The report may be ordered from National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151. The Accession Number is PB 203 600 and the price is six dollars.

"TURN-KEY" APPROACH PROPOSED
FOR CONSTRUCTION OF
WASTE TREATMENT PLANTS

Administrator of the Environmental Protection Agency (EPA), William D. Ruckelshaus, has proposed that municipalities planning construction of waste treatment facilities with federal matching funds be permitted to award "Turn-Key" contracts under which a single contractor is responsible for all aspects of a construction project including the meeting of prescribed performance specifications and water quality standards.

Ruckelshaus said the purpose of the "Turn-Key" approach is to (1) help assure that treatment works will be designed and built to meet water quality standards; (2) reduce the time interval from initial application for a federal grant to start-up of the completed plant; and (3) encourage use of new technology in the waste treatment field, since the "Turn-Key" contractor must guarantee performance.

The proposal to permit federal approval of such projects was published in the Federal Register on September 15, 1971, as an amendment to present regulations governing Grants for Construction of Treatment Works.

Under the "Turn-Key" approach, a single contractor is responsible for both design and construction of a waste treatment works based on performance requirements specified by the municipality. The same contractor also must operate the completed plant for a specified period to assure that the entire project meets the performance standards.

Under present conditions, communities negotiate with consulting engineering firms for planning and supervision of construction on the basis of performance and reputation. Actual construction of facilities is carried out by contractors through competitive bidding. This practice is based on the assumption that professional services cannot be subject to bidding if quality is to be preserved and interests of communities protected. Under the proposal, planning and construction would be combined raising questions of potential conflict of interests.

Currently, federal grants for construction of municipal waste treatment works are being approved at an annual rate of \$2 billion as authorized by Congress under an interim appropriation, pending approval of a final appropriations act for the 1972 fiscal year. The present rate is double the \$1 billion grants figure authorized for the prior fiscal year.

WATER QUALITY GUIDELINES FOR NATION
BEING UPDATED BY NAS FOR EPA

A basic reference on water quality criteria used in setting federal-state water quality standards is being revised and updated by the National Academy of Sciences under a \$458,000 contract awarded by the Environmental Protection Agency earlier this year.

The reference is the 1968 National Technical Advisory Committee Report, Water Quality Criteria, which is used by federal, state and local agencies for guidance in formulating standards as required under the Federal

Water Pollution Control Act, amended by the Water Quality Act of 1965. A draft of the updated version is due to be submitted to the Environmental Protection Agency by December 1, 1971.

The new edition will have broader scope, with more emphasis on public health than the original version, and will include additional information updated over a four-year period as well as more extensive review of existing literature on water quality.

A seven-member Committee on Water Quality Criteria, established under the Academy's Environmental Studies Board, will analyze scientific data, recommend quality criteria for various uses of water, and prepare the updated report from EPA.

The Committee is subdivided into six panels for determining water criteria with regard to public water supplies, agriculture, industry, marine life, freshwater life, and recreation and aesthetics. Such determination involves complex factors such as temperature, industrial chemicals, minerals, organic wastes, and radioactive substances.

"NEBRASKA WATER RESOURCES AND IRRIGATION DEVELOPMENT SEMINAR FOR THE 1970's"

President D. B. Varner has identified water resources and irrigation development as a key area for new and expanded programs by the University of Nebraska in the 1970's. Recognizing the necessity of continuing communication and close cooperation among all public

and private agencies involved or interested in Nebraska's water resources, President Varner has proposed the University of Nebraska sponsor a "Nebraska Water Resources and Irrigation Development Seminar for the 1970's". In late October Varner appointed a broadly based Planning Committee made up of 38 representatives of public and private agencies or organizations with involvement or interest in Nebraska's water resources and irrigation.

The Planning Committee for the Seminar met in Lincoln on November 17 and discussed plans for the Seminar. President Varner appointed Dr. Leslie F. Sheffield, Coordinator of the University's Irrigation Development Program, to serve as Chairman of the Planning Committee. Four subcommittees were established to handle the various aspects of the Seminar. The four subcommittees and their co-chairmen are:

1. Program and Arrangements - Vance Anderson, Western Land Roller Co., Hastings and Dr. W. E. Splinter, Chairman, Department of Agricultural Engineering, Lincoln.

2. Seminar Attendance and Invitations - Don Long, Secretary-Treasurer, Nebraska State Irrigation Association, Hastings and Mr. Dayle E. Williamson, Executive Secretary, Nebraska Soil and Water Conservation Commission, Lincoln.

