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Catalina Island Soapstone Manufacture

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Not infrequently the professional archaeologist along with the interested layman have had cause to speculate on the refined finish or delicate form displayed by some artifact of native manufacture. That stone is a "hard" substance and primitive man's methods were rude has perhaps encouraged the idea that patience and time were the principal tools of creation. Too few ethnographic accounts dwell in detail on the production of stone implements . . . with an apparent growing necessity for a more accurate recognition of artifacts in the early cultural horizons of North America, any additional data on the subject [are] welcome . . . [Treganza and Valdivia 1955:19].

THE prehistoric peoples of Santa Catalina Island gained notoriety in the southern California region in part because of their successful quarrying, manufacturing, and exchange of soapstone objects. Although small-scale exploitation of this resource began over 4000 years ago, large-scale production was restricted to the last 500 to 700 years. Various aspects of the utilization of this resource have been an important topic in southern California prehistory since the 1870's; yet, too often the "finished product" has taken precedence over the geological and technical aspects which gave the formless mass of material its recognizable and timeless shape.

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A review and synthesis of existing concepts concerning soapstone manufacture, along with a discussion of possible production processes, artifactual variability, and geological considerations, provides the basis for this article.

Quarrying and mining during the aboriginal occupation of Catalina Island has attracted the attention of archaeologists and other investigator over the years, as indicated by numerous descriptions of extractive activities and locational information (Schumacher 1878, 1879; Reiss 1955; Jones 1956; Heizer and Treganza 1944; Meighan and Johnson 1957; Meighan and Rootenberg 1957; Leonard 1971, 1973, 1976; Stevens 1977; Romani n.d.). Although numerous workshop and quarry areas have been identified and recorded in the area of the Airport, Empire Landing, and the Valley of the Ollas (Fig. 1), only limited research has been directed toward answering specific questions concerning the exploitation of soapstone, especially in terms of selection of material and actual production methods.

SOAPSTONE: THE RAW MATERIAL

In scientific literature, terms such as "talc," "talc schist," "steatite," "chlorite schist," and even "serpentine" have frequently been used interchangeably when discussing what are mineralogically different materials. Soapstone is the term properly used to describe a massive

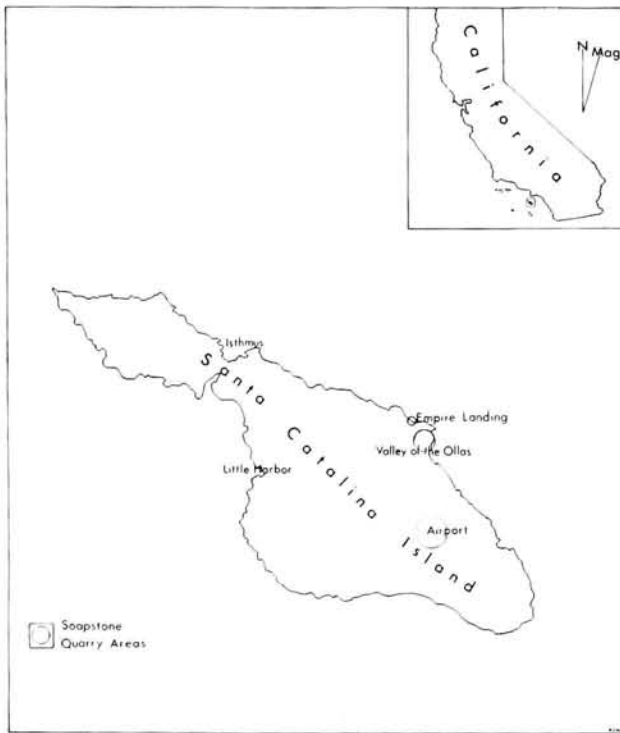


Fig. 1. Santa Catalina Island Location Map.

form of rock containing the mineral talc in quantities ranging from almost pure talc to a very low in talc content. Ordinary usage according to Wells (1975:1) usually restricts the term soapstone to impure massive talcose rock, while the high purity massive talc is called steatite.

Soapstone exhibits a great deal of variability in its mineralogic composition. It can be found in a range of hardness (Moh) from 1 to 4 (although 4 may represent a grade very similar

to serpentine), and in a variety of colors from light gray and pink to dark green and black. Soapstone appears geologically as either small localized outcroppings or large massive formations. Mineralogically speaking, soapstone is formed by a process which involves the alteration of certain igneous rocks to talc, where hydration of olivine and pyroxene to hydrous magnesium silicate minerals occurs and where talc is ordinarily the last of these minerals to form. The mineral serpentine, which is sometimes mistaken for the fine-grained, dense, low talc content variety of soapstone, commonly forms as an intermediary product in this progressive hydration process (Wright 1957:623). In the actual hydration sequence, the mineral talc represents the end product of this process. Along this imaginary continuum, a variety of types and grades of soapstone are formed, with serpentine representing one stage of the process in which the mineral change is incomplete, leaving a hard, densely-grained and low to non-existent talc content material. Figure 2 illustrates this imaginary continuum where the mineralogical characteristics and extremes (talc and serpentine) place utilizable soapstone in a median position within the actual hydration process.

Soapstone Type-Form Correlations

The importance of the soapstone continuum is reflected in type-form correlations.

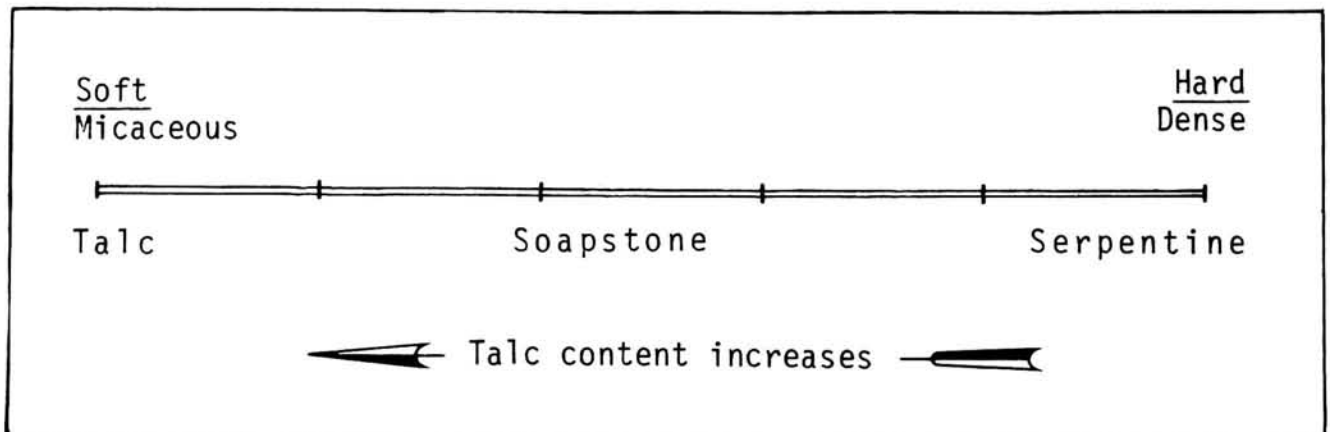


Fig. 2. Soapstone continuum and mineralogical scale of hardness.

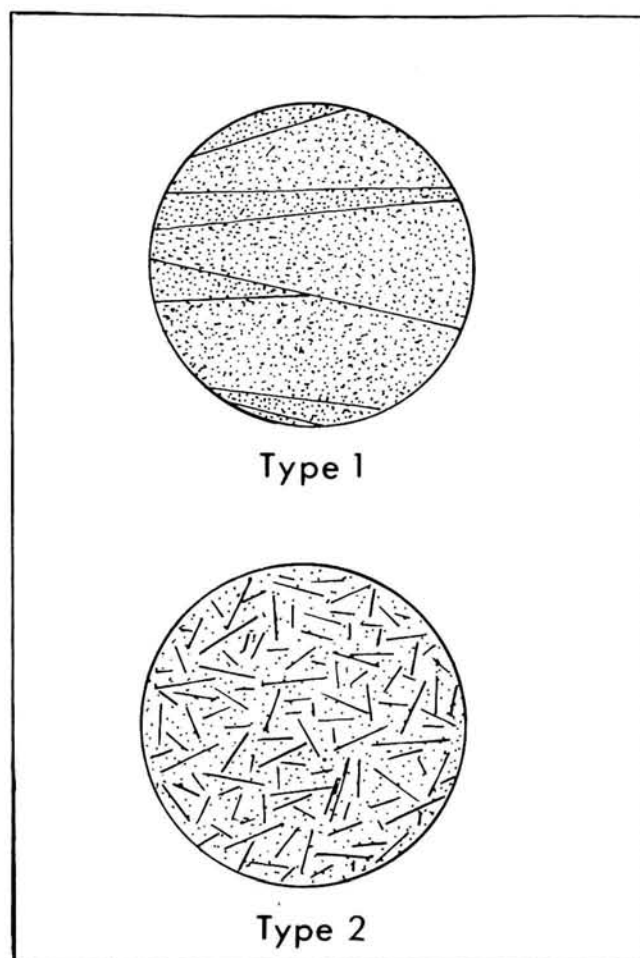


Fig. 3. Cross-section representation of basic grades of soapstone. Type 1: Fine-grained; Type 2: Coarse-grained. Drawings represent imaginary magnifications of the two basic grades.

