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## A History of The Geysers Geothermal Field Through 1960, An Annotated Bibliography

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### ABSTRACT

Histories are written a phrase, a date, a fact at a time. For over 30 years I've collected the early history—including a vast file of photos—of The Geysers Geothermal Field in Northern California. Everything changed at The Geysers in 1955 after the first modern geothermal well was drilled and in 1959 or 1960 when the first modern geothermal power plant went on line—but remnants from past eras remain. I've published these remnants several times and in several ways through the years, including one video—each adding to what was known before.

Because no comprehensive bibliography exists for information about the early history of The Geysers Geothermal Field, and believing one—with annotations—would be useful, I've prepared the following document. It isn't inclusive, as I personally have used *only a small part* of what's available. But even with a *caveat*, the bibliography should assist researchers.

Do you need descriptions of natural features or of Indian tribes who lived at The Geysers for thousands of years—who they were and what they left behind? What kind of a spa was The Geysers? What drilling tools were used in the 1920s when wells were first drilled there and the first power plant constructed? How was the first geothermal project financed in the 1920s? The answers are in citations from this annotated bibliography, divided into five historical eras: the time of wilderness; the period of discovery and use by Indians about 13,000 years ago; the development of organized tourism from the mid-1800s on, including visits by kings-to-be and at least four US presidents; the failed attempt in the 1920s of geothermal electrical-power generation; and, finally, the successful start of modern, geothermal electrical-power generation—the first ever in North and South America.

Future historical researchers may work for geothermal companies or prepare museum displays. Some may be geothermal archaeologists and anthropologists. This annotated bibliography, readily available in the *GRC Proceedings*, should help them all.

### Era One—The Wilderness

Of course no records exist of The Geysers Geothermal Field in its natural condition before humans set foot on the brushy slopes about 13,000 years ago (and for a long time after). What we believe today about the geology, climate, flora, and fauna of the ancient, untouched wilderness derives from speculative and scientific extrapolation. However comprehensive environmental summaries are found in the environmental documents by Fredrickson *et al.*, cited under *Era Two*.

### Era Two—California Indians

About 13,000 years ago in what is called the Palaeoindian Period, Indians first arrived at The Geysers Geothermal Field. By the mid-1800s after many settlers had arrived in California, six Indian tribes lived at The Geysers: the Southern, Central, and Eastern Pomo, the Western and Northern Wappo, and the Lake Miwok. All spoke different languages, had distinct cultures, and stayed in well-defined areas of today's geothermal field. Information about these peoples is found, of course, on line and in libraries. Descriptions of early California Indians appear in books and magazine and newspaper articles published onwards from the 1800s.

But for geothermal purposes, a good place to look is environmental documents—such as EIRs and EISs archived in libraries in the area (I used the Northwest Information Center at Sonoma State University—call ahead) and in libraries of nearby federal, state, and county governments—and in those of geothermal companies and public utilities. The following citations for Fredrickson *et al.* are very useful.

Barrett, S.A., 1908. *The Ethno-geography of the Pomo and Neighboring Indians*. Published by The University Press, Berkeley.

Brewer, William H., *Up and Down California in 1860-1864*, the *Journal of William H. Brewer*. Francis P. Farquhar, ed. 1930. Published by the University of California Press.

Finley, Ernest Latimer, ed., 1937. History of Sonoma County, California, Its People and Its Resources. Published by *The Press Democrat*, Santa Rosa, California.

