Why Aquarius?

Aquarius is the name given to a constellation south of Pegasus, and is the 11th sign of the zodiac. Aquarius is pictured as a man pouring water and is known as the water bearer or water carrier.

The name Aquarius was selected to carry water news of the Utah Center for Water Resources Research and the Utah Water Research Laboratory to interested individuals and groups throughout the state.

You are urged to use Aquarius for announcements, inquiries, requests, and other items of interest. Suggestions for improvement of the newsletter will be appreciated.

Irrigation Operator's Workshop Held At USU

"Water is the common denominator of progress in the state," said Jay M. Bagley, director of the Utah Water Research Laboratory at Utah State University and moderator for a panel discussing a state water plan. The discussion concluded a three-day irrigation operator's workshop sponsored by USU Extension Services under direction of Richard E. Griffin, extension agricultural and irrigation engineer. More than 100 officials and personnel of municipalities and organizations concerned with water allocation, distribution and use participated.

Various points of view concerning a water plan were presented by panel members Palmer Delong, project manager with the Central Projects Office, Bureau of Land Management; Dr. Wade H. Andrews, director of Institute for Social Science Research on Natural Resources at USU; Dr. B. Delworth Gardner, professor of agricultural economics, USU; Edward W. Clyde, legal consultant representing a number of water districts; and Edwin B. Haycock, planning director in Water Resource Development, Department of Natural Resources. All conceded in some measure to the idea that goals in water development must consider the broad concept of social welfare and related social problems and not just economic feasibility of projects.

Sections of the workshop ranged in content from review of water resources to dealing with human problems of motivation in organizations. In one of the workshop sessions Dallin W. Jensen, Utah Assistant Attorney General, pointed out that court decisions have had significant effects on water rights in the state.

Hybrid computer system added to UWRL Research Capabilities

A hybrid computer system has recently been added to the research capabilities at UWRL.

A hybrid computer is a computing device which combines the capabilities of both the digital and analog computers. The UWRL hybrid computer consists of an EAI 640 digital computer coupled to an EAI 580 analog computer.

Dr. W. J. Morris, visiting professor at UWRL, on leave from the City University, London, explained that the need for a hybrid computer at UWRL arose from the need to solve sophisticated problems which previously had not been solved at all or had been solved inefficiently using either the analog or digital computer alone.

"In the past, research workers at the laboratory classified problems as being either 'analog problems' or 'digital problems,' depending on which computer was best suited to the solution. The analog computer was used for real-time solutions and where high speed, repetitive solutions of systems of linear differential equations were required. Digital computers were applied to those problems requiring high accuracy, storage, and high speed arithmetic.

"The analog computer is a parallel device in that all operations are performed simultaneously (in parallel), while the digital computer is a sequential device with all operations performed in series.

"For simulation problems, one is usually concerned with the rate of change (suggesting a differential equation) of physical processes that occur both in parallel and also serially. The hybrid computer, therefore, with both its digital and analog components is capable of representing and accurately synthesizing the various processes which occur within a prototype system.

"The hybrid computer retains the speed advantage, man-machine capability (for changing parameters and verification studies), and instant display of results in graphical form (on an oscilloscope or a plotter) of the analog computer, while taking advantage of the greater precision, dynamic range, and information storage capability of the digital computer for arithmetical computation."

Dr. Morris is spending a year here as a visiting professor working with Dr. Paul Riley and Eugene Israelson in their (continued on page 2)
Hybrid Computer System

(continued from page 1)

A research program which involves the application of the hybrid computer system to the simulation of water resources systems.

Some of the graduate students and research projects in this program are:

Leon Huber — determination of response coefficients of a hydrologic simulation model by an optimization procedure; Neil Morgan, solution of partial differential equations; Keith Eggleston, snowmelt simulation; Kousoum Sakhan, simulation of scour flow process in erodible streams; James Thomas, quality and quantity simulation of irrigation return flow; Robert Hill and M. A. Bashir, simulation of Bear River system; Bihu Wang, simulation of Weber River basin; George Shih, simulation to study the effects of weather modification on runoff; Joseph Evelyn and Akbar Sial, simulation of runoff from urban watersheds; Duane Jensen, simulation of the hydrology and salt flow systems within the Sevier River basin.

Other staff members using the new computer facility include Dr. Bruce Anderson, simulation of groundwater drainage conditions within the Atlantic 3 Project of Colombia; Dr. George Reynolds, graphical analysis of climatic data from a telemetered system.

Proposals Submitted to UCWRR

Eighteen matching grant proposals requesting FY 1971 support were submitted to the Utah Center for Water Resources Research. The proposals were reviewed by the UCWRR council and recommended to the Office for Water Resources Research in Washington for acceptance.

Of the 18 proposals, UWRL submitted seven, and four were jointly submitted by the UWRL with Forest Science, the Institute for Social Science Research on Natural Resources, Agriculture Economics, and Chemical Engineering, Brigham Young University submitted three, Forest Science submitted two, and one each were submitted by Wildlife Resources and Agriculture Economics.

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Jay M. Bagley . . . . . .Director, UWRL
C. Earl Israelson . . . . . .Secretary, UCWRR
Dorina Falkenberg . . . . . .Editor

Proposals for the Allotment Grant program of OWRR should be submitted to the Utah Center for Water Resources Research not later than March 1, 1970.
Airborne Seeding Program Added To Weather Modification Project

Airborne seeding will be a part of the Wasatch Weather Modification program underway at the Utah Water Research Laboratory this winter.

A contract is being negotiated with Aemp, Inc. of Reno, California, to seed winter storms over the Wasatch Mountains from airplanes. This seeding firm has many years of experience in weather modification in many parts of the world.

The aerial seeding program is part of a weather modification program which began at the Utah State University in 1964, under sponsorship of the U.S. Bureau of Reclamation.

Project personnel maintain a large network of telemetry precipitation gages throughout northern Utah, southern Idaho, and western Wyoming which are utilized for determining the effectiveness of cloud seeding efforts. In addition, two remotely-controlled cloud seeding generators have been installed on mountain peaks west of Cache Valley, and are operated during severe storms when the airplanes can't fly.

The objective of this winter's seeding activities is to determine the operational feasibility as well as the effectiveness of the combined use of airborne and ground-based seeding generators.

A. Bruce Bishop Joins UWRL Staff

A. Bruce Bishop has joined the Utah Water Research Laboratory staff as Research Engineer. His specialty in operations research methods and engineering economics will strengthen and complement the systems engineering capability at UWRL.

Dr. Bishop recently finished work for his Ph.D. degree from Stanford University. His dissertation was "Socio-Economic and Community Factors in Planning Urban Freeways."

Dr. Bishop spent the summers of 1965 and 1966 in Brazil on an AID project. In summer 1967 he was with the Idaho Water Resources Board in Boise; in summer 1968 with the California Division of Highways, Group Planning Department; and summer 1969 at Stanford with the California Division of Highways and Public Roads.

He was graduated from Utah with a B.S. in 1965, and an M.S. in 1966.

Water Resources Council Tests New Evaluation Procedure

Reuben Johnson, Acting Executive Director of the Water Resources Council, announced that new evaluation procedures will be tested on five Federal multi-purpose projects.

The new evaluation procedures were developed by a task force and include national and regional income objectives, conservation objectives, and national well being objectives.

This evaluation system will replace the one which has been in effect for the past decade. One of the projects which will be used for the test is the Southwest Idaho development project.
Dissemination of Results Speeded

In order to speed up dissemination of results of Title I research conducted under the Water Resources Research Act, the Clearing House for Federal Scientific and Technical Information has been designated as an agency whereby technical reports can be obtained prior to their initial distribution. Such reports can be obtained by contacting the Clearing House. The Office of Water Resources Research will make a quarterly announcement of these reports and documents.

New Quarterly Published

The Corps of Engineers has announced a new quarterly publication, "Water Spectrum." The purpose of this magazine is to communicate, inform, and present a broad range of insights and ideas on bearing on water-oriented programs. The magazine is available from the Government Printing Office for $2.50 per year or 65 cents a copy.

Annotated Bibliography Available


Finance Outlined For OWRR Research

Research financed under the Water Resources Research Act, which was passed in 1964 and is commonly known as Public Law 88-379, is financed in three different ways:

First, each State Center is given an annual allotment of $100,000 to support research programs of the Center. Proposed projects must be submitted to and approved by the Office of Water Resources Research in the Department of Interior.

Title IB research provides for conduct of research on a 50-50 matching basis. Title IB grants are made only to State Centers on the basis of projects submitted through them. Such proposals are in competition nationally and selection of those to be funded is made by the Office of Water Resources Research. Overhead and indirect costs born by the Center or University can be used as part of the matching obligation.

Title II research funds are available to any individual, institution, or federal, state, and local government agency. Applications may be made directly to the Office of Water Resources Research or through one of the State Centers.