Here soapstone can be found as two major types: coarse- and fine-grained. Serpentine is also included in the fine-grained type classification since similar artifacts such as beads, pendants, and shaft straighteners were produced in many cases from both serpentine and fine-grained soapstone. The softer, more micaceous variety was used in the manufacture of globular pots (ollas), bowls, and comals, while the harder, denser, fine-grained, and usually darker variety was used in producing weights for digging sticks (doughnut stones), pipes, effigies, and ornaments. No doubt the Gabrielino Indians knew these two varieties by different names (Heizer and Treganza 1944: 294). Figure 3 illustrates, through a cross-

sectional representation, the basic internal differences exhibited by the two grades or types of soapstone found in an archaeological context.

Type-form correlations are predicated on the basic assumption that a particular grade of soapstone was intentionally chosen in the production process because of its particular and unique mineralogical characteristics and utility in producing a specific class of artifacts. However, other mineralogical and geological properties also affected the ultimate range of objects produced from the two grades. Fine-grained soapstone for instance, does not occur as massive outcroppings on Catalina, but rather as foliated and laminated strata, where erosion and quarrying produced thin slabs or chunks of this material. By its nature, the material was more suitable for manufacturing pipes, pendants, beads, effigies, shaft straighteners, doughnut stones (Fig. 4), shallow bowls, and dishes.

Coarse-grained soapstone, on the other hand, is usually found as large surface mounds and outcroppings or as underground deposits, which were suitable for producing a general class of artifacts including ollas, large bowls, and comals (Fig. 5). From an examination of soapstone manufacturing debris associated with coarse-grained outcrops on Catalina, it appears that comals, large bowls, and ollas were manufactured solely from coarse-grained soapstone. There is no indication that there ever was intent to manufacture smaller items such as beads, pendants, pipes, effigies, small bowls, or dishes in quantity from coarse-grained soapstone. The corollary is also true. Where fine-grained soapstone deposits were quarried and utilized to manufacture the smaller, more delicate items, there was no apparent attempt at manufacturing the larger ollas and bowls. A comparison of both Miner's Camp and the West End site substantiates this differential utilization of the two basic grades of soapstone for manufacturing different types

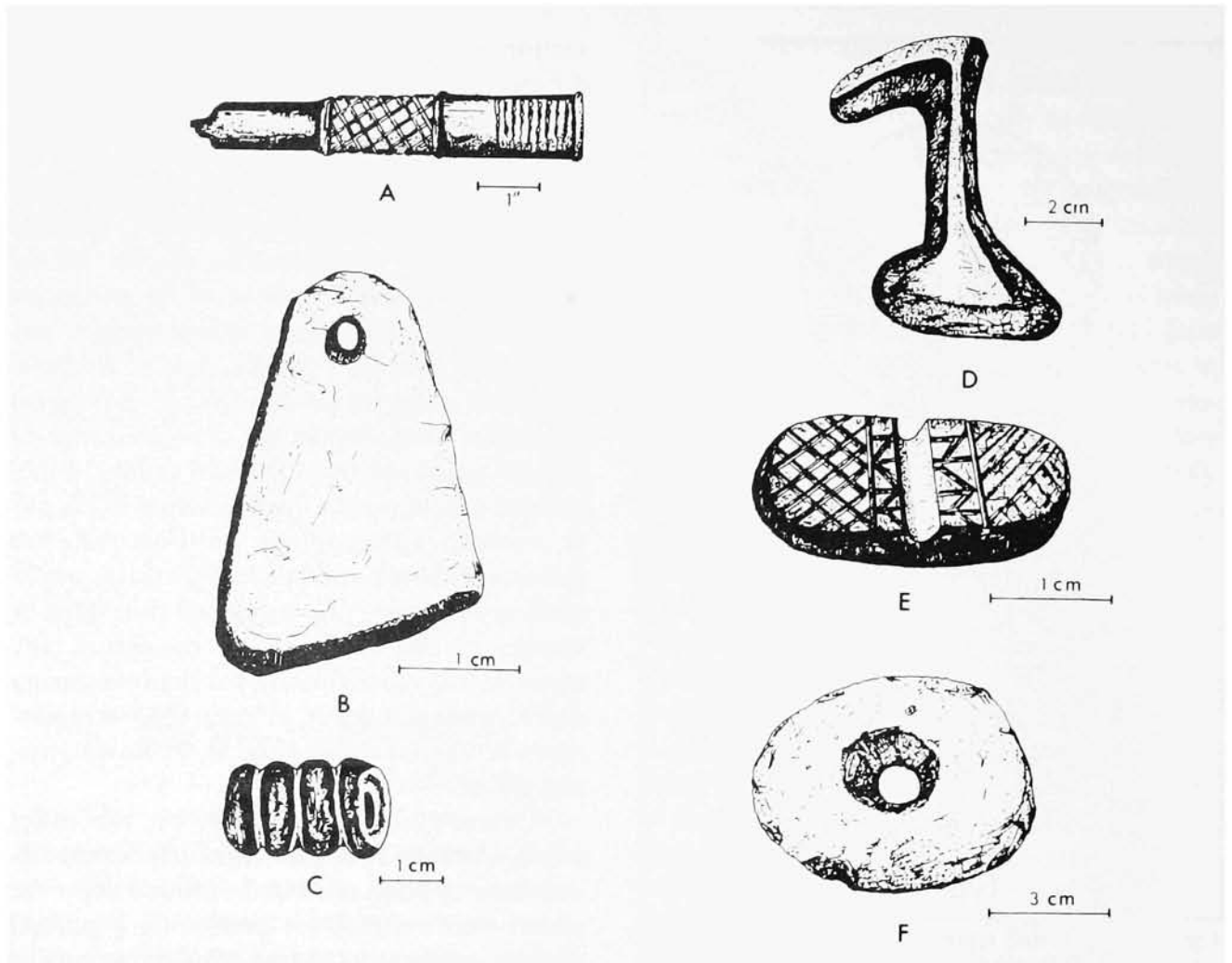


Fig. 4. Illustrations of some fine-grained soapstone objects. *a*: pipe (Heizer and Treganza 1944:329); *b*: pendant (Leonard 1973:3); *c*: bead (Hoover 1971:19); *d*: pelican stone (Meighan 1976:25); *e*: shaft straightener (Heizer and Treganza 1944:329); *f*: perforated stone (Meighan 1959:396).

of artifacts. At Miner's Camp, in association with a coarse-grained soapstone quarry the majority of artifactual material was limited to ollas, bowls, and comals, while at the West End site, over 99% of the soapstone artifacts were small items manufactured from fine-grained soapstone and serpentine with no evidence of attempts at manufacturing the larger, bulkier items. Through experimentation the artisan probably became aware of the variability and distinctive quality of the raw material (soapstone) in producing basic artifact forms as suggested by the type-form correlations and continuum.

Soapstone Quarry Locations on Catalina Island

During the early 1950's, Fred Reiss of the Santa Catalina Island Company and Clement Meighan of the University of California, Los Angeles, conducted surveys of various sites on Catalina. During the course of the reconnaissance efforts, a number of soapstone outcrops and quarry locations were discovered in the area of the Airport and Empire Landing. Fred Reiss (1955) recorded 41 occurrences of quarrying activities in the area of the Airport. The quarry sites and aboriginal mining locations all

