Proceedings World Geothermal Congress 2000
Kyushu - Tohoku, Japan, May 28 - June 10, 2000

TWENTY-THREE VIEWS OF THE GEYSERS GEOTHERMAL FIELD, *WHAT WAS SAID*

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Key Words: geothermal, history, anthropology, The Geysers Geothermal Field

ABSTRACT AND INTRODUCTION

This history of The Geysers Geothermal Field focuses on the rich variety of activities in the field, how each influenced the rest, and how many occurred simultaneously over long periods. First, of course, the field was an untouched natural area. About 10,000 years ago, Indians arrived and made it their home, bathing and healing in the areas they held sacred, those with hot springs and fumaroles. In the 1850s, settlers entering California began organizing and promoting tourism at The Geysers, to the point that by the mid-1880s European royalty couldn't resist the long, dusty trip to savor its charms. In the 1920s, the first geothermal electrical generation project in the Americas began at The Geysers, and in 1955 the first modern geothermal well in the Americas was drilled there, beginning the modern era of electrical power generation. The variety of human activity at The Geysers and the views of the participants **(depicted in bold type)** perhaps reflect the same variety of human activity found around Mt. Fuji by the Japanese artist Hokusai, who depicts this in his collection of woodblock prints, *One Hundred Views of Mt. Fuji.*

1. MT. FUJI AND THE GEYSERS, VIEWS VISUAL AND SPOKEN

He has gazed up at the lofty peak [of Mt. Fuji] through trailing willows and through trembling sheaves of rice.— From *One Hundred Views of Mt. Fuji,* by Hokusai, *Preface,* Ryutei Tanehiko, 1834, (Fig. 1).

One Hundred Views of Mt. Fuji, a masterwork of woodblock prints by the Japanese artist Hokusai, was printed in a 16-year period begun in 1834. The beautiful prints offer views of Mt. Fuji: peerless in height, for at 12,385 feet the volcano is by far the tallest Japanese peak, and peerless in the regard of the Japanese people.

Many books explain these connections in detail, but for me, the various views of Mt. Fuji offer a way to view the history of The Geysers Geothermal Field in Northern California, U.S.A.

This occurs because the prints by Hokusai depict Mt. Fuji through a lens of change, focussed by the activities that surround it and the points of view of beholders. Every print is different. In some the mountain is incidental, in some it is paramount, in some it is being acted upon, in some it is acting on others, in some its beauty or strength or size takes the primary place, and in some Mt. Fuji is so tiny, so subtly depicted that you must search for it in the scene. There are prints of the mountain by itself, or of gods on its peak, of people climbing in rows of ascending rounded hats, of people rolling down, tossed by an earthquake, of the mountain barely visible behind cattails lining a riverbank and fishermen, of picnickers paying no attention at all to the distant peak, and of a traveler resting under a tree, holding a wine cup of saki in which a tiny Mt. Fuji is reflected.

This is what I want to emphasize about The Geysers Geothermal Field, that from the beginning the place has known constant variation, that people have lived and worked there together doing many things, holding many points of view. Variety is often lost to history, unrealized by us and by people at the time. The little written about The Geysers usually highlights the dominant activity of the day.

Ironically for such a thesis, many of the myriad activities at The Geysers occurred at the same place in the field, for The Geysers is not sprinkled evenly throughout with hot springs and fumaroles. Instead, these features group, the most important area being the stretch of Big Sulphur Creek as it flows by the gorge of Geyser Canyon. In the canyon itself and in Big Sulphur Creek just below it, large numbers of fumaroles and hot springs are clustered (Fig. 2).

For the last 10,000 years the Indians held these features sacred and bathed for pleasure and cures. The Geysers Resort Hotel was built at the foot of Geyser Canyon and here the age of organized tourism began in the 1850s. Both eras of electrical generation in the field would begin with wells drilled in Geyser Canyon, one in the 1920s and one in 1955. But the beginning of one era was not the end of another, only a change in emphasis. No matter what happened, landholders still lived at The Geysers, Indians still visited hot springs, tourists still enjoyed the rugged green slopes, and in ever-smaller untouched places, plants and animals lived free of human interference as they had for millennia.