Further information on Title II research opportunities can be obtained from the Office of Water Resources Research, U.S. Department of the Interior, Washington, D.C. 20240.
International Seminar for Hydrology Professors Planned in August at USU

Plans are being made at Utah State University for an International Seminar for Hydrology Professors to be held here August 2-14, according to Dr. J. Paul Riley, Associate Professor, Utah Water Research Laboratory, and director of the seminar.

The 1970 seminar will emphasize the systems approach as applied to the science of hydrology. It will consist of lectures and workshop sessions, and detailed case studies will be made.

Lecturers will include: Ven T. Chow, University of Illinois; Norman H. Crawford, Hydrocomp International, Palo Alto, Calif.; Warren A. Hall, Office of Science and Technology, Washington, D.C.; Gerald T. Orlin, Water Resources Engineers, Inc., Walnut Creek, Calif.; Peter S. Eaglestone, Massachusetts Institute of Technology; Jaime Amoroscho, University of California at Davis; V. M. Vovk, Colorado State University; V. V. Dheeva Naraya, Central Arid Zone Research Institute, India; W. J. Morris, City University, London, England; and Calvin G. Clyde, James H. Milligan, Duane G. Chadwick, and J. Paul Riley, all of the Utah Water Research Laboratory at Utah State University.

Participants, except for certain specialists from government planning agencies and research institutes, will be selected from university faculty members actively engaged in hydrologic teaching and research.

Applications to attend the seminar should be postmarked not later than April 15, 1970. Application forms and other information may be obtained by writing Dr. Riley at the Utah Water Research Laboratory, Utah State University, Logan, Utah 84321.

Staff Organization Structure Changed For Division Of Water Resources

A change in the basic structure of the staff organization of the Division of Water Resources at the Utah State Capitol has been announced by Daniel F. Lawrence, Director. The positions of Development Director and Planning Director have been discontinued.

James G. Christensen and Ray H. Zenger have each been named Assistant Director, Division of Water Resources. They will work jointly with Director Lawrence in carrying out the overall program and responsibilities of the Division as a whole.

Mr. Christensen will head the planning staff and be responsible for coordination of the state's activities under the National Water Resources Planning Act. He will also give primary direction to the preparation and implementation of the State Water Plan.

Mr. Christensen has been serving as water resource planner in the planning section of the Division.

Mr. Zenger will continue his primary assignment of supervising the State's project construction program financed under the revolving fund.

Director Lawrence stated that the change would provide a more unified trust to the state's total activities in the field of water resource development.

Water and Wastewater Management Institute Scheduled March 19-20

USU will host the Seventh Annual Management Institute for Water and Wastewater Districts and Municipalities March 19-20.

The program will include discussions of a state water plan; water rights—legal effects of court decisions; Utah's revised plumbing code; relocating utility lines; automation for water systems; planning techniques and inventory management; organizational charts and management control through job descriptions; delegating authority and fixing responsibility; business forecasting; and decision making.

Some of the discussion leaders will be: Dallin W. Jensen, Assistant Attorney General; Lynn Thatcher, State Health Department; Lynn Marsh, Salt Lake City Personnel Director; Robert Collier, Dean and Professor, College of Business, USU; Glenn Marston, Associate Professor, and Allen Kastner, Assistant Professor, Business Administration Department, USU.

The management institute was organized to provide information to management board members, mayors, city councils, and others involved in municipal water. The idea for the institute originated with the American Water Works Association.

Sponsors include: USU, the American Water Works Association (Intermountain Section); the Utah Municipal League; the Utah State Health Department; and the Utah Water Pollution Control Association.
Real World Decisions Stressed at Meeting

The need for practical answers and information usable for planners and engineers making real-world decisions as a product of research was stressed at the Annual Conference of Water Resource Directors held in Washington, D.C., February 3-4.

Attending the meeting from USU were D. F. Peterson, director of the Utah Center for Water Resources Research, and Dean, College of Engineering, and Jay M. Bagley, Director of the UWRL.

A panel session on systems engineering concluded that researchers would have to expand their efforts considerably in applying these techniques to realistic systems. The panel recognized the need for integrated planning of regional broad-based economic systems on one hand, but on the other hand, more thought will have to be given to interpreting results of systems analysis for decision-making purposes at all levels, the panel concluded.

The importance of ecology in water resource planning was debated by another panel and the usual broad spectrum of views was expressed, ranging from strong developmental needs to meet population and growth needs to the ideals of preservation and undisturbed nature.

Highlights of some Maryland projects covering thermal loading, thermal mixing, and accommodation of agricultural processing plant waste water by forages and soil were given. The possibilities for beneficial uses of heated water discharges were also discussed along with possibilities of recycling of nutrients for animal and human food production.

Warren Hall, Water Resources Assistant in the President’s Science Advisor’s Office, pointed out the need for research which will yield usable answers in the near future. He also discussed the future goals and relationships of the Water Resources Council, the National Water Commission, and the Committee for Water Resources Research of which Dr. Hall is chairman.

The Administration’s budget for the Office of Water Resources Research for 1971 Fiscal Year calls for an increase of $2 million bringing the budget up to $13.3 million for next fiscal year. The budget includes an increase of $1.5 million for Title II research plus increases for support in the Water Resources Scientific Information Center. No increases were included for Title I research.

It is anticipated that, if Congress approves the funds, more research effort will be channeled into metropolitan and urban programs and evaluation of benefits resulting from water resource investments. More emphasis will also be given to the exchange of information and dissemination of research results to the ultimate user.

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The newsletter will be sent free of charge to those requesting it.

High Priority Given To Research On Benefits Of Water Resources Projects

Research which is designed to provide much better information on the benefits resulting from water resources development is of high priority in the minds of senators and representatives as well as Department of Interior officials.

In approving the budget for the Fiscal Year 1970 program of the Water Resources Research Centers, the Congress specified that research should be done to identify these benefits.

Specifically requested was a study which would compare benefits actually achieved as a result of a water resources project with those that were anticipated when the project was formulated.

In conversations with Jay M. Bagley, Director UWRL; D. F. Peterson, Director UCWRR; Carl Bronn, Executive Secretary of the Water Resources Association; and Ellis Armstrong, Commissioner of Reclamation, the interest in such studies was emphasized, and concern was expressed about the importance of the benefits foregone as a result of failure to appropriate funds for authorized water resource projects.
News Notes

Daniel H. Hoggan, Associate Professor Civil Engineering, USU, is author of an article "State Organizations for Water Resources Planning" which appeared in the December 1969 issue of the Journal of American Water Works Association. Reprints are available from UWRL.

Joel E. Fletcher, Professor of Hydrology at UWRL, is author of an article "Wetland Modification—Rain for Sale" printed in the Winter Quarter 1970 Issue of Graduate News and Comment, a USU School of Graduate Studies publication.

A paper "Free Surface Subcritical Flow Measurement" by Gaylord V. Skogerboe and Lloyd H. Austin has been accepted for presentation at the International Symposium on Hydrometry to be held at Koblenz, Germany, September 13-19, 1970.

Mr. Skogerboe is assistant professor and acting head, Agricultural Engineering Department at Colorado State University, Fort Collins, Colorado. Mr. Austin is a research engineer at UWRL.

More Research Needed On Urban Water Problems

A plea for more support of research on urban water problems coupled with a demonstrated need to develop a greatly increased body of meaningful urban water data were the major recommendations advanced in recent reports developed through the Urban Hydrology Research Council of the American Society of Civil Engineers. Secretary Hickel has called a conference of 60 scientists and public leaders to discuss such a program in Atlanta, Georgia, March 17-19. Dean D. F. Peterson will attend.

Water Resources Seminar

A two-week summer institute in water resources—"Applied Mathematical Programming in Water Resources"—will be held at the University of Nebraska July 26 to August 7, it has been announced by Warren Vissman, Jr., director of the institute. Further information may be obtained from Director Vissman, The University of Nebraska, East Campus, Lincoln, Nebraska 68503.

UWRL Personality

Water Pollution Research Strengthened With Addition Of A.A. Kalinske

Adding considerable strength and stature to a steadily growing research program in water pollution at the Utah Water Research Laboratory is Professor A. A. Kalinske.

Professor Kalinske, internationally known in the field of fluid dynamics and sanitary engineering, joined the UWRL staff just last summer. He is working in the areas of thermal pollution and municipal and industrial water and wastes treatment processes. He is also teaching and directing graduate students in the Civil Engineering Department.

Prior to his USU appointment, Prof. Kalinske had been with the Eimco Corporation in Salt Lake City since 1965. At Eimco he was director of sanitary research and development where he directed biologists and chemical and sanitary engineers in developing processes and equipment to purify water, treat industrial wastes and sewage, and reclaim water from waste effluents.

Clyde Presents Paper At Tennessee Meeting

Dr. Calvin G. Clyde, Assistant Director, UWRL, discussed the optimum use of desalting plants as a supplemental source of safe yield in a paper at the American Society of Civil Engineers National Meeting on Water Resources Engineering held in Memphis, Tenn., January 26-30.

