

THE CHARRING OF SUGARLOAF

Charcoal Making in Sugarloaf Ridge State Park

By Lawrence Maniscalco, History Docent
March 2015

The mention of the word *charcoal* today conjures the image of a backyard barbecue fueled by a bank of insignificant lumps of crumbly black material. But to persons a century or so ago that same word would have triggered thoughts of a high-quality and essential commercial product, a vital and job-producing American industry and even a growing threat of forest depletion.

During the 19th and early 20th century, wood and coal were the most commonly used sources of energy in California and throughout the United States. California did not have an abundance of naturally occurring coal and what was available was of such poor quality, that much of that kind of fuel had to be imported. Wood was abundant in California's forests and was used to power steam engines and also for manufacturing and transportation; but nearly 90% of it was used for domestic heating and cooking. While wood could be used as fuel in its natural state, it could also be converted into charcoal, another source of energy that by 1850 was in demand for blacksmithing and metallurgy. Its light weight, superior heating capacity compared to wood and its ability to burn cleanly without producing sooty smoke made charcoal an excellent source of fuel for domestic uses, as well.¹

WHAT IS CHARCOAL?

Charcoal is a material that is obtained by slowly heating wood or other organic substances in the absence of air. It is the absence of air – called pyrolysis – that makes the difference by removing moisture and volatile gases producing a light, black form of carbon resembling coal. Charcoal burns much hotter than wood (twice the heat of seasoned wood) and more evenly and consistently than wood. In addition to removing water and impurities, carbonization leaves a low ash content and low amount of trace elements like sulfur and phosphorous, meaning it produces a “clean” heat. Its heat is intense enough to reduce iron oxide into pig iron (2,600°F to 3,000°F). As well, charcoal is much easier than wood to transport and store as it has one-third its weight and one-half its volume. The characteristics of “good charcoal” includes hardness, retention of the grain of the wood, a jet-black lustrous color, a metallic ring when struck, non-soiling, floatation in water, and the ability to burn without a flame.²

HOW IS CHARCOAL USED?

Charcoal has been used since earliest times for a large range of purposes, but by far its most important use has been as a metallurgical fuel. Charcoal is the traditional fuel of a blacksmith's

forge and other applications where an intense heat is required (charcoal burns at up to 4,892 degrees Fahrenheit). Charcoal is an excellent reducing fuel for the production of iron and has been used that way since Roman times. In the 16th century England had to pass laws to prevent the country from becoming completely denuded of trees due to production of iron. Charcoal was the fuel of choice for the early 19th century for iron making and smelting in the United States. Until the 1830's all iron in the United States was produced using charcoal as the fuel. After the Civil War coal and coke iron production became significant, but absolute production of charcoal iron increased until 1890 and remained significant until after World War I. The last charcoal blast furnace ceased operation in 1945. In steel-making, charcoal is not only a fuel, but a source for the carbon in the steel. In ground-up form, charcoal was important to early chemists and was a constituent of formulas for mixtures such as black powder. Due to its high surface area charcoal can be used as a filter, and as a catalyst or as an adsorbent. Charcoal is still used in art for drawing and for making rough sketches. In the past, charcoal was consumed as dietary supplement for gastric problems in the form of charcoal biscuits. (Red Colobus monkeys have learned to consume charcoal to prevent indigestion from the cyanide that accompanies their leafy diets – a form of self-medication that is transmitted from mother to infant.)³

In the late 19th century, San Francisco consumed annually about 3,600 tons of charcoal (120,000 sacks of 60 pounds each) worth \$65,000 at the then existing rate of \$17 a ton. The bulk of the supply came from Sonoma County. The San Francisco Mint alone consumed about 900 sacks monthly (54,000 pounds, 27 tons) and the canneries about 250 tons yearly.⁴

There were four tin-shops in Petaluma, the first of which was established in 1867. The proprietors were Thomas Schlosser, J.J. Buckins, Harris Bros., and A.W. Barnes. Dairy-work constituted a considerable portion of their business. The shops annually consumed about one thousand sacks of charcoal, which was manufactured in the county.⁵

HOW IS CHARCOAL MADE?

