



The **Four Horsemen of the Apocalypse** are mentioned in the Bible in chapter six of the Book of Revelation, which predicts that they will ride during the Apocalypse. The four horsemen are traditionally named War, Famine, Pestilence, and Death.

The **Four Horsemen** were also the senior backfield that led Notre Dame to the national collegiate football championship in 1924; put together as sophomores by Irish coach Knute Rockne; immortalized by sportswriter Grantland Rice, whose report of the Oct. 19, 1924, Notre Dame-Army game began: "Outlined against a blue, gray October sky the Four Horsemen rode again..."

The **Four Horsemen** of snow surveys and streamflow forecasting were: Horace P. Boardman, James E. Church, George Dewey Clyde, and Walter W. McLaughlin. The people associated with the Snow Survey Program (past and present) are the hardest of individuals who love their work and toil tirelessly. There have been many "prominent" people throughout the years that have furthered the technology of snow data collection and water supply forecasting. It would take pages to acknowledge all of them and their accomplishments. There have been/are many great ones! However, the Snow Survey Program would not be what it is today without the singular contributions of these four dedicated, enthusiastic and ambitious men. To be sure, there would probably be a "Snow Survey Program", since the qualities of snow are so important to our Western U.S. culture and economy...but it wouldn't be what it is today without the "Four Horsemen"...Boardman, Church, Clyde, and McLaughlin.

### **The First Honorary Memberships to the Western Snow Conference<sup>1</sup>**

<sup>1</sup> This article was taken from the Western Snow Conference Honor Awards Ceremony held in Reno, Nevada on April 22, 1959.

### **FOREWARD**

Service to one's fellowmen is an enduring source of satisfaction. This satisfaction compensates for long hours of work, patient waiting and sometimes tedious effort. It is well earned and it explains, in part at least, the dedication to service characteristic of so many of our members.

The Constitution and By-Laws of the Western Snow Conference provides for election to Honorary Membership of any member or person who shall have significantly contributed in outstanding manner to Western Snow Conference or to the science of snow hydrology and streamflow forecasting.

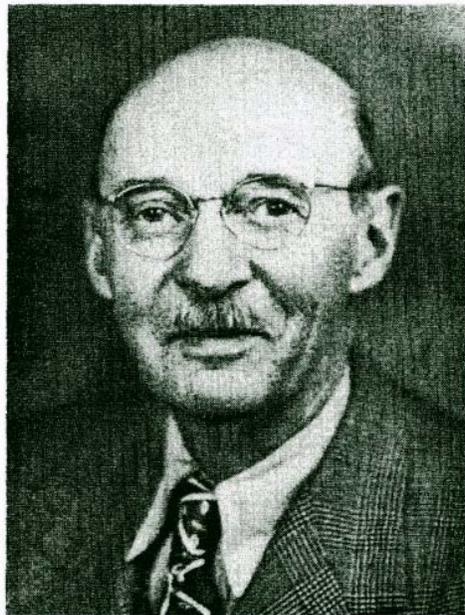
The Conference, in more than a quarter-century of activity, has presented four special awards of plaques and medals. However, not until 1959, the Golden Anniversary of Western Snow Surveying, has the Conference granted the coveted award of Honorary Membership.

By unanimous ballot, the Conference has now elected four candidates upon whom this signal honor is being seated. These candidates are noted nationally and internationally, each in his own field, and all in snow surveying, for their collective and individual service to their fellowmen, to the Western Snow Conference, and to the water users of Western States.

The Western Snow Conference pays tribute to these men:

PROFESSOR HORACE P. BOARDMAN  
DR. JAMES E. CHURCH  
GOVERNOR GEORGE DEWEY CLYDE  
MR. WALTER W. McLAUGHLIN

Herein are related the events and contributions which make of this a memorable privilege for Western Snow Conference to welcome these four patrons to Honorary Membership.



#### **HORACE PRENTISS BOARDMAN**

Horace Prentiss Boardman, engineer and educator, was born at Menasha, Wisconsin, January 21, 1869. Married Elsa Leonard in Chicago July 22, 1896 (deceased September 1948). There were four children: Russel L., Edgar, Dorothy and Elizabeth.

