

By

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The cornerstone of any organization is always placed by some remarkable individual who seems to have an abundance of ingenuity and foresight. The Western Snow Conference is no exception. Dr. James Edward Church (1869-1959) Professor of the Classics, University of Nevada, and Meteorologist, Nevada Agricultural Experiment Station, developed procedures for measuring the depth of snow and relevant water content beginning in 1909 on Mt. Rose in Nevada. By 1932, this pioneering work had spread to other localities in the Sierra Nevada Range, the Rockies, mountain areas of Utah, and the mountains of Oregon and Washington.

In early 1933, Dr. Church, Harlow M. Stafford, Hydraulic Engineer, Division of Water Resources, State of California, and George D. Clyde, Head, Civil Engineering, Utah State University at Logan, organized a conference of engineers and scientists interested in snow survey problems. The meeting on Saturday, February 18, 1933, was formally opened by Mr. S. D. Doten, Director, Nevada Agricultural Experiment Station. George Clyde acted as Chairman and Harlow Stafford as Secretary. Forty persons were in attendance; 30 from Nevada, 8 from California, 2 from Utah. A total of 13 federal, state, and local agencies and interests were represented. Regrets were sent by agencies in Washington, Oregon and Montana. This first meeting held at the University of Nevada serves as the birthplace for the Western Interstate Snow Survey Conference. In formal language the Conference was created and organized, "to discuss and resolve problems in the field of snow surveying including procedures, instruments and the forecasting of streamflow derived from snowmelt".

Strangely enough, representatives from Southern California had been blockaded from this initial meeting by a severe snowstorm. These representatives requested a supplementary conference and this was held on June 28, 1933 at the Nevada Agricultural Experiment Station in Reno. Ten persons were present, again including Dr. Church and Professor Boardman. Mr. James E. Jones, Assistant Engineer of the Department of Water and Power, City of Los Angeles, was elected chairman of the meeting.

In addition to the principal officers and organizers of this meeting were such pioneers as Ernest Bulpitt, Southern Sierra Power Company, George Lewis, Department of Water and Power, City of Los Angeles, Spencer Munson, California Cooperative Snow Surveys, Carl Elges, Humbolt Basins Snow Surveys, Fred and Walt Herz, Nevada Cooperative Snow Survey Program, George Malone, State Engineer, Nevada, Edward Bowie, Principal Meteorologist, U.S. Weather Bureau, San Francisco, Fred Scobey, U.S. Department of Agriculture, Berkeley, and Emily Richards, Secretary from the Department of Meteorology, Nevada Agricultural Experiment Station.

Proceedings of these first historic meetings were published by the University of Nevada as an Agricultural Experiment Station Bulletin. During the fall of 1933, Dr. Church arranged with the American Geophysical Union, Section of Hydrology, to hold the Snow Conference meeting with AGU and to have the technical papers included with their transactions. In 1943, at the Joint Regional Meeting (Section of Hydrology) of the American Geophysical Union and the Western Interstate Snow Survey Conference, the official name was changed to simply Western Snow Conference.

By 1947, the meetings of the AGU had become so frequent and complex to the extent that the Western Snow Conference began to lose its identity. Up to this point the Proceedings of the Conference had been published by the National Research Council of the National Academy of Sciences, Washington, DC, as part of the AGU transactions. Accordingly, in 1948, at the Sixteenth Annual Meeting held in Reno, Nevada, the conference members voted to hold only one meeting per year. This meeting would be separate from the AGU and the conference would publish their own proceedings. This arrangement has continued to the present time.