Fredrickson, David A., June 4, 1974. An Archaeological Survey of Ten Small Land Parcels in The Geysers Geothermal Field, Lake and Sonoma Counties, California. Prepared for Pacific Gas & Electric Company. Manuscript on file at the Northwest Information Center, Sonoma State University. *Access subject to approval; call ahead.*

Fredrickson, David A., Prin. Invest., W.H. Wright, M.S. Ziegenbein, M.M. Druckman, H. Ritter, August 16, 1978. Paleontological Resource Investigations in Units 16, 18, 19, 20, and 21 Areas of The Geysers Region, Lake and Sonoma Counties, California. Submitted to Pacific Gas & Electric Company. Manuscript on file at the Northwest Information Center, Sonoma State University. *Access subject to approval; call ahead.*

Fredrickson, David A., Prin. Invest., D.W. Peri, S.M. Patterson, S.L. McMurray, September 1978. Ethnographic and Historical Survey of the Geothermal Leasehold Unit 17, Lake and Sonoma Counties, California. Prepared for Pacific Gas & Electric Company. Manuscript on file at the Northwest Information Center, Sonoma State University. *Access subject to approval; call ahead.*

Hodgson, Susan F., 1993. A Geysers Album. Videotape by the California Dept. of Conservation, Division of Oil, Gas, and Geothermal Resources. *Shows a portion of an obsidian arrowhead the moment it is found.*

Muybridge, Eadward, Photographic Collection. The Bancroft Library, Berkeley, California. *You should look for his photos of The Geysers in any library with photographic collections.*

Powers, Stephen, 1877. Tribes of California, from Contributions to North America Ethnology, Vol. III, Department of the Interior, U.S. Geographical and Geological Survey of the Rocky Mountain Region, J.W. Powell, in charge. Reprinted in 1976 by the University of California Press, Berkeley and Los Angeles, California. *Includes "A Legend of The Geysers" reprinted from "The San Francisco Bulletin."*

Price, Andrew, Photographic Collection. The Library of Congress, Washington, D.C. Look for his photos of The Geysers in any library with photographic collections.

Thompson, Robert A., 1877. Historical and Descriptive Sketch of Sonoma County, California. Published by L.H. Everts & Co., Philadelphia.

### Era 3—Organized Tourism

Between 1848 and 1854, tourists to The Geysers stayed in a cloth house erected near the future site of the Geysers Resort Hotel. The 1854 register for the cloth lodging held 20 names. Soon after 1854, work was begun on The Geysers Resort Hotel, which would become world famous. By 1875, the number of hotel visitors had reached 3,500 guests.

Visitors to the Geysers Resort Hotel, at its peak, included four US Presidents: U.S. Grant, William Howard Taft (plus his Vice President Schuyler Colfax), Theodore Roosevelt, and Gerald Ford. John Jay Knox, Giuseppe Garibaldi, P.T. Barnum, Jenny Lind—"the Swedish Nightingale," General Philip Henry Sheridan, J. Pierpont Morgan, Horace Greeley, William Jennings Bryan, actress Lotta Crabtree, opera singer Dame Nellie Melba, the Prince of Wales (later King Edward VII), John Muir, and author Jack London came, as well.

Sources sometimes mention Mark Twain as a guest, but I could find nothing about the Geysers Resort Hotel in his writings. Finally I called the Bancroft Library in Berkeley, California, and the director of the *Mark Twain Papers and Project* said he knew of no mention of a Geysers visit in Twain's work. He said a fake Mark Twain had passed through Northern California in the late 1800s and he could have signed the register.

The visits to the Geysers Resort Hotel by the rich and famous seem all the more amazing because of the long and arduous journey involved. The Geysers Resort Hotel was not only in far-off California, but from San Francisco itself a day's journey was required, including two ferry rides, two train excursions, and a breathtaking stagecoach descent on the steep and famous Geysers toll road. Stage driver Clark Foss and his galloping horses raced visitors around 35 hairpin turns on a 1,500-foot plummet to the hotel.

The "drop" was so exciting that Queen Victoria once requested the presence of Mr. Foss in London after her son, the Prince of Wales, described his own lively trip on the stage. Of course Mr. Foss accepted the invitation, and afterward his photograph was sold in New York City as a typical western "type."