He was educated in the Monroe high school in Green County, Wisconsin and the Morgan Park Military Academy near Chicago. B.S. in Civil Engineering, University of Wisconsin 1894. Degree of Civil Engineer, University of Wisconsin 1911. Received Honorary Degree of Doctor of Science, University of Nevada 1950.

After graduation, Mr. Boardman worked in engineering department of Chicago Sanitary District; Chicago Pure Water and Drainage Commission. He was acting bridge engineer with the Chicago and Alton Railroad at which time he designed the sub-structure of the reconstructed Glasgow bridge over the Missouri River. He continued to design and build bridges with various companies, including an assignment as assistant bridge engineer with the Chicago, Milwaukee & St. Paul Railroad until August 1907, when he accepted the call to the University of Nevada as professor of civil engineering, a chair he held continuously for 32 years until his retirement in 1939. He was acting Dean of the College of Engineering from 1917 to 1921. He was director of University of Nevada Engineering Experiment Station for a number of years. One interruption to his consecutive work at Reno came during World War I when from March to August, 1918, he was on a leave of absence employed on the engineering force of the U. S. Explosive Plant at Nitro, West Virginia.

Dr. Boardman was for several years Chairman of the Forecast Committee of the Nevada Cooperative Snow Surveys. This might have been described as a hobby, though it proved of immense practical value. Snow surveys carried out for the purpose of estimating and predicting the seasonal sources of water for industrial uses have had repeated demonstration of their value many times in recent years, and especially so following the disastrous droughts of the 30's.

As Professor of Civil Engineering at University of Nevada, Professor Boardman inevitably became deeply interested in, and then actively associated with the studies of snow, initiated there by Dr. J. E. Church. These two scientists joined their enthusiasms, energies, and experience, all tempered and supported with engineering facts and approaches, and worked as a team through all of the succeeding years.

Professor Boardman since 1894 has been a member of the Western Society of Engineers at Chicago, and since 1918 has been a member of the American Society of Civil Engineers. He is also a member of the American Society for Testing Materials, the Society for the Promotion of Engineering Education, Western Snow Conference and American Geophysical Union.

He is an independent in politics, is a member of the Delta Upsilon, the Reno Rotary Club and Chamber of Commerce.

Technical articles from the pen of Professor Boardman have appeared in many engineering publications:

Stadia Surveys for Railroad Location, Engineering News – 1901

Reconstruction Design of Substructure of Glasgow Bridge over Missouri River for Chicago & Alton Railroad, Journal of the Western Society of Engineers, 1901

Retaining Wall and Earth Pressures, Engineering News Record, 1905

Wind Pressures on Inclined Roofs (Earned C. E. Degree with this paper), Western Society of Engineers, 1911

Buttress Type Dam with Curved Upstream Face, Civil Engineer, 1951

Snow Surveys for Forecasting Stream Flow in Western Nevada Agricultural Experiment Station Bulletin No. 184, September 1949

Some Interesting Facts About Lake Tahoe, (Now in the process of being published) 1959

Numerous articles and discussions in "American Geophysical Union" and other publications from 1930 to 1950.



### **JAMES EDWARD CHURCH**

James Edward Church, Educator, was born in Holly, Michigan, February 15, 1869. Married Florence Humphrey July 2, 1894, (deceased February 1922). There are two sons: Willis Humphrey and Donald Eisenbrey.

A.B. Degree at University of Michigan in 1892. Ph.D. at University of Munich in 1901; his LL.D. at University of Nevada in 1937. He studied archeology in Italy and Greece in 1901.

Dr. Church was a teacher and principal in public schools in Michigan in 1885-1888; instructor of Latin and German, University of Nevada in 1892-94, Assistant Professor Latin 1894-95, Associate Professor in 1895-96 and Professor in 1896 to 1939.

**Other Activities and Contributions:** He was Secretary, Rhodes Scholarship Committee for Nevada, 1904, President, 1933, 1935-; Co-founder of the Nevada Art Gallery, Incorporate President 1943-; Fellow, American Academy of Arts and Science; Member, American Meteorological Society (Councilor 1933-35); Member of Aeroartic; Member, American Geophysical Union (Chairman Committee on Snow 1931-47, Vice-President Section Hydrology 1936-39, President 1942-47); Member, International Association Science Hydrology (President Committee on Snow 1933-39, Snow and Glaciers 1939-48); Honorary Life Member, International Commission on Snow and Ice; Member, American Philosophical Association.