Presented at the Western Snow Conference, April 19-23, 1982

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Because of the break in formal association with the AGU, the year 1948 represents a landmark year. At the end of this first 18 years of WSC activities, it is appropriate to pause and name a few individuals who were prominent contributors to those early years in addition to the pioneers already identified. Some of these were R. A. Work, U.S. Soil Conservation Service and Oregon Agricultural Experiment Station, Medford, Oregon. Fred Paget, Department of Water Resources, California, Wayne Criddle, U.S. Soil Conservation Service, Boise, Idaho, William A. Lang, Southern California Edison Company, Los Angeles, Ashton Codd, U.S. Weather Bureau, Salt Lake City, Ralph Parshall, U.S. Bureau of Agricultural Engineers, Ft. Collins, Colorado, Harry Potts, Engineer, Denver Water Board, Walt Parsons, U.S. Corps of Army Engineers, Sacramento, California, James Marr, Irrigation Engineer, Soil Conservation Service, Boise, Idaho and Norbert Leupold, Portland, Oregon.

While the 1933-1948 period could be described as one of organization and evolution, the period of about 20 years from 1948 through 1968 can certainly be described as a period of "expanding interest and systems improvement". Without question, this was an extremely productive period.

The expanding interests included such areas as a greater recognition of the importance of water, the design and construction of new dams, the conception and construction of water diversion projects, the use of weather modification to enhance snowpack in the mountains following the initial discovery by Vincent Schaefer and the following work by Bernard Vonnegut and Irving Langmuir, the evolution of new forecasting schemes for both weather and riverflow, and the development of new methodologies by the statistical community.

Systems improvement included such important items as the first use of helicopters on snow surveys as conducted in the State of Washington during the 1947 season, the development of new types of snow tubes and cutters, the design and test of heated snow measurement gages, the emergence of oversnow vehicles, the development of radioactive systems for measuring snowpack water content, and the new evolving language of snow hydrology and related equipment.

Again, it was a group of contributing individuals who moved the organization ahead during the 1948-68 period.

To mention a few:

Stan Lord - Menlo Park	Francis Mayo - Salt Lake City
Jack Washichek - Ft. Collins	Walter Johnson - Spokane
Fred Strauss - Sacramento	Jack Doughty-Davies - British Columbia
Homer Stockwell - Ft. Collins	Bob Whaley - Portland
Harry Oliver - Oakland	Fred Limpert - Portland
Morlan Nelson - Boise	Bill Wadson - British Columbia
Wilbur Simons - Tacoma	Bob Gerdel - Sacramento
Edward LaChapelle - Alberta	Monty Atwater - Boulder City
Max Kohler - Washington, DC	Jack Wilson - Boise
Floyd Hugg - Sacramento	Jim Smith - Berkeley
Clyde Houston - Reno	Francis Blanchard - Oakland
Norm Hall - Reno	Manes Barton - Reno
Gene Christian - Sacramento	Lee Peterson - Menlo Park
Ash Codd - Bozeman	Jack Hannaford - Sacramento
Bill Dean - Sacramento	Bert Goodell - Ft. Collins
Walt Garstka - Denver	Bob Fischer - Denver
George Peak - Casper	Bob Elliott - Santa Barbara
Greg Pearson - Salt Lake City	Bob Dahl - Oakland
Gene Peck - Salt Lake City	Arnold Court - Berkeley
Lee Peterson - Sacramento	Glenn Castle - Sacramento
Bob Miller - Sacramento	Arch Work - Medford
Don Poulsen - Sonora	Phil Farnes - Bozeman
Robert T. Davis - Spokane	Harry Hunter - Victoria, B.C.

The 14 year period from 1968 through 1982 can easily be identified as the Age of the Computer and the Environmental Impact Statement. The philosophy within the Conference

during these recent years can best be exemplified through the titles of some select papers as published in the Proceedings. Some of the more revealing have been "The Effect of the Wilderness Law on the Collection of Hydrologic Data", Jerry van de Erve, 1968; "The Changing Water Resources", Thomas J. Henderson, 1971; "Omniscient Environmental Impact Statement", Fred Strauss, 1973; "Water Pollution Potential of Snowfall on Spent Oil Shale Residues", John Ward, 1973; "Computer Simulation of Glacier Mass Balance Throughout an Ablation Season", Larry Williams, 1974; "Meteor Burst Communications", Ray Leader, 1974; "Snotel-Automated Snow Surveys", Manes Barton, 1975; "Automated Remote Data Acquisition", Dean Horton, 1975; "Weather Modification Law and the Environmental Effects of Snowpack Enhancement", Ray Jay Davis, 1975; "Upper Air Data as a Parameter in Estimating Snowmelt Runoff", Jack Hannaford and Charles Howard, 1975.

