ITINERANT INDUSTRY: NINETEENTH-CENTURY CHARCOAL PRODUCTION IN THE COSO MOUNTAINS

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A remarkable 1870s landscape is preserved high in the pinyon forests of the Coso Mountains. This landscape was shaped by charcoal producers who chopped their way across the wooded slopes, leaving behind scores of cut trees, spent earthen charcoal ovens, mule trails and wagon roads, as well as temporary shelters. The charcoal was destined for the silver and gold ore smelters of burgeoning mining towns across southeastern California, and the remains as well as contemporary accounts evoke a way of life that was strenuous and nomadic. Ongoing survey conducted by Far Western Anthropological Research Group, Inc. (Far Western) for Naval Air Weapons Station, China Lake (NAWS-CL), has identified abundant features of this industry, including more than 150 of these ovens across approximately 3,500 acres. The charcoal workers' landscape is remarkably intact, and is likely the best preserved of its kind in California.

Since 1998, Far Western has conducted several archaeological surveys in the northwest portion of NAWS-CL. This area is situated within the Coso Mountains, which contain an upland island of pinyon and juniper surrounded by desert. Elevations range from 5,500 to 8,100 ft, and the area is characterized by steep mountain peaks and rugged basalt flows. To date, Far Western has surveyed approximately 3,458 acres of this area. The Coso Mountains were used for thousands of years by people who were drawn to the rich hunting grounds and pinyon groves. These pinyon groves also attracted the notice of charcoal producers in the mid-1870s.

BACKGROUND

The 1849 Gold Rush precipitated a frenzied land grab in the Sierras, attracting scores of would-be miners to California. As the easy diggings became elusive, prospectors expanded their search for the next big strike. These miners first entered the Coso Mountains in 1860, and they quickly established claims and trails as well as the now-ruined settlement of Coso (Nadeau 1992). Coso was never a major ore producer, but miners were able to stay and work small claims until the 1890s (Maniery et al. 1998). The story of the charcoal producers really begins in 1873, when the much-hyped settlement of Panamint arose. It was a classic boom-and-bust town, lasting only four years (Chalfant 1975). Inflated accounts of the Panamint silver mine brought more people to southeastern California. One year later, in 1874, these hopefuls established the town of Darwin, situated approximately 10 miles northeast of the Cosos at the foot of the Argus Range. Within a single year following its founding, the town had 20 mines, 200 frame houses, 15 saloons, two smelters, and a population exceeding 700. By 1880, the town had busted, with a population of only 85 people (Palazzo 1996).

With expanding population came greater fuel demands for domestic heating and cooking (see Whatford 2000 for an overview of charcoal production in California). Mining towns also required smelter fuel to process ores. When the Defiance Furnace in Darwin was first fired up in 1875, more than 25,000 bushels of charcoal were stockpiled and ready. A report issued in 1875 for the mining district confirms that the source of this charcoal was in the Coso Mountains (Brooks et al. 1979).

A vivid first-person account of the Coso area during this time is provided by Oliver Roberts in his memoir *The Great Understander* (Roberts 1931). Roberts arrived in Darwin at the age of 17 or 18 in 1875 from Rhode Island. He stayed in the area until 1878, when he moved on to Bodie. He worked many jobs, including charcoal burner. His memoir consists of sequences of anecdotes, which sometimes approach "tall-tale"-like dimensions. However, his memoir also offers glimpses into how the industry was carried out in this area, as well as provides a good idea of what daily life was like for these charcoal producers. According to Roberts, many of the charcoal burners were from Mexico. The following describes a charcoal camp likely based in the Argus range about 10 miles from the study area:

> [T]his camp was in a belt of pine-nut timber….The charcoal was burned on the top of the mountain and packed on mules to the foot, where it was loaded on wagons…There were about 300 men chopping wood and burning charcoal. There

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> was a supply store where one could get clothing, hardware, and provisions…I was made boss packer, and time keeper….I was given a good mule to ride from one charcoal bin to another following up the charcoal and keeping tally on what went down the hill. I only kept the time of the day laborers who were mostly Mexicans. They could not speak English, so I had to learn Spanish.…[Roberts 1931:70-71]

His accounts also indicate that camp organization could range from this stratified complex arrangement to a much smaller and more informal camp. He describes how he and three other men went into the mountains to form their own charcoal camp. They carried little: "We had 5 Jacks (mules). One was to carry water (3 10-gallon kegs); the others were to pack tools, blankets, and food. We were to walk" (Roberts 1931:160).