Not knowing others' activities at The Geysers did not begin in the modern age of electrical power generation, but eras before, as we see from the pen of Mrs. Frank Leslie, a writer and wealthy New York tourist who visited the Geysers Resort Hotel in 1877. She wrote in her book, *A Pleasure Trip from Gotham to the Golden Gate*, **"The Indian's vapor bath is a deep cave in the side of a hill, filled with scalding hot steam, which rises and hangs around the entrance in a dense cloud; the Indians used to resort here yearly for this bath until within a brief period, but now come no more."**

Tellingly Mrs. Leslie, in one of the few on-the-scene commentaries of Indian use of The Geysers, gives information of what was *no longer* done. In truth, though the tourists did not see them, some Indian use of the thermal manifestations continued through the 1970s, as recorded by Dr. Fredrickson and others. The hidden quality of this use is not unique. Sherrie Smith-Ferrie, Director of the Grace Hudson Museum, a museum of Indian culture in Ukiah, California, and herself a member of the Dry Creek Pomo tribe from the Geysers area, says of the adaptation, **"For the longest time, anthropologists have wanted to only look at Indian life prior to the arrival**

of Europeans. I think the real story is how amazing it is that native peoples survived, and in some very creative ways."

What do we know about Indian life at The Geysers? The only authentic photographs known to exist are from 1871 by famed photographer Eadweard Muybridge, perhaps the first to photograph The Geysers and the person who would invent motion pictures. His photos are of a tepee-like stick structure propped up over a fumarole. A hide draped over the structure would have made the inside a steam bath. Benjamin Avery wrote of the arrangement in 1873, **"A ravine contains a clear hot spring, which was formerly built over with stones and sticks by the Indians, and the steam used as a sanitary agent. It is still known as the Indian Spring."** Robert Thompson told in 1877 how the Indians built scaffolds or gratings over steaming pools, on which they placed the sick, especially those suffering from rheumatism.

By the mid-1800s when many settlers came to 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 lived in well-defined areas of the field (Fredrickson, 1974). Trails open to all the tribes crisscrossed The Geysers. Some trails led to the hot springs and fumaroles, which were considered neutral ground used for healing purposes by all tribes and may have held ceremonial significance (Fredrickson, et al.).Wappo invalids, wrote anthropologist Stephen Powers in 1871 or 1872, **"were accustomed to wallow in the hot, steaming mud and pools, receiving benefit therefrom into their bodies."**

The area around the former Geysers Resort Hotel was held especially sacred and its waters were used medicinally to treat a multitude of illnesses. An Indian woman said that her grandmother described the different types of water available near the former resort, saying **"Every kind of water came out of the mountain, ice cold, lukewarm, and boiling hot."**

She said that a man from Cloverdale (a nearby town), sick for a year, was cured with a treatment at this site. Basins were excavated near sources of cold, lukewarm, and hot water, and small channels to each were constructed. Proper water temperatures were obtained by opening and closing the channels. The man was brought to the area on a litter made of willow branches from the Cloverdale Pomo village of Makamo, near the confluence of Big Sulphur Creek and the Russian River. He stayed at The Geysers for four days and four nights, attended by an Indian doctor. At the conclusion, the man walked out without assistance, completely cured (Fredrickson et al.).

In 1871, Stephen Powers recorded an Indian legend about geothermal manifestations at Geyser Canyon. It is a lengthy and very literary tale of how the spirit of a slaughtered grizzly bear came to control the hot springs and fumaroles. The spirit supposedly frightened the Indians away so they no longer entered the canyon, using instead the fumaroles and hot springs in Big Sulphur Creek, a bit below it. This tale is an interesting key to what was going on, reflecting the probable reality of Indian life: because the Indians frightened the tourists and hotel staff, the Indians themselves were chased away, only to return by stealth, for it was just six years later that Mrs. Frank Leslie reports seeing no Indians at all. Powers writes confidently, however, oblivious to reality, that **"Enterprise and love of gain have built a beautiful hotel across from the Geysers, and hundreds of tourists annually flock thither. The Indians, however, firmly believe that the wrathful demon still holds sway, and they can never be induced to approach the gorge of the main Geysers."**

It was this "beautiful hotel" that opened the age of organized tourism at The Geysers Geothermal Field. The hotel did not prosper in its first decade. William Brewer, a geologist visiting in 1861 wrote in his journal, **"A company preempted a claim of 160 acres, embracing the principal springs and the surrounding grounds, built quite a fine hotel on a most picturesque spot, and at an enormous expense made a wagon road to them, leading over mountains over three thousand feet high. But the road was such a hard one, the charges at the hotel so extortionate, and the stories of the wonderful geysers so much magnified, that in this land of 'sights' they fell into bad repute and the whole affair proved a great pecuniary loss."**

However, these setbacks proved temporary. **"The first hotel register, kept in 1854, had 20 names. From then the number increased every year, and in 1875 there were 3,500 names enrolled,"** wrote Robert A. Thompson in 1877.