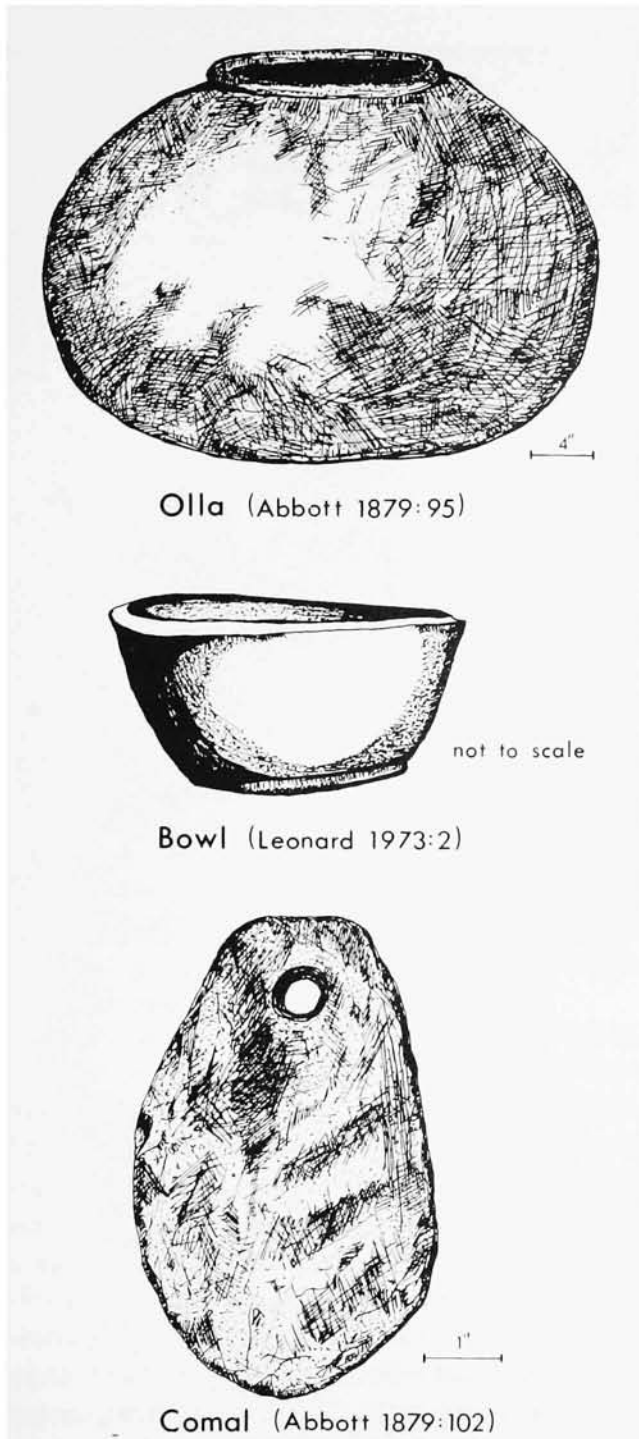


Fig. 5. Some coarse-grained soapstone objects.

exhibited evidence of exploitation and modification to some degree. Figures 6 and 7 illustrate quarry areas which exhibited bowl scars and cavities where large bowls or ollas were hacked off the outcrop. Reiss recorded many instances of protruding stubs of unfinished



Fig. 6. Fred Reiss inspecting a soapstone quarry. Bowl scars are visible in the foreground. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.

bowls, starter rings, soapstone fragments, and associated tools. Meighan also discovered many large outcrop areas, especially near the Airport where evidence of ancient mining activities was abundant (Meighan and Johnson 1957). Figures 8 and 9 illustrate protruding soapstone stubs which, for unexplained reasons, were left unfinished. Figure 9 in particular illustrates the extent to which the aboriginal artisans went in obtaining the soapstone. Here Keith Johnson is seen kneeling next to a surface vein of soapstone which was mined for the purpose of bowl manufacture. Based on the interpretation of recorded information provided by Reiss and Meighan, the majority, if not all, of the soapstone outcrop occurrences appear to be of the coarse-grained variety.



Fig. 7. Small soapstone quarry with visible bowl scars. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.

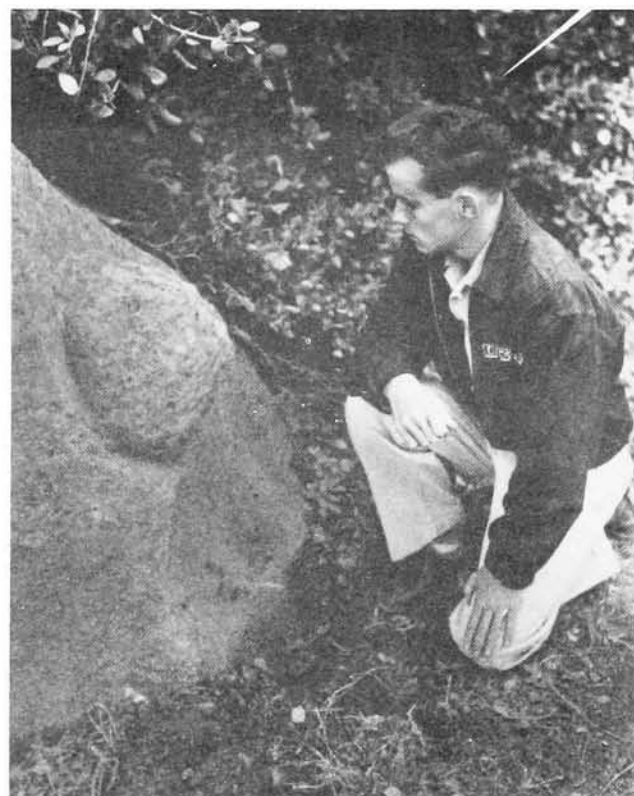


Fig. 8. Unfinished soapstone bowl still attached to the quarry outcrop. Photograph courtesy of the Santa Catalina Island Company.

The quarry location was probably of great importance to the artisan, who sought the best possible outcrop of raw material that could be optimally exploited. Knowing where to obtain a good workable quality and grade of soap-



Fig. 9. Unfinished soapstone bowl near the Airport. Photograph courtesy of the Santa Catalina Island Company.

stone was probably more important than merely utilizing an outcrop which was simply close to a distribution center. It becomes readily apparent from looking at quarried areas that quality in the grade of soapstone was a major factor in the choice of workshop location. The fact that the roughed-out or completed product would have to be carried many miles in some cases to a village location for ultimate use or distribution seemed of secondary importance. Transportation from quarry/workshop areas to village/distribution centers probably involved much labor, particularly during the period of extensive mining on the island. When quarry, workshop, and distribution/village locations were conveniently close to one another, as in the case of Empire

Landing, certainly the job would have been much easier. However, in many instances, outcrops of soapstone relatively close to village locations were not exploited at all, a fact that again points to the probable concern for quality of raw material rather than close proximity to a village location.

Temporary camps and workshop areas were often established when a quarrying locality was chosen, such as Miner's Camp, Empire Landing, and the Big Springs site. It was probably at the base camp when quarrying was in progress that the initial phases of modification were completed by laborers who occupied the site at certain times of the year.

Major areas for soapstone exploitation have been identified on Catalina by early investigators and archaeologists who recorded these localities as follows:

(1) In the vicinity of the Airport, where probably the most extensive and concentrated quarrying and mining of soapstone took place on Catalina. Researchers including Reiss (1955), Meighan and Johnson (1957), and Leonard (1976) located numerous quarries, workshops, and temporary camp sites.

(2) In the vicinity of Empire Landing, where coarse and fine-grained outcrops with associated workshop areas were located. Recently mined for extensive talc deposits in the area, many of the remains of aboriginal occupation were destroyed or badly disturbed. Ralph Glidden (1920) recorded the existence of seven Indian campsites in the area of Empire Landing, also noting the presence of six burials from 3 to 5 feet in depth. In association with the burials were carved pipes, doughnut stones, and ornamental bowls (Gleason 1951: 16; Glidden 1920:1, 19, 20), suggesting the manufacturing of objects from fine-grained soapstone and serpentine in the immediate vicinity. Empire Landing and the drainage to the east, referred to as both the "Valley of the Ollas" and "Potts Valley," can be considered as part of the same extensive soapstone outcrop

area, described as a major location for aboriginal quarrying activities on Catalina Island (Gleason 1951:16; Heizer and Treganza 1944:307; Jones 1956:226; Romani n.d.; Schumacher 1879:117). The "Valley of the Ollas," as printed on the 1943 USGS topographic map Santa Catalina North, is not the same "Valley" (Potts Valley) to which Schumacher and other investigators were referring in their descriptions of the area. From all indications, this valley is located one ravine to the east of the area as it is mapped. Gleason (1951: 16), however, states that steatite bowls found on the mainland have been traced to Potts Valley at Empire Landing suggesting that the "Valley of the Ollas" is correctly mapped. Most likely, Gleason, referring to Schumacher's early account, assumed that the designated valley was the same as Schumacher's extensive soapstone outcrop area, when in actuality it was one ravine to the east.

(3) Little Springs Canyon also contains many soapstone outcrops, although this area is less extensively discussed than either the Airport, Empire Landing, or Potts Valley. Only Leonard (1971:5), Romani (n.d.) and Schumacher (1879:117) mention the area in terms of aboriginally exploited outcrops. Ralph Glidden (1920:10-11) recorded three campsites and seven burials in the Little Springs Canyon area with associated pipes and doughnut stones. Leonard (1971:5) excavated a site in the Little Springs drainage and noted large quantities of unfinished bowls, comals, steatite waste, and slate and schist picks in the vicinity of a coarse-grained soapstone outcrop.

Other areas on the island have also been found to contain soapstone deposits. An area west of Eagle's Nest and east of Mills Landing just off the Middle Canyon Road contains a predominately black fine-grained soapstone and serpentine deposit (Romani n.d.). Although there is no apparent evidence that the outcrop was utilized, it lies very close to Torqua Cave, a major inhabited rockshelter

where a few artifacts of fine-grained soapstone and serpentine were found during an excavation. The area around Parson's Landing also contains outcrops of fine-grained soapstone and black serpentine of good quality (Romani n.d.). Variation in the quality of soapstone in this outcrop area is quite impressive, with grades ranging from high to very low talc content in colors from light to dark green, including a black serpentine rock. The importance of the outcrops in this area may eventually lie in the sourcing of the soapstone from the West End site to the outcrops that are present at Parson's Landing. Since the West End site contained almost entirely fine-grained soapstone and serpentine artifacts, and represents a manufacturing site without an as yet identified associated quarry, the possibility that outcrops at Parson's Landing were utilized with the material transported to the West End for modification must still be considered. In 1954 Meighan recorded a soapstone quarry in the area of Eagle's Nest. Martz and Gilmore (n.d.) excavated a site in the Cottonwood Creek drainage in association with a soapstone quarry, and Leonard's (1976) survey of the island recorded additional outcrops near Buffalo Springs Reservoir, Parson's Landing, and Emerald Bay/Sullivan's Beach.