By 1976 we were hearing "Metrication of British Columbia Snow Survey Operations", Letvak and "Grid Square Runoff Model", Obedkoff, followed in 1977 with, "Application of a New Hydromet Streamflow Prediction Model", Wendell Tangborn.

By 1978, the year after Ash Codd passed away, the formal presentations included such topics as, "Microwave Studies of Snowpack Properties", Hall, "Future Operations of Snotel", Farnes, and "Pilot Tests of Satellite Snow Cover", Rango. The year 1978 also saw the beginning of "Snow Notes" as a permanent addition to the WSC Proceedings.

The increasing sophistication of snow hydrology was noted in 1979 with, "Modernization of the Hydrologic Data Telemetry Network in California", McCullough and "Microwave Measurements of Water Equivalence", Boyne and Ellerbruch. In 1980, the year of Jim Smith's passing, the field was expanding with, "A Watershed Information System Model", Thompson and Stiffler, "Snow Drifting on Phosphate Mine Dumps in Southeastern Idaho", Chacho, Molnau, "Operational Airborne Measurement of Snow Water Equivalent Using Natural Terrestrial Gamma Radiation", Carrol and Vadnais, and "Calibration Procedure for Airborne Gamma Ray Snow Surveys", Glynn and Grasty.

This past year we have heard "Application of a Snowmelt Model to Two Drainage Basins in Colorado", Jones, Schaefer, "Predicting Deposition of Blowing Snow in Trenches from Particle Trajectories", Schmidt and Randolph, and "Snow Pillow Behavior Under Controlled Laboratory Conditions", Smith and Boyne. In the next two days we will hear, "Micro-computer Based Avalanche and Hydrological Forecast System", Williams, and "Metrication of Manual Snow Sampling Equipment", Farnes, Peterson, Goodison and Richards.

Meetings have been held in the Western United States and Canada every year since 1933. The numbers of meetings in various states include California (12), Nevada (6), Utah (4), Oregon (5), Washington (3), Idaho (2), Montana (2), Wyoming (2), Arizona (1), New Mexico (2), Colorado (3), British Columbia (4), Alberta (1), and Alaska (1).

At this point it is important to list the general chairmen who have provided strong guidance to the Western Snow Conference.

<u>YEARS</u>	<u>NAME</u>	<u>YEARS</u>	<u>NAME</u>
1933	George D. Clyde	1957/58	Ashton R. Codd
	James E. Jones	1959/60	Francis P. Mayo
1934	Harlow M. Stafford	1961/62	Jerry van de Erve
1935/36	James E. Jones	1963/64	Wilbur D. Simons
1937/38	George D. Clyde	1965/66	Morlan W. Nelson
1938/40	Horace P. Boardman	1967/68	Robert W. Fischer
1941/44	Fred Paget	1969/70	Glenn H. Castle
1945/46	R. A. Work	1971/72	Harry Hunter
1947/48	Wayne D. Criddle	1973/74	Philip E. Farnes
1949/50	Ralph L. Parshall	1975/76	Archie M. Kahan
1951/52	Homer J. Stockwell	1977/78	James L. Smith
1953/54	William A. Lang	1979/80	Manes Barton
1955/56	Austin E. Helmers	1981/82	Jack Wilson

Proceedings have also been published during this total historic period. These contain slightly more than 700 papers. This certainly represents the largest, and perhaps the most important, accumulation of information on snow and snow hydrology in the world. A bibliography of the Western Snow Conference papers was issued in January 1974 and is updated each year as new Proceedings are published.