Tourists arrived at The Geysers Resort Hotel in stagecoaches and wagons, fresh from enduring a precipitous descent of about 1,500 feet for a stretch of two miles. Describing the famous slope, Benjamin Avery wrote in 1873, **"There are 35 sharp turns in 'the drop,' and the road, just wide enough for the team, frequently hugs the edge of steep rocky precipices…. The great speed maintained, instead of increasing the danger, lessens it. Yet there are persons in almost every wagonful of passengers who pale and shrink as the vehicle dashes wildly down, and as they see below them, under the very wheels, as it were, the yawning chasms that threaten death…. When the wagon reaches the hotel, all its tenants have a half-wild-look, as if they had just come down in a balloon and were thankful it had 'lit.'**

What was The Geysers Resort Hotel like in its prime, from the late 1860s to the early 1880s? It was packed with famous visitors from around the world, including U.S. presidents and European royalty. Major B. C. Truman wrote in 1883, **"The hotel was so full during June, July, and August 1882, that people were compelled to sleep in bath-houses and on billiard tables. The hotel building is not at all modern in its structure, but is roomy and airy. There are broad piazzas on which the room doors all open; and Mrs. Sherwood, the jewel of a housekeeper, sees that everything is as neat and clean and sweet as a daisy.**

"The table is as good as the market can make it; and, in their season, there is fish, and bear meat, and venison. We could recommend no better place for reasonable recreation, absolute *re*-creation, and perfect rest, than the Geysers. Instead of fashion, there is freedom; instead of expense, economy; instead of watering-place luxury, country comfort."

After 1885, the popularity of They Geysers Resort Hotel declined rapidly, During the next decade, unsuccessful attempts were made to maintain patronage with appeals to lower-income vacationers. One ad touted the resort as **"the**

grandest, most beneficial for health, and cheapest pleasure trip in the world." Although the hotel's great days were never revived, a steady stream of visitors continued until the last proprietor died. A short time later in 1980, the final vestiges of the resort were razed by his heirs, ending about 128 years of operation.

Dr. Winslow Anderson noted in 1890 in his book on the medicinal uses of hot springs, that **"these famous springs [at the Geysers Resort Hotel] have been the objects of wonder and admiration to all the many thousands who visit them yearly…. Do not," he ordered, "commence a course of treatment at the springs by bathing one or twice daily. The American fashion, as noted elsewhere, of hastening and rushing through everything may do well enough for business, but where the life of an individual or the treatment of an obstinate disease is at issue this plan is not only deleterious, but may prove fatal to the life of the patient."**

A favorite hot spring of all visitors, called the Witches' Cauldron, bubbled and seethed in Geyser Canyon. **"The Witches' Cauldron is a black cavernous opening in the solid rock, about seven feet across, and of unknown depth, filled with a thick inky liquid, boiling hot, that tumbles and roars under the pressure of escaping steam…. That seems to proceed from some Plutonic reservoir. One irresistibly thinks of the hellbroth in *Macbeth,*"** wrote Benjamin P. Avery in 1873.

It was here at the Witches' Cauldron that the first era of electrical power generation began at The Geysers. John Grant, a local entrepreneur, often visited The Geysers with the dream of harnessing the natural steam. He took out a lease and option on the property in 1920. In the summer of 1921 with a cable tool rig, he drilled well No. 1 by the Witches' Cauldron, the hottest part of Geyser Canyon. At a shallow depth, **"the well blew up like a volcano,"** driller Glen Truitt recalled. After the blowout, Truitt said Grant simply moved across the canyon in 1922 to drill a second well, also called *well No. 1*, and one of the world's first successful geothermal wells drilled for electrical power generation. Grant found steam just below 200 feet. **"At this depth,"** Truitt said, **"everything came flying up—mud, tools, rocks, and steam. After things settled down, there was just clean steam. But the noise was loud enough to hear all over the valley."**

Ultimately, Grant drilled eight wells and built a 35-kilowatt power plant near well No. 1. The plant was equipped with two General Electric reciprocating, steam-engine-driven turbine generators. Unfortunately, by the early 1930s Grant's electrical generation project had failed, destroyed by costs and technical problems at The Geysers and by the glut of oil hitting the West Coast market, making electricity generated in oil-fired plants more attractive economically.

