Nevada

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NEVADA HISTORICAL SOCIETY QUARTERLY

The *Nevada Historical Society Quarterly* solicits contributions of scholarly or popular interest dealing with the following subjects: the general (e.g., the political, social, economic, constitutional) or the natural history of Nevada and the Great Basin; the literature, languages, anthropology, and archaeology of these areas; reprints of historic documents; reviews and essays concerning the historical literature of Nevada, the Great Basin, and the West.

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Front Cover: Dr. James E. Church at the weather observatory and snow survey station on Mt. Rose, Nevada, June 5, 1911. (*Nevada Historical Society*)

Book Reviews

SEEKING SNOW
James E. Church and the Beginnings of Snow Science

Bernard Mergen

As a writer, James Edward Church is closer to the scientist-explorers such as John Wesley Powell, Richard E. Byrd, and Michael Collins than to the poet-naturalists such as Henry David Thoreau, John Muir, and Loren Eiseley, yet he clearly belongs in both groups. In his love of nature in winter, in his devotion to the scientific study of snow, in his commitment to international peace, and, above all, in his ability to write clearly about these subjects, Church ranks among the greatest American naturalists. Through his love for snow, Church rose from being an obscure instructor in classics to international prominence as an hydrologist, meteorologist, and inventor. Because snow is so commonplace, so simple, so much a nuisance in modern life, Church's accomplishments have been overlooked. In the context of the environmental crises of the late twentieth century, his work takes on new meaning and new importance. Church's writings make two major points: Snow, an important source of water, is a limited resource, and the wise use of this resource is ultimately the concern of all nations.

Why was Church so fascinated by snow? One answer may lie in the climate in which he spent his childhood. He was born February 15, 1869, in the little town of Holly, Michigan, about thirty miles northwest of Detroit. Today it is ringed by state parks and ski areas, a recreation center for residents of Lansing, Flint, Pontiac, and Ann Arbor. The son of James Edward Church and Mary Alice Eisenbrey, he retained "Jr." in his signed articles until the 1930s. His mother's name suggests that his fluency in German may have been attained in childhood. He taught in public school and received his B.A. degree from the University of Michigan in 1892. In the fall of that year he began his sixty-seven-year association with the University of Nevada.[1]

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The appearance of this article marks the hundredth anniversary of Dr. Church's arrival at the University of Nevada in 1892. ed.

Church was hired to teach classics and German, but it is clear that his first love was the snow-covered Sierra Nevada conveniently close to Reno. Possessed already by what the writer Barry Lopez calls Arctic Dreams, Church may have been inspired by the exploits of Lieutenant Adolphus W. Greely, the Union army hero who led one of the first United States government expeditions to the arctic in 1881, and whose dramatic rescue captured headlines in 1884. The news that Fridtjof Nansen had crossed Greenland on skis and that Robert E. Peary confirmed that Greenland is an island must have reached Church while he was a student at the University of Michigan. The race for the poles was on. Thirty-six years later, Church joined the Michigan Greenland Expedition as associate meteorologist. His route to the arctic via Mount Rose and the Tahoe basin was far longer than Peary's and filled with as many adventures and controversies.[2]

Promoted from instructor to assistant professor after two years, Church returned to Michigan in the summer of 1894 to marry Florence Humphrey. A year later he made his first ascent of Mount Rose on snowshoes and experienced a rebirth. Winter and summer he and Florence climbed and hiked the Sierra Nevada from Mount Whitney to Mount Shasta. His rise through the academic ranks was also rapid. By 1895 he was an associate professor and in 1896 became full professor. From the distance of a century this life seems ideal: a relatively undemanding academic job and long holidays spent exploring the mountains. Abruptly his life began to take a different course.

The first sign of change was the publication in January 1898 of his directions for traveling between Susanville and Fall River Mills, California, on a trip from Reno to Mount Shasta. Church's map and instructions appeared in the second volume of the *Sierra Club Bulletin*. With this modest account, Church took a decisive step toward serious mountain exploration and study. A longer description of his 240-mile journey from Mount Rose to Mount Shasta appeared in the June issue. The Sierra Club had been organized in 1892, and Church was an early member, one of the few on the eastern slope. Most Sierra Club members lived in the San Francisco Bay area and confined their hikes to the California side. Although Church was to remain a voice crying in the wilderness of the Great Basin, he strengthened that voice by going back to school.[3]

Church returned to the University of Michigan for graduate study in 1898, a year that also saw the birth of his first son, Willis. The following two years were spent in Munich, where he received his Ph.D. in classics from Ludwig-Maximilians-University in 1901. The extended sabbatical and Bavarian sojourn allowed the Churches to develop both their intellectual and recreational interests. They hiked in the nearby Alps, where modern skiing and mountaineering were rapidly developing, and Florence Church's diary of 1899–1900 reveals her knowledge of art, child psychology, and German customs. His doctoral dissertation was a traditional philological study of the style of Latin epitaphs, and he also acquired a knowledge of statistics sufficient for his later snow surveys. Perhaps the most useful achievement of these years was the doctoral degree

James Edward Church as a young man. (*Nevada Historical Society*)

itself. Henceforth, James Edward Church, Jr., known as Ward to his friends, would be Doctor Church. In an increasingly degree-conscious society in which professional and academic specializations were rapidly proliferating, Church's title conferred status and guaranteed a hearing for his ideas.

Immediately upon their return to Reno, the Churches settled into their old routines. In November 1901, Church submitted a brief note on his preference for snowshoes over skis to the *Sierra Club Bulletin*. Among the various types of snowshoes, Church chose the narrow-pointed Canadian shoe for climbing Mount Rose, but mentioned two kinds of Bavarian *Algaue Schnee-Reifen* as useful for climbing on the thin-crust snow below 8,000 feet. On New Year's Eve 1901, the Churches began an eight-day trek up Mount Rose to Lake Tahoe and down the Truckee River carrying their gear in "a roomy German knapsack" and wear-

ing their *Algaue* snowshoes. Church's report on this and subsequent trips in the *Sierra Club Bulletin* are important beyond biography. They are excellent examples of how pioneer camping enthusiasts carefully tested outdoor clothing and equipment, shared their information, and ultimately laid the foundation for today's camping gear industry.[4]

In 1904, Church's interest in weather forecasting was stimulated by an article by Alexander McAdie of the United States Weather Bureau in San Francisco, who called for the establishment of a meteorological observatory on the highest peaks in the Sierra. The following March, Church and a companion attempted to climb Mount Whitney in the snow to test the possibility of checking instruments weekly during the winter. Although they failed to reach the summit of the 14,494-foot peak by 1,200 feet, Church was convinced that a weather station

Florence Church, c. 1902. (*Nevada Historical Society*)

could be maintained through the winter at slightly lower elevations, including the 10,778-foot summit of Mount Rose. In June 1905, Church and five volunteers began construction of the first weather observatory on Mount Rose. The Weather Bureau furnished maximum and minimum thermometers and a rain gauge, and Church and his crew built a wooden shelter. The observatory was maintained by volunteers, including Florence Church. Checked frequently and found unreliable, the original instruments were replaced in October by a thermograph and a barograph capable of recording fluctuations in temperature and air pressure for a period of eight days. Church also enlisted the cooperation of a botanist from the Nevada Agricultural Experiment Station to make a survey of plants near the station. Church the amateur meteorologist was on his way to becoming Church the snow ecologist. When some colleagues in the university's School of Agriculture asked him to investigate the relationship between forests and the depth of snow, Church the snow surveyor was born.[5]

The first public description of the Mount Rose Weather Observatory appeared, significantly, in the *Monthly Weather Review* in June 1906. This publication had become, under the editorship of Cleveland Abbe, one of the most important scientific journals in the country. Each issue contained a wide range of weather- and climate-related articles, which were often illustrated with photographs. Church, who had been taking pictures on his trips since 1895, used his camera effectively to popularize his work and enhance its scientific value. Thirty years after his initial efforts, Church recalled, "I had gone to the hills for pictures and pleasure, but to the public I was merely a great fool. So the humanist decided to become a scientist and a 'hero,' yet still take his pictures on the side." Church's awareness of the connection between photography and the "heroic" explorer-scientist must have become clear as the exploits of Peary, Cook, Scott, and Amundsen appeared in the illustrated press. His personal identification with the physical rigors of polar exploration is clear in his 1907 *Sierra Club Bulletin* article on the Mount Rose observatory, in which he describes the frostbite and leg cramps suffered by members of his crew. But he dismisses the hardships as merely "physical":

> To the spirit, as it revealed itself at midnight and at noon, at twilight and at dawn, in storm and in calm, in frost-plume and in verdure, the mountain became a wonderland so remote from the ordinary experiences of life that the traveler unconsciously deemed that he was entering another world.[6]

Church began to live in this other world of ice and snow, while continuing to teach classics, sending his students into downtown Reno to find examples of Doric, Ionic, and Corinthian columns at the Washoe County Courthouse and other public buildings. The birth of a second son, Donald, in 1904, restricted Florence Church's participation in the maintenance of the weather observatory, but the family spent time at Tree House, a retreat they built at Lake Tahoe.

Congressional passage of the Adams Act, which provided annual appropriations for original research by agricultural experiment stations, resulted in a $500 grant, and on June 30, 1906, the Mount Rose observatory officially became the Department of (Mountain) Meteorology and Climatology of the Nevada Agricultural Experiment Station. Although Church and his friends were still volunteering their time, the amateur was rapidly becoming a professional. The Church home at 358 Washington Street became the center for an expanding network of snow scientists and winter recreation enthusiasts.

As Church monitored the weather he became aware of the economic importance of snow. The only exit of water from Lake Tahoe is the Truckee River, which flows north and east seventy miles into Pyramid Lake. A dam had been constructed at the headwaters of the Truckee as early as 1865, and by 1906 there were several small hydroelectric power plants along its banks. The Newlands Reclamation Act of 1902 funded construction of more dams for an irrigation project east of Reno. By agreement with the United States government, the Pyramid Lake Paiutes were guaranteed enough water to maintain their fishing at the mouth of the river. Conflict had developed among the many users of the lake's water, and all of them—property owners at Lake Tahoe, the power company and its customers, farmers, and Indians—had crucial interests in predicting the rise or fall of the level of the lake. The level, in turn, depended on the amount and water content of the winter snows.[7]

In the winter of 1908–09, Church invented a snow sampler that both measured the depth of snow and determined its water content by weight. The basic element of Church's snow sampler was a stainless steel tube 2–3 meters long, which could be joined to similar tubes by screw couplings and used to sample a snowpack almost 10 feet deep. The tubes were 1.75 inches in outside diameter. Soldered to the end of one tube was a cutter 1.5 inches in diameter that increased to 1.6 inches so that a lip inside the head could help to hold the snow in the tube after it was withdrawn from the snowpack. The tubes were slotted and engraved with a scale in inches for easy measurement. When filled with snow, they were weighed on a spring scale whose dial was designed to indicate the depth of water rather than the weight of the snow. Church's prototype was built of galvanized sheet iron in the machine shop of the Engineering Department at the University of Nevada, where he received invaluable help from H. P. Boardman and S. P. Fergusson, inventor of the weighing rain-and-snow gauge used by the Weather Bureau since the 1880s. When sheet iron proved too flimsy, Church ordered stainless steel tubing from Edgar T. Ward and Sons Seamless Tube Company of America in Boston. He announced his invention in February 1909. The response, pieced together from surviving correspondence in Church's papers and from journal articles, was mixed, suggesting that rivalries among the inventors of similar instruments were strong. Moreover, the timing of Church's announcement was symbolic. In April, Robert Peary announced his discovery of

S. P. Fergusson standing on Mt. Rose beside the piece of equipment he made in the machine shop of the old Physics Building at the University of Nevada in Reno. (*Nevada Historical Society*)

the North Pole. Church and Peary had each achieved his immediate goal, but they would both spend the rest of their lives defending their claims.[8]

Church's first rival had already announced his invention in the April 1903 *Monthly Weather Review*. Charles A. Mixer, an engineer at the Rumford Falls Power Company in Maine, described his method of collecting samples of snow by "forcing a cylinder down to the ground, then shoveling down around it and inserting a sheet metal bottom and lifting it out," and claimed that he had taken his first sample in March 1900. Although he failed to describe how he determined the water content of his sample, he does not seem to have weighed it. He

also neglected to give the dimensions of his cylinder. He did, however, take several samples to determine the average water content over several months and covering a wide area of the Androscoggin River basin. A more serious claim for invention of the snow sampler and the snow survey system was made by Robert E. Horton two years later, in 1905.[9]

Like Church, Horton had been born in Michigan, in Parma, seventy-five miles southwest of Holly. Six years younger than Church, he had received his B.Sc. from Albion College in 1897, worked on the United States Deep Water Ways Survey, then become an engineer and hydrographer for the United States Geologic Survey in Utica, New York. It was in this position that he became interested in the problem of controlling stream flow and thus in the effects of cold and snow on waterlands. He soon discovered that there was a considerable difference in water content between loose, freshly fallen snow and compact accumulated snow. In 1903, he began experimenting with a tin tube about three inches in diameter that he thrust into the snow, then weighed to determine the water content. Horton was a well-trained hydrologist and, after working out comparisons of winter precipitation and runoff for several drainage areas, he drew five conclusions, the most important being that the Marvin rain-and-snow gauge, another commonly used device, seriously underestimated the total amount of precipitation and water supply. Horton also emphasized the importance of temperature changes during the winter and the role played by topography and vegetation in determining the density of the snowpack.[10]

Although Church had been corresponding with Cleveland Abbe as early as 1906 about the best way to install a precipitation gauge in windy mountain areas, he may not have learned of Horton's work until after he had constructed his own snow sampler in the winter of 1908–09. Supporters and opponents of Church's sampler began to form sides. Alexander McAdie of the Weather Bureau in San Francisco, whose weather instruments on Mount Whitney had inspired Church to build the Mount Rose observatory, wrote to him on February 20, 1909:

> I was glad to get your letter of February 17th and wish we could meet to discuss the snow problem. . . . For reasons which I cannot understand, Professor Bigelow does not wish me to go into the matter of an automatic snow register. I cannot write of the matter, as I am too disappointed. I think well of your snow sampler and weigher. It is the only way to measure snow on a water basis, for any given date or storm. The only objection I can see to it is, expense of making and expense of operation. I do not believe in snow bins and I have said so to Professor Bigelow. Yes, it will probably be best for you to seek a patent. Getting a patent, however, is a troublesome business and unprofitable.[11]

Three elements of the emerging rivalry are clear in McAdie's brief note: the crucial authority of Frank Bigelow of the Climatological Division of the Weather Bureau in Washington, the competition between supporters of snow bins and of snow samplers, and the potential shortcomings of the patent process. After two

years of experimentation, Church contacted the firm of Munn and Company, patent attorneys in New York City. His claim was filed February 27, 1911, for both the scale and the sampler. On May 29, the United States Patent Office rejected both applications on the grounds that neither was new. The commissioners cited the Rathbone grain sampler, patented December 31, 1867, and similar sampling tubes as being essentially the same as Church's snow sampler. If the decision disappointed Church, he does not appear to have protested. Instead, he began to write for popular magazines, explaining the importance of snow and the significance of his snow sampler. "The Conservation of Snow: Its Dependence on Mountains and Forests," published in *Scientific American Supplement,* September 7, 1912, is typical. Rather than assume that his case was made simply by publication, he compiled a list of influential persons around the world to whom he sent offprints of the article, including the leading German authority on snow, Gustav Hellmann, and the outspoken forester, Gifford Pinchot.[12]

Bigelow's apparent hostility to Church's invention of a snow sampler is easily explained. He had been working for more than a year on a snow bin that would replace the Marvin and Fergusson rain-and-snow gauges. Several bins were being tested near Lake Tahoe in the same winter that Church was developing his apparatus. In 1909, upon learning of Church's work, Bigelow wrote to him that the Weather Bureau had issued "37 steel tubes to use in cutting out sections of snow" to rainfall reporters "as long ago as January 1905," thus dismissing any claim to originality. In the same letter, however, Bigelow wrote, "We are much interested in your work, and recognize the advantages which will accrue from your experiments, and we should be glad to assist you financially as far as practicable. There is a possibility of appointing Mrs. Church a special observer, and we could arrange for a minimum salary of $25.00 per month." Bigelow suggested this strategy in case Church was already receiving a salary from some other government bureau.[13]

A year later, in June 1910, Bigelow published an article on snow bins in the *Monthly Weather Review*. In it he addressed the problem of catching the true amount of falling snow and admitted "that the ordinary Weather Bureau snow gauge is ineffective as a snow catcher." Five types of apparatus were tested: (1) a snow bin, which was essentially a wooden box five feet on a side and five feet deep, standing five feet off the ground to catch falling snow without being affected by surface winds, (2) a platform ten feet square, which caught the same amount of snow as a level piece of ground, (3) a pipe ten inches in diameter and ten feet high, (4) the regular Weather Bureau rain-and-snow gauge designed by Charles F. Marvin with an eight-inch diameter funnel, and (5) "the vertical scale, consisting of a board painted in feet and tenths . . . to show the depth of snow remaining on the ground at a given place." Some of the snow bins had louvers made of wire screen placed on the inside of the bins, and some on the outside, in an attempt to control the eddies of wind blowing around the bins. Bigelow's

conclusions seem foregone. He found that the platform, standpipe, and plain snow bin recorded less than half as much snow as the louvered bins did. "The bin with louvers on the inside," he wrote, "catches a normal amount and distributes it evenly." He also recommended placing the Weather Bureau rain-and-snow gauge near the center of each snow bin to measure the water content of the snow.[14]

The questions Bigelow failed to address—where the snow bins should be placed in the watershed, and what is a "normal" amount of snow—are exactly the ones asked by Church and obviated by his sampling technique. Bigelow acknowledged Church's work, and his article is the first mention of the snow sampler that I have found in print. Bigelow's skepticism toward Church may have been softened on instructions from Charles Marvin, who would soon become chief of the Weather Bureau. On April 21, 1909, Marvin had written to Church that as far as he knew the first measurements of snow using sampling tubes were made by Mixer and Horton and their samples were not weighed. "The use of the weighing sampler for measuring snow," Marvin went on,

> was first mentioned to me at an informal committee meeting held at the office of the Weather Bureau in Washington early in 1908. The device was subsequently quite fully described in a paper giving the general principles of snowfall measurements, submitted by me to the Chief of Bureau in August of 1908. Owing to statements made to me by those familiar with snow conditions in the west that it was necessary to be prepared to measure beds of snow ranging from 20 to 30 feet in thickness, I considered it impracticable to attempt to take out a whole section of snow bed in one sample. The plan which seems best to me under this view was to construct an apparatus so that small samples of snow could be taken and weighed, some at the top, others part way down, and still others at the bottom. We have actually made up one or two pieces of apparatus of this character. The spring balance for weighing is provided with special dial [*sic.*], graduated in either 50 or 100 parts which show the percentage of water in the snow sample taken. In the case of the dial graduated to 50 parts, the scale is so constructed that if the sampler is filled with pure water, the index will make two rotations of the dial corresponding to 100 percent of water equivalent of the snow. This gives us a rather more open scale than the dial with a 100 divisions for a single rotation, and gives rather better water equivalents for very light snow.[15]

Church must have read this letter with mixed emotions. Clearly, Marvin, a more formidable rival than Mixer, Bigelow, or even Horton, had beaten him in the race to invent a snow sampler for deep snow. On the other hand, it was equally clear that Benjamin C. Kadel, chief of the Instrument Division of the Weather Bureau, had no first-hand knowledge of snow conditions in the Sierra and that his administrative duties left him little time to perfect his apparatus himself.