He was founder of the Mt. Rose Meteorological Observatory in 1905; advisor to cooperative snow surveys for the State of Nevada;

Meteorologist of Michigan-Greenland Expeditions, 1926-27, and 28; Nevada Agricultural Experiment Station, 1906-19 and 1931-48, and snow specialist of U. S. Weather Bureau 1942-48; now retired and engaged in research and writing.

He was guest at the 220th Anniversary Soviet Academy of Science 1945; he organized snow surveys in the Himalaya for Indian Government in 1946-47, and in the Andes for Argentina in 1947-48.

**Honors Received:** Phi Beta Kappa (Michigan); Honorary Sigma Xi (Michigan); LLD (Nevada); Guest 2nd Pan-American Scientific Congress (Washington, D. C.); Unlimited Horizons: Radio tribute; Guest at Ghandi's Evening Service (New Delhi); Guest at CCXX Anniversary of Soviet Academy of Science in Moscow; Life Membership in Sierra Club, Explorers Club, American Geophysical Union, British Glaciological Society; Citations by Central Snow Conference (East Lansing), Western Snow Conference (Reno), U.S.A. Quartermaster General Military Planning Division, Reno Junior Chamber of Commerce (Citizen of the Month); Daughters of the American Revolution (Award of Merit); Naming of the Fine Arts Building (University of Nevada), Reno,

**Selected Writings:** The Influence of Mountains and Forests on the Conservation of Snow. Snow-Surveying: Its Problems and Their Present Phases, Second Pan-American Scientific Congress. Snow: Snow Surveying (Chapter in Physics of the Earth: Hydrology National Research Council, American Geophysical Union). Snow Survey (American Geographical Society). Snow-Surveying and the Forecasting of Stream Flow ("With Reference to Mt. Rose") (Sec. Pan-American Scientific Congress 1915). Greenland, the Top of the World, 1928. Climate and Evaporation in Alpine and Arctic Zones 1928. Law and Society.

The Human Side of Snow (Scientific Monthly)

1. The Saga of Mt. Rose Observatory
2. Snow: Sport and Transport
3. Snow Perils and Avalanches
4. Perennial Snow and Glaciers

The Soul of Soviet Russia 1936; Journal of a Trip Through Tierra Del Fuego 1940; Science and Adventure 1949; The Physics of Snow-Melt 1952; Forecasting the Summer Runoff of the Rhine, 1952-58; Snow and Life, 1955; Roman Burial Inscriptions; Pilgrimage to Mt. Paranasus,

**Travels:** Voyage to British Isles, Germany, Greece for Classics, 1899-1901. two voyages to Greenland, latter via Europe, 1926-28; to International Union of Geodesy and Geophysics at Edinburgh and Circle Trip to Snow-Hydrologists in Northern Europe with long convalescence from double pneumonia in Moscow, 1939; world trip eastward through Northern Hemisphere to CCXX Anniversary of Soviet Academy of Science, 19-15; world trip westward in Southern Hemisphere to India. Argentina, Chile, 1948-49; voyage eastward to Norway (Oslo) and Switzerland to International Union, 1949.

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Dr. Church, though a professor of classics, was an enthusiastic mountaineer and half a century ago became interested in the

relation of forests and mountains to the conservation of snow. He is referred to by many as "The Father of Snow Surveys."



**GEORGE DEWEY CLYDE**

George Dewey Clyde, engineer, educator and Governor of Utah, was born at Springville, Utah, July 21, 1898. Married Ora Packard. There are five children: Ned P., Ruth, Richard Bruce, Jerald Reed and Mary Ann.

B.S. Degree in Agricultural Engineering, Utah State University, 1921;  
M.S. Degree in Civil Engineering, University of California, 1923;  
Honorary LLD Degree, Westminster College, Salt Lake City, Utah;  
Honorary DSc Degree, Utah State University, Logan, Utah.

George Clyde spent his early life on an irrigation farm in central Utah where he gained his first insight into the soil and water engineering field that has occupied nearly all of his professional life.

Following his graduate work, he entered the education field and rose to become Dean of Engineering at Utah State University. He then entered Federal Service as Chief of Division of Irrigation, USDA, where he had charge of irrigation and drainage research work throughout the West. He was made Chief Engineer for the Soil Conservation Service. He left federal work and returned to service in his native state, heading up its water and power development, and after three years, became the Governor of Utah.