Co-authors of the paper which was entitled "Optimum Operation of Desalting Plants as a Supplemental Source of Safe Yield" were: Wesley H. Blood, UWRL, and Sam Shiozawa, Office of Saline Water, Washington, D.C.

During the five-day meeting, more than 300 authors presented significant engineering information on such diverse topics as: air and water pollution, possibilities of refuse incineration and power generation, and underwater and outseparate structures. In all, some 1,500 engineers participated.

Dr. Clyde also attended a meeting of the Research Committee of the Hydraulics Division of ASCE while in Memphis.

Prof. Kalinske has degrees in hydraulic and sanitary engineering from the University of Wisconsin at Madison. He was a faculty member in the College of Engineering at the University of Iowa, Iowa City, where he did teaching and research in fluid dynamics. Some of his early research in fluid turbulence and aeration and diffusion processes is still recognized as a major contribution which has found widespread application in water and waste treatment.

During World War II he was part-time consultant on fluid mechanics problems to the U.S. Navy, Bureau of Ships, and Bureau of Ordnance. He also carried on special research studies on atmospheric diffusion for the Chemical Warfare Service.

In 1946 he left the University of Iowa to join Infico, Inc., at Tucson, Arizona, as Chief Hydraulic Engineer. Infico, Inc., which is now a part of Fuller Company owned by General American Transportation Corporation, manufactures water and waste treatment equipment. He became vice president and technical director at Infico, and was there until 1965.

Prof. Kalinske is a fellow of the American Society of Civil Engineers, a member of the American Water Works Association, the Water Pollution Control Federation, and the American Chemical Society. He is the author of some 50 technical papers in the fields of fluid mechanics and water and waste treatment processes.

State Schools Urge Increased Funds and Duties For Centers

The problem of erosion of the water research effort by inflation of dollars has been addressed in recent action by another prominent, educational organization.

The National Association of State Universities and Land-Grant Colleges (NASULGC) has asked Congress and the President to bolster the present allotment of water research funds from $100,000 to $250,000. In addition, the association recommends amendment of a Federal Act so that each state center can expand its public information services.
Publications

Desalting Plants, Waterfowl Needs Are Topics Of New Publications

A report entitled "Optimum Operation of Desalting Plants as a Supplemental Source of Safe Yield" by Calvin G. Clyde and Wesley H. Blood has recently been completed as the result of a study at the UWRL sponsored by the Office of Saline Water, U.S. Department of the Interior. It describes the development of a computer program using available hydrologic data to decide when the plant should be turned on and turned off in order to meet shortages of least cost. Examples apply the program to three specific systems.

The publication, PRWG61-2, is available from the Utah Water Research Laboratory at $2.50.

"Water Requirements of Waterfowl Marshlands in Northern Utah" is the title of a new booklet by J. E. Christiansen, Professor, UWRL, and J. B. Low, Leader of the Utah Cooperative Wildlife Research Unit, USU.

The booklet, Publication No. 69-12 of the Utah Division of Fish and Game, is the result of a research project to determine methods of computing the amounts of water required to maintain productive marshlands.

It includes sections on how to determine water requirements in marshlands and gives suggestions for water management of marshlands. The report is available from the Utah Division of Fish and Game and the UWRL.

Western Regional Directors Meet In Washington

Directors of the 11 Centers of Water Resources Research in the western states met for a full day in Washington, D.C., on February 2. The principal item of discussion was a regional proposal on development of techniques for estimating the benefits of water resources development in achieving national and regional social goals. The research, if funded, would be conducted cooperatively through the Water Research Centers of the region with Dr. D. F. Peterson as the project leader.

The directors expressed a continuing interest in the regional economic input-output model which was suggested last year as a regional project and revision again this year with the California Center providing the central management.

Environmental Impacts Of Public Land Policy To Be Studied

In his role as chairman of the Public Land Law Review Commission, Representative Wayne Aspinall of Colorado, has announced the awarding of a major contract to Denver-based ROMCOE. The report of contract is to be a compilation of case studies illustrating the effect of public laws on: air quality; water quality; ecosystem changes; and alterations of scenic, wilderness, wildlife, fishery, historic, and outdoor recreation values and resources.

Utah Center for Water Resources Research
Utah Water Research Laboratory
Utah State University
Logan, Utah 84321

March 1970

Less Than A Pat On The Back:
GAO Comments On FWPCA
From AWRA Newsletter,
Mary Marsh, Editor

The federal government's long and costly effort to clean up the nation's rivers has been hampered by poor planning, inadequate funds, and unchecked industrial pollution. So says a report on the federal water pollution program by the General Accounting Office.

It further states that little or nothing has been accomplished despite the expenditure of $5.4 billion on waste treatment facilities since 1957, $1.2 billion of this being federal money, and that present funding levels are inadequate to meet the problem of polluted rivers.

The agency recommends that before more money is spent, a new basis for awarding grants be developed, and calls for improved planning involving systems analysis techniques to determine the requirements for controlling pollution in a particular area, the alternatives available, and the establishment of priorities.

The report is based on a study of eight rivers through the country where federal, state, and local forces have been battling pollution for some time. The rivers studied were chosen because they were regarded as typical of the water pollution problems throughout the country. They were the Willamette River in Oregon, the Nashua and Ten Mile Rivers in Massachusetts, portions of the Mississippi and Pearl Rivers in the South, and the Saco River and the Presque Isle Stream in Maine.
Season Ends For Cloud Seeding

By William J. Palmer

The aboriginal rain dance has been replaced during the last snow season (November-April) in experiments conducted by the Utah Water Research Laboratory which are designed to see if additional precipitation can be induced by cloud seeding.

The open, mild winter prevailing over most of the last five months has delighted Utah residents but has denied the modern "rain maker" of his most essential ingredient.

Lack of suitable cloud cover has restricted airborne seeding attempts to 18 flights where 30 were anticipated, and only 11 seedings were attempted from the ground where 15 had been hoped for.

The data assembled over the five-month snow season at 40 weather stations strategically located throughout northern Utah, southern Idaho, and western Wyoming, are now being evaluated in an attempt to assess the success of the seeding program carried out and provide answers to some of the questions dealing with man's ability to alter natural moisture patterns.

The airborne seeding part of the Wasatch Weather Modification Project was done by Atmospheres, Incorporated, Fresno, California, under contract with UWRL.

UWRL personnel heading this winter's seeding activities included: George W. Reynolds, Meteorological Analysis; C. Earl Israelson, Field Program; and Joel E. Fletcher, Water Management Studies.
Maughan Named Executive Director Of Water Resources Council

Secretary of the Interior Walter J. Hickel, Chairman of the Water Resources Council, has announced the appointment of W. Don Maughan of Carmichael, Calif., as Executive Director of the Council.

Secretary Hickel said the appointment of Maughan, formerly with the California Department of Water Resources, would provide outstanding leadership for the Council.

"The selection of Mr. Maughan from State government underscores the determination of the present Administration to upgrade the role of the States in water and related land resources planning and development," Secretary Hickel said. "Mr. Maughan comes to the job with an extensive State background, is familiar with Federal water programs, and has the endorsement of all eight Federal agencies represented on the Council."

Maughan has spent the past 23 years in water resources planning, and since the mid-1950's has participated continuously in interstate and Federal-State studies. Beginning in 1963 he helped arrange negotiations which resulted in western State endorsement for the Colorado River Basin Project, which finally was authorized in 1968. He aided in drafting organizational rules for the 11-State Western States Water Council and has been technical advisor to the California delegation on that Council since its creation in 1965.

Before accepting the Federal appointment, Maughan was Chief, Inter-State Planning Branch, California Department of Water Resources. Prior to his State service he was employed several years by the Bureau of Reclamation in Carson City, Nev., and Salt Lake City.

Amendment Sought For Water Resources Act

The Universities Council on Water Resources and the National Association of State Universities and Land Grant Colleges are seeking to amend the Water Resources Act of 1964 to provide for a $100,000 to $250,000 increment in the authorized annual allotments to state water resources research institutes, and to authorize programs for the extension of research results into practice.

The proposed amendments have been endorsed by the President's Science Advisor, Dr. Lee DuBridge. A number of meetings have been held with Assistant Secretary of the Interior Carl L. Klein, top officials of OWRR, and Congressional leadership. It is uncertain as to whether the legislation will be introduced this year.

WPCA Appoints New Officers

At the annual meeting of the Utah Water Pollution Control Association held on February 9, new officers installed were:

Calvin K. Sudweeks, President; Norman B. Jones, President Elect; Walter W. Brock, Vice President; Clyde M. Hopkins, Secretary-Treasurer; Donald E. Burns, Association Director, 2 year term; and Clyde W. Montgomery, Associate Director, 1 year term.