Elaborate and permanent brick or stone kilns constructed during the 19th century have been recorded on the eastern United States in connection with charcoal production. Although the use of kilns produced a higher quality charcoal, charcoal producers in the West commonly used temporary surface ovens which were constructed above ground, but still referred to as "pits".⁶

Historically, production of wood charcoal in locations where there is an abundance of wood dates back to a very ancient period, and generally consists of piling billets of wood on their ends to form a conical pile, with openings at the bottom to admit air, and with a central shaft to serve as a flue. The whole pile is covered with turf or moistened clay. The firing is begun at the bottom of the flue, and gradually spreads outwards and upwards. The success of the operation

depends upon the rate of the combustion. The factors that influenced the rate of burning or carbonization included the denseness, size, condition and moisture content of the wood, the condition of the ground, the time of year and weather conditions and temperature. The operation is so delicate that it was generally left to professional charcoal burners called *colliers* (the term is also used to describe coal miners).

Whatford goes into considerable detail in describing how charcoal was made in Sonoma County:

“Working together, groups of Italian immigrants would often contract with landowners to clear their trees in return for the opportunity to make the wood into charcoal before moving on to the next ranch. (See note⁷ in the Reference section below for additional information concerning Italian *colliers*.) As practiced at this time, charcoal making was a labor-intensive process, involving a great deal of work as well as the use of hand tools and horse-drawn implements. Because of the wet Sonoma County winters, charcoal making usually took place between April and November. Only live trees (e.g. oak, madrone, Douglas fir) were cut for making charcoal. Leaves, small branches and sometimes the bark were removed in order to maximize the amount of solid wood in the completed pile. The wood was cut into four-foot lengths, and, to keep the pile as uniform as possible, very large pieces were split so that all the wood was about the same diameter. Once a sufficient amount had been cut, it was hauled in horse-drawn wagons to a nearby flat that had been leveled from the naturally sloping terrain – often at the “Y” created by the confluence of two small creeks or on gently sloping alluvial terraces. Deliberately located near water to control the burning process, these flats were 30 to 40 feet in diameter. The soil that had been removed in levelling off the flat was kept nearby and later thrown on top of the pile after the wood had been stacked.”¹

Whatford goes on to describe the placement of the four-foot long wood in an upright circular fashion around a center pole that would later be removed to create a central chimney about 12 inches in diameter. The first layer of wood extended about four or five feet from the center, then a second layer, then a third layer and so on was begun until the layered wood formed a circle about 30 to 40 feet in diameter. Next a second and a third tier was stacked, each having a smaller diameter. The completed surface oven or charcoal oven resembled a beehive or inverted cone about 10 to 14 feet high.



Charcoal mound under construction, Sonoma County, 1915 (Sonoma County History and Genealogy Library, Photo 29332)

Having completed its construction, the colliers lit the oven by dropping lighted kindling and paper or hot coals and wood chips down the chimney, adding kerosene if needed to encourage the burning. The entire oven was then covered with green Douglas fir or redwood boughs followed by six to eight inches of hand-shoveled and packed to keep the wood from burning too fast. Small vent holes were located near the base to induce or retard the air needed to draw the burn from the center to the edges of the wood pile.