3. Publicity and Proceedings - Marvin Russell, Editor, Nebraska Farmer, Lincoln and Ralston J. Graham, Chairman, Department of Information, Lincoln.

4. Follow-up - Ken Haggard,

President, Nebraska Well Drillers Association, Ogallala and John Mayne, Area Engineer, Bureau of Reclamation, Grand Island.

The Seminar is to be held March 1-2, 1972 at the Nebraska Center for Continuing Education in Lincoln. Further details concerning the program and other arrangements for the Seminar will be announced in the near future.

EPA NAMES NEW HEAD OF SOLID WASTE PROGRAMS OFFICE

Administrator William D. Ruckelshaus announced that Samuel Hale, Jr., has been appointed Deputy Assistant Administrator for Solid Waste Management Programs of the Environmental Protection Agency.

Hale, 29, was formerly director of Special Projects for EPA. His appointment became effective October 4.

Ruckelshaus said, "Hale has been in charge of a number of important projects, cutting across all the programs of EPA. He has carried them out effectively and has greatly assisted in efforts to develop EPA into a cohesive agency."

SYMPOSIUM ON COSTS OF WATER POLLUTION CONTROL

A National Symposium on Costs of Water Pollution Control will be held in Raleigh, North Carolina on April 6 and 7, 1972. Sponsored by the Research Triangle Universities and several national societies, the program will include sessions on:

Economic Implications of National Goals for Water Pollution Control

Cost Effectiveness of Comprehensive Planning, Design and Construction, Information and Monitoring Systems

Economic Incentives for Pollution Control

Economics of Industrial Waste Management.

For further information, please contact:

F. E. McJunkin
Associate Director
Water Resources Research Institute
North Carolina State University
124 Riddick Building
Raleigh, North Carolina 27607

RESEARCH NEED

The Environmental Protection Agency is looking for organizations interested in determining the feasibility of developing a rating system that may be used to predict the ability of an urban water supply system to produce water consistently meeting the constituent limits of federal drinking water standards.

The project involves the development of a numerical rating system and demonstrating its application concepts by rating an existing urban water supply system. The system to be selected will be simple and will be one for which the effect of the physical, operational, and surveillance components are known or can be approximated.

No more than five typewritten pages of information, excluding personnel resumes, should be

mailed to: A. R. Smith, Environmental Protection Agency, Contracts Management Division, Arlington Contract Operations, Washington, D.C. 20460.

SYMPOSIUM ON WATERSHED MANAGEMENT

The American Water Resources Association and Colorado State University are sponsoring a National Symposium, Watersheds in Transition--A Symposium on the management of watersheds and their water resources in view of changing environments, priorities, and methods. The Symposium will be held June 19-21, 1972, at Colorado State University, Fort Collins, Colorado.

For further information contact:
Dr. W. D. Striffer
Dept. of Watershed Sciences
Colorado State University
Fort Collins, Colorado 80521

EPA REVISING REGULATIONS FOR GRANTS AND CONTRACTS

The Environmental Protection Agency (EPA) is writing new regulations to present a single set of rules for all 22 grant programs the agency administers. The move is seen as a help to state and local agencies applying for EPA funds for programs ranging from sewage treatment to manpower and development.

EPA is also working on a new policy manual for administering the grant programs.

The first elements of the new manual are expected to be in effect by mid-November, with new

regulations being in operation by sometime early next year.

The regulations will be broken down into four sections: a general section covering rules common to all programs; research and monitoring; manpower training grants and fellowships; and state and local assistance.

The general section has been circulated within EPA and the regional offices for final comments. EPA hopes to have this section published in the Federal Register about December 1 as interim regulations will go into effect on that date. The other sections are further from completion.

The new manual, which will tell Federal offices how the programs should be run, will also be in the same four sections. For the manual, the general section and the research and demonstration section were to be put into effect by November 15.

Some 90 percent of the money for all grant programs goes to waste treatment plant construction which in the last fiscal year amounted to some \$1.2 billion. This year the construction grant outlay is expected to be \$1.7 to \$1.8 billion.

Following is a rundown of the grant programs administered by EPA: Research and Development: air pollution; pesticides; radiation; solid waste; water hygiene; and water pollution control.

Demonstration grants: water pollution; air pollution; solid waste.

Manpower Development and Training: Training--air pollution, radiation, solid waste, water

hygiene, water pollution. Fellowships--air pollution, water pollution control.

State and Local Assistance: air pollution control; solid waste planning; water pollution control (comprehensive basic planning; and state and interstate programs); waste water construction grant program.