Church immediately realized that his own snow sampler was original in at least three ways—the small diameter of its tube, the joining of sections to sample snow depths up to twenty feet, and the slotting of the tube to allow direct observation of the sample and to facilitate removal—all of which were the result

Willard Mason in a light snowfall near the shelter on Mt. Rose used by Dr. Church and his students, March 6, 1915. The photograph was taken by Philip S. Cowgill, an engineering student at the University of Nevada, who was one of Church's earliest assistants. (*Nevada Historical Society*)

of specific snow conditions found in the Far West. Deep, wet snow lying in steep canyons and ravines over dozens of watersheds covering hundreds of square miles required special instruments and techniques for measurement and for estimating spring runoff. By 1917, when he published his fullest account of snow surveying, including a review of all known methods of measuring snow as it falls as well as on the ground, Church made clear that his sampler grew out of the conditions of the Lake Tahoe basin and that other instruments might be better suited to other areas. Nevertheless, he was obviously proud to announce that the Glacier Commission in Switzerland was using his invention, the Mount Rose Snow Sampler, to study snow in the Alps.[16]

Naming his instrument the Mount Rose Snow Sampler was a shrewd move on Church's part. While other gauges bore the names of their inventors or were simply called "snow density apparatus," Church evoked some of the romance of winter climbs and called attention to the uniqueness of the place where snow surveying was born. Never denying that Mixer, Horton, and Marvin had experimented independently with snow samplers, Church created a story about the origins of the Mount Rose sampler that placed it locally as well as in a larger scientific context that transcended the immediate concerns of the Weather Bureau. At the opening of the first meeting of the Western Interstate Snow Conference on February 18, 1933, Church offered a condensed version of his origin myth:

Snow surveying, like most inevitable things, had many births, though few survivals. It sprang from the need of the people. It was born in Europe [he had earlier identified Alfred Angot, director of the *Bureau Central Meteorologique de France,* and an anonymous Russian as inventors of portable snow-measuring devices], in the study of the density of snow. It was born again in the East in the study of stream flow. It was born a third time in the West, on Mount Rose in the Sierra Nevada, in a dispute regarding the effects of forests on the conservation of snow, but quickly turned to the flaming problem of the flooding of Lake Tahoe.

. . . Nature furnished the facts. The Sierra became a great laboratory for the study of weather, and snow cover, and snow density, and evaporation, and melting. The human need for water for food and power gave purpose to the undertaking, for the rapid increase in population was forcing one drop of water to do the duty for two.[17]

Legitimizing his contribution to snow surveying by placing it in the international scientific tradition as well as the more immediate political milieu of the Progressive conservation and reclamation movement gave Church a final victory over his rivals. The legend of the Mount Rose Snow Sampler lives on, despite the significant improvements made in the 1930s by George Clyde, an engineering professor at Utah State University, which led to the adoption of the name Federal Snow Sampler for it by the Soil Conservation Service.

The instrument itself, the Mount Rose Snow Sampler, was only one part of Church's innovation. Perhaps more important was the method of using it in a survey. In a paper presented to the Pan American Scientific Conference in Washington, D.C. (September 27, 1915–January 8, 1916), he outlined two general methods of snow surveying: (1) by seasonal percentage, and (2) by areas. Church developed the former to determine the variations in spring runoff in the Tahoe basin, a watershed of 340 square miles, far too large to be sampled in detail. Area sampling was begun in 1910, by J. Cecil Alter, a Weather Bureau observer in Salt Lake City, in Maple Creek Canyon, a 10.75-square-mile watershed south of Provo. By taking several hundred measurements with the sampler developed by Kadel for the Weather Bureau, Alter and his Weather Bureau section director, Alfred H. Thiessen, were able to estimate the total acre-feet of water available in the snowpack of the canyon. The estimate was then checked by weir measurements along the creek during the spring and summer. Variations on area sampling were developed by Alter, Thiessen, and Clyde.[18]

Church's seasonal percentage method involved establishing fixed courses in characteristic parts of the watershed, taking a few dozen samples along each course during late March and early April, when the snow was wettest, and then comparing the measurements of snow depth and density to the "average" as estimated from earlier records. Since it was relatively easy to measure the level of the lake, and even to estimate the amount of water lost from surface evaporation, Church was able to refine his correlations between snow measurements and runoff in just a few seasons. By trial and error, by careful review of the existing literature, and by consulting with his colleagues in engineering at the University of Nevada, Church perfected his sampler and his system of survey-

ing between 1909 and 1915. Scientific study of evaporation, soil absorption, snow metamorphism, and ablation continues to add to our understanding of the relationship between snowfall and runoff, but the basic methods of the snow survey in use today were worked out eighty years ago by Church, Horace P. Boardman, professor of civil engineering, S. B. Doten, director of the Agricultural Experiment Station, and others. These were heady days for a forty-five-year-old professor of classics who celebrated his own achievements by writing about University benefactor, Clarence Mackay, and "The Romance of the University of Nevada."[19]

The romance turned sour. Events beyond Church's control disrupted both his professional and personal life. World War I evoked anti-German feelings that must have affected how Church and others felt about his graduate education. The war also shifted resources and interest away from domestic programs such as snow research. Finally, the military took his older son away from architectural studies at the University of Pennsylvania, an experience that may have contributed to the young man's lifelong struggle with alcoholism and mental illness. The conservation movement, like the Progressive movement in general, lost momentum after the war, and there was little government support for science and none for snow surveys. Benjamin Kadel, as chief of the Weather Bureau's Instrument Division, opposed not only Church's sampler but his belief that forests contributed to the preservation of snow in the mountains. The amount of the snow fall determined the accumulation of snow; not the presence of trees. The Weather Bureau, an older and larger bureaucracy, ridiculed the scientists of the newly established Forest Service when they presented evidence for the complex interrelation among vegetation, soil, snowfall, and water conservation. Characteristically, Church proposed, in his 1914 article in the *Scientific American Supplement,* a compromise in which forests could be cut in a honeycomb fashion to create open glades for snow storage.[20]

As late as 1920, Church was holding his own against his rivals in Utah and Washington, D.C. A story in the December 11, 1920, *Scientific American,* illustrated with a dramatic Howard Brown cover painting of a lone snow surveyor taking a sample near a rugged summit, retold the story of Church's development of the Mount Rose sampler and his snow survey methods. A year earlier, he had been granted state funding to inaugurate the Nevada Cooperative Snow Surveys, and had helped Paul M. Norboe, chief assistant state engineer in the Department of Engineering of the State of California, acquire sampling apparatus to do snow surveys in the Sacramento River and San Joaquin Valley watersheds. But in 1922, Florence Church died. Church was deprived of his strongest supporter. In the same year Kadel published a new edition of the Weather Bureau's Circular E, *Measurements of Precipitation,* which virtually ignored Church's contribution to snow sampling and officially sanctioned Kadel's own instruments. With support for his meteorological activities diminishing and his second son about to enter the University of Nevada, Church appears to have

gone into retreat. The son went on to a doctorate in statistics from the University of Michigan and a distinguished career as chief of the Transportation Division of the Bureau of the Census, but the decade of the 1920s seems to have been a time of experiment and reflection for his father.[21]

The opportunity to fulfill his dream of becoming an arctic explorer came in 1926, when William Herbert Hobbs of the Geology Department at the University of Michigan led an expedition to Greenland to establish a meteorological station. Hobbs, who followed in the footsteps of Nansen and Peary, was one of the first scientists to recognize the importance of the polar ice sheets for global weather. With the rapid development of airplanes capable of transatlantic flight, weather forecasting based on an understanding of arctic storms was becoming crucial. The 1920s also saw a growing awareness and interest regarding the peoples and natural resources of the arctic. Robert Flaherty's film, "Nanook of the North," was released in 1922, the same year as Vilhajlmur Stefansson's *The Northward Course of Empire*. Church, whose broad interests included art and ethnology as well as meteorology and hydrology, must have been further stimulated by the new opening of the north. After visiting Hobbs in Greenland during his summer vacation in 1926, Church returned there in May 1927 for a year's stay as staff meteorologist, accompanied by Fred Herz, a young Nevada snow surveyor who served as a mechanic and photographer for the Hobbs expedition.[22]

Church's diaries, covering May 3, 1927 to September 2, 1928, reveal much about the man. It was a strenuous adventure for a fifty-eight-year-old scholar. He suffered several minor injuries and was once trapped in a tent in a snowstorm for three days without food or fire. Yet for most of the year he was happy and content to escape from his old routines. In one entry he noted that he had received a letter from Reno telling him that the level of Lake Tahoe was "keeping faith with the surveys . . . I had forgotten all about levels and run-off back home. Now I can play with good conscience." Other entries concern his desire to go off by himself, or with a single Eskimo companion, to explore the fjords and take photographs. "Pictures are courted not snapped," he wrote, "and in no other way can we win [?] the picture wonders of this land. . . . A trip to the Inland Ice, a sled trip thru Inland Greenland from the Ice to the sea, a motorboat cruise down the longest fjord in the world, each of these for science and beauty will but carry on the mountain work of past years. They are normal tasks but with high spiritual content. This will be a great year."[23]

Church was fascinated by Eskimo art and saw its relation to Cubism. Reading Knud Rasmussen's *Across Arctic America*, Church began to articulate his own philosophical system. His spiritual journey from Baptist to pantheist, and his advocacy of international brotherhood through science had begun. Commenting on Hobbs's interpretation of the Danish anthropologist's book, Church wrote: "Now I understand fully his appreciation of what I told him of my human experience in Greenland. He loves the North as I and also its people. It was his supreme human experience. With the Eskimo, he feels that 'Nature is great, but

man is greater,' But to me 'Man is great and Nature infinite.' The viewpoint only is different." Not all of Church's feelings were so sombre. He found time to flirt with Astrid Johanne Funder, the expedition's radio operator. "We do our 'Daily Dozen' together but in merry rivalry," he wrote, "she by the Muller system, I by Walter Camp." Past rivalries with Marvin, Horton, and Alter were momentarily forgotten, although other challenges would plague his future. The future was on his mind. He had misgivings about returning to the University of Nevada and a political climate unfavorable to science, yet he was formulating ideas that would carry him to new heights as a promoter and administrator of snow surveying. "Loyalty." He wrote the single word, adding,

> In recent days the question of sticking has come up and with it loyalty. Not personal loyalty, that to me is merely sympathy and putting myself in the leader's place. But loyalty to time and eternity, and the best that is in us, doing our manifest destiny and losing ourselves in it. This is love. I am loyal to my little university, not necessarily to its administration. I may hate that, but I look far ahead to what she must become. So with the Expedition, we have undertaken to determine the weather in Inland Greenland. This is our goal, to this we must be loyal.[24]

Church returned to Nevada and within a year was back in the thick of the politics of snow surveying. California had discontinued snow surveys in 1923, but in 1929, the Economic Research Council of California's state Chamber of Commerce appointed a special committee chaired by C. L. Hill of the United States Forest Service and composed of representatives from the Weather Bureau, the Irrigation Districts Association, Pacific Gas and Electric Company, Great Western Power Company, the state Division of Mines and Mining, and the state Division of Water Rights. The committee's report and the California legislature's action were reported at the June 1929 meeting of the American Meteorological Society in Berkeley, and published in the *Monthly Weather Review* in October by Harlowe M. Stafford, an hydraulic engineer in the California Department of Public Works.

Stafford, who played a significant role in promoting snow surveying for more than thirty years, was an enthusiastic advocate of "Doctor" Church's work. Convinced that Church's survey methods could help the state to develop and manage its water resources, the committee resolved that the state should standardize and correlate the private snow surveys, extend these surveys through the entire Sierra Nevada watershed, and appropriate $40,000 to the Division of Water Rights of the Department of Public Works to carry out this project. The legislature responded with a $30,000 appropriation. Stafford concluded his report with a few words of caution. Snow surveys alone could not provide all the data necessary for understanding snowcover runoff. "In each quadrangle," he warned, "it will also probably be necessary to establish supplementary precipitation and temperature stations. In addition, at certain key stations it may be advisable to establish facilities for observation of more complete meteorological

Dr. Church and party at the weather station on Mt. Rose in the 1920s. Note the women wearing high-heeled shoes. (*Nevada Historical Society*)

data, such as humidity, pressure, temperature, wind direction and velocity, etc." These words, and especially the expansionist "etc.," must have reassured the weathermen in the audience, but by the time Stafford's remarks were printed, the stock market had crashed and all government programs were about to suffer reduced budgets and hard times.[25]

Among the many changes brought about by the election of Franklin D. Roosevelt in 1932 was a commitment to conservation and scientific research by the federal government. Yet it was almost three years before this commitment was backed by funding and the articulation of new policies. Only after the immediate economic crisis had been dealt with could the government turn its full attention to problems associated with water resources. Again, interdepartmental rivalries

threatened to disrupt efforts to conduct research on flooding, irrigation, and reclamation. Secretary of Agriculture Henry Wallace and Secretary of the Interior Harold Ickes were both ambitious men, dedicated to improving the use of natural resources. Ickes acted first, creating a Soil Erosion Service on September 19, 1933, and luring two scientists from the Department of Agriculture, Hugh H. Bennett of the Bureau of Chemistry and Soils and W. C. Loudermilk of the Forest Service, to his new agency. Eighteen months later, Wallace recovered his staff and acquired the agency when Congress created the Soil Conservation Service and transferred it to the Department of Agriculture. Although the Soil Conservation Service did not assume full responsibility for snow surveying until the late 1930s, Bennett and Loudermilk had been directly involved in research on snow for more than a decade.[26]

The revival of the snow survey in California gave Church the boost he needed to promote snow surveying nationally and to expand the scope of the study of snow. In the spring of 1931, the Section of Hydrology of the American Geophysical Union authorized a Permanent Committee on the Hydrology of Snow, with Church as chairman. The goals of the committee were cooperation among agencies studying snow, standardization of methods, and publicizing results. With renewed energy, Church, now age sixty-two, began his most productive years. For the next two decades he kept up an international correspondence with snow scientists on every continent, compiled bibliographies, and published reports. With the help of George Clyde, the Western Interstate Snow Survey Conference was organized in 1933. In the same year, the International Association of Scientific Hydrology, meeting in Lisbon, created the International Commission of Snow, the first meeting of which was to be held in Edinburgh in September 1936, with Church as chairman. In his address to the delegates, Church was characteristically ambitious:

> The Commission of Snow is novel in some respects. By generous consent of Dr. Mercanton, Secretary of the Commission of Glaciers and Provisional Secretary of the Commission of Snow, the latter commission was at once expanded to include all fields of snow and ice not specifically desired by the former. This plan was advantageous to both, for it gave the specialized Commission on Glaciers its preferred project of measuring the movement of glaciers and the broader Commission on Snow the opportunity to include all other snow and ice scientists in a single organization. This is an inevitable moment, for neither projects nor scientists can be divided on the basis of snow or ice. Rather the Commission of Snow should be designated the Commission of Snow and Ice with the Commission of Glaciers complementary to it. This would be the evolutionary view. Practically, the study of glaciers antedated the study of their parents, snow and ice, for the phenomenon of ice movement has always been fascinating. Now finally the process is being reversed.[27]

Church almost didn't make it to Edinburgh. The trip began inauspiciously when he dropped the pocketwatch he had carried for twenty-five years overboard from the Cunard steamer *Laconia,* carrying him to London in July 1936.