However, The Geysers remained an inspiration for those who knew it, in more ways than one. In February 1938, a movement was launched to establish The Geysers as a national monument. Writes the Santa Rosa *Press Democrat,* **"In the event that the federal government should designate the Geysers as a national monument, federal funds could be secured for the necessary development, emphasizing the resort as a natural wonder. From there, the way would be clear, the committee believes, for action on the proposed foundation for the treatment of infantile paralysis [at The Geysers]."**

"I want to do everything in my power to bring to the attention of people everywhere the life-giving, health-stimulating water of The Geysers…. God certainly will bless efforts directed at relieving those who suffer and who could be cured with the opening of The Geysers as great health foundation," said the Reverend Father Frederick Deschenes in a 1938 interview. Toward this end, a Dr. Joseph Sooy obtained the property on a long-term lease from John Grant early in 1935. Dr. Sooy agreed to construct a 120-room hotel with hospital arrangements, transforming the place into a sanatorium. Wrote Ernest Finley in 1937, **"Development of what is sometimes referred to as 'Sonoma's Eighth Wonder of the World' into a health and recreational center doubtless will attract large numbers of tourists, sightseers and invalids to The Geysers annually."** Perhaps recalling John Grant's aborted venture, he added, **"It may result ultimately in harnessing in useful industries the steam that has gone to waste for ages."**

Dr. Sooy ran his sanatorium for a while, but with a fire that destroyed the hotel in 1938 and the advent of World War II, his dream ended. However, tourists continued to come to The Geysers and landholders to live there. Everyone I spoke with who has lived on these slopes recounts with enthusiasm the beauty and natural pleasures. Charles Sooy, for example, a nephew of Dr. Joseph Sooy, said, **"At night as we swam, the deer would peek at us over the fence."** Today many continue to enjoy the natural ambiance.

But a new time has come, the modern age of electrical power generation, bringing changes and new voices to The Geysers. These include regulatory agencies, such as the federal government, who wrote in 1970 in the *Geothermal Steam Act,* **"The Secretary of the Interior may issue leases for the development and utilization of geothermal steam and associated geothermal resources."** Not just the federal government, but the State of California and private landowners signed leases to develop steam at The Geysers.

The age of modern development really began a few years earlier when B. C. McCabe, founder of Magma Power Company, made a deal with Robert Bering and the Estate of Frank Wood to acquire about 3,300 acres of land along Big Sulphur Creek, including Geyser Canyon with its hot springs and fumaroles. In 1955 in Geyser Canyon, Magma drilled well Magma No. 1, the first modern well at The Geysers, about halfway between John Grant's wells No. 1 and No. 7, and close to the Witches' Cauldron. Mr. McCabe wrote in 1969, **"I consider the greatest dividend I ever had in my life came the day I went into the geothermal steam business, not from the standpoint of money, but from the standpoint of mental interest."**

In October 1958, Pacific Gas & Electric Company (PG&E), a major public utility in Northern California, signed a contract to purchase steam from the Magma-Thermal venture, the first modern commercial agreement for geothermal electrical power generation in the United States. Close to the wells, PG&E built power plant Unit 1, which began operating in September 1960, the first modern power plant to generate electricity from geothermal steam in the country. In this way, the project elements all came together.

Through the years, the field was expanded as successful wells were drilled and power plants constructed. As market conditions changed, steam prices rose and fell. Well depths increased and deep wells drilled in the northern third of the field encountered steam with corrosive hydrogen chloride and increasing amounts of noncondensible gases such as hydrogen sulfide. In addition, steam production rates and pressures at The Geysers declined much faster than anticipated. By 1991, it was widely recognized that accelerated development undertaken at The Geysers in the 1980s had caused steam pressure drops in much of the reservoir to about 200 pounds per square inch (psi) from an initial pressure of 500 psi in the 1960s.