INTERNSHIPS IN SCIENCE AND ENGINEERING

A new program of Presidential Internships in Science and Engineering was announced recently by the White House.

The one-year internships are expected to open more than 400 training opportunities in federally-funded laboratories across the country. Recipients will be matched to tasks where high degrees of specialization can provide innovation and new insights in meeting pressing national problems.

Dr. Edward E. David, Jr., Science Adviser to the President, said "we would hope to expose the trainees to both the problems and the capabilities of government research and development and put them in positions where they can best benefit the nation and themselves."

Labor Secretary J. D. Hodgson, whose department is funding the \$3 million effort from its Technology Mobilization and Reemployment Program, said "the internships greatly strengthen the nation's effort to hold onto its pool of trained scientists and engineers."

David, whose Office of Science and Technology developed the program, said "these people provide a unique pool of skills and resources, much of it developed at taxpayers' expense in colleges, universities and various laboratories. They represent a vital national resource."

He pointed out that the Internships should be particularly beneficial for unemployed younger scientists and engineers who hold advanced degrees. Those under 30 are among the hardest hit by the current job squeeze; they have an unemployment rate of 5.3 per cent according to a recent National Science Foundation survey.

The fields in which they would have the greatest impact, David said, are those of current social concern. These include pollution, trash disposal, management and integration of large projects, and the nuclear field in areas as diverse as new power systems or criminal and medical laboratories where nuclear techniques are making major contributions.

The internship program was the second Administration initiative this month aimed at enhancing the utilization of scientific and engineering techniques through existing manpower programs.

On September 1, Dr. David called his first formal meeting of the governors' science advisers here and outlined an employment program under which states, counties and local governments could hire scientists and engineers under Federal matching programs.

That effort had a double goal: reemployment of scientists and engineers and the seeding of technological specialists into the mainstream of those governmental units which have not, until now, been able to afford such expertise.

Under the new program candidates may apply directly to federally-financed laboratories for one-year, non-renewable internships which will be administered by the National Science Foundation. Veterans and those from high unemployment areas will receive preference.

The laboratories will be allotted \$7,000 for each intern and must match that amount with either cash or research support.

RESEARCH REVIEW

Project Title: Physiological and Biochemical Responses of Plants to Different Internal Water Potentials

Principal Investigators: Dr. E. J. Kinbacher, Dr. C. Y. Sullivan, and Dr. Jerry D. Eastin

Dates: July, 1969 to June, 1972

The objectives of this research are:

1. To investigate the biochemical effects of internal water stress on some physiological (biochemical) processes such as photosynthesis, respiration and dark fixation of carbon dioxide during stress and the recovery period.

2. To investigate the mechanisms by which plant water potentials and water use (transpiration) are controlled or influenced by the plants.

Accomplishments: The photosynthetic rate of attached sugar beet and bean leaves were monitored. Radiation intensities between .05 to .09 $\mu\text{E}/\text{cm}^2/\text{sec}$. caused similar photosynthetic rates for individual leaves in a leaf chamber. Photosynthesis proceeded at the same rate with a range in relative humidity of 60 to 90% when the soil was near field capacity. Sugar beet leaves recorded the maximum photosynthesis rates when the leaf temperature was about 35°C . It was found that the Hill reaction by chloroplasts isolated from sorghum, corn and pearl millet, which had been exposed to drought stress, was more susceptible to thermal inactivation than those from irrigated controls. There was no apparent effect of drought stress on cyclic photophosphorylation. Chloroplasts from pearl millet were the most stable in their ability to carry on photochemical activity after stress. Graduate Research Assistants have been given special training and problems in plant water relations.

The effect of internal water deficits on photosynthesis and transpiration will be investigated with an improved experimental system. Net photosynthesis and transpiration of individual leaves and entire plants will be monitored during several drying cycles. The effect of furrow irrigation and subsurface irrigation on plant water potentials and leaf diffusivity will be investigated. The effects of water and temperature stress on photochemical activity by isolated chloroplasts from other crop species, varieties and lines will be compared with results obtained to date. Carbon dioxide compensation points of

leaves will be studied at different water potentials. This study will provide information concerning the efficiency of carbon dioxide utilization within a leaf. The use of large tanks for hydroponic growth of plants for water relations studies will be expanded. The effects of drought stress at several stages of growth and recovery rates or prolonged effects of drought stress will be investigated.