From London he sailed to Norway, then on to Leningrad, going finally by rail to Moscow, where he collapsed from a cold turned to pneumonia. Confined to a hospital bed for several weeks, Church missed the sessions on snow surveying at the meetings, but his forced recuperation gave him the time to keep an extensive diary from which he later wrote a short memoir, "The Soul of Soviet Russia," neither of which has been published. This material offers a fascinating glimpse of Church's character, as well as a footnote on the career of Robert Merriman, the Nevada graduate who earned fame and martyrdom as commander of the Abraham Lincoln Brigade in the Spanish Civil War.

When the staff at the United States Embassy in Moscow learned that Church was in the hospital, they notified Doten. He got in touch with Merriman, who was studying there. Merriman had known Church at Nevada and became, in Church's words, his "link with the outside world." Merriman had been in Moscow studying economics for more than a year and knew most of the small American community. Church recorded many of Merriman's opinions about the Soviet system. Merriman's relations with the staff of the American Embassy may be inferred from the September 19 entry in Church's diary: "Bob has been charging the Embassy with coolness in its duties and had threatened to write Key Pittman, Chairman of the Committee on Foreign Relations. In my behalf he had been amply successful." Merriman badgered the Embassy into providing a limousine to take Church to the airport the following day to catch his plane to Scotland.[28]

Church was too deeply religious to be converted easily to Soviet communism, but he admired, as did most American intellectuals of the period, the spirit of the Russian people and the efforts of the government in support of scientific research. He was impressed, too, by the apparent equality of women in employment and by the medical care he received, especially since it was free. He recalled his nurses fondly and promised to return to see them. It is not known whether he kept his promise when he attended the 120th anniversary of the Soviet Academy of Sciences in 1945, but he was again hospitalized there, this time for dysentery picked up in Cairo on his way to Moscow. This illness was not serious enough to prevent him from enjoying his meetings with Russian snow scientists. His visit was made even more pleasurable when he made the acquaintance of a young interpreter, Marina, who labeled him a Leonardo da Vinci when she learned that his interests included classics and art. At seventy-six, he could still be charmed by a woman's attention.[29]

Through the 1930s and 1940s, Church was in control of regional, national, and international organizations for the study of snow. Within the American Geophysical Union, the Permanent Committee on the Hydrology of Snow, which became simply the Committee on Snow in 1933, sponsored sessions at the annual meetings, publishing the session papers in the Union's *Transactions*. Church established a format that was followed for thirteen years. Each annual report began with a review of the general conditions of snowcover and snow

surveying throughout the United States and Canada, with occasional reports from Europe. This was followed by a review of current publications and by individual papers reporting research in hydrology, snow surveying, winter recreation, and related topics. Church's bibliography was more comprehensive than the one later published by the Snow, Ice, and Permafrost Research Establishment of the Corps of Engineers of the United States Army because it included items relating to winter recreation as well as transportation, meteorology, and other sciences. From 1934 to 1944, the *Transactions* also published the proceedings of the Western Snow Conference. Although this organization, which first met in Reno in 1933 under the name Western Interstate Snow-Survey Conference, was regional in membership, it remained the core of all research on snow in the early 1930s, and served as the inspiration for the formation of the Eastern Snow Conference in 1937, the Central Snow Conference in 1941, and the International Snow Science Workshop in 1978.[30]

The Western Snow Conference was in essence the unification of the Nevada and Utah surveys. With Church and Clyde providing leadership, the conference became a place where engineers, hydrologists, meteorologists, foresters, snow surveyors, and administrators of power and water companies met to discuss improvements in equipment, the design of snow-survey courses, the financing of research, and tips on skiing. At the first meeting, Joseph Kittredge, who was to become the foremost authority on the effect of forests on climate, water, and soil, gave a paper on the relations of forests to snow, and Loudermilk, who was about to begin his distinguished career with the Soil Conservation Service, presented his research on the measurement of the percolation of water in snowpacks. The first conference was attended by forty delegates; the representatives from southern California were prevented from attending because snow blocked the roads.[31]

In 1936, the Western Interstate Snow-Survey Conference was held in Pasadena, California. Church announced the creation of the Federal-State Cooperative Snow Surveys under a division of the Bureau of Agricultural Engineering and noted the rapid development of snow surveying and flood forecasting in Idaho, Montana, Colorado, and parts of the East. James C. Marr, associate irrigation engineer with the bureau, presented a paper in which he reviewed the "Status of Coordination and Standardization of Snow Surveying." Marr, Clyde, and Church had traveled throughout the West, meeting with state engineers and agricultural college officials to compile a list of the surveys in progress. Although surveys were taking place in all the western states and in parts of Canada, the efforts were concentrated in California, Nevada, Utah, Oregon, Wyoming, Colorado, and Idaho. Clyde and Ralph L. Parshall established forty-three courses in Colorado and twenty-eight in Wyoming. R. A. "Arch" Work created ten in the Rogue River drainage area in southern Oregon, while Marr laid out seventy-seven snow courses on the Snake River in Idaho. The standardized sampler combined features of the Mount Rose and Utah apparatuses, as

well as incorporating a "heavier alco-aluminum stock" for the tubes. Bright yellow snow-course markers made of porcelain enamel and bearing the words, "Federal-State Cooperative Snow Survey Course Marker," were also adopted. Standards for the location and maintenance of the courses were suggested.[32]

From 1935 to 1939, the Division of Irrigation of the Bureau of Agricultural Engineering of the United States Department of Agriculture was responsible for the federal-state surveys. In January 1939, Secretary of Agriculture Henry Wallace directed Hugh Bennett of the Soil Conservation Service (SCS) to take over the Division of Irrigation and Drainage, as it was then called, and the SCS became the agency primarily responsible for the surveys. Until then, SCS was just one of several agencies involved, including the Forest Service, Park Service, Bureau of Reclamation, Corps of Engineers, Geological Survey, and the Weather Bureau. It is interesting, considering the later identification of the SCS with snow surveying, that Church failed to include any SCS employees in his Committee on Snow within the American Geophysical Union.[33]

The Committee on Snow, and the range of interests of its members, tells a great deal about the early development of snow surveying in the context of snow science as Church organized it. The 1935–36 committee consisted, in part, of Robert Horton for hydrology, Joseph Kittredge for snow conservation, William McLaughlin (chief of the Division of Irrigation) for water-supply forecasting, W. J. Humphreys (Weather Bureau) for snow and ice crystals, Charles F. Brooks (Harvard University's Blue Hill Observatory) for precipitation, François E. Matthes (United States Geological Survey) for high-level snow, and George H. Matthes (Mississippi River Commission) for floods. The committee's membership was probably a compromise between Church and officials of the American Geophysical Union. The 1936–37 committee retained only six of the original nineteen members. Horton, Humphreys, and Brooks were replaced; indeed, the Weather Bureau was no longer represented. In place of representatives from the government were men who either were associates of Church or were working in areas of interest to him: Carl Elges, snow surveyor and assistant meteorologist at the Nevada Agricultural Experiment Station; Bestor Robinson, chairman of the Winter Sports Committee of the Sierra Club; Henry Ives Baldwin, assistant forester for New Hampshire Forestry and Recreation and an avid skier; and Robert G. Stone, editor of the *Bulletin* of the American Meteorological Society. New members were added for snow removal, while some of the members of the original committee continued as "regional representatives."[34]

The Weather Bureau's fading interest in snow surveying and its inability to respond to changes taking place in the West are suggested in a series of letters between the meteorologist in charge of the River and Flood Division, who was, coincidentally, named Montrose W. Hayes, and the bureau's employees in Albuquerque, New Mexico. On September 4, 1936, Hayes wrote to the Albuquerque "Official in Charge" that his request for thirteen snow tubes and twelve balances of the Mount Rose type could not be filled.

The type made last fall by Julien P. Friez and Sons for the Bureau of Agricultural Engineering is available in a limited way, but this type, so it is understood, has not been an unqualified success and will not be bought. As a stop-gap, could you use some of the Weather Bureau tubes? You are familiar with them. They are heavy when made of steel, but some of them are duralumin and are quite light. They have no slots, which is a serious drawback. Also, there is no provision for coupling tubes; it is necessary to use *one* section that is long enough. The lengths are 2 feet up to 10 feet.[35]

The more than twenty-five years of experiment with the Mount Rose Snow Sampler had led to many improvements, including the substitution of aluminum for steel in the tubing, but problems remained when the Federal-State Cooperative Surveys began in the winter of 1935–36. The model tested in the first season was essentially the Mount Rose type as modified by the Utah surveyors—that is, it had a diameter of 1.4872 inches, rather than 1.5, so that an ounce of weight was equal to an inch of water, simplifying the scale. It was made of aluminum, but retained the slots for observing the core and for easy cleaning of the tubes. The complete outfit consisted of a cutter, tubes, scale, and cradle; it weighed between four and seven pounds, depending on the number of tubes, and cost $32.55 for a 7.5-foot-tube set, to $65.29 for a 17.5-foot set. Among the problems encountered with the first aluminum tubes were a tendency to expand under the pressure of tooling, causing a convex curvature opposite the slots, and a lack of a solder for joining the steel cutter to the aluminum tube. In the field, the aluminum tubes were apt to seize in cold weather, making it impossible to unscrew the parts. Although not as durable as steel, the aluminum tubes possessed several advantages. They were more rigid, allowing them to be driven vertically into snow as deep as twenty feet. They did not rust, and they were, of course, much lighter. Church's long report to the Western Interstate Snow-Survey Conference in January 1936 covered these problems and their solutions fully, so it is somewhat surprising to read Hayes's dismissal of the samplers made by Friez and Sons.[36]

Erle L. Hardy, associate meteorologist in Albuquerque, responded immediately with a request for whatever tubes and scales the Weather Bureau could send; he made repeated requests through January, when he was informed that Hayes had died in November—without filling the order. Thus, the 1936–37 season was lost in New Mexico. On October 5, 1937, Merrill Bernard, the new chief of the Weather Bureau's River and Flood Division, wrote to inform Hardy that "The Julien P. Friez Co. of Baltimore has kindly agreed to send you on consignment 2 sets of 5 sections each, together with scales and support. You will find these sets made up of sections which may not be consecutive. It will be necessary therefore to caution the observer to keep track of foot depths independent of the footmarkings." By late November, Hardy had received only one set of samplers, but Bernard sent Ashton Bodd, hydrologic supervisor from the Weather Bureau at Salt Lake City, as well as three sets of sampling equipment borrowed from the SCS, to begin instruction. On December 9, Hardy thanked

his chief and explained his persistence: "The entire economic and social structure of the people of New Mexico is built upon the maximum use of all available water, both ground and surface, therefore, hydrological data are much more important in this state than they are in many others." His tenacity paid off; by August 1940, Albuquerque had become the regional center of the Weather Bureau's snowfall work.[37]

Despite his absence from the country for more than four months in 1936, Church continued to make improvements on his snow sampler. Refinements in the spanner wrenches used to unscrew the tubes and in the scales were reported in 1937 and 1938. In March of the latter year, experiments near Lake Tahoe with shellacked and unshellacked tubes proved that shellacking improved the performance of the sampler by making it easier to drive into deep snow. Reports from the field increasingly indicated that the search for precision in measurement was less important than "portability, strength, and convenience of operation." Moreover, snow surveying in different parts of the country required different kinds of samplers. In Maine, for example, because of the coarser texture of the snow, a tube 2.65 inches in diameter was more accurate than the Mount Rose sampler.[38]

After five years of expanding snow surveys and improving the samplers and scales, Church, the Committee on Snow, and the state and federal agencies cooperating in the study of snow were ready to emphasize other problems and concerns, such as total annual precipitation, soil types, climatic trends, and even winter recreation. Under the leadership of Merrill Bernard, the Weather Bureau reasserted itself as an important agency in snow study. Conceding the snow surveys to SCS, the Weather Bureau revitalized its snowfall stations to provide additional information on precipitation, radiation, convection, evaporation, and condensation. In January 1941, Bernard reformulated the "Snow—Heat—Run-off Balance" cycle for those attending the Ninth Western Interstate Snow-Survey Conference in Sacramento, California. As he conceived it, data from hydrothermographs, electric psychrometers, recording anemometers, radiometers, snow gauges, rain gauges, depth gauges, density tubes (snow samplers), calorimeters, soil thermographs, and stream-flow gauges would be gathered, analyzed, and used to make accurate predictions of runoff.[39]

Thus, on the eve of World War II, snow hydrology was conceived as the field in which the work of snow surveyors, foresters, meteorologists, power-company and irrigation-district engineers, and others should integrate their knowledge. The war years stimulated interest in snow because of the strategic importance of Greenland and the arctic, and the Army Corps of Engineers became a major force in the expanding network of agencies and bureaus dealing with snow. Although Church remained as chairman of the International Commission on Snow through the war, the old order was changing. A new generation of snow scientists was emerging, and the very success of the Western Interstate Snow-Survey Conference and the International Commission stimu-

lated competition. An Eastern Snow Conference was organized in Boston on October 8, 1937, with support from the Weather Bureau and the American Society of Civil Engineers. Although it met only four times between its founding and 1949, this conference signals the re-emergence of the Weather Bureau as an important agency in snow science. As Merrill Bernard and Ashton Codd reported to the Western Snow Conference in January 1940, the Weather Bureau was modernizing its procedures for measuring snowfall in the mountainous areas of the West. Sampling was adequate for predicting the percentage of deviation from the normal water supply; Bernard's goal was accurate hour-by-hour measurement of the snowfall in hundreds of locations. A half century later, computers, SNOTEL (for SNOw TELemetry), and airborne and satellite snow-cover measurements have brought the dream closer to reality, but none of the remote-sensing systems has replaced the snow surveyor and the sampler.[40]

Church could write with growing confidence of "The Human Side of Snow." His four-part series under this general title, published in *The Scientific Monthly* between February 1937 and April 1943, retold the story of the Mount Rose observatory, examined snow sport and transport, summarized glacier research, and used his climbing experience to raise the issue of snow perils and avalanches. Each of these essays is autobiographical and scientific, but none is as revealing as the short article he published in *Soil Conservation* in 1942, following his appearance at the Central Snow Conference at Michigan State University in December 1941. He spoke on "The Melting of Snow." Perhaps because Michigan was his home state, or because of his face-to-face meeting with Robert Horton (who would be dead in four years), or because he saw the success of his efforts toward cooperation and unification of the snow sciences, Church titled the piece "Organized Water" and pointed out the benefits of cooperation in dealing with a resource as vital as water. Rivalries, he implied, were wasteful. He pointed out that the Latin root of the word, *rivus,* means "river contest." Certainly his career had produced its own share of rivalries, but now, at seventy-three, he had succeeded in unifying the snow sciences.[41]

The meetings of the first Central Snow Conference and the Tenth Western Interstate Snow-Survey Conference were planned with the knowledge that the United States might soon be at war. It is ironic that the work of the great Japanese meteorologist Ukichiro Nakaya on the formation of snow crystals was first introduced to American scientists at the Western Snow Conference in January 1940, but the American interest in snow was stimulated more by domestic concerns than by European or Japanese science, as the papers presented at the conferences indicate. Two hundred and seventy-five persons attended the first meeting of the Central Snow Conference, four days after the attack on Pearl Harbor. "'Snow as It Affects Military Operations," a brief introductory talk by Lieutenant W. F. Johnson of the United States Army, was added to the program. At the Pasadena meeting of the Western Snow Conference, Fred Paget of the California Division of Water Resources and chairman of the Executive Com-

mittee proposed the adoption of the term *niphometrology* for the science of measuring snow. Although the term did not catch on, snow surveying had reached its own watershed. Within four years, the niphometrologists and the American Geophysical Union came to a parting of the ways.[42]

The report of the Committee on Snow in 1942 included regional reports from more than twenty watersheds in North America, including Canada and Mexico. Although the war disrupted snow studies in Hawaii and Alaska, both regions took on new significance. Church's report emphasized research on the thermal quality of snow and melting, while others commented extensively on new safety bindings for skis and the problems of avalanches. A motion picture on the use of trench mortar shelling in avalanche control was provided by the Swiss Snow and Avalanche Commission. Interest in avalanche control was closely linked to the growth of recreational skiing, and winter sport was linked to national defense. Anticipating restrictions on civilian travel, representatives of ski- and tourist-related businesses attempted to relate their interests to those of the military. The Committee on Research, of which Church was chairman, included sport and transport in its report to the American Geophysical Union, quoting a self-serving editorial in *Travel West* magazine to the effect that, "To keep production and morale at highest levels the Nation must maintain travel- and vacation-facilities, or the human machines upon whom Democracy depends will not be kept at their most efficient pitch."[43]

By 1943, the Committee on Snow had shifted to a wartime footing. With support from the Weather Bureau, a snow-study research facility was opened at Soda Springs, California, near Donner Summit. Church continued experiments on snow melt and refreezing, but studies of the relation of forests to snow accumulation and melting being conducted at the Rocky Mountain Forest and Range Experiment Station in Colorado had to be curtailed for lack of manpower. Reports from the arctic and Greenland took on greater prominence. "Hydrology's Part in the War Effort," as one observer noted, was vital, but as yet unappreciated. A sign of recognition that employed the metaphor of war appeared the following year, when a former engineer from the Los Angeles Water and Power Department wrote about the snow surveyors as "Water Works Ski-Troopers" in *The American City,* a journal read by thousands of municipal administrators. Yet, even before the end of the war, major organizational changes in the study of snow and snow surveying were under way, not the least of which was the growing tension between the field men who were gathering data on skis in the mountains and the administrators and scientists working in offices and labs. At the June 16, 1943, meeting of the Western Snow Conference in Corvallis, Oregon, the president questioned whether the 600 reported members were "bona fide" when only 176 had paid dues. Church reported that "it had been the policy of the organization that anyone attending a meeting was automatically a member."[44]

J. A. Fleming, general secretary of the American Geophysical Union (AGU),

Dr. James E. Church, from his New Year's card of 1956. (*Effie Mona Mack Collection, Nevada Historical Society*)

was anxious to increase membership, raise revenue for publications, and strengthen the professional standards of his organization. He was also unwilling to continue publishing the proceedings of the Western Snow Conference in a single annual volume of the AGU *Transactions,* because the editorial board was trying to convert the *Transactions* to a bi-monthly journal. In addition, there was a feeling that some of the papers presented at the Western Snow Conference were not directly related to scientific hydrology. Fleming sent a letter to the 1946 Western Snow Conference meeting that sparked a lengthy discussion revealing the many changes that were taking place in snow surveying.