Although many other areas, as yet unidentified, almost certainly exist on Catalina, the apparent concentration of intensive exploitation of only a few select areas (these being predominately coarse-grained) including the Airport, Empire Landing, and Valley of the Ollas, seems apparent. The main focus of past research, however, has been directed toward recording occurrences of coarse-grained soapstone outcrops rather than discussing the role of fine-grained soapstone and serpentine in the development of Catalina's distribution network.

Only the Miner's Camp site report discusses the various aspects of quarrying, manufacturing, and distribution of coarse-grained

soapstone (Meighan and Rootenberg 1957), although Meighan and Johnson (1957) and Schumacher (1879) discuss general aspects of soapstone manufacture. The West End site (Wlodarski 1974) represents the only fine-grained soapstone manufacturing site so far discovered on Catalina. Chronological implications, pending further analysis, and questions dealing with the actual quarry location and relationship to a distribution center, remain uncertain. Only Finnerty *et al.* (1970) discuss the idea of a primary distribution center for soapstone artifacts, although more centers must have been in existence at various time periods.

Recording of evidence of aboriginal quarrying on Catalina has provided the best indications of the extent of aboriginal mining through past centuries. Although many large quarries have been destroyed by construction activities, photographs, articles like Schumacher's (1879) and Meighan and Johnson's (1957), and intensive surveys by Meighan, Decker, and Leonard attest to the once thriving industry on Catalina. Leonard's site relocation study updated the information regarding soapstone quarry and workshop locations on Catalina, noting that along with development, vandalism, erosion, and dense vegetation, many outcrops, mining locations, and associated workshop areas have been destroyed or remain difficult to locate.

Chronological Implications

Chronological implications also pose problems to the archaeologist. Evidence from the Little Harbor excavation and a site between Sullivan's Beach and Emerald Bay suggest that the island was occupied at least 5000 years ago. Evidence from Little Harbor indicates there was limited use of soapstone over 4000 years ago even though the site is within easy walking distance to soapstone quarry areas utilized to a much greater extent later in time. Differences in production pro-

cesses are evident when comparing early manufactured objects here with objects from Miner's Camp. These major observable differences include:

(1) The quantity of artifactual material produced from soapstone and utilized (particularly for large bowls, ollas, and comals) increases through time as indicated by a comparison of material from Little Harbor, Cottonwood Creek, and Rosski with material from Miner's Camp, Big Springs, Isthmus Cove, and the West End site. The early sites on Catalina produced relatively small quantities of what might be aptly referred to as "crude" or "simple" soapstone artifacts. The trend is most evident when comparing Isthmus Cove to Miner's Camp, where the increase in soapstone is obvious. Here, there is an increase in soapstone utilization where the production of large bowls and ollas indicates the development of a mining industry apparently during the Late and Proto-historic periods (Meighan and Rootenberg 1957; Meighan 1959; Finnerty *et al.* 1970). Initial quarrying and utilization of soapstone prior to the extensive mining phase on Catalina must have served to satisfy local demands with only small quantities finding their way to mainland sites attributed to a very early age (Meighan and Johnson 1957:28).

(2) The quality of the soapstone artifacts increases over time where stylization, elaboration, and diversification in types of objects occurs. More intensive production of the larger, coarse-grained objects, elaboration in design and ornamentation, and the appearance (according to Hoover [1974]) of stylized zoomorphic figurines and effigies are all attributed to the Late period. Earlier soapstone artifacts in general appear to be simple in form, less stylized, and more crudely manufactured, possibly due to the use of float material and less efficient production techniques (Meighan 1959:392). The relative simplicity of artifactual material from Little Harbor, Cottonwood Creek, and Rosski, and the small amounts of

soapstone in comparison with sites attributed to later time periods, further suggests that a simple quarrying and manufacturing technology predated the later, more intense mining and working of soapstone.

The following list is a compilation of investigations on Catalina which have produced information relative to soapstone, including a brief summary of artifactual material, relative site location, and projected chronological information where applicable.

(1) The Little Harbor site was excavated in the early 1950's and produced a very simple assemblage of coarse- and fine-grained objects. Located on the seaward side of Catalina, the artifactual material consisted of a few simple and unspecialized soapstone objects including fragments of small bowls and dishes, beads, unstylized effigies, and perforated stones. The age of the site (approximately 2000 B.C.), the small quantities of soapstone, and the overall poor quality of craftsmanship suggest a very simple technology geared toward limited utilization and dispersal. It appears that little if any quarrying was done and that utilization of surface or float pieces provided the necessary material for manufacture (Meighan 1959).

(2) Specimens collected from a limited recovery project at Empire Landing by Meighan (1954) provide information concerning the manufacture of soapstone objects in this area during the Proto-historic period. Bowl rims and fragments, pendants, beads, and perforated stones found in an area where several campsites and workshops have been recorded suggest occupation and activities directly related to the quarrying and manufacture of soapstone objects. During the summer of 1977, Eberhart and Reinman excavated a site on a bluff about a half-mile from Empire Landing (Lauter 1977). In the immediate vicinity were several soapstone outcrops showing aboriginal use. The excavation produced an abundance of bowl fragments, beads, doughnut stones, effigies, and comals, all

derived from the local quarries. According to Eberhart (personal communication) late dates of A.D. 1340 and A.D. 1730 were obtained from samples taken from the excavated units. Again, the late dates correspond well to the accepted span of time for intensive soapstone exploitation on Catalina.

(3) The excavation of Miner's Camp by Meighan and Rootenberg (1957) produced evidence of a utilized soapstone outcrop in direct association with a campsite and workshop area. A proposed time of occupation for the site was post-A.D. 1000. In 1973, a further sampling of the same area yielded comparable data including large quantities of soapstone bowls, ollas, and comals. Included in the sample were various unidentifiable fine-grained objects possibly manufactured out of float pieces of soapstone or waste material. The discovery of glass trade beads (not found during the 1956 excavation) provided a date in the 1700's for occupation of Miner's Camp (Rosen n.d.). The abundance of coarse-grained soapstone, without the recovery of any complete large vessels during the 1956 or 1973 excavations, suggests that this was indeed a workshop area where the material was roughed-out and then transported to a nearby distribution center, possibly for final processing.

(4) The excavation of a large site at the Isthmus (Finnerty *et al.* 1970) produced evidence suggesting that the site represented a Late period village and distribution center for island mainland trade. The presence of a wide variety of coarse- and fine-grained soapstone artifacts suggests that soapstone was the primary non-perishable trade item manufactured and traded from this site. Included in the list of soapstone objects recovered were vessel sherds, comal fragments, a small-mouthed globular pot, an inscribed plaque, pendant forms, and beads. The relatively short occupation of the site lends some credence to the hypothesis that large-scale soapstone manufacture and trade in southern California may

be limited to the Proto-historic and Historic periods. The presence of coarse- and fine-grained soapstone and serpentine objects in association with burials reflects the abundance and variety of soapstone artifacts produced and utilized at this village distribution center. Ralph Glidden (1920) recorded three Indian campgrounds at the Isthmus and the presence of fifteen burials at one spot near the beach. In association were found eleven "treasure boxes" and included in the list of objects were soapstone and serpentine vessels, many doughnut stones, arrowshaft straighteners, comals, fish hook sinkers, pipes, canoe forms, effigy forms, pendants, etc. (Glidden 1920:18-23).

(5) Three small-scale excavations (BC-572; BC-429A and the Big Springs site) provide general data concerning soapstone manufacture. BC-572 was excavated by James David and Dean Decker in 1971 (David n.d.). Located about one mile southeast of the Isthmus, this inland habitation site probably sustained a single family unit where soapstone manufacture occurred. The small sample produced vessel fragments and a pendant fragment. No complete or whole artifact forms were discovered, suggesting that this was a small manufacturing site whose finished products were possibly transported to the Isthmus for use or distribution. BC-429A, excavated by Dean Decker (n.d.), was one of seven closely grouped sites on a terrace above the Little Springs drainage. This manufacturing site yielded an abundance of vessel fragments of coarse-grained soapstone, and fine-grained and serpentine objects represented by beads, doughnut stones, a pipe, and pendant fragments. This small-scale excavation has never been completely processed or evaluated and no tentative dates advanced for its occupation. A final site excavated by Nelson Leonard (1971) (with follow-up work by Michael Gannon in 1971) is located in Little Springs Canyon approximately one and one-half miles from Little Harbor. This is an inland site in asso-

ciation with a soapstone outcrop where large quantities of unfinished bowls and comals, soapstone waste, and tools suggest the manufacture of a variety of objects. Fine-grained objects including beads, doughnut stones, and exotica were also uncovered. No chronological implications are advanced other than that the site was probably occupied for a long period of time into the Historic period.