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FWPCA Names Mayo
Great Lakes Chief

Francis T. Mayo has been named Director of the Federal Water Pollution Control Administration's Great Lakes Regional Office in Chicago. H. W. Poston has resigned from that post.

Mr. Mayo, a civil engineer, is an honor graduate of the University of Utah. He began his career with the U.S. Geological Survey in Salt Lake City, later joining the staff of the State Engineer of Utah.

Utahns will remember his many years of effective service as Chief, Water Resources Division, Utah State Engineers Office, Salt Lake City. Mr. Mayo joined the FWPCA in August 1966, and has served successively as regional enforcement representative in the Southwest Region; Chief of regional enforcement activities, Southwest Region; and Director, Division of Federal Activities Coordination at FWPCA headquarters in Washington.

Environmental Quality Council Head Named

President Nixon has named Under Secretary of the Interior Russell E. Train as Chairman of the new Council on Environmental Quality. Two other members appointed are Robert Cahn and Gordon J. F. MacDonald.

Mr. MacDonald, Vice Chancellor for Research and Graduate Affairs at the University of California, Santa Barbara, also serves on the President's Science Advisory Committee, and is chairman-designate of the National Academy of Science's environmental studies board. He is an expert on oil pollution.

Mr. Cahn, a Washington correspondent for the Christian Science Monitor, has specialized in conservation and natural resources reporting since joining the paper in 1965, and won the Pulitzer Prize for a series of articles on national parks in 1969. He is a graduate of the University of Washington.

Mr. Train, who attended Princeton University and Columbia University law school, interrupted a law career to devote full time to conservation matters. The founder of the African Wildlife Leadership Foundation, he was serving as President of the Conservation Foundation at the time of his appointment in 1969 as Under Secretary of the Interior.
News Notes

J.E. Christiansen, professor of agricultural and irrigation engineering, participated in a national short course for CIDiat (Inter-American Center for the Internal Development of Water and Land Resources) at Merida, Venezuela, during March and April.

George W. Reynolds presented two papers during April related to the UWRL Weather Modification Project. "Background Ice Nuclei in a Quasi-Rural Intermountain Valley—Cold Season" was presented at the Second National Conference on Weather Modification, April 6-8, at Santa Barbara, California. The second paper, "Durnal Variations in Precipitation in the Wasatch Mountains—Cold Season" was presented at the AGU spring meeting April 20-24, in Washington, D.C.

Bishop In Middle East

Dr. A. Alvin Bishop, Head of the Department of Agricultural and Irrigation Engineering at USU, is in the Middle East on a six-weeks trip developing the agenda and program for the 8th Near East-South Asia Regional Irrigation Seminar to be held later in 1970.

USU personnel have managed this biennial seminar for the past ten years, which was designed to assist high-level officials in 15 countries in developing their irrigation programs.

Herter Named Aide In State Department

Secretary of State William P. Rogers has announced the appointment of Christian A. Herter, Jr., as his Special Assistant for Environmental Affairs and Director of the new Office of Environmental Affairs in the Bureau of International, Scientific and Technological Affairs.

He will provide leadership in marshalling governmental and private resources in support of international initiatives to meet and manage the environmental crisis. In this capacity, he will represent the U.S. in international organizations.

Mr. Herter will also take over the duties of the Water for Peace Program that has been directed by Dean F. Peterson of USU.

Water Resource and Urban Leaders Meet

In response to a request by Secretary of the Interior Walter J. Hickel, a group of sixty national water resource and urban leaders met in Atlanta, Georgia, March 17-19, 1970, to assist the Interior Department in formulating a program for urban water resources research.

Edward W. Clyde Named Consultant to Water Commission

Edward W. Clyde has been named a part-time legal consultant to the National Water Commission, according to Theodore M. Schad, Executive Director.

Mr. Clyde is a well-known practicing attorney from Salt Lake City who has specialized in natural resources law. He is attorney for a number of water districts in Utah and has served as a teacher at the University of Utah, as well as Chairman of the University of Utah Board of Regents.

The seven-member Commission was appointed by the President. Its mandate is to make an independent assessment of the Nation's future water needs, and to identify alternative ways to meet them.

The Commission, under the chairmanship of Charles F. Leve of New York, will report to the President and Congress in 1973 with its recommendations for effective policies which will enable the Nation's water resources needs to be met in the future, and give consideration, among other things, to the economic and social consequences of water resource development and conservation.

Research Costs Rate Base Offered

The Federal Power Commission has offered to allow electric utilities to include air and water research costs in their rate base. It is hoped this will encourage development of pollution control devices by the electric companies. The FPC noted that research expenditures by the electric power industry amounted to only 0.23 percent of its total operating revenue in 1968. Proposed amendments to the FPC Uniform Systems of Accounts would make R & D expenditures fully recoverable through charges of operating expenses either currently or over a period of years.

UWPCA Appoints Executive Secretary

The Utah Water Pollution Committee recently appointed Calvin K. Sudweeks as Executive Secretary of the Committee, on recommendation of G. D. Carlyle Thompson, M.D., State Director of Health. This action concurred with a recommendation of Lynn M. Thatcher, past Executive Secretary of the Committee. Sudweeks was Chief of the Water Quality Section in the Division of Health and will continue to function in that capacity as well as taking on the Executive Secretary's duties.

Mr. Thatcher, who has been the Committee's Executive Secretary since it was organized in 1953, stated that he was recommending the change to complement the State Board of Health's recent action elevating environmental health programs to Bureau status in the Division of Health, and establishing Thatcher as Director of the new Bureau.
Subsurface Off-shore Water Conveyance Possibilities Examined in Report

A December report of the U.S. Bureau of Reclamation entitled "California Undersea Aqueduct Pre-Reconnaissance Study" examines the possibilities of subsurface off-shore conveyance of water from the Eel-Klamath River areas to an appropriate terminal point in southern California.

The report presents the results of a study which included a preliminary evaluation of potential requirements for import water in southern California and of potential supplies available for export from northwest California.

The state of knowledge regarding materials for such an aqueduct, the marine environment of the aqueduct, construction and maintenance problems, and other factors were analyzed. Recommendations for additional research and testing required to provide data for a full-scale reconnaissance investigation were made.

The pre-reconnaissance study suggested that about $2,000,000 and 5½ years would be needed to complete the reconnaissance investigation. Based on rough cost estimates, it was concluded that the cost of water delivered through such an aqueduct could be competitive with the cost of water delivered from other potential sources. However, many complex engineering and other technical programs associated with the potential aqueduct are not well understood. Thus, the economics of the aqueduct, as cited in the report, are somewhat speculative.

Light Weight Material Can Cut Evaporation Losses, Report Shows

Floating concrete blocks and other lightweight materials can cut evaporation losses in stock tanks and farm ponds according to a report of a U.S. Agricultural Department scientist.

Keith Cooley, meteorologist at the Water Conservation Laboratory at Phoenix, Arizona (civil engineering graduate, USU, 1957) has also used perlite styrofoam, butyl rubber, and other items in his water-saving tests. Evaporation consumes more ranch water than is used by livestock in the desert southwest, and cutting evaporation means saving $4 to $10 a thousand gallons on hauled water.

So far, Dr. Cooley says, wax has turned out best. It cuts losses 100 percent and is easier to handle than the buoyant blocks. The wax is squirted in a molten state directly onto the water. It forms 6-8 inch circles 1 to 1½ inches thick. The wax melts in torrid sunshine, but Cooley thinks that wax with a higher melting temperature could be developed.

The floating blocks contain perlite ore instead of sand and gravel, and their efficiency in reducing evaporation is approximately 60 percent.

Utah Center for Water Resources Research
Utah Water Research Laboratory
Utah State University
Logan, Utah 84321

National Water Commission Releases Annual Report

The National Water Commission, created by legislation enacted in September 1968 to make a five-year study and recommendations to the President and the Congress on the nation's water needs, resources, and problems, has released its Annual Report for 1969. The document is a brief summary of the Commission's activities during the first formative year of its existence. It outlines 22 special study areas for which the Commission hopes to make definitive assessments in order to arrive at policy recommendations.
Advisory Panel Formed for Utah Water Resources Research Programs

Utah State University has taken another significant step in gearing its various interdisciplinary water resources research programs to the needs of the state as seen through the eyes of State water leaders.

An Advisory Panel has been created to work with campus water leaders and programs in assuring a program of research that is fully coordinated with the state's needs. It is composed of businessmen, engineers, lawyers, local government, and civic leaders.

The Utah Water Resources Research Advisory Panel met for the first time June 12.

Dean F. Peterson, Chairman of the Utah Center for Water Resources Research, explained to the panel, "The scope and extent of the activities proposed for the Advisory Panel are not fully defined at this time. This is as it should be," he added. "It will take time and experience working together to evolve the proper role of the Advisory Panel in water resource programs of the Utah Center for Water Resources Research and the Utah Water Research Laboratory."