"Arch" Work of the SCS in Medford, Oregon was chairman of the conference. He read Fleming's letter and explained that the changes meant that snow sur-

veyors would need to buy four issues of the *Transactions* annually in addition to paying their AGU dues. Moreover, Fleming refused to publish "notes" from field men under a separate heading, to be called "Snow Surveyors' Forum," unless more members of the Western Snow Conference joined the AGU. After some debate, the members decided to publish their own annual proceedings, and "some kind of mimeographed sheet to send out to linemen, forest rangers, fellows in the field." Fred Paget, who had already made clear his own sense of a separate identity for those occupied in measuring and weighing snow through his advocacy of the term niphometrologist, summed up the sense of the meeting:

> Well, Mr. Work, we have always thought of the Western Snow Conference as developing aims and ideals a little apart from those of the A.G.U., and to some extent along different lines.
>
> We came into being just a few struggling people here and there. So few that for awhile we despaired of ever getting very far. Dr. Church was the only one who had faith in us; sometimes when we were almost ready to sink he threw out a life buoy in the form of a few hundred dollars and held us up awhile. We kept struggling along, and eventually got to the stage where we are today.
>
> But I feel our progress was largely due to the fact we had the annual "Transactions" to send out, printed in a single volume, along with the annual meeting on Hydrology here; that we could have something in one unit, that would come out once a year, which had an appeal to the rank and file who are less technical-minded than most of us who attend these meetings.[45]

Church added his imprimatur to the proposed publication. Deploring the overspecialization of the AGU *Transactions*, he concluded his remarks by saying, "I should like therefore to offer 'popular' themes in the hope that science will be benefited by them." The first issue of *The Snow Surveyors' Forum* appeared later that year and featured cartoons, humorous verse, and technical articles, including a contribution from Church on snow-sampling techniques. Two years later, the Western Snow Conference published the first of its annual proceedings as a small mimeographed booklet. Church missed the 1948 meeting because he was traveling in Argentina at the invitation of the Argentine government, which was planning a snow survey of Patagonia and Tierra del Fuego. His report on that trip in the *Geographical Review* is characteristically wide-ranging. (More revealing, however, is his address upon accepting a medal awarded by the Western Snow Conference. "Snow and Life," published posthumously in the *Explorers Journal* in 1960, is the best organized of his many autobiographical sketches. In it he concludes that he has been urged to write his memoirs, *Seeking Snow: A Journal of International Friendship*. This was one of the few tasks he ever left unfinished.)[46]

The following year Church attended the 1949 meeting of the Western Snow Conference in Denver and gave a rambling but humorous account of his life of "Science and Adventure." He took pride in his recent exploits in the Himalayas

and the Andes, he gave credit to his old colleagues Doten and Boardman, and he gave advice for future research. At eighty, he had earned the right to ramble. He had made significant contributions to science through the invention of the Mount Rose Snow Sampler and the development of the snow-survey system, and he had made an even greater contribution through his administration of the Committee on Snow and his tireless promotion, by publication and correspondence, for snow science and recreation. His humanistic definition of science as "man's interpretation of his experiences" is a useful characterization still, reminding scientists they can communicate across disciplines and specializations.

The final decade of James Church's life was filled with many acts of kindness toward citizens of Reno. Those who received his annual New Year's cards, with bits of his own verse or poems he had read and copied, were reminded that his search for snow had been spiritual as well as practical. In 1957, he sent out Robert Hillyer's "Akhnaten's Adoration of the Sun" with its third stanza:

> Men and their facts are thine, in all their stations,
> Their many languages, their many colors,
> All thine, and we who from the midst of peoples,
> Thou madest different, Master of the Choice.

The lines could serve as his epitaph. He felt the obligation to improve the world into which he was born. Nothing was impossible. Man was great, but nature infinite. The sun inevitably melts the snow. He died August 5, 1959, on the Catholic holy day of Our Lady of the Snows.[47]

Notes

[1]"Church, James Edward," *Who Was Who in America* (Chicago: Marquis, 1968), IV, 173.

[2]Barry Lopez, *Arctic Dreams: Imagination and Desire in a Northern Landscape* (New York: Scribner's, 1986). See also Adolphus W. Greely, *Three Years of Arctic Service,* 2 vols. (New York: Scribner's 1886); Fridtjof Nansen, *The First Crossing of Greenland* (London: Longmans, 1890); and W. H. Gilder, *Ice-pack and Tundra* (New York: Scribner's, 1883). On the latter, see Beau Riffenburgh, "James Gordon Bennett, the *New York Herald,* and the Arctic," *Polar Record* 27 (1991), 9–16, who argues that Bennett helped to create a national interest in polar exploration in the period 1873–87. On Peary, see "A Reconnaissance of the Greenland Inland Ice," *Bulletin of the American Geographical Society* (30 September 1887), and recent discussions of the controversies surrounding his explorations such as, for example, Wally Herbert, *The Noose of Laurels* (New York: Atheneum, 1989), and Hugh Eames, *Winner Lose All: Dr. Cook and the Theft of the North Pole* (Boston, 1973).

[3]James E. Church: "A Direct Route from Susanville to Fall River Mills," *Sierra Club Bulletin* 2 (January 1898), 194–96; "From Mt. Rose to Mt. Shasta and Lassen Buttes, "*Sierra Club Bulletin* 2 (June 1898), 205–15.

[4]James E. Church: "Midwinter Trips in the Sierra," *Sierra Club Bulletin* 4 (January 1902), 64–66; "A New Year Outing in the Sierra," *Sierra Club Bulletin* 4 (February 1903), 216–27; "Some Further Experiments with Sleeping-Bag and Sled on Winter Trips," *Sierra Club Bulletin* 5 (June 1905), 318–21.

[5]James E. Church: "Up from 'The Land of Little Rain' to the Land of Snows: Being the Journal of a Sledging Trip Up Mount Whitney in Winter," *Sierra Club Bulletin* 7 (June 1909), 105–18; "The Mount Rose Weather Observatory," *Monthly Weather Review* 34 (June 1906), 255–63; "Mt. Rose Weather Observatory, 1905–1907," *Sierra Club Bulletin* 6 (June 1907), 177–85; "A Midwinter Trip through Nevada's Mountain Park," *Sierra Club Bulletin* 8 (June 1912), 249–59.

[6]James E. Church: "Mount Rose Weather Observatory"; "The Human Side of Snow: The Saga of the Mount Rose Observatory," *Scientific Monthly* 44 (February 1937), 141; "Mt. Rose Weather Observatory, 1905–1907," 181.

[7]For Church's version of the Lake Tahoe water conflicts, see "The Human Side of Snow: The Saga of the Mount Rose Observatory." In response to a complaint from a farmer living near Fernley about the power company's waste of water, Church wrote that "there is available on the Truckee watershed this season from 51 to 61 percent of the water available in 1910, when precipitation was nearly normal, or, if deduction be made for absorption by the extra dry soil of the watershed, there will be about 45 percent as much water to use as there was two years ago. If only all of the water users could practice economy and system as the settlers of the project are forced to do, there might still be a minimum of water available for all." Since Church was officially affiliated with the Agricultural Experiment Station of the university, he prudently submitted a draft of his reply to the director of the station. The director made him omit the last sentence, noting that it is an expression "of your personal opinion concerning the actions of others, opinions you as an individual you have a perfect right to have [*sic*], but which I think a member of a Station Staff had better not needlessly express. The correctness of the opinion is not questioned." W. R. Pray to Church, 28 April 1912; Church to Pray, 2 May 1912; Gordon H. True to Church, 3 May 1912. Letters in NC 96, Box 3, Church Papers, Special Collections, University Library, University of Nevada, Reno.

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[9]Charles A. Mixer, "The Water Equivalent of Snow on the Ground," *Monthly Weather Review* (April 1903), 173; Robert E. Horton, "Snowfalls, Freshets, and the Winter Flow of Streams in the State of New York," *Monthly Weather Review* (May 1905), 196–202.

[10]"Horton, Robert E.," *Who Was Who in America* (Chicago: Marquis, 1950), II, 263; Horton, "Snowfalls."

[11]McAdie to Church, 20 February 1909. NC 96, Box 3, Church Papers.

[12]James E. Church, "Conservation of Snow," 152–55. Church to Munn and Co., 24 November 1910; Patent Office report, May 29, 1911; envelope from *Scientific American*, postmark 24 January 1913, on which Church has written the names Hellman, Pinchot, and more than a dozen others. NC 96, Box 52, Church Papers.

[13]Frank H. Bigelow to Church, 30 March 1909. NC 96, Box 3, Church Papers.

[14]Frank H. Bigelow, "The Catchment of Snowfall by Means of Large Snow Bins and Towers," *Monthly Weather Review* (June 1910), 969.

[15]C. F. Marvin to Church, 21 April 1909. NC 96, Box 3, Church Papers.

[16]James E. Church, *Snow surveying: Its Problems and Their Present Phases with Reference to Mount Rose, Nevada, and Vicinity* (Washington, D.C.: Government Printing Office, 1917).

[17]James E. Church, "The Biography of Snow Surveying," *Proceedings of the Western Interstate Snow Survey Conference . . . February 18, 1933* (Carson City, Nevada: State Printing Office, 1934), 9. In his letter to Church of 10 November 1909, McAdie wrote: "I hope the snow gage works. It ought really to be called the Mount Rose Snow Gage, because it is the outcome of your own experience and our mutual discussion of the problem in Reno." NC 96, Box 3, Church Papers.

[18]George Clyde also served several terms as Utah's governor between 1957 and 1972. Church, *Snow Surveying;* Alfred H. Thiessen, "Measuring the Snow Layer in Maple Creek Canyon," *Monthly Weather Review* (April 1911), 601–603; J. Cecil Alter, "Predicting Water Supply for the Farmer," *Scientific American Supplement* (29 June 1912), 413–14; Thiessen to Chief, United States Weather Bureau, 16 March 1912, with clippings from the *Deseret News, The Evening Telegraph*, and the *Salt Lake City News;* Thiessen to Chief, 20 March 1912, with Alter's report. RG 27, Weather Bureau Corre-

spondence 1912–1924, 532.3 SoDAK-WYO, Box 2673, National Archives and Record Service, Washington, D.C.

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[20]J. Cecil Alter, "Where the Snow Lies in Summer," *Monthly Weather Review* (May 1911), 758–61; Alexander J. Jaenicke and Max H. Foerster, "The Influence of a Western Yellow Pine Forest on the Accumulation and Melting of Snow," *Monthly Weather Review* (March 1915), 115–24; "Remarks by the Weather Bureau," signed C.F.M. and B.C.K., *Monthly Weather Review* (March 1915), 124–26. For the larger debate, see Bernhard Fernow, *Relations of Forests to Water Supply,* United States Department of Agriculture, Forestry Division, Bulletin no. 7 (Washington, D.C.: Government Printing Office, 1893), 123–170; G. A. McKay and D. M. Gray, "The Distribution of Snowcover," in *Handbook of Snow,* D. M. Gray and D. H. Male, eds. (Toronto: Pergamon Press, 1981), 165; Michael Williams, *Americans and Their Forests: A Historical Geography* (New York: Cambridge University Press, 1989).

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[23]James E. Church, Greenland Diary, Book II, 168, 171. NC 96, Box 15, Church Papers.

[24]James E. Church, Greenland Diary, Book I, 3 May-July 22, 1927, n. pag. (NC 96, Box 15, Church Papers). Knud Rasmussen, *Across Arctic America: Narrative of the Fifth Thule Expedition* (London: Heinemann, 1927).

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[31]*Proceedings of the Western Interstate Snow-Survey Conference* (1934).

[32]James C. Marr, "Status of Coordination and Standardization of Snow-Surveying." *Transactions of the American Geophysical Union,* 1936, 530–33.

[33]Helms, "Bringing Federal Coordination to Snow Surveys,"

[34]James E. Church: "Report of the Committee on Snow, 1935–36," *Transactions of the American Geophysical Union*, 1936, 277; "Report of the Committee on Snow, 1936–37," *Transactions of the American Geophysical Union*, 1937, 269–70.

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[41]James E. Church: "The Human Side of Snow: The Saga of the Mount Rose Observatory," *Scientific Monthly* (February 1937), 141; "The Human Side of Snow: Sport and Transport," *Scientific Monthly* (March 1942), 211–29; "The Human Side of Snow III: Perennial Snow and Glaciers," *Scientific Monthly* (March 1943), 211–31; "The Human Side of Snow IV: Snow Perils and Avalanches," *Scientific Monthly* (April 1943), 309–31; "Organized Water," *Soil Conservation* 8 (November 1942), 109–15.

[42]*Proceedings*, Central Snow Conference, East Lansing, Michigan (Michigan State College, Office of Short Courses, Special Courses, and Conferences), 11–12 December 1941; Fred Paget, "Report of Treasurer, Western Interstate Snow-Survey Conference, 16 January 1942," *Transactions of the American Geophysical Union*, 1942, 165.

[43]*Transactions of the American Geophysical Union*, 1942, 393–424.

[44]J. C. Stevens, "Hydrology's Part in the War Effort"; James E. Church, "Snow-Study Program at Soda Springs Near Donner Summit of Central Sierra Nevada," *Transactions of the American Geophysical Union*, 1943, 5–6; *idem*, "Western Snow-Conference Minutes of Business Meeting," *Transactions of the American Geophysical Union*, 1943, 77–90; H. A. Van Norman, "Water Works Ski-Troopers," *The American City* 59:10 (October 1944), 67–69. The 1943 meeting of the Western Interstate Snow-Survey Conference voted to change its name to Western Snow Conference.

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[46]James E. Church: "In Argentina Tierra del Fuego: Notes on a Tour," *Geographical Review* 28 (July 1948), 392–413; "Snow and Life," *Explorer's Journal* 38 (December 1960), 2–6.

[47]Church, "Science and Adventure," i–xiii; New Year 1957 card, author's possession; "Obituary," *Journal of Glaciology* 3 (March 1961), 944; Horace P. Boardman, "Friendships in the Snow," in Helen J. Poulton, *James Edward Church: Bibliography of a Snow Scientist*, Bibliographical Series, no. 4 (Reno: University of Nevada Press, 1964), 9–14.

WILDCATS AND BANK WRECKERS
The Mining Camp Entrepreneurs of Goldfield

Sally S. Zanjani

The part played by Nevada's early-twentieth-century mining boom in reversing the state's twenty years of depression and depopulation has long been remarked by historians. In Goldfield, where the excitement reached the highest pitch, an uninhabited spot in the central Nevada desert became a thriving metropolis in the span of just four years. Yet some evidence suggests that actual mining production played a smaller part in the state's economic miracle than is commonly realized. A closer look at the spectrum of enterprises outside the Goldfield mining district can provide insights on the role played by entrepreneurs in the last boomtown on the Western mining frontier.

When the gold rushers round about Columbia Mountain assembled in the October sunshine in 1903 to organize Goldfield, twenty-six of the thirty-six called themselves miners or prospectors, though some were novices still in the process of learning these occupations. Other callings were sparsely represented by a single physician, lawyer, or merchant. Never again during the boom years that lay ahead would so large a proportion of Goldfield's populace be physically engaged in mining. At the peak of the boom in 1906, miners probably accounted for less than 15 percent of the Goldfield population, compared to between 53 and 80 percent of the male contingent in the earlier California gold towns.[1] Although Goldfield's birth and decline between the 1900 and 1910 censuses prevent a definitive occupational analysis, these figures clearly suggest that a large sector of the town's working population was not engaged in mining. From the broker in his luxurious mahogany-trimmed offices to the popcorn vendor in the street, Goldfield abounded with entrepreneurs who had abandoned the predictable routines of ordinary life in the hope that the bounty pouring from the mines could be channeled in their direction.