(6) In 1971, Dean Decker and Fred Plog excavated a multi-purpose site whose primary function was most likely the manufacture of fine-grained soapstone and serpentine artifacts for possible trade and distribution. Tentatively dated at post-A.D. 800, with occupation possibly into the Historic period, a variety and quantity of fine-grained objects unknown from any previously located site on Catalina were found. Pendants, beads, pipe fragments, plaque-like objects, small toothpick and triangular shaped objects, effigies, and other fragmentary pieces attest to the variability in soapstone objects manufactured by the aboriginal artisans. The fact that the great majority of processed soapstone was either fragmentary or waste material suggests that the site probably functioned primarily as a manufacturing location for the production of fine-grained soapstone and serpentine artifacts (Wlodarski 1974).

(7) During 1973 Nelson Leonard excavated the only rockshelter so far discovered on Catalina exhibiting an extensive and deep midden component, although Quist (1978) discusses a cave site with rock art and a large midden component (depth and extent unknown). At Torqua Cave soapstone manufacture presumably took place as suggested by the quantity of artifactual waste and material. Large quantities of high quality soapstone objects and waste material were confined to the uppermost levels of the cave, while the lower levels for the most part lack any soapstone remains and have been dated at approximately 1100 B.C. (Nelson Leonard, personal commu-

nication). The lack of significant quantities of soapstone in the lower levels and the increasing quantities in the uppermost levels point to a probable late date for this increase.

(8) During 1973 Martin Rosen and the author excavated an inland temporary campsite near Little Harbor that produced a variety of simple coarse- and fine-grained soapstone objects. The limited number, overall poor quality, and simple nature of the objects suggest manufacture from float, rather than quarried material. A tentative date of approximately A.D. 500 is suggested for occupation of this site (Rosen n.d.).

(9) Cottonwood Creek, an inland site located beside a drainage south of Little Harbor, yielded soapstone artifacts in association with a quarry outcrop (Martz and Gilmore n.d.). Excavated in 1973, the small quantity of soapstone artifacts, including a black serpentine pendant, a disc bead, a possible effigy fragment, and a charmstone, suggests a very limited use of the nearby poor quality soapstone quarry for manufacturing purposes. Based on beads recovered from this small-scale sampling, an occupation range of A.D. 500 to 1500 is proposed.

Over the years Schumacher (n.d.), Wheeler (1879), and Rogers (1929) added evidence for the manufacture of great quantities of soapstone by the Catalina Islanders and the enormous variability in objects manufactured. Schumacher in 1877 visited a great many village sites on Catalina, as did Glidden during the 1920's, and uncovered thousands of objects made from coarse- and fine-grained soapstone and serpentine. In burial contexts at the Isthmus, Johnson's Place, Whitney's Place, and at Potts Valley, Schumacher uncovered several hundred bowls, ollas, comals, effigies, doughnut stones, shaft straighteners, net sinkers, beads, pendants, pelican stones, pipes, "steatite toys," small dishes and bowls, and boat-shaped objects. Many of these objects are brilliantly illustrated in Wheeler (1879).

Tentative dating, suspect collections, and the lack of comparative site data for evaluating trends or suggesting implications for soapstone manufacture and changes through time prevent any statements concerning chronology, quarrying, manufacturing, and distribution of artifactual material other than the following. It appears:

(1) that prior to A.D. 1200, the manufacturing of soapstone objects was not as intense nor as extensive as in later times;

(2) that the manufacture of small objects of coarse- and fine-grained soapstone (rather than the larger bowls, ollas, etc., of coarse-grained soapstone) was on-going since the earliest periods of occupation so far discovered on Catalina;

(3) that the technology for producing artifacts prior to A.D. 1200 was for the most part simple and geared more toward satisfying immediate needs rather than for large-scale trade purposes; and

(4) that there is an apparent trend from the earliest recorded evidence of soapstone manufacture toward more stylized forms (especially effigies), use of better quality soapstone in production, and better quality artifact forms. There is also a general increase through time in the amount of soapstone objects and waste material found during excavation.

Unfortunately, only a few dated sites provide the basis for comparative data necessary to properly evaluate intersite relationships, soapstone assemblages, and trends in manufacturing technology. However, other site data are slowly being processed and may help fill the void that now exists concerning soapstone manufacture.

SOAPSTONE MANUFACTURE: PAST CONTRIBUTIONS AND STUDIES

The manufacture of soapstone objects resulted in the creation of an enormous amount of variability in artifact types (Hoover

1971). Utilized for purposes of trade, subsistence, and social, ceremonial, and religious functions, the precision, skill, and time involved in manufacturing objects can be readily appreciated in terms of techniques used in the production of these objects. A very interesting and informative control study was undertaken by Treganza and Valdivia (1955) in which an attempt was made to replicate the workmanship of the early Indians. Their report states that the purpose of the study was not simply to demonstrate that it was possible to duplicate existing artifact forms, but also to experiment with various kinds of stone materials and tools known to have been employed by the Indians to manufacture their objects. The study was an effort to determine the response of various rock materials to the tools used for testing and to understand perfection and latitude in the use of tools, the time factor involved in the various stages of manufacture, and the casualty rate in production (Treganza and Valdivia 1955:20). Although the report dealt only with charmstone forms, one can easily imagine at least in general terms what must have gone into the manufacturing of the larger cooking implements and the smaller and more precision-oriented beads, pendants, and effigies.

Before an item could reach what might be termed a "finished product," the projected artifact in the perform state would have to pass through various stages of modification or manufacture. Figure 10 illustrates the stages of manufacture of a charmstone. The material is steatite and according to Treganza and Valdivia the total modification time was two hours and eight minutes. The first stage of manufacture involved the heavy end of a core tool to batter the rough stone to the size represented by dashed line one. Alternately, grinding and pecking followed. Grinding was accomplished by rubbing steatite against a sandstone slab, and pecking was done with a chert core tool until the form shown by line two was

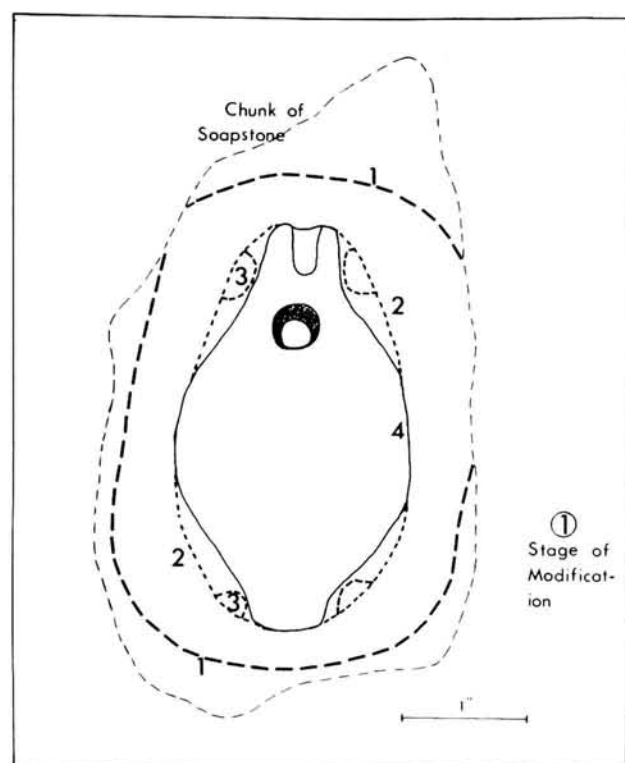


Fig. 10. Steatite charmstone showing stages of modification (adapted from Treganza and Valdivia 1955:24).

attained. An obsidian blade was used to cut a permanent groove at one end, and two additional encircling grooves, one at either end. Part of one such groove is shown as line three. A chert core tool was then used to peck and crumble away the steatite surrounding the latter grooves so that the two end knobs were formed. A small sandstone pebble was used to shape the charmstone to its ultimate form, as shown by line four. The perforation was made with a chert drill. The finished surface was produced by rubbing the charmstone briskly between the manufacturer's hands, using fine wet sand as an abrasive. Finished gloss was obtained by wear in handling without use of any artificial polishing agent. Pecking time was two hours and two minutes, grinding and smoothing time was two minutes, and drilling time was four minutes.

Depending on the type of artifact to be manufactured and the specific tools used in the

modification process, the time required to produce a finished product might vary from artisan to artisan, while the overall general stages of modification and reduction would appear to be much the same for all artisans and artifacts. Generally, the artifact passed through three main manufacturing stages: quarrying and roughing-out; alteration and dressing; and final preparation, smoothing, and polishing.