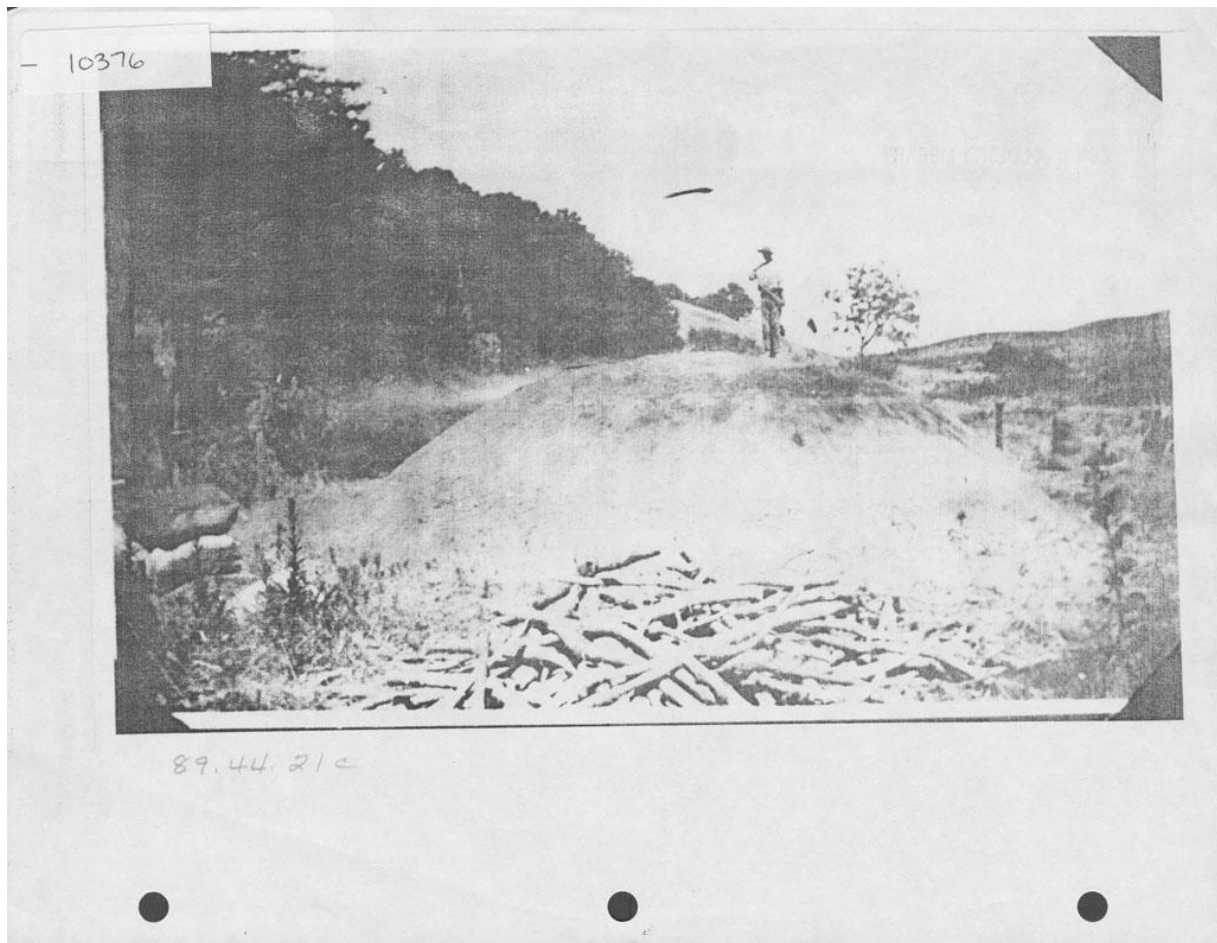
A burning charcoal mound, Occidental, CA, 1925 (Sonoma County History and Genealogy Library, Photo 30155)

Then the hard work began.

The key to the production of charcoal was the manipulation of the oven vents and the collier's ability to determine what was going on inside the oven from external cues. Once lit, the colliers never left the site of the burning until the entire process was finished – a process that would often take four to five weeks to complete. Eric Sloane in "Reverence for Wood" held that "At its best, the job of making charcoal was not for any normal human being. The time required for charring a small mound varied from one to two weeks, but with mounds of wood 30 feet or more around, a month was average. During all that time, through every kind of weather, the maker of charcoal lived with his mound, sleeping only in dozes for fear a flame might start and explode into a full fire which would demolish the mound. There was no time for washing; there was seldom more shelter than a bark lean-to. And there were so many things to watch for in a 'live mound' that the man became an almost part of it. Until the heat subsided, the mound

never stopped 'working' and neither did the man. By the end of the charring, his body had become completely black outside and exhausted inside."

A 30-foot diameter, 14-foot high oven comprised of about 30 cords of wood and would have produced approximately 1,000 sacks of charcoal, each weighing 50 to 70 pounds.⁶



A collier tending his charcoal oven, Trenton, CA, 1910 (Sonoma County History and Genealogy Library, Photo 10376)



Hauling charcoal to the Northwestern Pacific Railroad Station, Forestville, CA, 1895 (Sonoma County History and Genealogy Library, Photo 7712)

ENVIRONMENTAL IMPLICATIONS

A writer for the Oakland Tribune gave the following account of the tan bark and charcoal industries in the Sonoma County forests in the late 19th century: “The redwoods are scattering, and never form dense groves. The live oak of the valleys is present, but stunted in growth and few in number. The white oak and the black oak are also present, but are not very large or very numerous. The madrone and the chestnut oak or tan bark oak, as it is here called, are quite characteristic of this elevation, and both trees are very plentiful and attain quite considerable dimensions, and both form the materials for important local industries, viz., the collection of tan bark and the preparation of charcoal.