Anderson, Dr. Winslow, 1890. Mineral Springs and Health Resorts of California, with a Complete Chemical Analysis of Every Important Mineral Water in the World. Published by A.L. Bancroft & Company, San Francisco, California.

Avery, Benjamin P., 1873. "The Geysers of California," *Scribner's Monthly*, October 1873, vol. VI, no. 6. New York.

Bancroft's Tourists' Guide Around the Bay, (North) The Geysers, 1871. Published by A.L. Bancroft & Company, San Francisco, California.

Bradley, Walter W., 1946. "Observations at 'The Geysers,' Sonoma County, California," State Mineralogists Report 42, No. 3. Published by the California Division of Mines.

Cronise, Titus Fey, 1868. The Natural Wealth of California, Published by H.H. Bancroft & Co., San Francisco, California.

Headly, Hon. J.T., 1879. The Life and Travels of General Grant. Published by Hubbard Bros., Philadelphia, Pa; Thomas Prothero, Emporia, Kansas; A. L. Bancroft & Co., San Francisco, Cal.; and W.H. Thompson & Co., Boston, Massachusetts.

Hodgson, Susan F., 1988. "A Geysers Memoir," *The Geothermal Hot Line*, vol. 18, no. 1. Published by the California Division of Oil, Gas, and Geothermal Resources.

Hodgson, Susan F., 1992. "A Geysers Album," Monograph on The Geysers Geothermal Field. Published by the Geothermal Resources Council, Davis, California.

Hodgson, Susan F., 1996. "Eadweard Muybridge, Early Geothermal Photographer" and "Eadweard Muybridge to Thomas Moran," *The Geothermal Hot Line*, vol. 22, no. 2. Published by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

Hodgson, Susan F., 2007. "Guests at The Geysers, La Crème de la Crème, Part I," *Bulletin*, vol. 36, no. 1, pp 28-31. Published by the Geothermal Resources Council. Davis, California.

Hodgson, Susan F., 2007. "Guests at The Geysers, La Crème de la Crème, Part II," *Bulletin*, vol. 36, no. 2, pp 32-35. Published by the Geothermal Resources Council. Davis, California.

Koenig, James B., 1992. "History of Development at The Geysers Geothermal Field," Monograph on the Geysers Geothermal Field. Published by the Geothermal Resources Council. Davis, California.

Langhart, Edwin, personal archives of The Geysers Geothermal Field.

Leslie, Mrs. Frank, 1877. *California: A Pleasure Trip from Gotham to the Golden Gate*. New York.

Meneffee, C.A., 1873. *Historical and Descriptive Sketch Book of Napa, Sonoma, Lake and Mendocino*. Reporter Publishing House, Napa City.

Panoramics, 1860. "A Trip to the California Geysers," *Hutchings' California Magazine*, vol. IV, no. 7.

Rintoul, William, 1990. *Drilling Through Time*. Susan F. Hodgson, ed. Published by the California Department of Conservation, Division of Oil and Gas. 178 p.

Shumate, Dr. Albert, 1957. *Early California Resorts*. Printed by Black Vine Press.

Stevenson, Robert Louis, 1883. *The Silverado Squatters, From Scotland to Silverado*, James D. Hart, ed. Published by The Belknap Press of Harvard University Press, Cambridge, Massachusetts.

Shoar, Jayne, 1865. She published a poem copied from the register of The Geysers Resort Hotel.

Truman, Major Ben C., 1883. *Tourists' Illustrated Guide to the Celebrated Summer and Winter Resorts of California Adjacent to and upon the Lines of the Central and Southern Pacific Railroads*. Published by J.S. Crocker & Co., San Francisco.

Truman, Major Ben C., March 1898. "Knights of the Lash," *Overland Monthly*.

## Era Four—The First Electrical Power Generation

In the early twentieth century, John D. Grant was a rock, gravel, and cement contractor working in Healdsburg, California, about 60 miles northeast of San Francisco and about 13 miles from today's Geysers Geothermal Field. John Grant had spent a lot of time at The Geysers and he formed The Geysers Development Company to generate electricity with steam from the field. Grant

served as company president and here is a history of his work in the geothermal field, in his own words.