Dr. Peterson also stressed that "the many talents, the perspective, and wisdom possessed by the panel members are sincerely welcomed. They are needed in the evolution and execution of water research programs for Utah that will serve its citizens effectively and efficiently."

"Every reasonable attempt is now being exercised on campus to eliminate possible confusion and duplication and to keep the various water programs tracking and in phase."

The one-day conference placed primary emphasis on a free and unlimited discussion of University research programs and of state water problems. It included a luncheon meeting with Eugene D. Eaton, Associate Director of the Office of Water Resources, U.S. Department of the Interior, as speaker, and a successful inspection of work underway at the Utah Water Research Laboratory.

After the inspection, the panel discussed their impressions and recommendations with University personnel in a concluding session. The meeting adjourned with the consensus that, in all, a monumental start had been made on a worthwhile venture.

At the luncheon, Mr. Eaton commended the Utah Water Resources Research Advisory Panel and Utah State University for meeting together. "You are engaged in a task of great importance and difficulty," he told the panel.

In discussing the present role of research in water resources, Mr. Eaton explained that research is now confronted with many new problems which demand a continuing self-examination to see if programs are relevant to the community. He also stressed to the panel that Congress is primarily concerned with building up local areas to deal with their own problems.

Members of the Advisory Panel are: Jay R. Bingham, Vice President of Terrarac Corp.; Lynn M. Thatcher, Division of Environmental Health; Gordon H. Harnson, Executive Director of the Department of Natural Resources; Frank Davis, Manager of Engineering and Construction for Utah Power and Light Co.; Ival V. Goslin, Executive Secretary for the Upper Colorado River Commission.

Charles Wilson, Head of Salt Lake City Water Dept.; LaVann Cox, Executive Director of Utah Petroleum Council; George D. Clyde, of Clyde, Cridle, Woodward, Inc., Civil and Agricultural Engineers; Mrs. Eugene L. Bliss, President of Utah League of Women Voters; Leonard Johnson, Assistant Director of Natural Resources Department of American Farm Bureau Fed., all of Salt Lake City; and Lynn S. Ludlow, General Manager, The Central Utah Water Conservancy District, Orem; Angus Belliston, President of First State Bank, Salina; and Thorpe B. Waddingham, Attorney at Law, Delta.

Land Law Review Board Releases Report

The report of the five-year $7,000,000 study reviewing the public land laws of the United States was presented to President Nixon on June 23.

This report recommends major changes in the laws under which the 755 million acres of public lands of the United States should be administered. These lands are held in 26 of the 50 states, and includes one third of the nation's land.

The report is of great concern to the Intermountain area where public lands represent 65.5 percent of Utah's total land area, 86.4 percent for Nevada, 63.9 percent for Idaho and 48.2 percent for Wyoming.

Among the recommendations of the Commission was that the United States Forest Service be transferred from the Department of Agriculture to the Department of Interior.
William I. Palmer Appointed Executive Secretary for Water Resources Center

William I. Palmer has joined the staff of Utah State University as Executive Secretary for the Utah Center for Water Resources Research.

Dr. C. Earl Israelsen, who has been serving as Executive Secretary, has been appointed as Director of CIDIAT (Inter-American Center for the Internal Development of Water and Land Resources) with headquarters at Merida, Venezuela.

Mr. Palmer is a USU graduate of 1941 and a native of Cedar City. He was Assistant Commissioner for the U.S. Department of the Interior, Bureau of Reclamation (1944 to 1964) where he supervised and coordinated development and execution of all aspects of the Bureau's project investigation, irrigation and land use, and foreign activity programs.

During 1964 and 1965 Mr. Palmer was Resources Development Adviser to Senator Carl Hayden. He served with the U.S. Agency for International Development from 1965 to 1967.

After retiring from federal government duties (1967), Mr. Palmer joined the Ralph M. Parsons Company of Los Angeles where he was Senior Agricul-

International Seminar Planned in August

Plans are being finalized at Utah State University for an International Seminar for Hydrology Professors to be held here August 2-14, according to Dr. J. Paul Riley, Associate Professor, Utah Water Research Laboratory, and director of the seminar.

The 1970 seminar will emphasize the systems approach as applied to the science of hydrology. It will consist of lectures and workshop sessions, and detailed case studies will be made.

Participants, except for a few specialists from government agencies and research institutes, will be selected from university faculty members actively engaged in hydrologic teaching and research.

Sponsors are National Science Foundation and UNESCO in cooperation with U.S. National Committee for the International Hydrologic Decade, Universities Council on Water Resources, American Geophysical Union, American Society of Civil Engineers, and the Department of Agricultural and Irrigation Engineering, Department of Civil Engineering, Utah Water Research Laboratory, and Conference and Institute Division, all at Utah State University.

Water Resources Evaluation Process Discussed at Conference

At a recent week-long conference in Milwaukee, Wisconsin, about 70 conferenceists wrestled with problems about the "Evaluation Process in Water Resources Planning." Jay M. Bagley, Director, UWRL, participated in the conference.

The stated objective of the conference, sponsored by the American Water Resources Association, was to stimulate thinking leading to more meaningful research on this topic.

After nearly three decades of continuing trial and experience with the evaluation process in the federal service, many issues and problems remain unsolved. Evaluation concepts currently employed were scrutinized and modifications were examined with a view towards placing water planning and development in a broader social realm.

The problem of determining and/or articulating public preferences and attitudes about water in today's complex society was recognized as formidable.

The lack of understanding about where the short and long term beneficial and detrimental effects fall when water development takes place was also noted. Who should pay and how much for environmental quality measures is not clear and needs considerable attention. The matter of involving society in setting planning goals and keeping citizens informed during the planning process about the basis for particular schemes is also difficult.

Considerable discussion centered around the use and application of computer models in the evaluation process. Problems of incorporating multiple and incommensurate objectives into a single mathematical equation was admitted. The lack of data from which to verify and calibrate these models, though conceptually sound, leads to some skepticism about their application and use.

Some expressed a feeling that modeling advances had outstripped data techniques resulting in inferences and assumptions that make use of models questionable. However, the advantage of being able to screen best solutions from a large set of possibilities, illuminating specific data deficiencies, testing the system sensitivity to particular inputs, and the general insight that comes from being required to examine and define each relation and linkage in the model development makes this approach valuable.
Training Seminar Held at USU

Utah Water Research Laboratory at Utah State University conducted a training seminar on Conjunctive Operation of Desalting Plants May 26-28, sponsored by the Office of Saline Water, U.S. Department of Interior, and under the direction of Dr. Calvin G. Clyde.

Twenty-three engineers from all over the United States represented federal and state governments, industry, and consulting firms at the training seminar.

Sam Shiozawa of the Office of Saline Water, Washington, D.C., welcomed the participants and introduced the instructors for the three-day seminar who were: D.F. Peterson, Dean, College of Engineering, USU; Dr. Clyde, Assistant Director, and Roland W. Jeppson, Associate Professor, UWRL; and Wesley H. Blood, Research Assistant and graduate student at USU.

Purpose of the seminar was to instruct participants in the use of the Operating Rule Program for evaluating and optimizing the operation of desalting plants as a supplemental source of safe yield. Participants not only studied the logic of the program, but worked practical problems with the computer as well.

A training manual, “Optimum Operation of Desalting Plants as a Supplemental Source of Safe Yield,” was prepared for the seminar by Dr. Clyde and Mr. Blood.

Israelsen Named CIDIAT Director

C. Earl Israelsen will assume directorship of the Inter-American Center for the Internal Development of Water and Land Resources at Merida, Venezuela, on July 1. Dr. Israelsen has been serving as associate professor and project leader at the Utah Water Research Laboratory, and executive secretary for the Utah Center for Water Resources Research.

The Center is operated by the Organization of American States (OAS) by Utah State University in cooperation with the University of the Andes.

The Center (commonly known in Latin America as CIDIAT, the initials of the Center's title in Spanish) was established in 1965 for training Latin American leadership from the 20 member nations of OAS in water and land resources development. The curriculum and procedures developed by the Center allow maximum participation of the Latin Americans and the infusion of their background and experience into the program.

USU Receives Grant For Regional Project

Utah State University is recipient of a $105,000 grant from the Office of Water Resources Research for a study titled “Techniques for Estimating the Potential of Water Resource Development in Arid and Sub-humid Regions of the United States for Achieving National and Regional Social Goals,” it was announced by Secretary of the Interior Walter J. Hickel.

The project is a regional one in which six other water resource centers are participating. Dean F. Peterson, Chairman of the Utah Center for Water Resource Research, is the principal investigator.

This grant is the largest single grant made by OWRR under its Title II program for this fiscal year, according to H.G. Hershey, Director of OWRR, and it is one of 33 projects selected from a total of 228 research proposals received.

The grant covers the first year of a three-year project totaling $405,000.