A list of WSC publications would not be complete without noting the Snow Surveyor's Forum. This publication was initiated in 1946 and ended in 1964. Fifteen volumes were put together during that period. Each was dedicated to the field men in recognition of the importance of these dedicated individuals. The work of the field men serves as the true basis for all of the results produced in the past 50 years. Without the field men there would not be a Western Snow Conference.

The various editors of the Snow Surveyor's Forum were:

EDITORS - SNOW SURVEYOR'S FORUM

<u>Volume No.</u>	<u>Publication Year</u>	<u>Editor</u>
1	1946	Western Snow Conference
2	1948	Western Snow Conference
3	1949	Western Snow Conference
4	1950	Morlan Nelson
5	1951	Morlan Nelson
6	1952	George Lewis
7	1953	George Lewis
8	1954	Harry Oliver
9	1956	Tom Henderson
10	1957	Norm Hall
11	1958	Norm Hall
12	1960	Jack Hannaford
13	1961	Jack Hannaford
14	1962	Jack Hannaford
15	1964	Jack Hannaford

The Western Snow Conference has provided a number of awards during the past 50 years. One award has survived the test of time and still remains the highlight of presentations at the various annual banquets. It is the El Farsante Award. This award sprang from the fertile mind of George "Pappy" Lewis of the Department of Water and Power, City of Los Angeles. El Farsante (loosely translated means "the faker") is the Fabulous Forecaster from Furnace Creek, whose remarkable record of accuracy is unequal anywhere. This record includes a "zero" forecast for the runoff of Armogosa River in Death Valley, a "zero" forecast for the number of degree days below zero at Furnace Creek, and a "never" forecast for the dates on which salmon start to run in Stove Pipe Wells. Each year a suitable statue of El Farsante is presented to the "poor cluck who makes the lousiest forecast of the year". The "lousiest forecast" has been loosely amended to mean nearly anything, and the Awards Committee has always followed that particular guideline. It was fitting that George Lewis received the award the year of its birth in 1953 simply for "introducing such an idea".

And now a few questions are in order:

- A. Can a series of streams be estimated according to a standard, or must each be a problem by itself?
- B. What is the best method, if any, of determining the long term effect of dry years upon runoff?
- C. What is the effect of wind, temperature, rain, topography, porosity, and soil temperature, and what method will best adapt itself for their determination from the practical standpoint?
- D. How much variation in time is permissible in consecutive years of making snow surveys to still get comparable results?
- E. Has any method been devised for determining soil capacity in a satisfactory manner for snow surveys?

These questions were posed by Jimmy Jones, Los Angeles Department of Water and Power at the very first organizational meeting of the WSC in June 1933. They have a suspicious similarity to questions asked today.

There is another quotation which seems appropriate.

"In 63 forecasts for the Truckee, Tahoe, Carson, West Walker, South Yuba and Mokelumne Basin covering 19 years, 41 or practically two-thirds were within 10% and all were within 31%. Furthermore, 27 or nearly one-half were within 5%. This system is known as the 'Percentage, or Nevada System'. It is cheap, it is accurate and avoids all the obstructions of the rainfall system."

This was a comment provided by Dr. Church at that first organizational meeting in 1933 and the quoted figures came from data obtained prior to 1933.

A review of these first 50 years reveals two observations which must be mentioned.

- A. The similarity between the questions asked and the investigations conducted in 1933 and those asked and conducted 50 years later.
- B. The accuracy of the riverflow forecasts produced in the period prior to 1933 compared with the forecasts today.

This should not be discouraging picture. The thoughts only emphasize the fact that all of the frontiers within our area of interest needs further exploration and there is plenty of room for improvement in what is certainly a challenging and absolutely fascinating field. The second 50 years will surely be as exciting as the first!