“Tan Bark - The oak which furnishes the bark for tanning leather, is a tree which is not known in the valleys near the bay. It is a live oak in the sense of not shedding its leaves in winter like the

white or black oak. This mountain oak almost rivals the redwood and fir in the straightness of its trunk and the symmetry of its foliage. Its long, straight trunk thus facilitates the removal of the bark, and this, no doubt, is one of the principal reasons why this tree is so much better suited for this purpose than the other species of oak. The landowners here, as a rule, sell their oaks as they stand at a certain rate to the woodsmen who fell the trees, cut the bark around the straight trunk into four foot lengths and then split the bark off. After drying on the ground for some time the bark is collected and hauled to the railroad. The blows of the ax, as they resound through the beautiful woods, bode no good to the quiet beauty and shady coolness of these groves, for the dense and truly splendid foliage of these oaks contributes in no small degree to their pleasantness. The wood is also cut up and sent off on the road for firewood.

“Charcoal Burning - But the tan bark industry is not alone in disfiguring the lovely face of Nature in this locality. The madrone, pride of the foothills, with its smooth, red bark and brilliant leaf, almost rivaling the magnolia in size and luster, also is notified that it must step down from the ranks of the merely ornamental and minister to the wants of man. Its thin skin-like bark is of no value; its wood brings a poor price as firewood, and hence it is called into requisition for the manufacture of charcoal. By the time the tan barkers and the charcoal burners have been through the woods, the redwoods and firs and occasional white and black oaks, begin to look thin and the ground covered with brush and undergrowth of all kinds, and tree squirrels on extended tours are obliged to take to the ground for a good part of the way. Fortunately, from the aesthetic point of view, if not from the practical, the redwoods are too few and the firs too small, in this particular locality, for the saw mills to come in and finish the devastation of these woods. But if the woods must go, it is at least a consolation to see the vineyards which here and there dot the valleys, and to think that orchards, dairies and gardens are the natural successors of the primeval forests which we love so well and cling to so fondly as the hand of man desolates with ax and fire their sacred solitudes.”⁸

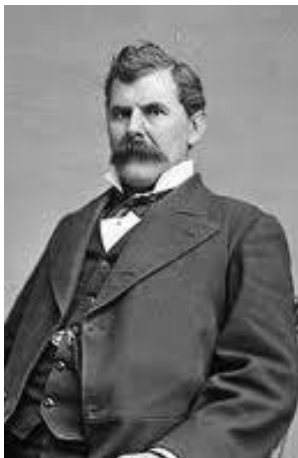
According to Straka², charcoal production had a huge impact on forest depletion in the United States. Its importance is often overlooked as it occurred as the timber industry was converting much of the nation's forests into lumber. The eastern United States iron producing region had hardwood stands that generally yielded about 30 to 35 cords to the acre. It took about 30 years of growth to produce those yields. Western woodland yields were for stands that were slow-growing with lower yields. Ten cords per acre was as a good average. Woodland in the western United States took many decades to grow back to maturity. Regeneration and growth were so slow that wood supplies would likely be depleted after a decade or so of woodcutting. This happened at Eureka, Nevada. All usable wood was cut within 50 miles of town in less than a decade of time. Thus, the sparse woodland yields and slow growth rates combined to make western charcoal burning more of a forest devastation problem.

CHARCOAL MAKING IN SUGARLOAF

Christina Jones identifies the Luttrell's as the first family to be associated with the property that is now SLRSP around 1870, though settlement could have occurred earlier. The older generation of Luttrell's including J. K. and Samantha Luttrell, and later about 1890, Herbert and Frank M. Luttrell began filing patents on surrounding lands. (Jones notes, however, that the history of the Luttrell's ownership is complicated as sales, repurchases and consolidation occurred on various parcels.)⁹

According to the park's official historical timeline, J. K. and Samantha Luttrell by 1880 had consolidated the homesteads in the main valley of the park for the purpose of producing charcoal from the oak and madrone hardwood forests that covered the valley floor and hillsides at that time. After depleting the hardwood forest between 1887 and 1893, the Luttrell's 640-acre holdings reverted to the San Francisco Savings and Loan Society. According to Jones, however, charcoal production might have continued during the time that the property that is now parkland was owned and ranched by W.D. Reynolds, who purchased the land in 1907. Jones reiterates that Sonoma County was a top charcoal producer and ascribes the time period of activity around 1905 to 1910. She cites an interview with Emma Bettiga Catelani by Milo Shepard, in which Catelani, who lived on the Reynolds Ranch recalls that charcoal was produced and on the Reynolds property and hauled off by horse and wagon early in the 20th century.⁹