Agreement Negotiated Between USBR and USU

A cooperative agreement has been negotiated between the Utah Water Research Laboratory at Utah State University and Region 4 (Provo Office) of the U.S. Bureau of Reclamation to develop “Hybrid Computer Models for the Upper Jordan River Drainage.”

Under the first phase of the agreement, UWRL will formulate and verify a model of the Utah Lake including all inflows and outflows to the lake. This model will be used to determine the yields and outflow of the lake under different operating criteria, and to determine water quality effects.

In the second phase, a hybrid computer model of the groundwater system of Utah Valley will be developed. This model will be used to help refine estimates of groundwater recharge from the rivers and other sources in Utah Valley. The model will also be used to determine the effect of various levels of groundwater development on groundwater levels and on the quality and quantity of groundwater inflow to the lake. Similarly the effects that altering recharge will have upon the groundwater elevation, quality, and inflow to the lake will be studied.

In the next phase, the Utah Lake model will be expanded to include both Utah Lake and its tributaries, thus modeling the entire surface water system. Finally, the surface water model will be combined with the groundwater model to produce a complete model of the whole water resource system of the Upper Jordan drainage.

Once this final model is ready, it will be used to determine lake and system yields for various Bonneville unit conditions. The proposed Jordanelle Reservoir will be studied to find the required reservoir capacity for various operating conditions. The optimal relationship between surface water and groundwater development will also be studied with the help of the model.

Dr. J. Paul Riley will direct the effort at UWRL assisted by Eugene Israelsen. Palmer DeLong and Ed Wiscombe will supervise the cooperative work at the Provo Office of the Bureau of Reclamation.
Hydrologic Inventory Completed For Uintah Study Unit

A publication "Hydrologic Inventory of the Uintah Study Unit" (PRWG40-5) has been completed through a cooperative effort between the Utah Division of Water Resources and UWRL.

The publication is another in a series of hydrologic inventories which are fundamental in the development of a state water plan. The plan calls for a careful study of each stream basin, recognized hydrologic techniques, land use, and resource inventories to help provide a better understanding of the state's water resources, the way in which the water resources are being used, and the opportunities for further water conservation.

Authors are Lloyd H. Austin and Gaylord G. Skeggsboc.

"Optimizing Conjunctive Use of Groundwater and Surface Water," (PRWG42-T) by James H. Milligan has been reprinted and copies are now available.

The above reports are available for $2.50 each from the Utah Water Research Laboratory, Utah State University, Logan, Utah 84321.

Interim Report Released By Division Of Water Resources

The Division of Water Resources, under the general direction of the Board of Water Resources, has released an "Interim Report on the State Water Plan."

The purpose of the report is to inform the people of the State of progress in the State water planning process and to use the ideas in the report as a basis for obtaining public reaction so that the process of implementing a State Water Plan can go forward, according to Clyde E. Conover, Chairman of the Board, and Daniel F. Lawrence, Director of the Division.

Chairman Conover and Director Lawrence have stressed that "this report is not a State Water Plan—it is a report on the needs of the State and an indication of some of the things that must be done to complete the planning process and develop a State Water Plan."

The Board of Water Resources plans to use this report as a basis of communication with responsible citizens and leaders throughout the entire State. Discussions and public meetings will be held to disseminate information and receive public and private reaction to the data and concepts presented.

USU and Forest Service Initiate Project

A cooperative arrangement has been developed with the Forest Service acting through the Rocky Mountain Forest Experiment Station to initiate a cooperative project on the stream geometry of large-bed element streams.

The program will carry on the work begun by Dean F. Peterson, Dean, College of Engineering, USU, and Harl Judd, Dean, School of Science, Southern Utah State College. It will be directed by Dr. Gary Z. Watters, Professor of Civil Engineering at USU, and a graduate student will be employed. Dr. Peterson will serve as science consultant.

Herbert Storey is Research Director for Hydrology for the Forest Service in Washington, D.C.; Paul Packer is Head of the Forest Service Research Laboratory here at Logan, and Joseph Pechance is Director of the Rocky Mountain Forest and Range Experiment Station.

The project is expected to provide information about the erosion and stream formation characteristics of steep mountain streams and should be of significance in projects where these streams are relocated in erosion prevention and possibly in predicting flood discharges.
Prof Adds Scientific Touch to Ancient Art of Water Dowsing

The art of water dowsing, which has been practiced for many centuries, has generally been surrounded by an aura of mystery, superstition, and gentle scoffing on a scientifically sound basis.

Duane G. Chadwick, an electrical engineering professor at UWRL, has proposed a possible way in which this phenomena may scientifically occur by relating perturbations in the earth's magnetic field to the involuntary muscle reaction of the water dowsers.

Professor Chadwick explains, "It is known that the existence of water in the earth's crust can be related to the perturbations in the earth's magnetic field in several ways. This perturbation, for example, can exist as a result of the difference in magnetic susceptibility of water from that of the surrounding medium which has no water. Also, a conductor, viz. water, cutting the earth's magnetic field acts as a generator in generating electric current which has a magnetic field associated with it which tends to perturb the earth's field."

Professor Chadwick postulated that the magnetic gradient thus existing may cause involuntary muscle reaction in a dowsor who is holding a forked stick, welding rods, etc. Since all dowsing devices are held so that they are essentially unstable, it is thought that slight involuntary hand motion caused by induced muscle potentials could thus be amplified to produce the seemingly magical "divining" phenomenon.

In order to make magnetic measurements of high resolution, he is using two cesium vapor magnetometers to obtain the essential measurement which is the difference between the reference probe and the exploratory probe.

"To date," Professor Chadwick says, "innumerable magnetic perturbations have been noted and an equally large number of dowsing reactions have been observed. The real problem lies in obtaining good correlation between magnetic field observations and dowsor responses."

He notes that "at times the correlation is relatively high; at other times it is low. What's the reason? It is difficult to tell," he says, "Maybe we'll have to find out what the dowsor eats for breakfast."
Peterson Named Chairman Of International Panel

D. F. Peterson, Jr., dean, College of Engineering, and chairman, UCWRR, has been named chairman of an ad hoc panel on international land and water development by the National Academy of Sciences.

The panel of senior advisers will review various plans for water resource development in East Pakistan. It was convened at the request of the U.S. Agency for International Development. It met for the first time in Washington, D.C. August 27-28, and will meet again October 21-22 this year.

Dr. D. Wayne Thornie, vice president for research at USU, has been named a consultant to the panel, and Dr. W. C. Brady, director of research at Cornell University and a graduate of Brigham Young University is one of the 10 panel members.

Dean Peterson explained that East Pakistan has one of the most dense population concentrations in the world at the confluence of the Ganges and Brahmaputra Rivers. The area has extensive flooding in the monsoon season, and suffers from annual droughts when almost no rain falls for about half the year.

Montgomery Appointed to Water Resources Staff

S. Bryce Montgomery has been appointed to the Utah Division of Water Resources staff, it has been announced by Daniel F. Lawrence, director.

Mr. Montgomery will serve as water resources planner with primary responsibility in the development of the Utah State Water Plan. He will work under James G. Christensen, assistant director, and will be responsible for correlating the inventory of water needs and the interrelationships of projected plans with existing water rights and institutions, and for evaluating the impact of various alternatives on the existing overall state objectives.

Mr. Montgomery has been employed as area engineer for the Division of Water Rights (State Engineer's office), where his main location of concern was the Utah Lake and Jordan River drainages. Prior to 1965, he was employed as an exploration and development geologist for an oil company in the midwest. He was graduated from Brigham Young University in 1956.

International Seminar Held For Hydrology Professors

Fifty-five professors from 26 states and 9 countries participated in an International Seminar for Hydrology Professors at Utah State University August 3-14.

Director for the seminar, Systems Analysis of Hydrologic Problems, was J. Paul Riley, associate professor, UWRL. W. James Morris, visiting professor at USU from the City University, London, England, was the assistant director.

This was the second annual International Seminar for Hydrology Professors. The first was held at the University of Illinois at Urbana with Ven Te Chow as director. Dr. Chow is a world renowned educator and consultant in hydrology, hydraulics, and water resources and is professor and head of the hydraulic engineering division at the University of Illinois.

Senate Approves Bill Continuing Aid For Utah Water Projects

The Senate approved an appropriations bill continuing nearly $15 million for Utah water projects on August 4, which included $12.9 million for the Bonneville Unit of the Central Utah Program.

The Bonneville Unit funds include $10.9 million in new construction money for fiscal 1971 and $2 million in carryover funds from the past fiscal year.

The bill also contains $500,000 in planning funds for the Jensen Unit of the Central Utah Project and $300,000 to start construction work on the Upalco Unit, an irrigation development on the Lake Fork and Yellowstone rivers north of Roosevelt.

It provides $300,000 for the Jones Hole Fish Hatchery in northeastern Utah, and $150,000 in new funds for the Little Dell Flood Control Project for Utah County.

Also in the bill is $100,000 for advance planning work on the Dixie Irrigation Project in southern Utah.