Governor Clyde has made many contributions in the field of soil and water engineering. Has done original work in snow surveys and water supply forecasting, in irrigation and drainage, in watershed protection and development and in the multiple purpose use of the limited water resources of the West.

Academic recognition: Johansen Scholarship (Utah State Agricultural College); Phi Kappa Phi (Utah State Agricultural College);

Valedictorian (Utah State Agricultural College), 1921; Member, Sigma XI (University of California); Willard D. Thompson Scholarship (University of California) 2 years; Member, Sigma Tau (Engineering Fraternity); Honorary LLD Degree—Westminster College, Salt Lake City, Utah; Honorary DSc Degree—Utah State University, Logan, Utah.

**Professional record:** Engineering teaching - Utah State Agricultural College, 22 years; Irrigation Extension Specialist - Utah State Agricultural College; Engineering Research (water supply, irrigation, and drainage), Utah State Agricultural College - 22 years; Consulting Engineer (water supply, litigation, investigations, design, construction); Administration (education, research, investigations and construction) - 30 years.

**Special professional assignments:** Water Commissioner, Logan River, 20 years; design and construction of irrigation systems, water works and sewer systems; snow surveys and streamflow forecasts (11 western states); water allotments for irrigation districts; special investigation on Kootenai River in Idaho; special hydraulic investigations - Bear River Bay Refuge; special investigations - smelter fumes - Garfield Smelter, Utah; water supply and return flow studies; flood-control studies on Southern Utah.

**Public service assignments:** State Water Conservation - appointed by Governor Blood to act during the severe drought of 1934; member, National 18-Man Land Grant College Association Committee on Post War Agricultural Policy, 1942-44; Vice-President and Director, Utah Water Users Association; member, Advisory Board, Utah State Department of Industrial Development, Water Resources Development, Water Resources Division; member, National Reclamation Association; Vice-President, Colorado River-Great Basin Development Association; member, N.R.A. Committee to study President's water policy commission report, 1951; member, 17-Man Water Policy Committee, N.R.A., 1952; member, U. S. Delegation to Fourth Pan-American Conference on Agriculture, Montevideo, Uruguay, 1950; member, 18-Man Advisory Committee on Soil and Water Conservation, USDA - 1955; Advisor on Water Resources and Utilization to two Secretaries of Agriculture; member and Vice-Chairman, Upper Colorado River Commission.

**Administrative assignments:** Governor, State of Utah - 1957 to date; Director, Utah Water and Power Board and Commissioner of Interstate Streams for Utah; member Upper Colorado River Commission, Bear River Commission, Columbia River Commission and Pacific Southwest Inter-Agency Committee - 1953 to date; Chief Engineer, Soil Conservation Service, USDA - 1953; Chief, Division of Irrigation Engineering and Water Conservation Research, SCS, USDA - 17 western states 1945-1953; Dean, School of Engineering & Technology, Utah State Agricultural College, 1935-1945; Director, Utah State Engineering Experiment Station, 1939-45; Administrator of the following activities, all at USAC: National Defense Training Program, 1940-42; War Production Training Program, 1942-45; Civilian Pilot Training Program, 1939-42; Naval Radio Training Program, 1942-44; Army Specialized Training-Program, 1943-44; Manager, USAC Hydro-electric Plant, 1936-45.

Governor Clyde is a member of the following professional societies: American Society of Civil Engineers, American Society of Agricultural

Engineers, Soil Conservation Society of America and Western Snow Conference, of which he was General Chairman in 1937-38.

**Publications:** Over 50 publications on many subjects in the field of water supply, its development and utilization, and irrigation institutions have been written by Dr. Clyde.



#### **WALTER W. McLAUGHLIN**

Walter McLaughlin was born at Nederland, Colorado on January 6, 1876. Married Phoebe Eliason. There is one daughter, Mrs. Anna M. Demsey, two grandchildren and three great-grandchildren.

B.S. in civil engineering, Utah State Agricultural College, 1896. M.S. degree in soil physics and irrigation, University of California, 1924.