The Nevada state controller's reports on Esmeralda County show that many

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were not disappointed. In 1903 Esmeralda ranked as one of the poorer counties in a severely depressed state. In 1907, by contrast, the value of Esmeralda County real estate had increased nearly twelve times over because of the Goldfield boom, and state property taxes from the county showed a comparable advance. Total state and county tax revenues from Esmeralda far exceeded those of any other Nevada county. Although Reno had been the leading population center before the gold rush and would presently reclaim that distinction, total tax revenues from Washoe County lagged 40 percent behind Esmeralda in 1907. This brief but spectacular dominance in the state financial picture would undoubtedly have been even more one-sided had Goldfield mining companies not routinely been manipulating their books to reduce tax levies—when they did not ignore their bullion taxes altogether.[2]

As in so many other camps, the first business to open its doors in Goldfield was a saloon, soon to be joined by many others. In 1905 the press reported that Goldfield had sixty saloons, about one for every 142 people, if population estimates made that year were roughly correct. The 1907 Goldfield directory listed fifty-one saloons, probably the largest and most respectable, but a survey of the smaller and more disreputable establishments would undoubtedly have boosted the total much higher. While these figures may have sounded shocking to small-town America, by frontier standards they seem moderate. Leadville, for instance, may have had as many as one saloon for every 80 residents in 1880; Deadwood boasted one for every 60 residents in the same year; and three weeks after the 1907 stampede began, Rawhide weighed in with one saloon for every 25 inhabitants. Such figures were not entirely a reflection of the conviviality and

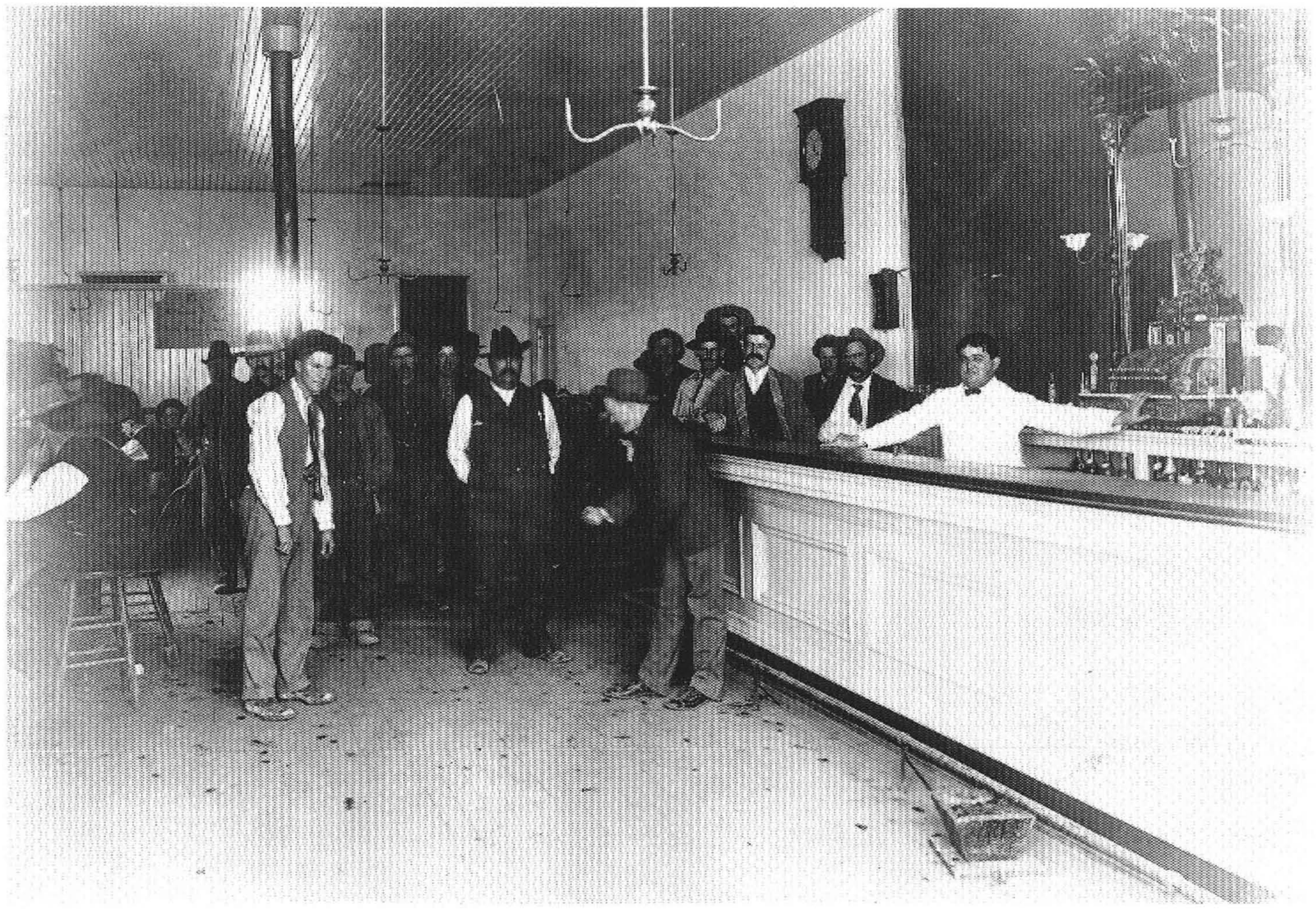
The Palace Saloon on Main Street in early Goldfield. (*Nevada Historical Society*)

notorious drinking habits of the gold rushers. Because all camps contained a disproportionate number of men, the primary patrons of saloons, the number of citizens per saloon in such communities would naturally be lower than in those having a more normal population of women and children.[3]

Even after Goldfield's decline had unmistakably commenced, the state issued far more liquor licenses in Esmeralda than in any other Nevada county, and gaming fees closely followed the bullion taxes from the mines in the revenue totals in the Esmeralda County treasurer's reports. Collectively, Goldfield saloons did a business second only to mining and stocks in the local economy. In one month in 1907, the Northern Saloon announced $30,500 net winnings from the gaming tables and $15,000 in bar receipts. Returns had reportedly soared even higher at the height of the boom. In 1908 the daily payroll at the Mohawk Saloon was still averaging in the $500–$600 range, a figure far beyond the daily payroll at any mine in the Golden Horseshoe except the Goldfield Consolidated Mines Company and the Rogers Syndicate. If the other "four corner" saloons, situated at the intersection of Crook Avenue and Main Street, did as much business as the Mohawk, the monthly payroll at these four saloons alone would have been around $66,000—almost as much as the monthly payroll of Goldfield Con at a time when the company's figures were swollen with construction workers occupied at the new mill. In keeping with the position of the saloons as highly profitable businesses, the owners organized both the Northern and the Mohawk as joint-stock corporations. Goldfielders joked that henceforth when a customer ordered a dandified drink like a pousse-café, the bartender had better stifle his natural response ("G'wan—you'll take it straight if you want a drink") because the elbows on the bar might belong to a stockholder.[4]

These were palmy days for saloonkeepers. The wife of Carl Fuetsch, owner of the California Beer Hall, could travel to Austria to visit her parents. W. S. "Ole" Elliott, who had commenced his working life stuffing sausages and gone on to make a sizable stake in the Alaska gold rush, could wager princely sums in the never-ending poker game in the back room of his saloon. And "Shanghai Larry" Sullivan, a large dark man with the voice of a bellowing bull, could provide the capital that made him president of the brokerage company masterminded by George Graham Rice simply by reaching into a leather sack of gold coins garnered in his saloon. Shanghai Larry may have earned his sobriquet as proprietor of a cheap Seattle boarding house for sailors; his guests sometimes awoke after a binge to find themselves far out at sea; but in Goldfield he became an influential man whose opinions carried weight. Rice observed, "Owners of the gambling places now stood as much for financial solidity in Goldfield as did savings-bank directors in the East."[5]

Aside from these two great staples of the local economy—mines and saloons—Goldfielders strove for the almighty dollar in a plethora of other enterprises. There were even two interior decorators, who anticipated that those who lately sat bathless on empty barrels would soon be agonizing over the most



Interior of the new Palace Saloon, 1906. The man in the center of the three in the foreground is Jack Shirley, one of the owners. To his right is Brick MacIntosh. The bartender is Jack Gordon, known as the "King of the Cacti." (*Nevada Historical Society*)

fashionable styles in draperies and mission furniture. A good deal about the relative importance of the luxurious and the utilitarian during a mining boom can be deduced from the fact that Goldfield had five jewelers but only one plumber, who turns up belatedly in the 1908 reports on business licensees. Even allowing for the dearth of indoor plumbing in much of the city, he probably had a longer waiting list than the interior decorators. As *Goldfield Gossip* editor Parmeter Kent warmly welcomed plumbers considering a move to Goldfield, "We are glad to see you. There is work for you. In accordance with your usual scale you get a house and lot for working a day; an automobile for finishing any job; and a share of the Mohawk mine if you remain with us all winter. Come, and be of good cheer, for the earth is yours."[6]

While Goldfield merchants enjoyed considerable success, they seem to have loomed less large in the social and political life of the camp than mine promoters, lawyers, and saloon keepers. This, of course, was not true of the newspaper editors, who not only presided over prosperous businesses but wielded enormous influence. In addition to the usual functions of the early-twentieth-century urban newspaper—focusing public attention on local problems, keeping a diffuse population informed on public events, and articulating community opin-

ion—mining-camp newspapers had another role. The successful development of a town on the mining frontier depended upon the promotional activities of a local newspaper geared to distant investors and potential residents as well as local readers. Mining-camp editors well understood this necessity. Goldfield newspapers could—and did—soft-pedal political corruption and the ravages of the black plague (pneumonia),[7] along with other unpleasant subjects, but never did they falter in their primary function of promoting the camp.

The fledgling camp's first newspaper was the *Goldfield News,* an eight-page weekly; on April 29, 1904, it published its premiere issue on an old hand press welded together by an ingenious blacksmith from an assortment of scrap metal. Goldfield's residents had reportedly subscribed $500 to launch editor-and-publisher James O'Brien, a recent arrival from Denver, and his partner R. E. L. Windle in the business of publicizing the camp. The first issue of the *News,* promising "All That's New and True in the Greatest Gold Camp Ever Known," was so eagerly received that O'Brien cursing himself for cranking out only fifteen hundred copies on his rickety press, hastily bought back as many as he could at a quarter each, to be resold for a dollar. During the next two years, O'Brien's newspaper prospered to the point that the manager of the *Denver Mining Record* wrote him with a shade of envy: "Understand you have made so much money that it will take the rest of your days to count it. Hope this is true."[8]

An apparent rarity in early Goldfield, a plumber's shop. The Goldfield Hotel is under construction in the background. (*Nevada Historical Society*)

In January 1906, O'Brien sold the paper to Charles Sprague, who more strongly infused it with his own Democratic viewpoint and added an evening daily edition in February 1909.

By that time several other Goldfield newspapers had come and gone. The *Goldfield Vigilant, Nevada Mining Bulletin,* and a number of market newsletters issued by brokerage firms vanished almost as fast as they appeared. *Goldfield Gossip,* edited by the witty Parmeter Kent and making no pretense at comprehensive coverage or objective reporting, lasted a little over a year. It succumbed in January 1908, some time after Kent was obliged to make the embarrassing admission that he had been an "amazing ass, unable to take care of a dollar." Yes, Parmeter Kent and Sidney Flower, former editor of a Chicago magazine called *New Thought,* were one and the same. Yes, in the persona of Flower he had used the magazine to promote stock in a hodgepodge of disastrous commercial enterprises ranging from hair tonics, nicotine-free cigars, and milk diets to gold mines. And yes, he had lost the investors' funds at the race track; the postal authorities had closed down *New Thought* for mail fraud; and Sidney Flower had borrowed enough money to head for Nevada's newest mecca for men of promotional talents, where he metamorphosed into Goldfield's Parmeter Kent. Apparently the amazing ass had not yet been entirely laid to rest. In 1909 a federal grand jury indicated him for promoting stock through the pages of *Goldfield Gossip* and pocketing both the investors' money and the stocks. Considering that Flower/Kent's past career had so admirably prepared him for the conduct of business in Goldfield, *Goldfield Gossip* should have lasted a good deal longer.[9]

In February 1905, the first daily, the *Goldfield Sun,* made its debut. It was edited by Lindley Branson, who was virulently opposed to the Industrial Workers of the World—the IWW—and who also published the *Tonopah Sun.* Following a bitter conflict with the union, Branson was compelled to suspend publication in August 1906 and retreat to Tonopah, where he continued to excoriate Goldfield's union radicals through the pages of the *Tonopah Sun.* To refute the "misrepresentations and slanders of our capitalist press," Goldfield's radical Socialists attempted in the summer of 1907 to launch a newspaper of their own, *Nevada Workman,* but the venture foundered in less than six months.[10]

By contrast, the former *Goldfield Sun* prospered. Sold to J. M. Burnell and John Martin, it reappeared as the *Goldfield Tribune,* a publication destined to rise over several contenders as the ultimate winner in the newspaper field. At its peak, the *Tribune* had more than five thousand subscribers in addition to its newswagon sales, and it also did a big business in job printing for mining firms anxious to hasten their newsletters to investors and willing to pay large bonuses. In those flush times, the demand for printing in Goldfield so far exceeded the capacity of its newspaper plants that $100,000 worth of job printing was farmed out each month to firms in Reno and Carson City. In its heyday, the Goldfield

Press Club boasted more than seventy members, variously employed at several newspapers. Even newsboys floated high on the tide of prosperity.[11]

A second daily, the *Goldfield Chronicle,* published by Horace Dunn, entered the field at the height of the boom in November 1906. In early 1908 the *Chronicle* acquired the *Goldfield Review,* a weekly that had been appearing since 1904, and continued it as a weekly edition of the *Chronicle.* Despite this consolidation, Goldfield still had more newspapers, with three weeklies and two dailies, than her by then dwindling population could support.[12] Why the *Chronicle* was to be the loser in the ensuing contest with the *Tribune* had little to do with the lively and entertaining quality of the newspaper's reportage and a great deal to do with the political enmities aroused by its muckraking and its independent stance.

In the autumn of 1907, the *Chronicle* committed what was probably a fatal error: It inspired and reported on a grand jury investigation into official graft, a subject the other newspapers tactfully avoided. Under heavy pressure, editor Dunn refused to reveal his confidential sources in court. Angry officials threatened to put the *Chronicle* out of business, and they withdrew the contracts for county printing that might have helped to tide the enterprise over when subscribers and job-printing orders dwindled. Dunn bitterly declared, "Had the *Chronicle* so desired it could have ambled up to the democratic trough and been fed so long as it were humble; it could have wallowed, even."[13] Relentlessly continuing to blast incompetent officials and expose scandals in powerful quarters, the newspaper fell into debt, and the John S. Cook bank acquired its obligations. By 1909 the *Chronicle* was floundering desperately. Dunn cut the newspaper's price to five cents (half the cost of the *Tribune*) and also sharply lowered subscription rates. But news dealers refused to sell the paper for reduced commissions, the result of a union decision allegedly engineered by the *Tribune.* In February 1909 the bank foreclosed, and the crusading *Chronicle* ceased to exist.[14]

The *News,* which sought to benefit from the *Chronicle's* demise by commencing daily editions, was next to succumb. Unlike many other Goldfield reporters, Charles Sprague, the editor since 1906, was an educated man who had studied journalism at Princeton and edited three newspapers in Colorado, where he also entered politics. When he moved on to Goldfield in 1905, Sprague brought his political ambitions as well as his journalistic gifts. At first his prospects seemed promising, but after his financial backers withdrew in the wake of the 1907 stock-market crash, he inherited a large debt for the extravagantly expensive *News* building. By the time he ran for the United States Congress in 1910, he had incurred the enmity of George Wingfield, who made it a high priority to defeat Sprague and destroy his newspaper. As usual, Wingfield succeeded in his aims. Sprague lost the election and was forced to sell the *News* to the *Tribune* in March 1911.[15] The *Tribune* emerged the apparent winner of the newspaper wars. Yet,

in a sense, the *Tribune* lost as well. The *Chronicle* and the *News* had at least gone down with their flags flying and their independence intact, but similar burdens of debt drove the *Tribune* to become a satellite of powerful interests that desired a conservative and Republican mouthpiece in a community of predominantly Democratic and Socialist voters.[16]

Ignoring both politics and scandal, the first section many readers turned to in a Goldfield newspaper was the mining-stock quotations. Stock trading in Goldfield had commenced in the winter of 1904–1905 with informal nightly sessions in the Northern Saloon, where brokers gathered to trade thirty or forty thousand shares. The Goldfield Mining Stock Exchange opened in a basement in October 1905 with single daily sessions at 1:30 P.M., later moving to a commodious flat-roofed stone building with large plate-glass windows. Morning and evening sessions soon became the norm, and a second exchange, the Goldfield Stock and Exchange Board, opened its doors in 1906. Goldfield women, from the laundress in gingham to the society woman in diamonds and silks, sandwiched in the crowd or seated on chairs in the "ladies' corner," shared in the feverish excitement. Sometimes the yelling of the coatless, uncollared crowd massed around the caller literally rattled the windows. In periods of particular euphoria, they reverted to the practices of early days, convening informal sessions of curb trading outside the exchange during off hours.[17]

Some two hundred stock exchanges specializing in mining and oil securities were organized in the United States between 1860 and 1930, the earliest in San Francisco, with Virginia City and other Nevada camps close behind. From the time the first mining-camp stock exchange opened for business in Virginia City in 1863 through the Goldfield boom, the fundamentals of "stock devilment" in the market remained unchanged, as did widespread gambling in mining stocks among all sectors of the local populace. Comstock historian Grant Smith considered the great lode a "boon to the thousands who found in it opportunity for persistent and useful work" and "also a bane to the thousands who converted it into an instrument for trickery and passionate gaming."[18] In this respect, the last great mining boom differed not at all from its predecessors.