"I first negotiated for The Geysers and adjacent properties in 1917," John Grant wrote, "but was unable to get satisfactory options to purchase until the fall of 1919. A well was commenced in the summer of 1921 but at a depth of 140 feet an explosion occurred which crumbled the ordinary well casing used. Well #1 was commenced in 1922 and by September had reached its final depth of 203 feet. Well #2 was started on October 18, 1922, and completed to a depth of 319 feet July 20, 1923. Well #3 was started in the summer of 1924 and was down 150 feet when work was stopped on account of the new method of drilling with a rotary rig. Well #4 was immediately started. By 1926, eight wells had been drilled in the field. The information obtained from the first two wells was sufficient to warrant drilling more wells to prove the extent of the territory. I incorporated The Geysers Development Company in the fall of 1922."

The company built a 35 kilowatt power plant in Geysers Canyon, near wells #1 and #2. A news clipping says the power plant went on line January 13, 1923, the first geothermal power plant to operate in either North or South America.

### Existing Early Film Footage

The wells drilled at The Geysers in the 1920s and the first power plant were filmed in 1925 by the Pathe Newsreel Film Company. Today the footage may be seen at the British Pathe Limited website, though the date on the website film is April 11, 1929. To find the film footage, enter "Geysers" under "Search the Pathe Database" and scroll down to "Steam Heat—Free."

Allen, E.T. and A.L. Day, 1927. *Steam Wells and Other Thermal Activity at "The Geysers" California*. Publication No. 378. Published by the Carnegie Institution of Washington, 106 p.

Anderson, D.N. and B.A. Hall, ed., 1973. *Geothermal Exploration in the First Quarter Century*. Published by the Geothermal Resources Council, 191 p.

Anderson, D. N., 1986. "B.C. McCabe and Magma Power Company," *Bulletin*, vol. 15, no. 6. Published by the Geothermal Resources Council, p. 3-5.

Foppiano, Louis J., Interview with William Heintz, Feb. 9, 1981. (*See final section on William Heintz materials.*)

Foppiano, Louis J., Interview with Susan Hodgson, Nov. 20, 2000.

"Geysers Offer Power Possibilities," Nov. 7, 1925, *Electrical World*.

Grant, J.D., letter to Frank Thone, March 14, 1927, *Science Service*, Washington, D.C. From *Geothermal Exploration in the First Quarter Century*, Special Report No. 3, Geothermal Resources Council. Ed. by D. N. Anderson and B. A. Hall. Published by the Geothermal Resources Council. Davis, California.

*Healdsburg Enterprise*, Healdsburg, California.

Hodgson, Susan F., 2006. "January 1925: Rotary Drilling comes to The Geysers with Well No. 4," *Bulletin*, vol. 35, no. 5-6,



pp. 175-178. Published by the Geothermal Resources Council, Davis, California.

Hodgson, Susan F., 2007. "Guests at The Geysers, La Crème de la Crème, Part II," *Bulletin*, vol. 36, no. 2, pp. 32-35. Published by the Geothermal Resources Council, Davis, California.

Hodgson, Susan F., 2008. "It Always Meant Money—How John Grant Financed the First Geothermal Power Project in the Western Hemisphere," *Bulletin*, vol. 37, no. 1, pp. 21-29. Published by the Geothermal Resources Council, Davis, California.

McCabe, B.C., Photographic Collection, Geothermal Resources Council, Davis, California.

Observer, "Harnessing Steam Geysers to Produce Electricity," *Petroleum World*, Aug. 1925, p. 26. From *Geothermal Exploration in the First Quarter Century*, Special Report No. 3, Geothermal Resources Council. Ed. by D. N. Anderson and B. A. Hall. Published by the Geothermal Resources Council, Davis, California.