The food they cooked was generally not single-use items from cans, but bulk goods such as beans, potatoes, and flour, probably in sacks. Water is present in the Cosos, but in widely spaced springs, so that water transportation was a constant concern.

Archival evidence indicates the charcoal burners essentially "mined" out the trees (although other researchers into the industry concluded that these claims were somewhat over-inflated; see Reno 1994:19 and Hattori et al. 1984:28). In the 1875 report of the timber present in the Cosos, the writer noted that "it may last the drain upon it for two years, not more, with three furnaces running" (Brooks et al. 1979).

An important implication of this industry is that it put the interests of the charcoal producers directly at odds with the local Native peoples. Pinyon nuts were an important resource for Native groups and the nut groves of the Coso Mountains were incorporated into their seasonal rounds (Steward 1938). Charcoal production entailed the wholesale destruction of these groves. Roberts relates an incident in which one of the local Native groups confronts Roberts and some other Anglo-American men. Roberts responded by saying "[T]he only pine-nut trees that would be burned or chopped, would be used around the mines and that as long as the mines were running, they could get food from the white men and did not need the pine-nut trees" (1931:149).

Some of the Native people apparently were incorporated into charcoal production. In the 1970s, Melvin Chico, a local Shoshone, was interviewed about the Coso people. According to him, Native people participated in chopping wood and burning it in the charcoal kilns. His grandfather was paid one dollar a day to haul the charcoal to Darwin (Brooks et al. 1979).

Findings

During the archaeological survey, the most visible and ubiquitous historical remains are the axe-cut tree stumps and spent charcoal ovens. To date, 159 of these ovens have been recorded in the area; the greatest density occurs in the eastern area closest to Darwin, where one oven was recorded for every 8.5 acres surveyed.

These charcoal ovens were created using relatively simple technology. In contrast to the more-widely known charcoal kilns at Wildrose Canyon in Death Valley and Cottonwood Creek near Owens Lake, which are built of stone or clay and designed for re-use, these Coso ovens were created of earth and were used only once. Oven shapes are of two general forms: circular/oval or rectangular.

Similar ovens have been excavated in the Roberts Mountains of Nevada (Reno 1994, 1996), and these excavations provide details of construction. For the circular forms, Reno found that the ovens were created by first clearing the ground of rocks and brush. Next, four-foot lengths of pinyon wood were stacked upright in a circle around a concentration of small logs or a pole which would be removed afterward to form a chimney. Successive layers of wood were placed on top, forming a beehive-shaped wood mound standing 10 to 14 ft high. Rectangular ovens were constructed in a slightly different manner, with the wood laid horizontally on top of log supports to allow air to circulate. Leafy branches were then placed on the mound, and finally soil was shoveled onto the mound, sealing it except for the chimney opening at the very top. Smaller vent holes were poked around the outside near the base.

Once the oven was ignited, it had to be constantly monitored to ensure even burning. Vent holes were manipulated by the charcoal burner, and the color of the smoke signaled the oven's progress. There was always the threat of flare-ups, and barrels of water were kept nearby for this reason. The process was slow – each oven might take one or two weeks to burn, and then another couple of weeks to cool down. At that time, the earthen cover would be cleared away and the charcoal placed in sacks, loaded on mules or horse-drawn carts, and hauled into town.

Given the steep slopes of the area, it is not surprising that these ovens were designed for one-time use. Rather than bringing the wood to the kiln, as happened at Wildrose and Cottonwood, these charcoal producers put the kiln in the woods. Packing out the charcoal was presumably more cost-effective than hauling out raw timber.

Other features related to this industry in the Cosos consist of the roads, trails, and housing remains. Reno (1996) identifies two types of occupation sites: the Watch Station, which is the place where the charcoal burner stayed during the oven's firing, and the Habitation Center, which is a more elaborate structure used as a logistical base from which food, water, equipment, and other supplies were distributed. This center was also where communal cooking, eating, and sleeping took place.

Watch Stations are usually very ephemeral and difficult to identify. Recognizable features consist of low rock alignments used as windbreaks or sunshades, small terraces cut into a hillslope, or relatively small rock structures. Ten Watch Stations have been identified in the Coso Mountains, and all are defined by proximity to a charcoal oven, a lack or minimal presence of artifacts, and a size that could shelter no more than two people.

Habitation Centers are more visible. They consist of rock-laid cabins with fireplaces and are associated with a domestic-artifact assemblage as well as transportation access for wagons. Of the 18 Habitation Centers recorded to date in the Coso Mountains, nearly all contain a partially dugout rear wall. Some of the centers were roofed with logs, but most were likely roofed with canvas tarps.

