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The Manley Hot Springs Hotel, circa 1910 (University of Alaska Archives photo, Charles Bunnell Collection).

What's Old in Geothermal Energy?

By Lee Leonard

Putting geothermal energy to practical use is not a new concept, although we may be tempted to think of it that way during our present search for alternative energy sources. Most of us can recall images from film and story of young maidens trembling at the brink of a volcanic crater while the local high priest chants some exhortation to an angry god. Such scenes sweep the pages of antiquity and seem to be a primitive, but very

effective, combination of population and weather control.

In the northern regions of the globe, the record is vague as to whether or not any such geothermal techniques were employed, but we can probably assume they were not for various reasons, not the least of which would be the seemingly continuous shortage of young maidens in northern climes. There was, though, at least one practical geothermal experiment

that was made some years ago in Alaska. It did not involve the intense fire of a volcano, but rather the placid water of a few small thermal springs. The place was what is now known as Manley, Alaska. The time was the first decade of the 20th century. And the story of the experiment is a tribute to the energy and ingenuity of the men of that time.

Today, the village of Manley, located about 90 air miles northwest of Fair-

banks, is a small and pleasant community of around 70 permanent inhabitants. But in 1900 there was no village or inhabitants and the present site appeared indistinguishable from the other bottom lands along the north shore of the Tanana River. There was a difference, however, and in 1901 a prospector by the name of J. F. Karshner discovered several hot water springs issuing from a small depression between the two hills about a mile north of one of the many sloughs which meander from the main channel of the Tanana.

Whether Karshner was actually the first white man to discover the springs is not certain, but he has been credited with doing so, since immediately after his discovery, he staked the land surrounding the springs as a homestead, built a cabin and took up residence. It is interesting to speculate about Karshner's motives for settling at the springs. Like most prospectors, he was undoubtedly familiar with vast areas of Alaska, and yet when he finally made his stake, it was not a gold claim, but a homestead, miles from the nearest settlement, with only a few hot water springs as a treasure.

Perhaps Karshner did have a motive other than merely an inclination to settle down. For within the year, rich gold strikes at nearby Tofty and Eureka brought thousands of miners to the region and soon the banks of the slough, only a few hundred yards from Karshner's springs, were lined with tents and cabin starts. A village was forming within sight of his cabin and we can only wonder what role Karshner visualized his homestead and his hot springs would play in the coming boom. We have no way of knowing what Karshner, the prospector, knew about the potential of his hot springs in those early days; we only know that they did not lie idle for long.

One of the new immigrants to the country was a man called Frank Manley. Not much is known about him except that he was originally from Texas, a state which he had left in some haste to seek the anonymity of the Alaskan gold fields. It is alleged that his real name was Willard Beaumont, and some years after the gold rush, he was to return to Texas to stand trial for horse stealing, of which he was acquitted. But in the years 1901 to 1902, he was Frank Manley, fresh from the

Cleary Creek diggings with several hundred thousand dollars in gold nuggets lining his pockets, and looking to increase his wealth in the new fields of Tofty and Eureka.