After graduation, Mr. McLaughlin spent three years as assayer and chemist for the Swansae Mining Co. at Silver City, Utah. In 1901 he returned to Utah Agricultural Experiment Station as assistant chemist and also taught irrigation engineering and some mathematics at the college. In 1902 he took the first examination offered by U. S. Reclamation Service of the Department of Interior and was appointed irrigation aide in 1903. In 1904 he was transferred to the U. S. Department of Agriculture. In 1905 Mr. McLaughlin was loaned to a cooperative undertaking in eastern Montana involving the U. S. Department of Agriculture, Montana Agricultural Experiment Station and the Northern Pacific Railroad to establish five agricultural experiment stations for so-called "dry farm methods". In 1906 he returned to Utah Agricultural College for cooperative work between the USDA and the College.

In 1914 Mr. McLaughlin resigned from the college to conduct research studies on the movement of soil moisture in different types of soils with the U. S. Department of Agriculture at Riverside, California. In 1917 he was transferred to Berkeley, California and continued in charge of research work until 1925 when he was made

Chief of the Division of Irrigation in the Department. In general, the research and investigations covered the origin of water, transit of water by natural and artificial means to its best use for agriculture and the disposal of surplus water by drainage or otherwise; and the economic feasibility of the project and its financing. At various times, Mr. McLaughlin was given duties in addition to his regular work. One such in 1927 was to cooperate with the U. S. Biological Survey in the locating and building of migratory water-fowl refuges in the western states, including preparation of plans and specifications for the engineering works, such as dams, dykes, and other water control structures and devices, and supervision of construction after contracts to build were let. The refuge at the mouth of Bear River some 15 miles west of Brigham City, Utah and developments on the Souris River in the vicinity of Minot, North Dakota are examples. This special duty extended over six or seven years. In 1946 Mr. McLaughlin retired from Government Service.

In 1946 to 1953 he was consultant to the Chief of the Soil Conservation Service and spent about half of his time in this capacity.

Mr. McLaughlin is a member of the Masonic Order, American Society of Agricultural Engineers, Geophysical Union, National Reclamation Association, Utah Association of Engineers; and is registered civil engineer in California.

He has traveled in all but seven of the states of the Union. His European trips have taken him to England, Scotland, Germany, The Netherlands, Denmark and Sweden.

Mr. McLaughlin was awarded honorary life membership of the Western State Engineers Association, the Association of Agricultural Engineers and the American Geophysical Union as well as some other state organizations. He received the John Deere Medal Award in 1940 for service in agriculture; an honorary award from the U. S. Department of Agriculture in 1949; a plaque award from the Western Snow Conference in 1952.

Never a popular or prolific writer, the total of his reports, bulletins, and technical papers would yet be impressive. In one obviously abridged list of two dozen major items are two papers presented to the International Soil Congress; others to the American Association for the Advancement of Science, the American Society of Agricultural Engineers, the American Geophysical Union, the Institute of Irrigation Agriculture, and others. Most of his bulletins and kindred publications have been issued by the Utah State Agricultural College and by the U. S. Department of Agriculture. He is the author of numerous technical articles in English journals as well as of similar articles here. We list five of his most important publications:

USDA Bulletin 835, "Capillary Movement of Soil Moisture";  
"Utilization of Soil and Water Resources of Cache Valley, Utah";  
Research Bulletins of the Utah Agricultural College with which he was connected—Bulletins 80 and 86 and the series 105 to 115, all dealing with the use of soil moisture by crop plants; an article in the Journal of the Bureau of Public Roads in May 1921 entitled "Capillary Moisture and Its Effect on Highway Subgrades."

Chief accomplishments for and in snow surveys or other fields of

public service:

Mr. McLaughlin took leadership in organizing the snow survey and irrigation water supply forecasting in the arid states in 1935.

Secured the first appropriation by the Federal Government for snow surveying and irrigation water supply forecasting. Organized state irrigation associations. Developed methods of economic feasibility of irrigation and drainage projects in several of the Western States.

One of his Utah State colleagues said of him: "In his capacity of leadership he has inspired and directed research work by many men ... on almost every phase of irrigation and drainage and made many significant contributions . . . consumptive use of water in irrigation; seepage losses from canals; flow of water in soils; design and construction of irrigation and drainage wells; use of water by crops; and so on and on." "His influence on irrigated agriculture has been out of all proportion to the notice he has received in the public press," said another of his associates.

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Tom Perkins  
NRCS Senior Hydrologist  
Portland, Oregon