An article by Paul Schumacher (1879:117-121) is reproduced almost in its entirety for the insight it provides into the processes and results of soapstone quarrying and manufacture on Santa Catalina Island:

In my investigations among the remains of the aborigines of the Pacific Coast, south of San Francisco, I was . . . rewarded by finding the "olla," one of the most beautiful utensils of genuine aboriginal workmanship. The pot is usually of globular form, with a narrow opening on the top; sometimes pear-shaped, and others of the Mexican form, with a wide opening . . . The stone is [made of] steatite, usually of a greenish-gray color, sometimes showing . . . prisms in stellated groups, with pearly lustre and greasy touch, especially when reduced to powder. It changes in some portions of the same ledge into a more flaky and micaceous character, while in neighboring deposits, as at Santa Catalina Island, it exists crystallized in stellated groups of well developed hexagonal needles of glistening apple color, which are easily detached from the weathered surface. The living rock is not as bright or shining as are the fragments of pots that had been exposed to heat; it loses its greasy character the more a utensil has thus been in use, and the color is changed to a bright metallic lead color . . . [d]uring my last expedition to that locality, [Santa Catalina] . . . I made the discovery, finding pits, quarries, and tools, together with unfinished articles. I noticed that the softer stone usually obtained in the pits, which is

of a more micaceous character, was used for pots, while the close-grained rock of dark color, serpentine, was mainly used for the weights of digging sticks, cups, pipes, ornaments, etc.

While in camp at Little Springs, my attention was first arrested by a small silvery hue, which same hue also extended over the adjoining ground. The mound is in front of a large outcropping rock of pot-stone, which I found to be an impressive witness of the tedious labors of the aborigines, it being entirely covered with marks where pot-forms had been worked out or left in various stages; some even were only begun and abandoned, while others were nearly worked out in rough outlines, but still united with the living rock. At the foot of the bluff is a burrow in which, and among the debris forming the mound, many potsherds, a broken pot of which the outside had already been well worked and even the hollow started, and a pot-form as broken from the mother rock, were brought to light, with many tools of hard slate in the shape of chisels, and scrapers of quartz.

From the Little Springs we followed the cañon to the northward, and crossed the pass, easy of access from this side, into Potts Valley. It is a wide hollow cañon, in which pot-stone, silicious slate, and "float" quartz are found abundantly Between this place and the second ravine, about 50 yards to the northwestward, is another pit of larger dimension—about 15 feet in diameter and still 5 feet deep—where, too, among the débris, potsherds and quantities of slate fragments and quartz are found; some of which had evidently been used in working the mine and making pots I was struck, on examining the locality through a field-glass, by the discovery of so many silver-hued mounds, the débris of pits, the rock quarries, and the open-air workshops, so that I believed I had found the main factory of the 'ollas' of the California aborigines. Even those not interested in aboriginal

remains cannot fail to notice the manufacturing propensities of the people that formerly roamed here, and the locality was appropriately named.

In examining the slate quarry I found the rock had been first broken into accidental shape and size, and such pieces as were best adapted for chisels were then selected and trimmed. The scrapers, usually made of milky quartz, found in abundance all over the island, are sometimes quite well chipped, but oftener simple flakes. I will mention here that we detected among the chisel-marks on the living rock, as also on several potsherds, distinct signs of metallic tools having been used. These were probably of iron, and like those which we frequently found in the burying-ground on the Isthmus I also give a sketch, Fig. 41, [Text Fig. 11] of a part of the bluff near the boat-landing, which gives a better idea of how the rough work of detaching the rock was carried on.

After the pot form had been worked out, it was broken from the living rock by working under it and by the gradual pressure of the chisel around the base. The detached pot-boulder was next rounded into proper form; it was then hollowed out until a certain thickness of the pot was reached, and was finally carefully finished

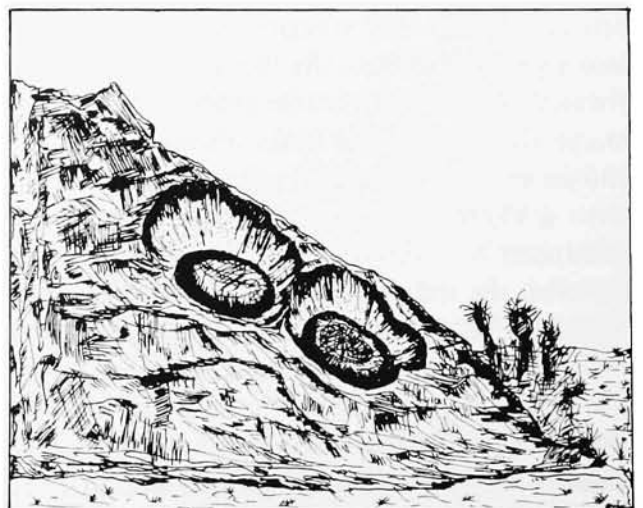


Fig. 11. Soapstone quarry mound on Catalina Island showing the method of detaching the pot forms (after Schumacher 1879:121).

with the scraper. As the thickness of the olla increases toward the bottom—it usually thickens from about half an inch at the rim to one and a half at the bottom—it requires skill to attain this evenly. No mechanical apparatus was used for this purpose (as shown by certain irregularities in the form of the pot), but simply the touch of both hands in antiposition, one gliding outside the already finished surface, while the other worked inside toward the guiding hand.

Figure 12 further illustrates what Schumacher describes as “working out” and detaching the pot-boulder from the mass of parent rock, and then beginning to hollow out the preform.

Meighan and Johnson (1957) also contributed significantly to our understanding of soapstone technology and production pro-

cesses. According to them, soapstone was far and away the most important exploitable resource of aboriginal Catalina Island, with its quality and quantity not found elsewhere in southern California. Although this statement is generally true for coarse-grained soapstone, other locations have been discovered in Tulare County (Walker 1935:178), Sierra Pelona, Santa Cruz Island (Romani n.d.), Cuyamaca Rancho State Park (Polk 1972:7), the Jacumba Valley region (Heizer and Treganza 1944:308), Boiling Springs in the northern Laguna Mountains (Polk 1972:8), San Rafael Mountains, Upper Santa Inés River area, (King 1971:40) and other localities in California, as suggested by Heizer and Treganza (1944:308-309). While other areas besides Catalina Island show aboriginal exploitation of coarse- and fine-grained soapstone and serpentine deposits, none other has yielded so



Fig. 12. Soapstone quarrying and bowl making on Santa Catalina Island (after Heizer 1954:51).

much evidence of such extensive and concentrated mining and manufacturing.

Many of the outcrops on the island exhibit signs of aboriginal quarrying:

The main objective of the ancient miners was to hack out large rounded blocks which could then be hollowed out to form bowls, plates, and globular vessels. Smaller pieces of soapstone, including the waste from making bowls, were turned into such objects as effigies of whales, grooved stones for straightening and smoothing arrow shafts, pendants, and beads Nearly all of the steatite objects in southern California archaeology appear to be derived from Catalina quarries [Meighan and Johnson 1957:26]

The exploited outcrops of soapstone are often covered with scars and evidence of bowl removal (Fig. 13). In several instances, the number of visible scars on a particular outcrop exceeded thirty, while the largest outcrop recorded had more than eighty scars. Meighan and Johnson (1957:27) note:

Stone bowls were quarried mainly in two ways. From ledges and outcrops with a flat surface the miner began cutting a circle of the proper size on the rock face. Then, with stone chisels, gouges, and picks, he cut downward and inward to isolate a block of steatite. As soon as he could, he broke off the block, leaving a stem in the cavity. The blank was hollowed out with stone chisels, smoothed with abrading stones (often to a remarkable degree of thinness and symmetry) and the finished product was ready for a trading expedition. On some outcrops natural projections were frequently shaped into a rough bowl form and then undercut by the most convenient method. The bowl was not finished until the blank was detached, however, whichever way it was begun.

Many of the preforms and unfinished objects were broken during manufacture as indicated by the hundreds of fragmentary

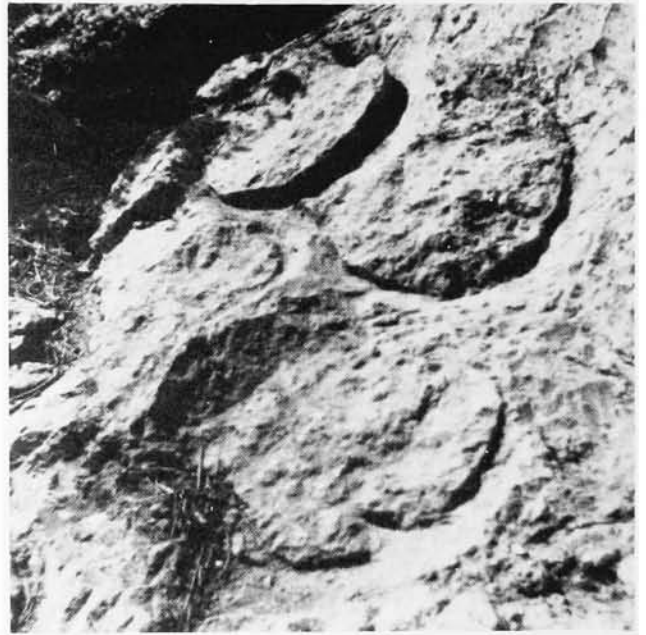


Fig. 13. Illustration of several visible bowl scars on a quarried outcrop on Catalina. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.

pieces of soapstone found scattered on the surface near quarry, mining, and workshop areas where probable impurities in the grade of soapstone contributed to the breakage factor (Figs. 14, 15). Meighan and Johnson (1957) state that the necessity for obtaining quality soapstone went beyond the use and exploitation of surface outcrops. There is evidence that the Indians resorted to open pit mining in some instances to obtain further quantities of soapstone. Following out veins and ledges resulted in the exposure of more rock surface for mining. Though the mining was not extensive compared to modern standards, the fact that dozens of mining pits have been identified suggests the intense working of soapstone by the aboriginal miners.