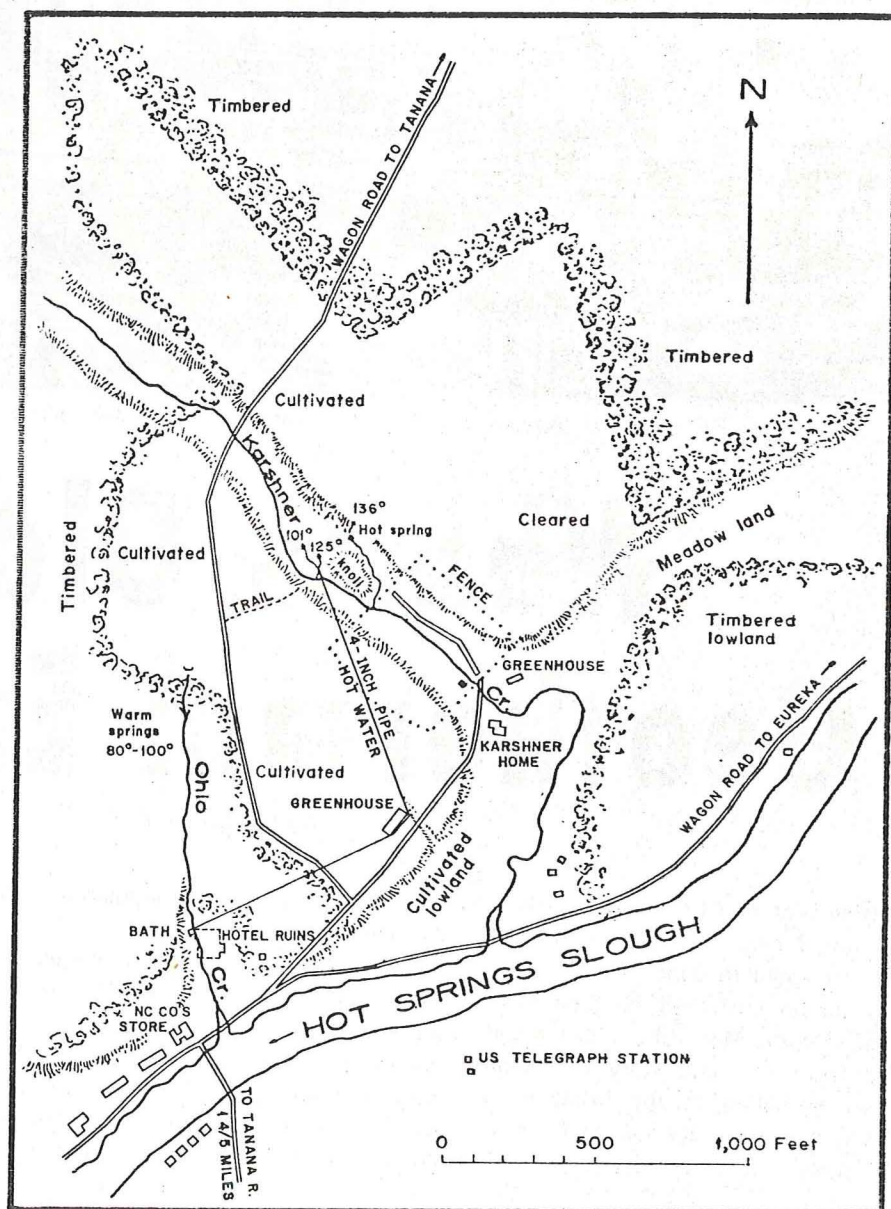
Apparently Manley found something he thought more lucrative than digging for gold. The camp by the hot springs was growing into a major supply depot for the mines back in the hills. Services were needed, and Manley had capital to invest. And there sat Karshner with his homestead and hot springs.

It is not clear exactly what form the partnership between Manley and Karshner took, but the result was the largest experiment in putting geothermal energy to work that was known in Alaska at the

time or has ever been attempted since.

The early prospectors in Alaska did place a value on thermal springs, and they were developed in several locations - Circle Hot Springs, Pilgrim Springs, and Chena Hot Springs, to name the major ones. But these were mainly used as resorts with bathing pools and hot running water, small oases of heat in a cold and rugged wilderness. The experiment into which Manley and Karshner entered, however, was something new. Today we would call it a "total energy concept"; then it was merely considered Yankee ingenuity.

The idea was to create a plantation, resort, and hotel less than 120 miles south of the Arctic Circle. And the energy



Re-creation of a sketch map made by Waring showing the extent of the agricultural improvements at the hot springs.

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Poultry and hog barns near Manley Hot Springs area, 1910. The barns were heated by water carried in buried aqueducts (University of Alaska Archives, Charles Bunnett Collection).

needed for this enterprise was to be supplied by the water of the thermal springs.