The J.K. Luttrell, mentioned by Jones, was John King Luttrell (June 27, 1831 – October 4, 1893) who was a U.S. Representative from California. He was born near Knoxville, Tennessee and



attended the common schools. Luttrell (*photo at left*) moved with his parents to a farm in Alabama in 1844 and to Missouri near St. Joseph in 1845. He moved to California in 1852 and engaged in mining, then settled in Yolo County and engaged in agricultural pursuits. He moved to Prairie City (later Folsom) in 1853, to El Dorado County in 1854, to Watsonville in Santa Cruz County, and then to Alameda County. He studied law, was admitted to the bar and commenced practice in Oakland in 1856. He was a Justice of the Peace in Brooklyn (now a part of Oakland) in 1856 and 1857. He moved to Siskiyou County in 1858 where he purchased a ranch near Fort Jones. He engaged in agricultural pursuits, mining, and the practice of law. He was a member and sergeant-at-arms of the California State Assembly in 1865 and 1866. He again served as a member of the Assembly in 1871 and 1872. He married Samantha Jane Patterson (1837-1930) who bore three children, one of whom, Henry, died when he was 8½ years old.¹⁰

Luttrell was elected as a Democrat from the 3rd District to the 43rd, 44th, and 45th Congresses (March 4, 1873 – March 4, 1879), but declined to be a candidate for reelection. He resumed the

practice of law, farming, and mining and served as member of the board of state prison directors from 1887 to 1889. He was appointed United States Commissioner of Fisheries and special agent of the United States Treasury for Alaska in 1893. He died in Sitka, Alaska at age 62, and was interred in Fort Jones Cemetery, Fort Jones, California.^{11, 12, 13}

While not related to charcoal making, it is interesting to note that an 1195-page report of the California Senate Joint Select Committee on Chinese immigration (1862) listed a J.K. Luttrell in Appendix F as an honorary vice-president of the Anti-Chinese Union of San Francisco. According to the organization's constitution, its objectives were "to protect the people of the United States from the degrading influences of Chinese labor in any form; to discourage and stop any further Chinese immigration; to compel the Chinese living in the United States to withdraw from the country; and to unite, centralize, and direct the Anti-Chinese strength of our country to the end that good order and harmony may prevail; that no law may be violated, and the great objects herein enumerated may be fully accomplished by the use of lawful means." It also is recorded that Luttrell while in Congress made a speech to the House of Representatives denouncing Chinese immigration ("The Chinese in America"). It was one of those unfortunate periods of xenophobia in U.S. history and apparently Luttrell was caught in its web.

Subsequently, the Chinese Exclusion Act was passed by the U.S. Congress and signed into law by President Chester A. Arthur on May 6, 1882. It was one of the most significant restrictions on free immigration in U.S. history, prohibiting all immigration of Chinese laborers. The act followed revisions made in 1880 (a year after Luttrell's term of office expired) to the US-China Burlingame Treaty of 1868, revisions that allowed the U.S. to suspend Chinese immigration. The act was initially intended to last for 10 years, but was renewed in 1892 and made permanent in 1902. It was finally repealed by the Magnuson Act on December 17, 1943

But back to charcoal production.

The photo below shows the "Sugar Loaf" charcoal operation of the V. Luoni Company in 1908. It is not known if the photo was actually taken in the area that is now Sugarloaf Ridge State Park, as the Luoni Company was located in Occidental and the main charcoal producing area in Sonoma County was near Sebastopol. The forested area in the photo appears to be like that which is found in Occidental and the Russian River area. As well, any pyramidal hill could have been called "Sugar Loaf". On the other hand . . . we know that charcoal had been produced in the area and that Reynolds allowed it to continue, and the hill that now lends its name to the park was likely called Sugar Loaf locally because of its characteristic shape.



Sugar Loaf charcoal operation of the V. Luoni Company of Occidental, 1908 (Sonoma County History and Genealogy Library, Photo 30177)

Jones indicates only that “the spots in the park where the charcoal was burned are now flat pads about 35 feet to 45 feet in diameter with small encircling trenches.”⁹

Whatford, however, goes into more detail. In his section on “Inventory of Charcoal Making Sites Recorded at Annadel and Sugarloaf Ridge State Parks” he identifies a number of circular flats, cut and filled from the naturally sloping terrain – three sites at Annadel and five sites at Sugarloaf. The sites at Sugarloaf, discovered between 1969 and 1995, included 12 surface charcoal ovens and the remnants of three access/haul roads, all but two of these were located near or adjacent to seasonal streams and, at several locations, on terraces adjacent to perennial Sonoma Creek. The Sugarloaf sites are recorded as:

CA-SON-2143H – six flats 30 to 40 feet in diameter on a terrace near Sonoma Creek with deposits of black soil and charcoal. The vegetation consists of grassland, overtaken by yellow star thistle with adjacent hillsides of oak woodland.