The bill now goes to a conference committee to iron out differences between the Senate and House versions.

Staff for the seminar included: Dr. Chow, F. E. Perkins, Massachusetts Institute of Technology; Y. Y. Haines, Case Western Reserve University of Cleveland; J. Amorocchio, University of California at Davis; V. M. Yereth, Colorado State University; N. H. Crawford, Hydrocomp International, Palo Alto, California; Warren A. Hall, Office of Science and Technology, Washington, D.C.; and Robert Shubinski, Water Resources Engineers, Inc., Walnut Creek, California; Dr. Riley, Dr. Morris, Calvin G. Clyde, Duane G. Chadwick, Roland W. Jeppson, and A. Leon Huber, UWRL. Opening remarks and welcomes were given by D. F. Peterson, dean, College of Engineering, USU, and chairman of the United States National Committee for the International Hydrological Decade, and Jay M. Bagley, director, UWRL.

Sponsors were National Science Foundation and United Nations Educational, Scientific and Cultural Organization (UNESCO) in cooperation with U.S. National Committee for the International Hydrological Decade, Universities Council on Water Resources, American Geophysical Union, American Society of Civil Engineers, and the departments of Agricultural and Irrigation Engineering and Civil Engineering, Utah Water Research Laboratory, and Conference and Institute Division, all at Utah State University.

AQUARIUS

A newsletter of the Utah Center for Water Resources Research
Utah Water Research Laboratory
Utah State University

Glen L. Taggart . . . . President, USU
D. F. Peterson . . . . Chairman, UCWRR
Jay M. Bagley . . . . Director, UWRL
William L. Palmer . . . Secretary, UCWRR
Donna Falkenberg . . . . Editor

We invite you to submit your news items for inclusion in the Aquarius newsletter.

The newsletter will be sent free of charge to those requesting it.
News Notes

Calvin G. Clyde, assistant director, UWRL, and William I. Palmer, executive secretary, UCWRR, represented Utah State University at the annual meeting of the University Council on Water Resources (UCOWR) July 27-29. The meetings were held at the Virginia Polytechnic Institute and State University at Blacksburg, Virginia. About 125 persons representing all of the country’s water centers were in attendance. Dr. Clyde and Mr. Palmer participated in committee work of UCOWR and attended conference sessions, discussion groups, and workshops. The theme of the annual meeting was “The University’s Role in National Water Policy.”

Dr. Clyde and J. Paul Riley, Associate Professor, UWRL, attended the American Society of Civil Engineers Hydraulic Division 18th Annual Specialty Conference August 19-21 at the University of Minnesota at Minneapolis. Dr. Clyde was co-chairman of two conference sessions on Water Resources Systems Analyses. He also attended a meeting of the Hydraulics Division Committee on Research. Dr. Riley participated in a panel session on Modeling Small Watersheds. He discussed experience in modeling small watersheds with particular emphasis on the utility and shortcomings of the use of the electronic analog computer as a tool in modeling.

Christiansen Retires

J. E. Christiansen, professor of civil engineering at UWRL and former dean of the College of Engineering at USU, has the new title, Professor Emeritus of Civil Engineering. He was honored by colleagues and friends at a banquet August 10. Aquarius extends congratulations and good wishes to him.

Eaton Retires

Eugene D. Eaton, associate director of the Office of Water Resources Research since the creation of that agency in 1965, retired on July 31. He was a principal architect in the organization and did much during the early years of the agency to establish a meaningful program in OWRR that was not in conflict with other federal water programs. Aquarius extends sincere good wishes to Mr. Eaton.

E. J. Middlebrooks Joins Staff For Water Quality Research

E. Joe Middlebrooks joined the Utah Water Research Laboratory staff in August as professor of civil engineering. He will be involved in water quality research at the UWRL, and will teach in the civil engineering department.

Dr. Middlebrooks has been at the University of California at Berkeley since 1968 where he was an associate research engineer and assistant director of the Sanitary Engineering Research Laboratory.

From 1962 to 1968 he was assistant and associate professor at Mississippi State University. He has also taught at the University of Florida and the University of Arizona.

He received the B.C.E. degree in 1956 and the M.S.E. degree in 1960 from the University of Florida and the Ph.D. degree from Mississippi State University in 1965, and he is a registered professional engineer.

His professional society affiliations include the American Society of Civil Engineers, American Water Works Association, Water Pollution Control Federation, American Association for the Advancement of Science, American Association of Professors in Sanitary Engineering, American Society of Limnology and Oceanography, and the International Association on Water Pollution Research.

Dr. Middlebrooks was awarded the Harrison Prescott Eddy Medal given by the Water Pollution Control Federation in 1969, Special Post Doctoral Fellowship from FWPCA in 1967, INFILO Research Scholarship in 1961, and LOVETT Scholarship in 1955.

He is the author or co-author of some 50 publications.

Bagley Attends Hearing To Amend Water Resources Act

Jay M. Bagley, director, UWRL, recently attended a congressional hearing in Washington, D.C., to give strong support for legislation which would amend the Water Resources Research Act of 1964 to increase from $100,000 to $250,000 the amount authorized annually for each state water resource research center.

“In all the hue and cry about environmental degradation and ecological impacts we may tend to lose sight of the ‘ubiquitous’ role of water. Water is a key ingredient in molding the character of the natural environment as well as in shaping the modified environments that make our individual and community surroundings more pleasant, useful, and attractive. The plain fact is that these broadened environmental and ecological concerns merely intensify the need for water research since water is so inextricably associated with these other considerations” Dr. Bagley said.

Dr. Bagley also submitted a statement for D. F. Peterson, chairman of UCWRR, who was on a foreign assignment.

Sen. Frank E. Moss presided at the hearing and the leadoff witness was Karl L. Klein, assistant secretary of the interior for water quality and research.

Title II Deadline Set

Research proposals for 1972 Title II grants are due at the Utah Center for Water Resources Research by September 15. They should be submitted to William L. Palmer, UCWRR secretary, at Utah Water Research Laboratory room 205. The proposals are due in Washington, D.C. October 1, so the September 15 deadline must be met.
New Publications
Completed at UWRL

Publications recently completed and available from the Utah Water Research Laboratory, Utah State University, Logan, Utah 84321, include:


NESA Irrigation Practices Seminar
To Be Held In Afghanistan

“Efficient Use of Water on the Farm” will be the emphasis of the 8th Near East—South Asia Irrigation Practices Seminar to be held at Kabul, Afghanistan, September 19 through October 1.

A. Alvin Bishop, professor and head of the Agricultural and Irrigation Engineering Department at USU, is technical adviser of the seminar which is sponsored by the United States Agency for International Development (USAID).

In explaining the importance of the seminar series, Dr. Bishop said, “We have come to realize that irrigation is complex, necessary, and perhaps the most important single discovery that has been made by man. The past seminars have been designed to make irrigation more effective in the NESA region. The seminar objectives are carefully planned to determine the problems and exchange ideas regarding their solution.”

Ceylon, India, Nepal, East Pakistan, West Pakistan, Afghanistan, Iran, Saudi Arabia, Jordan, Lebanon, Turkey, and Cyprus will send delegates to the seminar. These delegates are appointed by their respective governments from officials having a major responsibility concerned with irrigation in their countries.

The seminar series for the NESA region had its beginning in Izmir, Turkey, in 1956, and has been held biennially since that time with meetings in Tehran, Iran; Lahore, Pakistan; Ankara, Turkey; New Delhi, India; Amman, Jordan; and Lahore, Pakistan again in 1968.

D. F. Peterson, Jr., dean of the College of Engineering at USU, was the technical adviser for the 3rd, 4th, and 5th seminars. Dr. Bishop has previously been adviser for the 6th and 7th seminars.


Snow Making Season Begins For UWRL Project

By

Charles F. Chappell
Associate Professor, UWRL

The Wasatch Weather Modification Project is involved in conducting research necessary for understanding precipitation processes that produce mountain snowfall and investigating possible techniques for increasing the efficiencies of these processes. The ultimate goal is to develop a cloud seeding technology for use in water management systems.

This technology would provide answers to such questions as: “Under what cloud conditions can seeding be expected to increase mountain snowfall?” “How much additional water per winter season can be added to the mountain snowpack by cloud seeding?” “Can cloud seeding be used to target the snowfall on the mountain barrier?” “Where on the mountain barrier would the largest increment of runoff occur if a given artificial increment of snowfall can be added?”

Several experiments are planned for this winter season. An aircraft seeding experiment that began last year will be continued for this winter season. This experiment will evaluate the effectiveness of aircraft in delivering seeding material to the clouds in order to augment snowfall. The primary target area will encompass roughly the Wasatch Mountain Range from east of Brigham City northward to the Idaho border.

A ground based seeding experiment will also be conducted during this winter season. A remote controlled generator located on Willard Peak will provide silver iodide seeding material to the cloud system. This experiment will evaluate the effectiveness of ground based seeding and provide a comparison with the aircraft delivery system.