Land was cleared and cultivated, and with logs from the clearing, a sixty-room hotel was built and heated with hot water piped from the springs. Enclosed bathing pools were built behind the hotel in varying temperatures to suit the taste of the most discriminating miner. A dairy was started and hay and feed grains were grown on the gently sloping hillsides above the springs. Greenhouses were constructed and heated for year-round growing by piped-in hot water. A wide variety of vegetable crops were grown on garden plots immediately adjacent to the springs. Several yards down the slope from the springs, a wooden stockade enclosed approximately four acres. Inside the stockade was a long building in which poultry and hogs were housed. In the photograph, a buried conduit can be seen; presumably its purpose was to supply heat to this building.

The favorable location of the springs permitted all hot water transmission lines

to supply their water by gravity flow and no mechanical pumping devices were required. There is no way for us to make an accurate calculation as to the total amount of geothermal energy that the Manley-Karshner operation utilized, but from Waring's (1917) account of flow rates and temperatures made only a few years after the peak of agricultural production, we can make a rough estimate of the energy available. If we assume the average water temperature to be 128° F, the total flow rate to be 145 gpm, and the useful work to be transferred between the temperatures of 130° and 90° F, the total useful energy available would be about 2.7×10^6 Btu/hr.

Little is known about the financial success of the operation, either, but one statistical fragment remains. Waring reports that in 1910, the Manley-Karshner operation shipped 150 tons of potatoes down river to the Iditarod mining district. And if we assume a price of \$1 a pound as reasonable for potatoes in those in-

flated gold rush days, a tidy gross of \$300,000 could have been realized from that single transaction. Presumably the sale of eggs, milk, meat and fresh vegetables was restricted to the local market at the mines of Tofty and Eureka.

Unfortunately, this early attempt to use the geothermal energy contained in the thermal springs was short-lived. By 1913, the production of the mines began to decline, and in April of that same year the hotel burned to the ground, never to be rebuilt. By the time the United States entered the First World War, the village by the hot springs, which had become known as Manley, was all but abandoned and Frank Manley himself was off to another adventure in the Iditarod district. The gold rush in Alaska was over. The nation had turned its attention back to the Old World, and the native flora around the hot springs began to reclaim what had been the Manley-Karshner geothermal experiment.

Today the hot springs are owned and operated by Charles and Gladys Dart.

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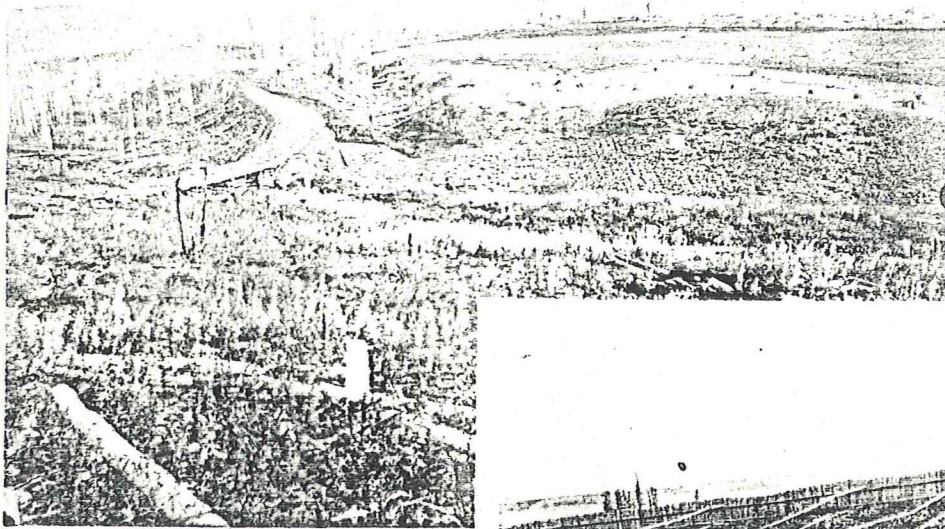
A few gold rush sophisticates among the corn and potato fields. Note the stone cribbing surrounding one of the hot springs at the lower left (University of Alaska Archives photo, Mrs. Luther Gordon Schooling Collection).