During the Goldfield era, the Los Angeles, Salt Lake, Chicago, and New York exchanges played some role, but San Francisco remained the sun around which the Goldfield exchanges orbited. San Francisco "made the market" on Goldfield mining stocks in the morning, and if San Francisco decided to drop a stock from the board, the death knell sounded. When Goldfielders wined and dined a visiting delegation of three hundred San Francisco stockbrokers at a banquet and grand ball in a fashion as lavish as the primitive 1905 camp allowed, they did so because they were acutely aware of the importance of this group to Goldfield finance. Several of these San Franciscans were sufficiently impressed by the "excitement and revelry" accompanying their arrival that they decided to remain in Goldfield. Former San Franciscans, sometimes operating branch offices of San Francisco firms, or linked more loosely to old associates there, became a

major force at the original Goldfield exchange, while Coloradans formed the nucleus of the new exchange.[19]

At the peak, 370 mining stocks were listed, the combined membership of the two Goldfield exchanges included three hundred brokers, many of them newcomers to the profession, and a seat cost $2,400 (compared to $10,000 on the San Francisco exchange). Evidently commercial activity still provided a swift avenue upward for the foreign born in mining camps, much as it had in Grass Valley and Nevada City half a century earlier. The press commented on the polyglot origins, as well as the "restless energy" and "perpetual chance taking" of the "struggling howling mass" in the exchange:

> There are found the bright and quick thinking Jews, the sturdy and slow going Germans, the restless and lucky Irish, who have acquired for themselves at least a temporary prosperity—temporary, because, in many cases this maelstrom of trading compels hitherto lucky operators and traders to disgorge their winnings to help onward the star of ascendancy of some new Richmond in the field. Here are also found the cast off relics of the Big Exchange, broken in spirit and in pocket, who . . . watch at the gates for a fortune which will never come.[20]

The most successful among the brokerage fraternity built offices elegantly furnished with overstuffed leather chairs and mahogany desks and wall trimmings, the better to impress their clients. Donald MacKenzie's offices, the largest, contained space for forty clerks, as well as mailing and stock rooms where the work force labored to float seven major mining properties. Other brokerage offices ranged from this enviable peak down to family mail-order firms where a man designated himself as General Manager, his wife and daughter as Clerk and Typist, and his son as Mine Superintendent. Unfortunately, much of Goldfield mine promotion was sheer surface display because many of those purveying mining stocks were laughably ignorant of mining. George Graham Rice later acknowledged that his partner, Shanghai Larry Sullivan, knew no more about mining than "an ostrich knows about ocean tides." Unaware that the mining term *winze* denotes a shaft dug from the lower levels of a mine, Shanghai Larry's booming voice once boasted to a group of potential investors in the L. M. Sullivan Trust Company, "Right now I've got a whole carload of winzes coming in to rush development work on half a dozen properties."[21]

Shanghai Larry was by no means unique. Henry Miles, an old Goldfielder, described the steps by which camp newcomers who had never been underground or done any work connected with mining transformed themselves into "mining men." The first step was to get an option on a claim, however remote from the mineral bearing zone, and a membership in the Montezuma Club, where potential investors from the East congregated.

> Then get a Khaki coat and trousers; a miner's candlestick; a broad-brimmed hat; high-lace boots. Next liberally sprinkle candle grease on coat; pants; hat, and boots; stick the

candlestick in one boot leg. It was essential to memorize some mining terms: e.g. "winze"; "cross-cut"; "locus of the vein" . . . "foot wall" . . . "shattered dioxide"; "gangue"; etc. The foregoing being done then lounge in the Montezuma Club or the "Northern"; endeavor to contact a well-to-do "tenderfoot". . . . Often . . . substantial business, and professional men, in the East, could be induced to invest, and keep on investing for years on ground that never produced a ton of ore.[22]

Some regarded ignorance of mining as a positive asset for promoters, perhaps because it gave freer rein to their imaginations. "A man does not have to be a miner to make money under right conditions in a mining camp. Oftentimes the less he knows about such things the more fortunate it is for him," declared the respected mine promoter J. P. Loftus to James O'Brien.[23] Together with the candid reminiscences of George Graham Rice, Loftus's private letters to the young newspaper editor, with whom he was involved in mine promotion schemes, offer startling insights on the methods of successful mining entrepreneurs.

The potential for profit was enormous, and true stories abounded of men who entered the camp with nothing but pocket change, later to strut through the streets as millionaires. Rice was one of these. According to Richard Lillard, Rice (born Jacob Herzig) had "stolen, gambled, forged, swindled, and tipped at race tracks since boyhood when his first victim was his father."[24] Having done time

The Montezuma Club in Goldfield, c. 1906, where many deals in mining shares were made. (*Nevada Historical Society*)

in the New York State Reform School and the state prison, Rice left what he always termed "my youthful Past" behind and arrived in Goldfield with fifteen dollars of borrowed money in the winter of 1904–1905, virtually broke. Though he managed to persuade a newspaper to hire him, his boundless ignorance of mining got him fired in less than a week. Undaunted, Rice started an advertising agency that placed advertising copy for Goldfield brokerages in newspapers nationwide and blossomed into a huge success.

Soon Rice announced the opening of his own brokerage firm, the L. M. Sullivan Trust Company, capitalized with the gold coins from Shanghai Larry Sullivan's leather sack. Like most Goldfield brokerage firms, Rice's company dealt in stocks for clients at the exchange and also promoted its own "flotations," often of nearly worthless mining claims. Following the common practice of placing a governor, a United States senator, or other prominent personage on a firm's directorate to lend respectability to the enterprise, Rice induced Nevada's governor, "Honest John" Sparks to assume the presidency of several of these mining companies. Though the mining companies produced no ore of any value, profits rolled in all the same. After Rice ran display ads in the big city newspapers, stock in one of his new mining companies was oversubscribed inside two weeks, bringing him $100,000 in profits. As fast as Rice could announce a new mining company, investors gobbled up the stock. Sometimes Rice was forced to cancel his ads because his offerings were oversubscribed before the copy reached the newspapers. Before the decline in Goldfield mining stocks, the absence of genuine value in Rice's mining properties, and the hostility of George Wingfield combined to bring down his house of cards, Rice's energetic promotion had parlayed a few poor mining claims into a multimillion dollar business.[25]

Why were American investors so gullible? Rice's answer was that "the stock offerings undoubtedly *struck a popular chord*. Tens of thousands of people . . . whose incomes were not sufficient to permit them to indulge in stock-market speculation in rails and industrials, found in cheap mining stocks the thing they were looking for—an opportunity . . . to give full play to their gambling, or speculative, instinct."[26] Another broker opined that investors accepted the dark-horse odds of mining-stock speculation in hopes of making huge gains. Yet much of the advertising for Goldfield mining stocks aimed for the innocent sucker, not the sophisticated investor aware of the risks and able to afford them. One mine promoter observed of his stock sales to investors in upstate New York: "I know they are fresh, and not overloaded with mining stocks and have not had everything hawked at them [and] furthermore I know that a large percent of them are now susceptable."[27]

Arguing that investment in mining had ceased to be speculative, a host of mendacious advertisements and prospectuses in editorial guise cleverly attempted to relieve working people of life savings set aside for old age. Indeed, they claimed that mining had turned into a "regular business undertaking, as

certain of success as either banking or manufacturing, and the profits are immensely greater." The Nelly Bly Mining Company (never a producer) promised investors that their money would be "safer than in a bank," while bringing returns of several hundred percent. With no moral compunctions, these promoters preyed upon the fears that plagued many people in an era that predated Social Security:

> One of the problems of the present day that is confronting both men and women is how to provide a competence for old age. A man may toil for years on a farm, in an office, in a workshop or factory, and find himself unprovided for against the certain coming of infirmities. . . . As a man or woman passes the years of middle life, his or her services become less valuable to employers, and the time will come when it will be difficult for them to find employment. How, then, can a wage-earner use his savings to make them . . . bring him an income?

Where else but in mining stocks? And what is more, the "toiler . . . with no brighter prospects than to drudge day by day" was generously allowed to sink his money into Nelly Bly stock on the installment plan.[28]

In Goldfield and throughout the nation, working people responded eagerly to these seductive arguments. Goldfielder Anne Ellis and her miner husband lost their entire savings in mining stocks, as did the owners of the busy bakery where she worked for awhile, along with countless other residents of the camp. American investors may have lost as much as $150,000,000 when Goldfield mining stocks crashed in 1907, plus a comparable amount on the unlisted stocks vended by the wildcats. As Rice noted, Goldfield became "the graveyard of a million blighted hopes."[29]

The rules set forth in 1907 by the American Mining Congress for the protection of investors reveal both the unconscionable scheming of the "lemon peddlers" and the regrettable fact that prudent investors who followed every rule could still wind up with nothing but a drawer full of handsome stock certificates. If the investor ascertained, as the mining congress suggested, that a legally incorporated mining company held clear title, without debts or encumbrances, to a well-located property, this might protect him from wildcats who never owned a foot of ground. But not from Rice, whose flotations were legitimately purchased and organized. Or from Loftus, who urged O'Brien to acquire properties indiscriminately: "Go right ahead and use the pool money, use your own money, or any other money that you may pick up honestly or dishonestly, even to the extent of acquiring it by holding up men in the streets, for the purpose of acquiring mining interests anywhere and everywhere." Loftus knew that the value of the claims was immaterial because "the stocks would sell regardless."[30]

The mining congress recommended inquiring about development work done on the property. Again, no protection. Some promoters, like Loftus, preferred to limit development to one or two assessment holes "in soft places." He advised O'Brien, "Do not do a single thing that you do not have to. For instance, should

you at any point open anything that looks good, I would suggest that you do not attempt to sink ten feet on it. Get some fellow . . . and give him a lease . . . and thus get the development work done for nothing." But Rice, who believed in making expenditures to multiply returns, sometimes stirred up a veritable whirlwind of development work on his properties without ever producing pay ore.[31]

Then should the critical question for investors have been the mine's past production? Production gave no clear guidance either, because producing mines often played out early (like the Sandstorm) and those which had never produced might suddenly strike bonanza (like the fabulous Mohawk). If the investor demanded to be shown an engineer's report on the mine, this, too, provided no certitude. Companies often presented reports from engineers who viewed their mines favorably and sometimes held a hidden financial stake in them. Even honest engineers could be addled by the enthusiasm surrounding them and submit elastic reports that exaggerated proven ore reserves.[32] In short, even a company that met all the criteria of the mining congress could still be a disastrous investment.

Other methods of selecting mining stocks proved no better. Many investors relied heavily on newspaper reportage. But mining editors, long trained to avoid the cardinal sin of "knocking the camp," routinely turned in favorable reports. Furthermore, they often lacked time for careful analysis, and even when they had not received gifts of stock from a mining company to sweeten their opinions, they often succumbed to the excitement surrounding a promising discovery—a recurrent phenomenon in the western mining camps since Comstock days. Nor did the presence of famous names on a mining-company directorate provide investors with a guarantee. Senator George Nixon and George Wingfield, whose association with the Mohawk gave their names a golden luster, appeared nevertheless as officers of numerous worthless mining companies useful only for purposes of stock promotion. John Cook, Goldfield's most prominent banker, lent his name to the notorious Union Securities swindle, while Governor Sparks assumed the presidency of several Rice flotations. Famous mines offered no better security to the investor than famous names. The best of mines, like the Goldfield Consolidated Mines Company, still represented poor investments because their owners had overcapitalized them at a level far beyond their real values. If steel king Charles Schwab could be so badly buncoed on his mining investments that he characterized Nevada as a den of thieves, less worldly investors scarcely stood a chance.[33]

A number of practices at the exchanges multiplied the opportunities for profit among the unscrupulous. Despite occasional attempts at stock registry, forged stock certificates and overissues remained a persistent problem. In 1906 the *Goldfield News* urged the exchange to make an organized effort to protect the public by exposing hundreds of fraudulent Goldfield flotations then in progress, an evil that the listing committees, empowered to investigate all mining companies with stock quoted by the exchange, had failed to correct.[34] Predictably,

the exchange continued to look the other way. Then as now, sharpers hammered stock up and down for profit, often using rumors to exploit the public mood of the moment. Loftus candidly noted, "When the craze is on locally, any old thing will bring good money." The *Tribune* further explained: "Goldfield is essentially mercurial. . . . At times optimistic, the people are the next moment plunged into the depths of despair by a flickering breeze and they rush to the other extreme. This knowledge has helped the speculators who toy with the savings of their patrons with a callousness to all moral susceptibility." The *Tribune* also charged that labor negotiations had been needlessly prolonged because both sides used the vicissitudes of the bargaining table to play the stock market: "The stock exchanges are the root of the evil . . . the common people are between two millstones which grind and grind until the last cent of money has been extracted from the poor deluded fools who imagine that they can make a fortune in a day without possessing any knowledge of the inside workings of the cabal that has the market in its clutches."[35]

The list of knavish practices by this cabal went on and on. Exploiting the differences in stock prices between widely separated exchanges like San Francisco and New York had long been a favorite ploy. With the addition of the second separate exchange within Goldfield, brokers could profitably milk the minor differences between these two. After mining stocks crashed and the market shriveled, the two exchanges combined into a single "scalping board," and those brokers who had survived the holocaust acted in concert on wash sales (that is, matched orders) so blatant that the *Chronicle* thought them "evident to the merest tyro at the game." First, investors were induced to purchase a certain stock by glowing reports, planted in the newspapers, of new bonanzas. Then, through "preconcerted plans," the brokers would break the price within a few minutes and "shake the sucker down."[36]

In the end, many in the brokerage fraternity reaped what they had sowed. With the dawning of the day of reckoning, sharpers who had bought stock on margin and speculated unsuccessfully with clients' funds went broke as swiftly as they had risen in the soaring market of 1906. Though actual developments in the Goldfield mines and trends in national financial markets affected this roller-coaster process, so, too, did the machinations of George Wingfield. The large loans made to margin traders through the Cook bank, in which Wingfield was heavily interested, undoubtedly stoked the fires of speculation at the same time that they stimulated investment in Goldfield Consolidated; the dominance of Goldfield Con, as some had foreseen, choked off the diversity on which a local mining-stock exchange depended; and Wingfield's practice of destroying rivals who had incurred his ill will, most notably Rice and the once great house of MacKenzie, accelerated the decline of the Goldfield traders.[37]

Brokers who came out winners had probably followed the general Wingfield *modus operandi*—selling high and diversifying. But few of those who for a time had played and won at the grand gamble of Goldfield mining had the self-

control to walk away. It was often said among Goldfielders that all the money they had raked in "went back into the ground" in fruitless search for new bonanzas and purchase of worthless mining stock. Many brokers no doubt bore their losses lightly, like the inveterate gamblers they were, and moved on to greener pastures. Rice, for one, retreated to Reno, where he published a newspaper, *Nevada Mining News,* in which he promoted more mines and levied vengeful rhetorical blasts at Wingfield. He went on to New York, more shady promotions, a conviction for mail fraud, and the publication of his memoirs, aptly entitled *My Adventures with Your Money.*[38]

Not far behind the stockbrokers in the fanciful realm of speculation were Goldfield's bankers, a breed wholly different from the staid and cautious gentlemen who gave banking the reputation for conservatism and financial solidity that it enjoyed in many American cities of the period. Of Goldfield's five banks, all but one founded in the 1904–1905 period, three collapsed within five years, bringing financial ruin to depositors. The reason in every case lay in the bankers' financial manipulations. In the absence of regulatory legislation and federal deposit insurance, Goldfield bankers were free to treat their depositors' funds in a manner that recalls the buccaneers leaping aboard captured treasure ships on the Spanish Main.