Aircraft flights are also planned during both seeded and nonseeded conditions to determine the effects of seeding upon the structure of the cloud itself.

Controls for the experiments will be located in the UWRL building. A facsimile machine that receives weather maps from Washington, D.C., and weather data from all over the northern hemisphere, is being installed at the UWRL.

A 3 centimeter wave length radar has been made operational and is maintained in a trailer located on Cache Peak for the winter season. This equipment will aid in identifying characteristics of storms moving into the Wasatch Mountains and may also help to determine changes in cloud structure produced by cloud seeding.

Special soundings of the atmosphere will be taken during experimental periods by releasing sounding balloons from Cache Peak. These will include measurements of air pressure, temperature, moisture content of the air, and upper level wind direction and speeds.

Other observations will include the measurement of snow crystals. The structures of snow crystals and changes in these structures due to seeding, provide an indirect means of identifying changes in the cloud system.

The ground based seeding experiment begins the first part of November while the aircraft seeding experiment will be conducted December through March. The remote telemetered precipitation network in the Wasatch Mountains is serviced and ready for the new snow making season which is just beginning.

THIS REMOTE CONTROLLED ground-base cloud seeding generators is located on top of Willard Peak.
New Staff Added For Research In Weather Modification, Water Quality

Two new members joined the Utah Water Research Laboratory staff this fall. They are Charles F. Chappell, associate professor of meteorology who has been named project leader in weather modification research, and Donald B. Porcella, assistant professor of aquatic biology who will be involved in water quality research.

Prior to Dr. Chappell's appointment here, he was at Colorado State University where his research was primarily concerned with the precipitation processes and how precipitation might be increased through cloud seeding. He was with the U.S. Weather Bureau from 1955 until 1967, and had numerous assignments as forecaster, analyst, research meteorologist, and consultant.

Dr. Chappell received the B.S. degree in 1949 from Washington University at St. Louis in electrical engineering; the M.S. degree in 1967 and the Ph.D. degree in 1970 from Colorado State University in atmospheric science. He also has done graduate work in meteorology at St. Louis University.

His professional and honor society affiliations include the American Meteorological Society, Phi Kappa Phi, Sigma Xi, Pi Mu Epsilon, and the American Geophysical Union.

He is the author of several publications on cloud seeding.

Dr. Porcella was at the University of California at Berkeley as an assistant research zoologist for SERL before his appointment here. He was a post graduate fellow at the Norwegian Institute for Water Research at Oslo, Norway, during 1967-68, and he also was a research zoologist for the U.S. Public Health Service at the R.A. Taft Sanitary Engineering Center in Cincinnati, Ohio.

He received the A.B. degree in 1957, and the M.A. degree in 1961 in zoology, and the Ph.D. degree in 1967 in environmental health science from the University of California at Berkeley.

His professional society affiliations include the American Association for the Advancement of Science, American Society of Limnology and Oceanography, California Water Pollution Control Federation, International Association of Water Pollution Research, and American Museum of National History.

He is the author or co-author of some 25 publications.

Irrigation Operators Workshop
Planned December 7-9 at USU

The 1970 Irrigation Operators Workshop is planned for December 7, 8, and 9 at Utah State University.

Major topics to be discussed include: water pollution, water measurement, underground water resources in Utah, the State Water Plan, sprinkler irrigation, crop water requirements, water forecasting, national water assessment, drainage, weed control, and the role and responsibility of state water organizations.

This workshop is a continuation of those held in previous years. It is designed for irrigation company officials and others interested in the management of Utah's water resources.

Registration forms and programs are available from the Utah Water Users Association Office, Irrigation Department, Utah State University, or from your County Agent's Office.

Ground-water Data Programs
Topic for AGU Symposium

The American Geophysical Union is sponsoring a Symposium on Planning and Design of Ground-Water Data Programs on December 8, 1970, during its National Fall Meeting at the Jack Tar Hotel in San Francisco.

Water resource specialists from Canada and the U.S. will present a thought-provoking program on a subject of timely interest to hydrologists and water resource managers alike.

Information on the full program for the National Fall Meeting may be obtained from the American Geophysical Union, 2100 Pennsylvania Ave., N.W., Washington, D.C. 20037.

Matching Grant Deadline

Water research proposals for matching grant consideration for fiscal year 1972 funding by the Office of Water Resources Research must be received by the Utah Center for Water Resources Research on or before November 15.

Those submitting proposals are urged to meet this deadline, and to contact William I. Palmer, Executive Secretary, UCWRR, if they have questions. Mr. Palmer's office is in UWRL 205, and his University extension is 7821.
Five Dams In Utah Underway

The Utah Board of Water Resources has five dams under construction in Utah. Daniel F. Lawrence, director for the board, reported that this is the largest number of dam projects under construction at any one time in the 23 year history of the board.

The projects are financed from a revolving fund to which has been appropriated $6.7 million over this 23 year period. The revolving nature of the fund has resulted in $12 million being made available to projects. Funds are returned over an installment contract period and used for future projects.

The Lower Gunlock Dam on the Santa Clara River is about 50 percent complete. This dam will be 150 feet high and cost $1 million. The project will store a total of 10,300 acre feet of water, with 6,000 acre feet to be used for irrigation in the Santa Clara River area west of St. George. The reservoir will also provide fish and game benefits.

The Manning Meadow Dam in Piute County is under construction by Henrie Brothers. This reservoir will store 1,000 acre feet. It will provide 800 acre feet of fish storage and 200 acre feet of irrigation water for the irrigation of 5,200 acres of land in the Woodruff area.

The Mill Site Dam in Ferron is being constructed in cooperation with the Soil Conservation Service at the cost of $3.5 million. It is a multipurpose project for recreation and irrigation.

The Silver Lake Flat Dam and reservoir in Utah County will provide 1,040 acre feet supplemental irrigation to 19,200 acres of land located in communities of American Fork, Pleasant Grove, and Lehi. The cost of this dam is about $1.2 million.

The Woodruff Dam is expected to be complete in October of 1970. This project is being constructed for the Woodruff Irrigating Company at the cost of about $632,000 and will store 4,200 acre feet of water for the irrigation of 5,200 acres of land in the Woodruff area.

Saline Water Symposium Proceedings Available

Papers presented at the “Symposium on Saline Water—A Valuable Resource” held in April at the American Geophysical Union Annual Meeting in Washington, D.C. are being released as a proceedings volume. The papers also will be released in the October issue of AGU’s journal “Water Resources Research.” Copies may be ordered from the American Geophysical Union, 2100 Pennsylvania Ave., N.W., Washington, D.C. 20037 for $2.00.

ATTENTION AQUARIUS READERS!

You have been receiving AQUARIUS, a bimonthly newsletter of the Utah Center for Water Resources Research and the Utah Water Research Laboratory at Utah State University.

We hope you have enjoyed reading the water news we have reported during the past year, and we want to keep you on our mailing list to receive future issues.

If you would like to continue to have AQUARIUS sent to you, free of charge, please check the boxes provided, and return this slip to us.

☐ Yes, continue to send me the AQUARIUS newsletter
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Utah Water Research Laboratory
Utah State University
Logan, Utah 84321
IASH and IAH Develop
International Legend

The International Legend for
Hydrogeological Maps is now available
as a publication printed in full color.
The Legend was developed by a joint
committee of the International Associa
tion of Scientific Hydrology (IASH) and
the International Association of Hydro-
geologists (IAH) after a decade of ef
fort by representatives from a number of
countries.

Approved by UNESCO and estab-
lished within the framework of the
International Hydrological Decade, the
Legend was developed to provide a
standard set of symbols for use on inter-
national hydrogeological maps.

Legend may be ordered from Pro-

fessor Leon J. Tison, General Secreta
ry, Association Internationale D’Hydro-
logie, 61, Braamstraat, Gentbrugge, Be-
grgium for $0.

$106 Billion Needed For Cleanup Program

A Bureau of the Budget study has
estimated that a minimum of $106
billion over the next 5 years will be
needed to finance the country’s water,
air, and solid wastes cleanup program.

Budget Bureau Assistant Director
Maurice Mann made it clear that the
federal government does not plan to
pick up the full tab; he made it equally
clear that the White House basically
accepts the $106 billion figure as a cor-
cert and realistic goal in allocating
federal “seed” money.

In announcing the study, Mann
said, “Estimates of the amount needed
to cover a possible inconclusive attack
on water pollution might be as much as
$60 billion—if not more—over a five-
year period.

“Air pollution control costs come
to more than $12 billion, and
again, cover only the best known
aspects of the air pollution problem....

“The costs involved in taking care
of some of the Nation’s solid wastes
could be as much as $27 billion...if not
more.”

(From “Water Pollution Control Federa
tion Highlights,” Volume 7, No. 9,
September 1970.)