Open air and controlled environment gardening techniques employed by the Manley-Karshner operation (University of Alaska Archives photo, Charles Bunnell Collection).

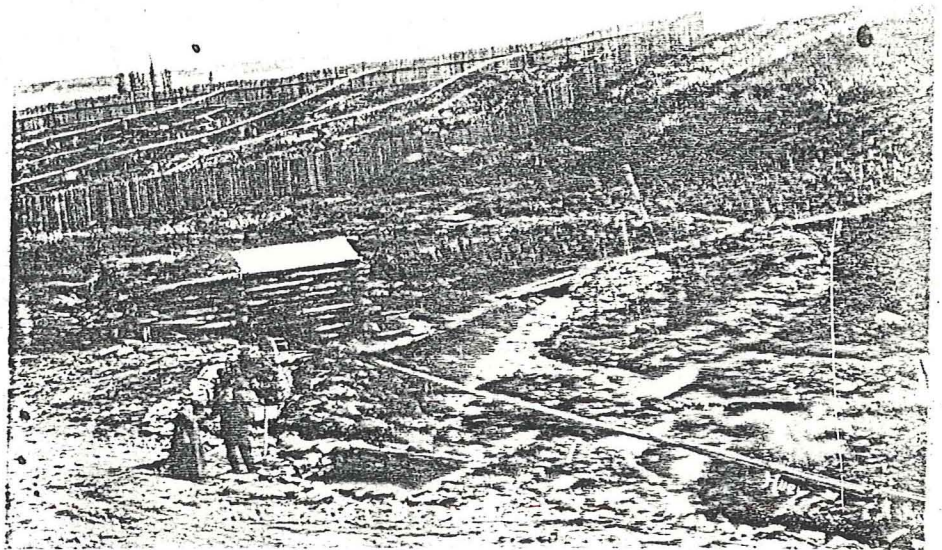
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Hay and grain crops were raised on the gently sloping hillsides above the springs (University of Alaska Archives, Charles Bunnell Collection).

A Sunday promenade about the plantation. Again, note the stone cribbing around the spring which is tapped by buried aqueducts (University of Alaska Archives photo).



The Darts still use the spring water for heating their home and a 72' x 120' greenhouse where each year they raise what this author considers to be the finest tomatoes available in the state. The Darts often pick fresh asparagus in season, now growing wild near the springs — a remnant of the Manley-Karshner gardens. Wild strawberries still abound as well, but the days of a rich plantation in the midst of the taiga are over.

One puzzling aspect of the Manley-Karshner operation is the apparent matter-of-fact attitude with which it was regarded at the time. This must be so, since there is such a small amount of material in print describing the operation, while so many other details about the old rush days and the ways northern immigrants dealt with the land are so well documented. Perhaps it was taken for granted by those early pioneers that anyone with any sense could see the value in

the natural energy contained in the hot springs and only a romantic fool would not put it to some use in such a cold and hostile environment. Or, perhaps in their search for gold, they never really noticed.

In our generation, we can no longer afford not to notice. The gold of our time is the very energy which sustains our civilization, and no non-polluting source should be overlooked. There are more than one hundred hot springs in the state of Alaska alone, and many of these should be suitable for agricultural operations similar to the Manley-Karshner experiment. World food production is an ever-increasing problem and as the eyes of nations are turning north in their search for new energy sources and raw materials, why should as basic a commodity as food be neglected? Maybe we need to look back 75 years for some new ideas.

ACKNOWLEDGEMENTS

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