It is well known that much of the utilization of the nation's water resources follows the soil--plant-atmosphere pathway. Availability of soil water and atmospheric demand both markedly influence this utilization, but the response of the plant to its internal water status or water potential also is very influential in regulating this utilization. Much is unknown about the biochemical and physiological responses of plants to water deficits, and for maximum production, or most efficient plant water use, we must understand the internal effects of different water potentials. For example, our finding of specific photochemical reactions which are affected by drought conditions, and the finding of significant differences between crop species and varieties will greatly aid plant breeders in developing species which are efficient in water utilization.

NEW PUBLICATIONS RECEIVED
BY INSTITUTE - NOVEMBER

1. "Nitrate Removal From Wastewaters by Ion Exchange," for the Water Quality Office, Environmental Protection Agency, January 1971.

2. "Heat Shrinkable Tubing as Sewer Pipe Joints," for the Water Quality Office, Environmental Protection Agency, June 1971.

3. "Research on the Physical Aspects of Thermal Pollution," for the Water Quality Office, Environmental Protection Agency, February 1971.

4. "Conversion of Crankcase Waste Oil Into Useful Products," for the Environmental Protection Agency, Water Quality Office, March 1971.

5. "A Survey of Alternate Methods for Cooling Condenser Discharge Water - System, Selection, Design, and Optimization," for the Water Quality Office, Environmental Protection Agency, January 1971.

6. "Biological Treatment of Chlorophenolic Wastes," for the Water Quality Office, Environmental Protection Agency, June 1971.

7. "Combined Treatment of Domestic and Industrial Wastes by Activated Sludge," for the Water Quality Office, Environmental Protection Agency, May 1971.

8. "Recovery of Floating Oil Rotating Disk Type Skimmer," for the Water Quality Office, Environmental Protection Agency, July 1971.

9. "Agricultural Pollution of the Great Lakes Basin," combined report by Canada and the United States, July 1971.

10. "Benefits of Water Quality Enhancement," for the Environmental Protection Agency, Water Quality Office, December 1970.

11. "The Electro-Oxidation of Ammonia in Sewage to Nitrogen," for the Water Quality Office, Environmental Protection Agency, July 1970.

12. "Zinc Precipitation and Recovery From Viscose Rayon Waste Water," for the Environmental Protection Agency, Water Quality Office, January 1971.

13. "A System for Industrial Waste Treatment RD & D Project Priority Assignment," for the Environmental Protection Agency, Water Quality Office, February 1971.

14. "Removal of Nitrate by an Algal System," California Department of Water Resources, April 1971.

15. "Water Resources Center Annual Report - F.Y. 1971," University of Delaware, September 1971.

16. "Statistical Geometry of Porous Media," Final Report, A. E. Scheidegger, University of Illinois, July 1971.

17. "Social and Ecological Aspects of Irrigation and Drainage," Speciality Conference, Miami Beach, Florida, ASCE, November 4-6, 1970.

18. "Physical Sciences," Graduate School, Cornell University, 1969-70.

19. "Graduate Catalogue," University of Arizona, 1967-68, 1968-69.

20. "General Bulletin 1970-71," Chadron State College, 1970.

21. "Civil Engineering Graduate Bulletin," Colorado State University, 1967-68, 1968-69.

22. "Environmental Quality-A Survey of Costs, Benefits, Citizens' Attitudes," for the Second Alabama Environmental Conference, October 6-7, 1971.

23. "Feasibility of Liquid Ion Exchange For Extracting Phosphate From Wastewater," for the Environmental Protection Agency, Water Quality Office, October 1970.

24. "HEC-2 Water Surface Profiles," Users Manual, U.S. Army Corps of Engineers, August 1971.

25. "Water Resources Data for Nebraska - Part 1. Surface Water Records," U.S. Department of the Interior, 1970.

26. "Enhancement of Ecologic and Aesthetic Values of Water Associated with Interstate Highways," C. A. Carlozzi, University of Massachusetts at Amherst.

27. "Control of Benthic Deposits in Lakes," T. H. Feng, University of Massachusetts at Amherst, July 1971.

28. "Urbanization and Sedimentation - A Bibliography," U.S. Department of the Interior, October 1971.

29. "Montana Water Law Problems," Montana University Joint Water Resources Research Center, 1971.

30. "Symposium on Water Law and Its Relationship to the Economic Development of Montana's Water Resources," Montana University Joint Water Resources Research Center, June 1971.

NEWSLETTER ITEMS

Newsletter items and inquiries should be sent to: Dr. Warren Viessman, Jr., Director., N.W.R.R.I., 212 Agricultural Engineering Building, University of Nebraska - East Campus, Lincoln, Nebraska 68503.