All of the artifacts at the Coso charcoal-burner sites are consistent with a mid-1870s occupation. The tight fit of all the occupation dates strongly suggests that the industry peaked rather quickly and that the Cosos were subsequently abandoned (Hildebrandt and Ruby 1999). Although small-scale miners continued to pass through the area well into the twentieth century, Anglo-American interest in the area waned until the formation of the military base in World War II.

Not surprisingly, the Coso ovens tend to be situated adjacent to or within areas where pinyon trees grow. The industry's focus was on the eastern edge of the pinyon forest closest to Darwin. Although there are pinyon stands on the west, they went mostly untouched. This may be because the industry had started to decline before the charcoal producers could work their way farther west from Darwin, or that the groves were too thinly spaced to make it worthwhile.

An analysis of the oven locations reveals that the charcoal producers did utilize a "mining" approach to the trees. Of a sample of 43 ovens recorded in the eastern part of the pinyon zone, most (n = 34) are situated on steep to moderately steep slopes within drainages. This pattern is very similar to that reported by Reno (1996) for the Roberts Mountains. There, dendrochronological analysis established that the wood was harvested simultaneously along the entire length of a drainage. These findings ran counter to his expectations, as it would seem to make more sense to selectively cut wood in the lower, more easily reached lower slopes before moving upslope. Although similar analysis has not been conducted on the Coso complex, the highly similar spatial distribution of features and roads suggests a similar strategy.

The most likely sequence is that a Habitation Center would be established near a relatively flat area near the base of a steep slope. This center would shelter the wood cutters and burners and contain all of the tools and food used by them. The men would proceed to move upslope and chop down trees. The cut trees would then be dragged to the nearest drainage, where the charcoal oven was prepared. If the oven was situated far enough away from the Habitation Center, the charcoal burners would set up a small shelter or flat spot to rest while they monitored the firing. When the charcoal was ready, they packed it onto mules and brought them down the slopes to the Habitation Center. From here, the charcoal would be loaded onto a wagon for the journey to Darwin. When the area had been satisfactorily harvested, they would move on to the next location.

The most striking differences between the Coso and Roberts mountains charcoal complexes are the shapes and sizes of the ovens (Ruby and Hildebrandt 2004). The dominant oven shape in the Roberts Mountains is circular, with a few rectangular ovens, and the rectangular ones tend to be concentrated along the lower slopes. In contrast, oven shape did not appear to be greatly influenced by topography in the Coso Mountains, where rectangular ovens are the most common form and nearly half are found on the steepest upper slopes; no rectangular ovens are found on flat or nearly flat ground surfaces. After rejecting reasons based on ethnicity or efficiency, Reno (1994) suggests that individual stylistic preferences influenced an oven's shape. The near-inversion of oven shapes in the Coso Mountains study supports Reno's contention that oven shape was not primarily influenced by efficiency. The influence of ethnicity on the construction of the Coso ovens is left unresolved at this time; focused archival research may assist future work on this topic.

While the density of the Coso ovens compares favorably with that in the Roberts Mountains, this measure alone does not indicate harvesting intensity: availability does not equal use. The size of the ovens is another key variable. Reno (1996:102) documents a diversity of oven sizes in the available literature.

Circular oven diameters range from 2 m in the Philippines to 14.3 m at Mount Hope in Nevada (Zeier 1985:206), although reconstruction of archaeological ovens is inexact. Assessment of original oven dimensions is difficult for three reasons: (1) erosion is a significant factor, particularly for ovens located in drainages or on steep slopes; (2) the earthen ovens may have been distorted during charcoal removal as debris was swept back; and (3) a key dimension, height, is lost during burning. Assessment of oven size in the Coso study area followed methods established by other researchers (see Reno 1994, 1996 and Zeier 1985). Although the size of the Coso ovens is estimated from surface indicators and not from excavation, as were those in the Roberts Mountains, both the Coso circular and rectangular ovens trend toward being larger. Given that oven densities are nearly identical in the Roberts and Coso Mountains study areas, the larger sizes of the Coso ovens relative to those in the Roberts surely indicate more intensive cutting of the Coso woodlands, at least in the area around Coso Peak. Across the western part of the mountains, however, oven densities are much lower and indicate less intensive use of the woodlands.

Overall, the historical remains associated with this industry attest to a fast-moving mindset, bent on "mining–out" the wood. This approach is characteristic of other resource-extraction industries in nineteenth-century California. The uniqueness of this particular complex of sites lies in its nearly pristine preservation due to relative isolation and the protection afforded by today's military management.

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