*Press Democrat*, February 1938, selected articles. Santa Rosa, California.

Report XIV of the State Mineralogist, 1913-1914. Published by the California State Mining Bureau.

Siegfried, H.N., July 1, 1925. "The Geysers." *From Geothermal Exploration in the First Quarter Century*, Special Report No. 3, Geothermal Resources Council. Ed. by D. N. Anderson and B. A. Hall. Published by the Geothermal Resources Council, Davis, California.

## Era Five—Modern Electrical-Power Generation

Today The Geysers Geothermal Field is the largest geothermal field in the world, generating about 7.6 million megawatt hours, gross, of electricity in 2009, according to the California Division of Oil, Gas, and Geothermal Resources. The modern story of the field perhaps began around 1953 when B.C. McCabe, founder of Magma Power Company, began acquiring leases for land at The Geysers along Big Sulphur Creek, including the Big and Small Geysers areas (and Geysers Canyon across from the Geysers Resort Hotel). For leasing and legal details available nowhere else, read the interview with attorney Joseph Aidlin, cited below.

Hodgson, Susan F., 2010. "Seeking Basic Concepts, The *Sui Generis* of Joe Aidlin," *Bulletin*, vol. 39, no. 1, pp. 3-10. Published by the Geothermal Resources Council, Davis, California.

The first modern well at The Geysers, well Magma No. 1, was completed in 1955—drilled by Magma Power Company and Thermal Power Company. The first modern power plant, built by Pacific Gas & Electric Company, went on line in September 1960. Although the electrical generation in the field first declined from the peak development and production of the 1980s—and then leveled off, today in 2010 The Geysers still generates more electricity than any other geothermal field in the world.

To read a summary of modern times at The Geysers through 2009 as well as the early history, *see* the following citations under "Compiling All Five Eras," and especially the second edition (2010) of "A Geysers Album." For additional technical and scientific information, hundreds of publications are available with a myriad of details on modern field activities and developments.

## Compiling All Five Eras—Publications & Videos About The Geysers

Hodgson, Susan F., 1992, "A Geysers Album," essay from *Monograph on The Geysers Geothermal Field*, pp. 19-40. Published by the Geothermal Resources Council, Davis, California.

Hodgson, Susan F., 1993, A Geysers Album. Videotape by the California Dept. of Conservation, Division of Oil, Gas, and Geothermal Resources.

Hodgson, Susan F., 1997 (2010—the Second Edition). A Geysers Album, Five Eras of Geothermal History, *about* 80 pages. Published by and available from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, Sacramento, California. Also available from the Geothermal Resources Council.

## Photographic & Film Collections

Many photos of The Geysers Geothermal Field exist in an unknown number of collections throughout the United States. The collections are owned by local, university (an example is The Bancroft Library at UC Berkeley), and federal (an example is The Library of Congress) libraries, public utilities—PG&E has a great collection of photos from the 1960s and 1970s, geothermal companies, county and state entities involved with The Geysers, and private individuals. The Huntington Library in San Marino has a good photographic collection and may have some photos of The Geysers. The Healdsburg Regional Library is a treasure trove of Geysers memorabilia. The Geothermal Resources Council has many geothermal photos, and a large geothermal library, as well. People living in areas around The Geysers have family photos. Photos and drawings are found in old newspaper articles, now available on microfiche at many libraries, and books. Always ask for photos wherever you are researching—and *vice versa*.

For early film footage, *see* the section under *Era Four*, "Existing Early Film Footage."

## William Heintz Collection of Historical Information on The Geysers

Ring binders of historical articles and interviews compiled chronologically by William Heintz about The Geysers Geothermal Field are owned by Calpine Corporation. The binders—perhaps still in the company's Cartwright Geothermal Visitors Center in Middletown, California—offer many news clippings and a great deal of information. *Call to inquire*.