The steam decline altered significantly the expected production and longevity of the steam resource. In October 1991, of the 2,093 megawatts of installed electrical generating capacity, the actual output was 1,326 megawatts. In May 1997, the actual output had fallen to 824 megawatts but by June 1999 had risen to about 1,000 megawatts, partly because since 1997 treated wastewater for injection was piped to the field from Lake County. With plans nearing final approval in June 1999 for a second wastewater pipeline running just above historic Geyser Canyon, the Santa Rosa *Press Democrat* reported that **"Pipeline construction is expected to begin next year and the system to begin operating in 2002."**

Today Calpine Corporation owns most wells and power plants at The Geysers, a change allowing more efficient steam management and production. At the same time, the company works to protect and preserve the same natural environment that people have cherished for thousands of years. In June 1999, I asked Calpine for its views on environmental care. Charlene Wardlow, Environmental, Health and Safety Manager, replied, offering an encapsulated look at the field today and its future. She said, **"Calpine is committed to maintaining and is striving to enhance our excellent environmental record at The Geysers…. This includes improvements at the power plants to improve the utilization of the steam, improvements to hydrogen sulfide abatement systems that will reduce air emissions and waste generation, new pipelines between power plants so that steam can be used at other more efficient power plants, and of course, our commitment to the Southeast Geysers Effluent Pipeline Project** [the pipeline from Clear Lake] **and the Geysers Recharge Project** [the second pipeline]**."**

As life and development at The Geysers continue, this account ends with Hokusai's last drawing of Mt. Fuji, an outline in one inexorable stroke like the movement of time. The moment begins page left in puddles of ink zigzagging horizontally across the volcano's base, then up its side for a way. With altitude, the puddles gradually disappear, becoming at last a delicate concave line that reaches the crater, sawtooths across it for an instant, and slopes gracefully down page right. Here too is the history of The Geysers, an unbroken, variegated line of people and events that moves through history to shape, define, and endure.

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Figure 1. *Fuji over a Willow Bank.* Passing Mt. Fuji, two travellers pause to smoke a pipe beneath the willows and enjoy the view. The rest go on their way indifferently. *One Hundred Views of Mt. Fuji*, by Hokusai, courtesy of the Spencer Collection, The New York Public Library, Astor, Lenox and Tilden Foundations.

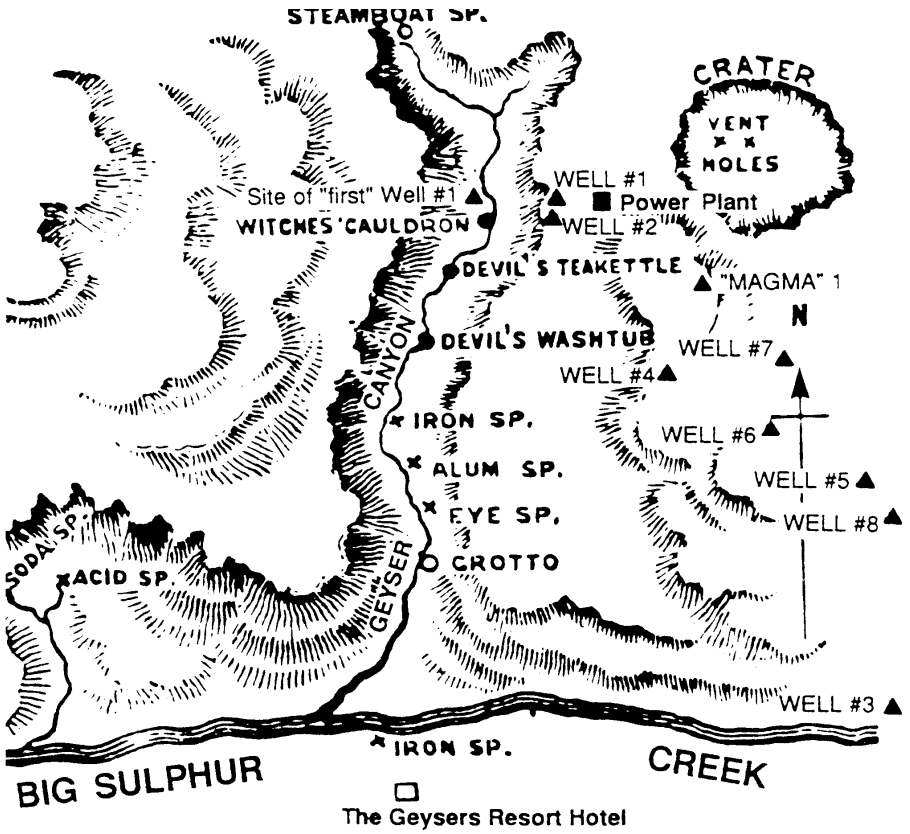

Figure 2. This map of Geyser Canyon, published in the late 1880s, includes fanciful names for the thermal features. The Geysers Resort Hotel, the eight geothermal wells drilled by John Grant in the 1920s, and the first modern well, "Magma" 1, are added for reference.