Goldfield's most successful bank was John S. Cook and Company, which opened its doors in January 1905 in a wooden shack adjoining the Palace Saloon. Later that year the bank moved to more stately quarters, and appointments that signalled success to the business community were soon in place—mahogany desks and trimmings and overstuffed leather chairs, in addition to a steel ceiling to foil bank robbers who might descend from above and, a much admired

A crowd gathered in front of the John S. Cook and Company Bank in the Nixon Block on Main Street in Goldfield. (*P. E. Larson, photographer; Nevada State Museum*)

novelty, a rubber-tiled floor. Considerable assets lay stashed in the vaults beneath that floor, for the bank had fueled the stock boom with its practice of easy lending to purchasers of stock in Goldfield Con, while at the same time enriching Wingfield and Nixon, principal shareholders in both the bank and the mining company. In the spring of 1907, the bank reported deposits well in excess of $6,000,000. If the $10,000,000 estimate for the total of deposits in all Goldfield banks is correct, the town's per-capita deposit of $555 is more than double the level found by Watson Parker in Deadwood for 1904 and exceeds that year's national average almost seven times over.[39]

When the speculators went broke, John S. Cook and Company held a host of bad loans, but it still stood while other banks failed. Perhaps one of its most important assets was the influence of Senator Nixon, an experienced banker who had no intention of ruining his political career with a bank failure. In 1909 Wingfield took over the Cook bank, acquiring Nixon's bank holdings at the same time that he purchased Nixon's share of Goldfield Consolidated. When he subsequently acquired Cook's interest as well, Wingfield became sole owner of the bank, as he was of so much else in Goldfield by that time. The only other viable bank in town was the First National Bank, founded in 1908 by L. L. Patrick and others, including Wingfield's rival, Tom Lockhart; unable to compete with the well-entrenched Cook bank for the rapidly diminishing business of a mining camp in decline, the First National gave up the ghost in 1913.[40]

The Nye and Ormsby County Bank had already disintegrated in the wake of the October 1907 financial panic, following a run on the bank that remained vividly etched in the memories of old Goldfielders—especially those unlucky enough to be among the bank's depositors. Part of a chain initially organized by Nixon and his associates and later sold when Nixon shifted his focus to the Cook bank, Goldfield's Nye and Ormsby County Bank progressed from the corner of a grocery store, where business had been carried on in the summer of 1904, to more impressive quarters, but the bank was never to occupy its expensive new building or fully reimburse its depositors. In 1909 it permanently collapsed. A subsequent grand jury report on the affairs of the Nye and Ormsby County contained a scathing condemnation of its directors for their heavy borrowing while the bank tottered and for "their apparent utter disregard for the interest of the depositors."[41]

Similar attitudes came to light in the collapse of the camp's first bank, the State Bank and Trust, also the Goldfield branch of a Nevada chain. Like the other banks, the State Bank and Trust progressed from humble beginnings in the front portion of Ole Elliott's saloon in the summer of 1904 to a fine stone building conveying a false impression of financial solidity within. After the October run on the Goldfield banks, the State Bank and Trust never reopened, blaming bad loans made on mining stocks at four-to-one margins. In fact, the banking chain's financial affairs were a good deal more complicated and also included a welter of fictitious dividends, questionable loans to the doomed L. M. Sullivan com-

pany, among others, and inflated construction costs. Initially the bank's president, Thomas Rickey, promised to repay the depositors dollar for dollar, and many believed him. After all, "Honest Tom" Rickey, the aged pioneer cattleman, with far-flung interests in mining, irrigation projects, land holdings, and the Nevada-California Power Company that served Goldfield, was reputedly the richest man in the state. One of those who did not believe was Donald MacKenzie, the bank's largest depositor. A battle of the sharks ensued, in which Rickey and MacKenzie at first cooperated, at the expense of other depositors, in an elaborate paper shuffle with the bank's principal asset, its stock in the Keane Wonder Mine in Death Valley. Then, as the *Chronicle* phrased it, Rickey walked "away with the swag." MacKenzie at least managed to salvage more from the bank than did the other depositors.[42]

Although none of Goldfield's "bank wreckers" received their just deserts in court, one of them met his end in a blaze of gunfire. The most short-lived institution, the Goldfield Bank and Trust Company, closed its doors in May 1905, just six months after opening in a temporary tin and corrugated-iron building in 1904. Rumors that only 80 cents remained of the $80,000 deposited in the bank's vaults proved apocryphal: The actual sum was $21.05. The bank's president, its principal director, and its cashier had prudently skipped town but were subsequently arrested. After they were tried and inexplicably acquitted, the former director, Francis Burton, continued to flourish unabashed, making Mina his new base of operations. Indeed, Burton was a man not easily abashed, even when a delegation of residents awaited his arrival at a new mining camp and compelled him to take the next stage out of town. A Colorado attorney of unusual persuasive powers, Burton had shammed injuries from a train wreck in order to secure heavy damages from the railroad company. When the fraud was exposed, Burton went to prison in Massachusetts, but this took the wind from his sails only temporarily. He persuaded the warden to entrust him with $15,000 for mining investments. Upon arriving in Goldfield, he used this capital to organize the Goldfield Bank and Trust, among several other schemes.

After J. Holman Buck labeled him a "shyster lawyer, ex-Goldfield bank wrecker, Lida mining fakir" in the pages of the *Rawhide Rustler*, Burton threatened the editor's life. Buck began carrying a short-barreled shotgun. Seeing Burton approaching on Mina's main thoroughfare, Buck called on him three times to put up his hands. Instead, Burton drew a revolver from his pocket. Buck fired first, riddling Burton with buckshot and killing him instantly. The district attorney declared that he would refrain from wasting the taxpayers' money on a trial because no Esmeralda County jury would convict Buck—a measure of the bank wrecker's general unpopularity.[43]

It may be noted in passing that despite the rampant crime in Goldfield, no one robbed a Goldfield bank during the boom days. Moreover, one of the fireproof safes lived up to its manufacturer's claims by surviving the conflagration of 1923 in which much of the city burned. The real dangers to depositors' funds came

not from fires, nor floods, nor masked bandits, but from the unprincipled activities of the bankers themselves, both shysters like Burton and respected financial titans like Rickey. Investors faced similar risks. Losses suffered by investors in mining stocks during the 1907 crash may have exceeded, by at least one third, the value of the entire production of the Goldfield district for the half century following its discovery.[44] From this it can readily be inferred that the value of transactions in mining stocks during the grand bacchanal of speculation surpassed that of actual mining production many times over. Moreover, the saloons—forerunners of today's casinos—conducted so large a volume of business that their payrolls ran a close second to the mines'. There can be little doubt that Nevada's present tourist-dependent economy based on legalized casino gambling has deep roots in the mining camps.

In retrospect, the activities of Goldfield's entrepreneurs suggest both widespread rascality, free to flourish in an atmosphere of weak legal and social control, and a pervasive boom psychology. Some have noted the extractive nature of the mining industry "set a mood" in the West that outlasted the mines. In the heady days when Goldfield was "drunk with money,"[45] few newspaper publishers, bankers, or brokers could resist overextending themselves, going into debt in hopes of ever greater gains. Sound business practices fell by the wayside and, when the crash came, fewer still survived. But the experience of being part of the last great boom could scarcely be tallied in an accountant's ledger. Indeed, many seasoned gold rushers saw the sudden gains and disastrous reversals of mining-camp businesses as a normal part of their way of life. So long as they earned enough to elbow up to the bar with the boys of an evening, and stand for the drinks now and then, they were, at heart, content. It was the pursuit of El Dorado that mattered, not actually reaching the golden shore. In fact, a subliminal fear of losing the old way of life to success may have impelled more than a few to gamble away their long-sought fortunes with surprising speed.

An old veteran of the California gold rush, W. G. Searles, gave voice to a view still widely shared in the last boomtown. Upon arrival in Goldfield, Searles declared with enthusiasm that it reminded him of San Francisco in the days when he first stepped off the trading ship that carried him around Cape Horn: "It almost makes me think I had sloughed off about forty years and gone back." During the ensuing years, he had known "dull times and good times" as he hastened to mining excitements from Tombstone to Siberia, but he had always known how he wanted to live. "When we had money we always spent it, and when we were broke we worried along as best we could until we got some more. I fell in love with the life, and I want to live and die . . . in a mining camp."[46]

Notes

[1]M. B. Aston, "Esmeralda County," in *The History of Nevada*, Sam P. Davis, ed. (Los Angeles: Elms Publishing Company, 1913), II, 864–68; *Goldfield News* (Hereafter cited as *GN*), 4 August 1906; on

California, see Ralph Mann, *After the Gold Rush: Society in Grass Valley and Nevada City, California, 1849–1870* (Stanford: Stanford University Press, 1982), 19, 138.

[2]Reports of Nevada State Controller, *Appendix to the Journals of the Senate and Assembly*, 1905, 1907, and 1909; report of Nevada State License and Bullion Tax Collector, *Appendix*, 1909.

[3]Aston, "Esmeralda," 864–65; *GN*, 8 December 1905; *Goldfield Tribune* (hereafter cited as *GT*), 28 April 1907; *Goldfield Chronicle* (hereafter cited as *GC*), 11 July 1908; *City Directory of the City of Goldfield—Columbia, Diamondfield, Jumbo Town, Mill Town, Nevada, 1907–1908* (Chicago: National Directory Company, 1907), 303–304; Watson Parker, *Deadwood: The Golden Years* (Lincoln: University of Nebraska Press, 1981), 63, 228; Elliott West, *The Saloon on the Rocky Mountain Mining Frontier* (Lincoln: University of Nebraska Press, 1979), 121–22.

[4]*GT*, 17 February 1907. Also see *GT* for 28 April 1907 and 11 July 1908; *GC*, 1 April 1908; and report of Nevada State License and Bullion Tax Collector, *Appendix*, 1909.

[5]George G. Rice, *My Adventures with Your Money* (1911; New York: Bookfinger, 1974), 83–89; Joseph Fuetsch, interview, 8 December 1986, Walnut Creek, California; Martin Duffy, *Goldfield's Glorious Past* (Sparks: Western Printing and Publishing Company, 197?), 45; *GT*, 2 March 1907.

[6]*Goldfield Gossip* (cited hereafter as *CG*), November 1906. Also see *City Directory*, 269, 272–73, and the 1908 report of Nevada State License and Bullion Tax Collector.

[7]Sally S. Zanjani, "To Die in Goldfield: Mortality in the Last Boomtown on the Mining Frontier," *Western Historical Quarterly* 21 (February 1990), 51.

[8]Manager, *Denver Mining Record* to James O'Brien, 16 September 1904, James O'Brien papers, Nevada Historical Society, Reno; Richard E. Lingenfelter and Karen Rix Gash, *The Newspapers of Nevada: A History and Bibliography, 1854–1979* (Reno: University of Nevada Press, 1984), 101; Wells Drury, "Journalism," in *History of Nevada*, Davis, ed., 490; Carl B. Glasscock, *Gold in Them Hills: The Story of the West's Last Wild Mining Days* (New York: Grosset and Dunlap, 1932), 107–108.

[9]Lingenfelter and Gash, *Newspapers*, 101–108, *GG*, 9 March 1907; *GN*, 20 April 1909.

[10]Lingenfelter and Gash, *Newspapers*, 101–108; Sally S. Zanjani and Guy L. Rocha, *The Ignoble Conspiracy: Radicalism on Trial in Nevada* (Reno: University of Nevada Press, 1986), 110.

[11]Drury, "Journalism," 490–91; Lingenfelter and Gash, *Newspapers*.

[12]Lingenfelter and Gash, *Newspapers*.

[13]*GC*, 25 September 1907, and also see 24 September 1907.

[14]*GC* 14 January, 26 February 1909; Lingenfelter and Gash, *Newspapers*.

[15]Drury, "Journalism," 492; Lingenfelter and Gash, *Newspapers;* W. H. Bryant to George Wingfield, 10 June 1910, and other correspondence, George Wingfield papers, Nevada Historical Society, Reno; Sally S. Zanjani, *The Unspiked Rail: Memoir of a Nevada Rebel* (Reno: University of Nevada Press, 1981), 169–70.

[16]Drury, "Journalism," 492.

[17]*GT*, 21 February, 22, 23 April, 23 October 1907; *GN*, 10 November 1905, 19 January 1907.

[18]Grant H. Smith, *The History of the Comstock Lode, 1850–1920*, University of Nevada Bulletin, Geology and Mining Series, no. 37, 1st rev. ed. (Reno: Mackay School of Mines, 1974), 62–63. Also see Marian V. Sears, *Mining Stock Exchanges, 1860–1930: An Historical Survey* (Missoula: University of Montana Press, 1973), 10, 110, 180.

[19]*GN*, July 1905, 10, 17 November 1906; *Goldfield Review* (hereafter cited as *GR*), 15 June 1907.

[20]*GN*, 17 August 1907, and also see 17 November 1906, and 21 September 1907; Sears, *Mining Stock Exchanges*, 110; and, on California, Mann, *After the Gold Rush*, 89–90.

[21]Glasscock, *Gold*, 180; Rice, *My Adventures*, 85; Henry W. Miles, "Recollections of Goldfield, Nevada," 1948, manuscript, Nevada Historical Society, Reno; *GT*, 20 June 1907.

[22]Miles, "Recollections."

[23]Loftus to O'Brien, 7 December 1903, O'Brien papers.

[24]Richard G. Lillard, *Desert Challenge* (Lincoln: University of Nebraska Press, 1942), 264–65.

[25]Rice, *My Adventures*, 47–55, 79, 121, 165–67; Russell R. Elliott, *Nevada's Twentieth-Century Mining Boom: Tonopah, Goldfield, Ely* (Reno, University of Nevada Press, 1966), 91–93.

[26]Rice, *My Adventures*, 56.

[27]Delos Dunbar to Frank Ish, 25 March 1904, O'Brien papers. On stock speculation and promotion, also see Elliott, *Nevada's Twentieth-Century Mining Boom*, 77, 86–89.

[28]Prospectus, O'Brien papers; *GR*, 27 April 1907.

[29]Rice, *My Adventures*, 176; Anne Ellis, *The Life of an Ordinary Woman* (1929; rpt. Lincoln: University of Nebraska Press, 1980), 250, 255.

[30]Loftus to O'Brien, 4 January, 10 February 1904, O'Brien papers; *GR*, 16 November 1907 (American Mining Congress recommendations).

[31]Loftus to O'Brien, 7 December 1903; Rice, *My Adventures*, 92–93.

[32]*Mining and Scientific Press*, 90 (25 March 1905), 180, and 95 (21 December 1970), 759.

[33]*GC*, 21 October 1907; *GN*, 1 December 1906. Also see Smith, *History of Comstock Lode*, 222–23.

[34]*GN*, 13 April, 10 July, and 20 October 1906, and 16 February 1907.

[35]*GT*, 4 April 1907; Loftus to O'Brien, 20 February 1904, O'Brien papers.

[36]*GC*, 12 November 1908, and also see 24 August 1907.

[37]On diversity, see Charles E. Knox, undated statement, Wingfield papers; on MacKenzie, see Sally S. Zanjani, "George Wingfield: The Goldfield Years," *Nevada Historical Society Quarterly*, 32 (Summer 1989), 122–23. Rice's own version of his downfall appears in *My Adventures*, 144–78; Wingfield's continuing vendetta with Rice is suggested by at least two letters in the Wingfield papers: Ralph Elbaterman to Wingfield, 24 May 1910, and W. G. McSwain to Wingfield, 22 March 1910.

[38]Lillard, *Desert Challenge*, 265–66, 271–72.

[39]Parker, *Deadwood*, 65; *GT*, 14 April 1904; *GR* 26 October 1907; Hugh A. Shamberger, *Goldfield* (Carson City: Nevada Historical Press, 1982), 115, 136.

[40]Shamberger, *Goldfield*, 136–37.

[41]Zanjani and Rocha, *Ignoble Conspiracy*, 138. Also see Shamberger, *Goldfield*, 133–35.

[42]*GC*, 13 October 1908; Richard E. Lingenfelter, *Death Valley and the Amargosa: A Land of Illusion* (Berkeley: University of California Press, 1986), 303–304; Elliott, *Nevada's Twentieth-Century Mining Boom*, 93; Zanjani and Rocha, *Ignoble Conspiracy*, 165.

[43]*GC*, 10–12 December 1907; Rice, *My Adventures*, 52; Shamberger, *Goldfield*, 135–36.

[44]On estimates of mining production and stock losses, see Shamberger, *Goldfield*, 201; Rice, *My Adventures*, 128.

[45]Patricia N. Limerick, *The Legacy of Conquest: The Unbroken Past of the American West* (New York: W. W. Norton, 1987), 100. On Goldfield attitudes, see *GT*, 4 June 1907.

[46]*GT*, 23 June 1907.

BOOK REVIEWS

Writing Western History: Essays on Major Western Historians. Edited by Richard W. Etulain. (Albuquerque: University of New Mexico Press, 1991. 370 pp., notes, bibliography, index.)

Generations of dutiful history students have been taught the Turner thesis in the years since its initial pronouncement by Frederick Jackson Turner, at the 1893 World's Columbian Exposition in Chicago. There, in a brief essay entitled "The Significance of the Frontier in American History," University of Wisconsin history professor Turner depicted the westering progress of Anglo settlement across North America and argued somewhat breezily that it was this frontier that had produced the things most identifiably "American" about the resulting society, including its democratic form of government. His formulation was immensely popular, and it set the stage for discussion of the frontier from that time to the present. Indeed, the most recent cause célèbre in western history, Patricia Limerick's *Legacy of Conquest*, takes as its theme an explicit rebuttal of Turner's theories about the American West. The Turner thesis just won't die, and with approach of its centennial, western historians can expect to be inundated with new volumes of debate and reconsideration.

Richard Etulain's volume of essays on historians of the American West does not fall into that category, however. Instead, these eleven essays, accompanied by an introduction and conclusion supplied by the editor, manage to put Turner's work in context by discussing important western historians both before and after him. Only two of the essays are devoted to Turner himself. One, by environmental historian William Cronon, covers the infamous Turner thesis. The other, by Michael Steiner, a historian of regionalism, discusses Turner's later and less popular work on the importance of sectionalism as a force in American history.

The remaining nine essays consider a wide variety of other influential western historians. These include two Turner precursors. Josiah Royce, a philosopher of idealism at Harvard who also wrote about his native California, is discussed by Robert V. Hine. Charles S. Peterson writes of Hubert Howe Bancroft, the indefatigable San Francisco publisher who financed the compilation of a thirty-nine-volume western history series, and whose collection of primary sources forms the basis of the library that bears his name at the University of California, Berkeley.

The rest are men who succeeded Turner, who were either his contemporaries and students, his successors, or occasionally his critics. These include Turner's student Frederic Logan Paxson, described by editor Etulain; Texas environmen-

tal determinist Walter Prescott Webb, discussed by Elliott West; Borderlands historian Herbert Eugene Bolton, depicted by Donald Worcester; and University of Kansas iconoclast James C. Malin, sympathetically portrayed by Allan G. Bogue. In a section entitled "Recent Western Historians," Etulain includes three big names from among many that might have been selected. Henry Nash Smith's seminal work on the perception of the West is covered in an essay by Lee Clark Mitchell. Ray Allen Billington's worshipful defense of Turner is lambasted by Patricia Nelson Limerick. Finally, Earl Pomeroy's profound reorientation of western history, from Turner's emphasis on distinctiveness to a contrary emphasis on continuity, is discussed by Michael P. Malone.

To pay tribute to the variety of their forebears in western American history, editor Etulain has gathered an impressive group of current contributors in the field. The names of all the essayists will be familiar to modern students of western history; and their work, indeed, is briefly highlighted in the whirlwind tour of recent trends and works that Etulain provides in his conclusion. While the tone of these essays inevitably varies, with some being more personal or more sympathetic than others, the authors have obviously been given clear editorial instructions. Each essay provides a useful biography of the historian being treated, and then considers each of his works in turn. Critical analysis of the historians and their works is not abjured. All of the essays conclude with two bibliographies, one of works by the historian being considered, and the other of works about him and his work.