The Indians on Catalina had at their disposal a variety of resources essential to the manufacturing of soapstone objects. Slate could be obtained from localized outcroppings and ledges for use as picks, saws, and choppers, while quartz (a material conducive to making hammerstones, drills, and scrapers) could be

obtained at various locations on the island. The latter is often found as fist-sized float pieces on the ground or in washes. Certainly trade was also a means of obtaining any other raw material necessary for production purposes.

The production of many artifacts probably resulted in specific technological responses to the state and condition of each preform to be modified. Not every artifact would have to

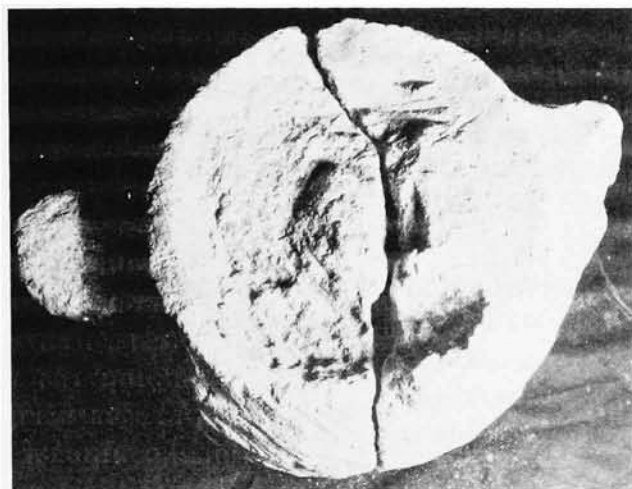


Fig. 14. View of soapstone bowl broken while being hollowed out during manufacture. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.



Fig. 15. Side view of same soapstone bowl. Note the gouging marks from picks. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.

pass through every manufacturing stage. For example, many potential objects were broken during different stages of manufacture and instead of beginning again, a new form was created using the broken artifact at a specific stage and continuing the modification from there. In many cases, a finished product was broken during use. When it could not be repaired, it was sometimes worked into another form. In this way, the reworked form did not have to pass through all the modification stages again. Breakage was not uncommon to the aboriginal artisan, and it can be postulated that where time and effort were concerned the easiest manufacturing process was adopted by utilizing short cuts or "tricks of the trade."

In reflecting on the entire range of production and manufacturing possibilities which might have been encountered by the artisan, the following discussion will attempt to synthesize prior descriptions and accounts, illustrate the possible stages of manufacture and modification, identify possible tools used during each stage, and demonstrate that there are inseparable associations between the raw material, stage of modification, and the tools used during manufacture. In essence, the particular object to be manufactured dictated the type of soapstone to be used, the specific manufacturing steps to follow, and finally, the tools and techniques necessary to complete the process.

TOOLS AND MANUFACTURING PROCESSES

The main object of the artisans and miners of soapstone was to procure, through techniques, craftsmanship, and experienced judgment, utilizable soapstone for the purpose of modification and manufacture. Generally speaking, and based on available literature, the following manufacturing continuum (Fig. 16) reflects stages of development and

SOAPSTONE MANUFACTURING CONTINUUM

Manufacturing Stage		Possible Tools		Manufacturing Marks Exhibited
1	Quarry Gouge Dig	Picks Saws Blades Knives	Chisels Hammers Choppers Axes	Visible deep grooves, cuts, incisions and gouge marks on the surface.
2	Crumble Scrape Peck Fracture	Cores Scrapers Knives Hammerstones	Choppers Chisels	Many visible shallow thick to thin cuts, lines and striations on surface. Some deep grooves remain.
3a	Grind Smooth Drill Incise Inlay Perforate	Abrading Stones Files Drills Reamers		Most visible deep cuts and thin shallow lines are worked out. Smoother texture exhibited.
3b	Finish Polish	Sand Hand Rubbing		Surface exhibits sheen and visible luster.
	Possible Finished Forms	Fine-grain Type 1 Beads Pendants Effigies Figurines Charmstones Doughnut stones Pipes Sucking Tubes Straighteners	Coarse-grain Type 2 Bowls Comals Ollas Straighteners Sinkers Fishing Weights Heating Stones	

Fig. 16. Soapstone manufacturing continuum.

processes involved in the manufacture of soapstone objects.

The first manufacturing stage can be considered the conceptualization, planning, and design phase during which the quarrying, digging, picking, and gouging of the rock mass took place. Here, the heavy work required to remove large or workable pieces of soapstone from outcroppings or mining locations was accomplished. This particular stage applies primarily to the production of the larger and often bulkier coarse-grained objects. The fine-grained soapstone and serpentine deposits on the island and corresponding artifact forms

appear to have been fashioned in many cases out of chunks, waste, or float pieces of soapstone, which were not necessarily mined in the same way as the coarse-grained grade. However, lack of references and replicative studies like the one undertaken by Treganza and Valdivia (1955) prevents a more adequate assessment of the initial phase of manufacture for fine-grained soapstone objects.

A review of the literature suggests that various tools were used during the first phase of manufacture (Schumacher 1879:120; Meighan and Johnson 1957:27-29; Meighan and Rootenberg 1957:180; Finnerty *et al.*

1970:14; Heizer and Treganza 1944:302). There are references to picks made from slate, saws, slate chisels (probably used as picks rather than as devices for leverage, wedging, or shaping in the initial stage), choppers, scrapers, knives, blades, and hafted hammers (although examples of these are rare). Mention has also been made of the possibility that iron or other metal implements were used in the quarrying of soapstone during later times (Schumacher 1877:263; 1879:120). Both Schumacher (1877) and Glidden (1920) mention the fact that metal implements were found in the context of an aboriginal cemetery on Catalina.

The most indicative wear patterns which distinguish this stage of manufacture from others are, deep grooves, cuts, and gouges, visible on the surface of the object (Figs. 17 and 18). Although these wear patterns are easily discerned on coarse-grained soapstone, the nature of the material and the differences in manufacturing of fine-grained soapstone and serpentine objects did not always warrant their passing through this heavy reduction phase. Therefore, the major cuts and gouges present on coarse-grained, mass-removed material (in most instances resulting from large tooling techniques) might not have been required for the already much reduced, smaller, fine-grained preform.

The second manufacturing stage includes the design implementation and alteration phase, where dressing and pecking are directed toward the general to specific shaping and reduction of the preform. Once the workable portion of soapstone is removed from the outcrop or obtained from a specific source (float or other debris), the artisan was then concerned with forming and shaping the rock mass by a process including but not limited to pecking, crumbling, scraping, and, in general, the removal of large or small amounts of excess material in order to reduce the size of the preform. Generally the use of quartz hammerstones, core tools, drills, blades, and the con-

tinued use of smaller and more efficient slate saws and scraping implements might accomplish this function.

Diagnostic marks and wear patterns for this stage might include the appearance of many shallow, thick-to-thin surface grooves with a general decrease in deep, large grooves and gouge marks characteristic of the first stage. Striations are definitely visible, possibly resulting from the reduction and elimination of

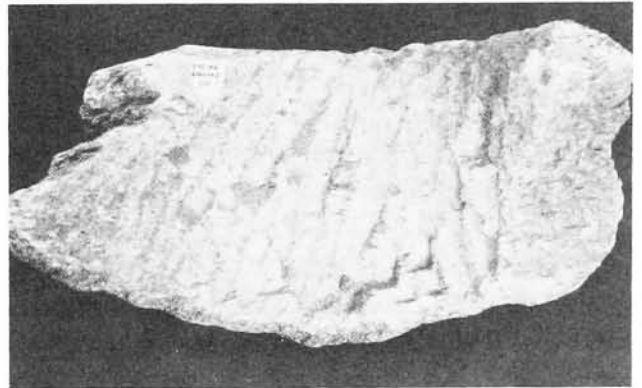


Fig. 17. Gouging and cut marks visible on surface of bowl broken during manufacture. Photograph courtesy of the Museum of Anthropology, University of California, Los Angeles.



Fig. 18. Broken soapstone bowl exhibiting pick and chisel marks from being shaped. Photograph courtesy of the Museum of Cultural Anthropology, University of California, Los Angeles.

excess waste on the developing form and the roughing-out of the object. By the close of this stage, the object has taken on its diagnostic form, leaving the basic clarification of details and minor alterations to be completed.

The final manufacturing stage includes final preparation where there is a clarification of detail, polishing, and additional finishing touches. Here, the emphasis is on abrading, smoothing, drilling, incising, rubbing, and polishing when required and depending on the particular object.