CA-SON-2144H and CA-SON 2145H – each site contains a small circular flat about 35 feet in diameter. Both sites are on terraces adjacent to drainages. Site 2144 is grassland blending into oak woodland. Site 2145 is in an area of mixed evergreen forest with oak, bay, Douglas fir and madrone.

CA-SON-2147H – three circular flats connected by remnants of a narrow dirt road along the banks of an intermittent drainage. Cutting and filling of the naturally sloping terrain created all three flats. One flat is located at the toe of a grassy slope near a riparian corridor growing along the watercourse. The second is on a terrace in the “Y” formed where two small drainages meet in an area of mixed evergreen forest. The third flat is situated on a bench cut into the hillside above the confluence.

CA-SON-2148H – includes a narrow access/haul road extending about 250 feet along the bank of a drainage to a small circular flat about 25 feet in diameter and located on an alluvial terrace adjacent to an unnamed seasonal creek containing oak savannah.¹

REFERENCES

¹ Fuel for the Fire: Charcoal Making in Sonoma County: An Overview of the Archeology and History of a Local Industry, J. Charles Whatford, California Office of Historic Preservation, Sacramento, California (undated).

² Historic Charcoal Production in the US and Forest Depletion: Development of Production Parameters, Thomas J. Straka School of Agricultural, Forest, and Environmental Sciences, Clemson University, Clemson, SC, USA, 2013.

³ Charcoal, Wikipedia: the free encyclopedia.

⁴ The Commerce and Industries of the Pacific Coast of North America, John S. Hittell, San Francisco, A.L. Bancroft & Co., 1882, pp725-726.

⁵ Historical and Descriptive Sketch of Sonoma County, Robert Allen Thompson (Editor of the Sonoma Democrat), Philadelphia, L.H. Everts & Co., 1877 pp 65-66.

⁶ Cultural Resources Inventory of Annadel State Park, Sonoma County, California, Volume 1, John Charles Whatford, Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California, 1993.

⁷ According to an article in the Daily Alta California on February 14 1888, Italians were heavily involved in mining in the mineral counties of California, especially in Amador, El Dorado, Calaveras and Sierra, and in the State of Nevada. The report stated that, “The woods of Sonoma and Mendocino counties resound to the Tuscan proverbial songs, enlivening the active Lucchiesiane [i.e., people from Lucca, Italy], who are almost the only people in California engaged in the charcoal industry.” Hittell described the charcoal producers as 70 or 80 Italians who worked in little partnerships, numbering from 3-5 men. Each firm leased a piece of land containing some oak timber, under a contract requiring the payment of a fixed rent, a further payment of a few cents, not more than 5 on each sack of charcoal made, and sometimes a clearing of the land so as to be fit for tillage. The lessees sold some of the wood as cordwood for fuel, and make the best of it into charcoal. “If they could earn \$430 each in the year, they think they have done well,” he said.

The San Francisco Call, June 18, 1896 reported that one Italian, Daniel Giovannini who had come to California in 1858, became a U.S. citizen in 1868 and was said to have been the first man ever to burn charcoal in Sonoma County. His furnaces were near the “Laguna Station”, most likely a stop on the San Francisco and North Pacific train line to Sebastopol. His obituary indicated that “in this line of business, he met with great success” A later report on the probate of his estate, listed his assets as \$35,000. His advertisements in area newspapers read, as follows:

DANIEL GIOVANNINI, DEALER IN WOOD AND COAL
Nos. 812 and 816 Pacific Street
Wood, Coke, and Hard and Soft Coal of Superior Quality, Wholesale and Retail.
Delivered to any part of the city free of Cartage
Terms, Cash in Coin

⁸ The Pacific Rural Press, July 31, 1880, page 67.

⁹ Sugarloaf Ridge State Park: An Historic Sketch (Draft), Christina Jones, Cultural Heritage Section, California Department of Parks and Recreation, April 1977).

¹⁰ Sacramento Daily Union, November 3, 1863.

¹¹ John King Luttrell, Wikipedia: the free encyclopedia

¹² John King Luttrell, Ancestry.com

¹³ John King Luttrell, TheLuttrell's.com