Such attention to consistency and detail, as well as the careful match, in most cases, between the authors of the essays and the figures they are writing about, give this volume the hallmarks of a classic. Even though several good works on western historiography have appeared in the 1980s, this one is an important new contribution. The previous works focused on topics rather than on individual historians, as Etulain's volume does. *Writing Western History* offers an important contribution to western American historiography and belongs on the bookshelves of all current practitioners of Turner's art.

C. Elizabeth Raymond
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Desert Wood, An Anthology of Nevada Poets. Edited by Shaun T. Griffin. (Reno, Las Vegas & London: University of Nevada Press, 1991, xxxvii + 250 pp. foreword, preface, index.)

One of the cardinal functions of poetry is to show the other side, the wonders of everyday life: not poetic irreality but the prodigious reality of the world.

——Octavio Paz

Ten years in the making, *Desert Wood, An Anthology of Nevada Poets,* is full of the wonders of Octavio Paz's "other voice," the voice of the poet speaking out of humankind's collective experience of time and life. Paz, winner of the 1990 Nobel price for literature, is passionately committed to the role of the poet throughout history's fashioning and refashioning of a vision of social order. Indeed, for reasons he elaborates in his most recent collection of essays, Paz is convinced that the survival of poetry "is bound up with one of greater urgency and graver import: the survival of humanity itself." It is in this context that readers may welcome the strong voices of forty-nine poets who have over the last fifty years practiced their art in Nevada.

In an age when poetry is admittedly not the most popular of literary forms, *Desert Wood* reassures us that faith in the ancient tradition of poetic craft is yet unbroken. The collection includes the sensual songs of lyricists as well as the prophetic murmurings of twentieth-century visionaries. It offers narratives of human experience or insight, and, in many of the poems, it affords a glimpse of the extravagant grandeur of desert landscape. More than this, however, *Desert Wood* presents the great gift of poetry, the gift of embodying memory in words. To quote Paz once again, "Poetry is memory become image, and image become voice." The other voices of Nevada's poets speak of everyday life, and, in their speaking, "fabricate," as Nevada poet Joanne de Longchamps says, "a world of wonders."

The voices of Nevada's poets are notably various. *Desert Wood* includes the work of twenty-one women poets. Emma Sepúlveda-Pulvirenti, a Chilean exile, writes her poems in both English and Spanish. nila northSun, a Shoshone Chippewa, uses the persona "gramma" to explore the loss of Native American traditions across the generations. Adrian C. Louis, a member of the Paiute Tribe, writes vividly of reservation life, watching "the desert sun wilt the white man's flowers." Novelist Walter Van Tilburg Clark, well known for *The Ox-Bow Incident,* captures delicate moments of transition, changes in life and season that are reflected in Nevada's landscape. One of the wittiest of Nevada poets is Thomas Whitehead, master of humorous overview and in his everyday life a bicycle repairman. Other poets are teachers, writers, or journalists. There is a former National Basketball Association player, a potter, an anthropologist, a massage therapist, a musician, and a police officer turned weather watcher. Octavio Paz hopes that poetry will not become superfluous in the modern age. The multiple voices of these writers, gathered together in *Desert Wood,* affirm his claim that "against all odds, poetry circulates and is read."

Indeed, there is an interesting subtext in *Desert Wood.* Details in the biographical sketches of the poets include reference to a continuing network of communication among the state's writers. Several of the poets have been engaged in small-press publishing efforts over the years. Others have participated in organized poetry workshops. Some have served on the Nevada State Council on the Arts. Many have published chapbooks, and most have presented their poems in

public readings. The poems of several have been published in national journals. Shaun T. Griffin, the editor of *Desert Wood,* is presently working on a posthumous edition of the work of Joanne de Longchamps, one of the most gifted and distinguished of Nevada's poets.

The poets of Nevada do write of the wonders of everyday life, but the eloquence of *Desert Wood* is not provincial. Some of the themes are distinctly Nevadan: A. Wilber Stevens, for example, writes of "The Night Sammy Davis, Jr., Couldn't Go On (Las Vegas)." And certainly the length and the breadth of the nation's fourth largest state cannot be overlooked by its poets. They must write, to borrow Gailmarie Pahmeier's phrase, "with respect for distance." The distance extends, in the work of William L. Fox, to poetic images inspired by visits to the mountain peaks of Nepal. The distance is telescoped, in L. A. Fleming's wonderful piece, "Musing on Flower Poems," to that moment when an observer stands before roses with open mouth, gaping until "the whole body turns to summer." For Emma Sepúlveda-Pulvirenti, the distance is the past, recovered in the memory of a native land. The voices of Nevada's best modern poets truly reach beyond its wide borders, and all readers of poetry should welcome the publication of *Desert Wood.* Poetry is alive. To use Kirk Robertson's Nevada image, it is

out there
on the horizon
all that neon
beckoning you
in from the dark.

Lorena Stookey
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Bonanza Rich: Lifestyles of the Western Mining Entrepreneurs. By Richard H. Peterson. (Moscow: University of Idaho Press, 1991. 192 pp., preface, notes, appendix, bibliography, index.)

Focusing on the late nineteenth century, E. L. Godkin, editor of the *Nation,* dismissed the contemporary business elite as a "gaudy stream of bespangled, belaced, and beruffled barbarians." "Who," he asked contemptuously, "knows how to be rich in America?" According to Richard H. Peterson, Godkin would not have found the taste and style he sought among western mine owners. In a natural sequel to his well-received work on the social origins and business prac-

tices of fifty western mining entrepreneurs, Peterson has examined the efforts of these same men "to be rich."

The product is a strong and informative book. Peterson's research in both primary and secondary sources is thorough; his prose is crisp and readable; his examples are illustrative and engaging; and his organization is sound. Most important, he has couched his materials in a relevant and informed historiographical context. His analysis measures attitudes and actions of the mining elite against studies of their wealthy peers east of the Mississippi and against the social outlooks and behaviors that an application of Frederick Jackson Turner's frontier thesis would have predicted.

Peterson concludes that western mining leaders pursued lifestyles that conformed closely to eastern elitist standards. Rather than exhibiting a peculiarly "pioneering" approach or developing an "innovative" western culture, these rich westerners looked east for their models. Their lifestyles demonstrated "cultural continuity" and national homogeneity rather than a "separate regional identity." Like wealthy easterners, the mining entrepreneurs credited their success to rugged individualism, natural selection, and God's will, even as they eagerly sought government subsidies; like wealthy easterners, they built gaudy mansions, hosted lavish parties, sailed on imposing yachts, provided their children with expensive private educations, travelled abroad in search of status and art objects, and maneuvered for seats in the United States Senate; and like wealthy easterners, many of them liberally supported education and other philanthropies. Peterson contends that this final practice embodied a public spirit that has too often been overlooked and that runs counter to Turner's arguments for frontier anti-intellectualism.

Such contributions and ostensible public spirit are often cited by opponents of the robber-baron interpretation of Gilded Age businessmen. Peterson, however, chooses not to use his (substantial) evidence to engage directly in the robber-baron debate. While a more focused treatment of this question would have been useful, this is a minor criticism of a fine study.

Joseph A. Fry
University of Nevada, Las Vegas

Equal to the Occasion: Women Editors of the Nineteenth-Century West. By Sherilyn Cox Bennion. (Reno and Las Vegas: University of Nevada Press, 1990. 210 pp., introduction, illustrations, notes, bibliography, appendix, index.)

The function of western periodicals and their editors in providing news, information, and entertainment, in boosting communities, and in promoting

causes has long been recognized by historians. Until now, however, the role of women in editing these publications has been ignored. In *Equal to the Occasion,* Sherilyn Cox Bennion, professor of journalism at Humboldt State University, provides the data to begin to correct this oversight. She sketches a group portrait of the almost 300 women who, during the last half of the nineteenth century, edited more than 250 publications in the states and territories of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Oregon, Utah, Washington, and Wyoming.

To accomplish this, Bennion surveys the lives, careers, and publications of a representative sample of approximately fifty of these women. (An appendix lists by state or territory the names of all women editors the author discovered, with the titles of their papers, place and frequency of publication, and the location of extant physical or microform copies.) The brief biographies are arranged according to the type of publication each woman edited: those intended primarily for a female audience, weekly small-town newspapers, radical and reform publications, woman suffrage periodicals, religious publications, medical periodicals, and literary magazines. And since each chapter includes a discussion of the particular genre under consideration, in both a national context and as it appeared in the West, the book is also an introduction to nineteenth-century periodical publishing. This organizational device breaks down, however, when confronted with women whose lives and careers resist easy categorization, necessitating additional chapters: "The Queen Bee and Other Characters" for eccentrics such as Colorado's Caroline Nichols Churchill, and "A Miscellany," which includes Annie H. Martin of Carson City.

In her introduction, the author situates the study within the context of current research in both western women's history and the history of frontier journalism, and provides a statistical image of western women editors and their publications. Although Bennion found no typical woman editor, no typical woman's publication, and nothing definitive to separate women from men editors, some generalizations about her subjects are appropriate. The editors ranged in age from the teens to the eighties, but they were predominantly middle class, apparently exclusively white, and usually possessed a better-than-average education. Most (more than two thirds) were sole editors of their publications, and, with a few notable exceptions such as Emmeline B. Wells whose career as editor of Utah's *The Women's Expositor* lasted thirty-seven years, their tenures were brief—no more than five years and often less than one year. Of the wide variety of publications these western women edited, the small-town weekly newspaper was the most common, as it was for women editors elsewhere in the nation.

Ten women worked in Nevada as editors during the nineteenth century. From those like Mary Atkinson, Nancy Hill, and Vienna Dollarhide, who remain largely mysteries, to Nellie Verrill Mighels and Annie H. Martin, they serve as a "microcosm of the group as a whole," illustrating "both the complexity of a group portrait and the difficulty of making it complete" (p. 158).

These editors, according to Bennion, were "among Western women who entered somewhat unconventional careers" (p. 10). She argues that they were accepted as editors in the West because of a "subconscious perception" that women and the press played similar roles—both were viewed as civilizing influences. More significant, though, their experiences emphasize once more the diversity of western women's lives. As the author concludes, almost any interpretation of the role of women in the West could be supported with evidence from the lives and work of these women. "At best, an examination of the women, their publications, and the situations in which they worked may reveal patterns that illuminate their experiences and their place in the nineteenth-century West" (p. 6).

Equal to the Occasion is a useful addition to the growing body of work on women's experiences in the American West. It provides a starting point for researchers investigating women journalists and their work in western communities, and should stimulate further research on the topic.

Kathryn Totton
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In the Delta Saloon. By Duncan B. M. Emrich. (Oral History Program, University of Nevada, Reno, 1991. 353 pp., introduction.)

The Oral History Program's recently released *In the Delta Saloon* is both an extremely valuable and at times frustrating contribution to Comstock history. Duncan Emrich (1908–77), professor of folklore at American University, was the founder and first chief of the folklore section of the Library of Congress. Ultimately, *In the Delta Saloon* promises to change the way historians look at this important part of Nevada's heritage.

Because of his life-long commitment to Virginia City and the West, Emrich made the Comstock his part-time home for several decades. In 1949 and 1950, he set up shop in the Delta Saloon and recorded residents' recollections about a Comstock and a West that had disappeared. Unfortunately, he left his tapes untranscribed in the Library of Congress, where they remained unknown to Nevada historians for the next forty years.

With the persuasion of Andria Daley, chair of the Comstock Historic District Commission, Senator Harry Reid, and Professor R. Thomas King of the University of Nevada Oral History Program, the Library of Congress agreed to provide copies of the tapes in exchange for transcriptions. The resulting publication is one of the most important recent additions to Comstock historiography. *In the Delta Saloon* can be seen as contributing to several lines of research, flawed only

by the fact that background noise in the saloon rendered some passages unintelligible.

A few of Emrich's two dozen informants were born in Virginia City in the 1870s, and they offer insights that historians previously thought irretrievable. Emrich's work provides a unique opportunity to work with first-hand recollections of nineteenth-century Virginia City. Although collectors invariably fail to ask all the questions later readers wish to have pursued, the scatter-gun approach that Emrich employed evoked discussion of a wide variety of topics. The informants address, among other subjects, ethnic groups, prostitution, violence, drug use, and the community infrastructure. And they do this with detail and perspectives not usually found in other sources.

Within Emrich's line of questioning, it is possible to discern a transition in Comstock popular culture. He was working at a critical time when original Comstock residents were becoming increasingly rare and newcomers were redefining the Comstock. Among the latter were Lucius Beebe and Charles Clegg, eastern authors who sought to celebrate and in some instances to create a wild west heritage for the region. One point of fascination for the newer residents was Julia Bulette, a prostitute who was murdered in 1866 and who recently has become important to the promotion of the Comstock. Emrich frequently attempted to steer his informants away from areas they wished to discuss in order to address topics such as Julia Bulette. The older Comstock informants were frequently unable to tell Emrich much on these subjects. Nevertheless, he doggedly pursued that material which would eventually make up much of the image of the Comstock spawned by Beebe and Clegg's publications and the tourism campaign of the 1950s and 1960s. As a result, *In the Delta Saloon* documents a transition between the older and newer sets of perspectives and folk mentalities.

Another intriguing type of information that this publication records is the variety of card games and drinking banter found in a Comstock bar in 1950. This material is in itself of value. The importance of this aspect of the document will no doubt be appreciated even more by future generations.

Finally, *In the Delta Saloon* must be regarded as an important addition to the contributions of Duncan Emrich—professor, author, and one of America's most noted folklorists. Emrich wrote about a dozen books, and this posthumous edition will provide readers with insight into his interests, his lifestyle on the Comstock, and his techniques as an interviewer. Although this particular endeavor is flawed by the sometimes casual nature of his method, it will nonetheless be regarded as an additional example of what made Emrich's career remarkable.

Emrich's *In the Delta Saloon* provides information for a variety of research avenues. The frequent hiatuses in the transcriptions, invariably occurring just as the text becomes most interesting, are extremely frustrating, but what remains will be of value as long as research is conducted on the Comstock. That the

rendering of *In the Delta Saloon* attains the quality it does is evidence of the diligence and talent of the staff of the University of Nevada's Oral History Program—Helen Blue, Linda Sommer, Kay Stone, and Verne Foster—professionals who provided the transcription and worked with the text. The problematic recordings are available to researchers at the Oral History Program.

An index would have made *In the Delta Saloon* more valuable, but given the nature of the original recordings, that process would have been difficult and less profitable than has been the case with other publications of the Oral History Program. In fact, *In the Delta Saloon* is unique, representing an attempt to produce an archival document distinct from the oral histories the program regularly publishes. Indeed, it should be noted that the Oral History Program's resources are underused and deserve more attention in Nevada historiography. If Emrich's work inspires researchers to look into the program's many other fine volumes, it will have made a further contribution to Nevada historiography.

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West West West: Major Paintings from the Anschutz Collection. Foreword by Philip F. Anschutz, introduction by J. Richard Gruber; text and artist biographies by Elizabeth Cunningham. (Denver: The Anschutz Collection in association with the University of Nebraska Press, 1991. 132 pp., illustrations, selected bibliography.)

Between 1974 and 1991 the exhibit, "Masterpieces of the American West: Selections from the Anschutz Collection," traveled throughout the United States and abroad. Residents of Reno and the surrounding area had the opportunity to view this fine group of paintings in the fall of 1987. *West West West* is the catalogue prepared for the exhibit.

Most of the publication is devoted to color reproductions of the exhibit's paintings and to Cunningham's succinct and helpful biographies of the artists who did them. Most of the sixty-eight artists are represented by one or two of their works. Chronologically, the plates range from Charles Bird King's 1828 portrait of Jesse Bushyhead to a 1979 portrait, also of an Indian, by Fritz Scholder. Not unexpectedly, Indians and landscapes are the predominant subjects. The people and scenery of the Southwest are depicted more often than those of other regions. This is especially true of the twentieth-century works that were painted after the rise of the artists' colony at Taos, New Mexico.

Even the earliest of those who portrayed the West felt a need to capture the

land and its people on canvas before the region as they knew it disappeared. By the end of the nineteenth century, Frederic Remington and others were painting a bygone era. In keeping with the general trends, romanticism characterizes the work of the nineteenth-century artists; from the twentieth-century painters we get realism, impressionism, and various avant-garde forms.

Most of those who painted the West have come from the eastern United States or abroad. Many of the American-born were trained in Europe. Not a few of them were influenced by the Mexican muralists. Some of these "western" painters never traveled beyond the Mississippi; others resided in the West only briefly. Many, however, came to stay. The inclusion of Alexander Pope of Massachusetts is puzzling since it is not clear if he was ever in the West or painted western subjects. Surprisingly, the artist with the most impressive western pedigree is Wyoming's Jackson Pollock.

Cunningham's introductory essay covers familiar ground: Frederick Jackson Turner, the West of myth and romance, and the new western history. But her assertion that western art and literature have been "dismissed as insignificant by critics and historians alike" (p. 14) is too sweeping. "French fur-trapper" (p. 17) is not an accurate description of Benjamin L. E. Bonneville, and the reference to John Pope's "survey of the Missouri Territory" in 1865 (p. 45) is utterly baffling. Also confusing is the identification of Colorado, Wyoming, and Nebraska in the 1870s as "Indian territory" (p. 58).

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