During the final preparation stage, the artifact form has been completely roughed-out and ornamentation was added if necessary. Smoothing and polishing completed the modification of the object. In general, the artifact was then ready for use or distribution (Wlodarski and Larson 1975:160-162).

Tools used during this phase of manufacture appear to include abrading stones of schist or sandstone used primarily for waste reduction, grinding, and smoothing. Drills, reamers, and blades of chert or quartz for incising and perforation of the object if necessary, light flake tools of quartz, quartzite, and chert for notching and incising, and sand or the use of the hands for a final rubbing and polishing to provide sheen and luster might also have been required during this final stage (Treganza and Valdivia 1955:20-24; Meighan and Johnson 1957:27; Finnerty *et al.* 1970:14).

Characteristic of this stage are the absence of all deep, visible surface gouging and cuts, and the working out of most of the thin lines (cuts and striations indicative of the second stage of manufacture), leaving a relatively smooth surface with only minor scratches caused by abrading and smoothing procedures. Differential finishing processes may be expected depending upon the artifact and its intended function.

Variations in manufacturing then are primarily based on the grade of soapstone (coarse- and fine-grained), the procurement of

the raw material (mining, quarrying, use of float material or reuse of waste from an already manufactured or broken object), the intended function of the object (burial, trade, everyday use), the stylization and elaboration involved (drilling, inlaying, ornamentation, cross-hatching, and other design elements) and the ultimate distribution of the object. It is also probable that the skill and level of expertise of the artisan contributed to the variations in quality of the object produced, affecting the overall production process, although testing for such variables might prove to be subjective and very difficult.

CONCLUSIONS

Comparisons of sites on Catalina where soapstone objects have been found and discussed is limited. The West End site and Miner's Camp reflect differential exploitation of soapstone and represent manufacturing areas where coarse-grained (Miner's Camp) and fine-grained soapstone and serpentine (West End site) were modified into a variety of forms utilized on Catalina as well as those traded to many coastal mainland areas. The Isthmus Cove site represents the only scientifically excavated village distribution site on Catalina, although other locations including Empire Landing, Avalon, White's Landing, and Johnson's Landing are also ideal areas for villages and possibly distribution centers. Unfortunately, the associated middens and cemetery locations in these areas have been heavily impacted by various investigators, including Dr. William Dall in 1874, Paul Schumacher from 1875 to 1878, W. H. Holmes in 1900, C. F. Holder in 1910, George Shaffer and Louella Blanche Trask from 1895 to 1915, Ralph Glidden for George Heye in the 1920's, and E. L. Doran in the 1930's (Decker 1969: 73). Although they recorded their "finds" and other general information, these researchers failed to document contextual data necessary

in reconstructing past lifeways. It would be rather presumptuous to assume that the Isthmus represented the sole distribution center for Late period soapstone objects on Catalina. Other areas most certainly were functioning not only in the Late period but possibly as early as 2000 B.C., even though there is only evidence from Little Harbor suggesting a crude, simple exploitation of soapstone. The disturbance of the majority of large coastal and island village sites by previous investigators, vandals, developers, and natural forces have hampered research efforts directed at answering related questions. Along with a limited amount of published material and corresponding data, our knowledge and basis for making evaluations, judgments, and predictive statements concerning soapstone quarrying, manufacture, and distribution comes from only a handful of sources, some of which have not been updated or expanded since the late 1800's.

Soapstone was available as a resource to the Indian for thousands of years, although large-scale exploitation of the quarries and outcrops on the island was a relatively recent phenomenon. Small-scale manufacture is confirmed as early as 4000 years ago, continuing without any apparent increase until A.D. 1000 or later. Other sites on Catalina, including Torqua Cave, Rosski, and Cottonwood Creek, substantiate the fact that limited soapstone exploitation was occurring prior to A.D. 1000. Sites at Empire Landing, Isthmus Cove, Big Springs, Miner's Camp, the upper levels of Torqua Cave, and possibly the West End, suggest increased exploitation and more intense production of soapstone objects after A.D. 1000 (Meighan and Rootenberg 1957; Leonard 1973; Stevens 1977; Rosen n.d.; Eberhart personal communication). With large-scale quarrying most likely came the specialist and a modification sequence which addressed itself to the fact that a production-oriented endeavor implicitly revolved around a

mode of manufacturing not unlike the proposed continuum represented by Fig. 16. This continuum summarizes the possible relationships between manufacturing stages, tools used during the modification process, distinguishing manufacturing marks characteristic of each stage of manufacture, and the possible finished forms as they relate to the specific grade of soapstone used during manufacture.

Although the production of coarse-grained objects in the form of bowls, ollas, comals, etc., appears to be the main focus of quarrying and manufacturing activities after A.D. 1000, fine-grained soapstone and serpentine forms, including small dishes and bowls, beads, pendants, effigies, doughnut stones, charmstones, etc., are no less significant in terms of value or distributional potential as shown from the West End site. What is lacking, however, is the dating of this fine-grained soapstone manufacturing site in order to establish or refute contemporaneity with the Late period exploitation of coarse-grained outcrops and manufactured objects.

Up to now there has been a basic adherence to the notion that only the large coarse-grained objects were manufactured in quantity for trade purposes after A.D. 1200. What about the quantities of fine-grained soapstone and serpentine objects found on Catalina and mainland sites? Catalina certainly must be considered a primary source for many of these objects, including the effigies, pendants, pipes, doughnut stones, beads, and charmstones found in various contexts along the immediate mainland coast of southern California. Again the nature of the data available and lack of chronological data for a site like the West End serve only to create more speculation. General trends concerning chronology and grade of soapstone concern themselves with quantity and quality of manufacture, lacking precise dating information and any acceptable basis for contrast and comparison. Generally stated,

the earlier sites on Catalina from which evaluations can be made appear to contain soapstone objects that are simple in form, crudely manufactured as if made from float pieces of soapstone sometimes hard to identify or distinguish from natural rock, and in very small quantities when compared with the overall assemblage. The progression from early to much later sites prior to the large-scale manufacturing that occurs post-A.D. 1200 finds more intermediate forms being produced (Meighan 1976), although no substantiation for this has yet been found on Catalina. Here, simplicity is still present, yet the quality of manufacture has resulted in a more detailed and better constructed object. There is no reason to assume that only fine-grained objects were manufactured at this time, but there is also no indication that quarrying and production of large coarse-grained objects were occurring with any noticeable increase on Catalina or in coastal mainland sites of this period. Sites on Catalina which appear to date to post-A.D. 1200 exhibit greater quantities of soapstone, greater variety in artifact forms, the presence of bowls, ollas, and comals produced from coarse-grained outcrops, and in some cases large amounts of soapstone waste most likely resulting from the reduction and modification of various objects at the manufacturing site. The basic trend in manufacture from 2000 B.C. to A.D. 1700 appears to be an increase in complexity and variety of artifact forms produced, an increase in the overall quantity of material produced, and a late exploitation of the coarse-grained soapstone outcrops on the island for production of large ollas, bowls, and comals.

NEEDED RESEARCH

This paper has broadly surveyed our current knowledge on the exploitation of soapstone on Catalina Island. Further research beyond the scope of this paper is needed not only on soapstone quarries on Catalina but on other source areas before many important

questions concerning this resource can be answered. Among areas of research deserving consideration are the following:

1. Attempts should be made toward sourcing soapstone. These would entail identification of various types and grades of soapstone by color, specific mineral content, crystalline structure, and other comparable internal characteristics which might help define the extent of distribution of artifacts from Catalina Island and other sources in southern California. This problem is currently being addressed by Gwen R. Romani (n.d.) and N. Nelson Leonard (personal communication).

2. A better understanding is needed of manufacturing processes, tools, and time/labor factors in the production of artifacts (including labor specialization). This knowledge can possibly be obtained through more replicative studies and other types of research.

3. Recovery of more data that will lend themselves to interpretations and discussions of stylistic variability based on personal, local, or regional sociocultural behavior, possibly accounting for form and decorative variability in artifacts, including incising, inlaying, grooving, cross-hatching, pigmenting, etc.

4. More in-depth analysis into trade and other cultural patterns where there might be differential acquisition in terms of personal, local, or regional wants and needs as reflected in preferences for certain types of soapstone artifacts, blanks, preforms, or raw material. To what extent did the artisans affect or control trade relations and inter- or intra-cultural economic trends? Were only "finished" or "completed" products traded to outlying areas or was there a choice in bartering for goods? Could artifacts be ordered according to prearranged specifications?

5. Determination of who actually controlled the resource of soapstone. Were the Gabrielinos or Chumash primarily responsible for Late period manifestations of soapstone production? Was there a difference between

the laborer who mined and roughed-out the raw material and the artisan who did the more delicate work leading to the final product? If so, was this reflected in social stratification or status differentiation? Was there assimilation or acculturation involved in the control, exploitation, and distribution of soapstone?

Generally speaking, our knowledge of the many aspects of soapstone quarrying and trade is limited to sparsely published data on the subject. Although more work has recently been completed on Catalina Island soapstone by a number of individuals, little of this new material has as yet been published. When the bulk of this new material is analyzed and published, it is hoped that many of the questions now raised concerning soapstone may be answered.

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