



CALIFORNIA INDIANS,



Artisans of Oil



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*Front cover:
Display of a
Chumash
Indian woman
pouring water from
a woven bottle
waterproofed with
asphaltum.
Photo by Susan
Hodgson. Re-
printed courtesy of
the Santa Barbara
Museum of Natural
History.*

*The vertical design
is Pomo Indian
basketry language
for ka teá katip',
obsidian chips.*

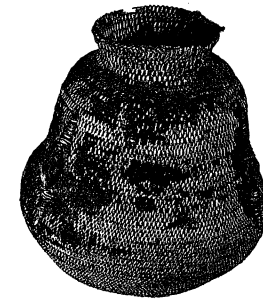
*Back cover:
Natural oil
seeps at
Carpinteria
State Beach in
Southern
California.
Photo by Steve
Mulqueen.*



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CALIFORNIA INDIANS, ARTISANS OF OIL



By Susan F. Hodgson
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California Department of Conservation
Division of Oil, Gas, and Geothermal Resources

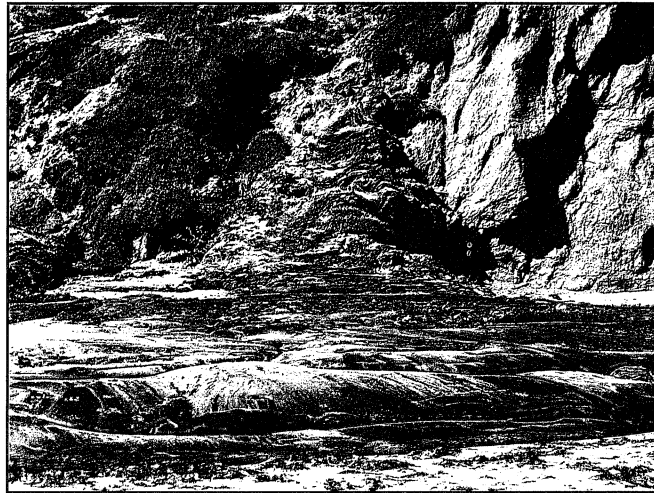
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FOREWORD—WHERE THE WORDS COME FROM

"The substances referred to under the names *bitumen*, *asphalt*, *maltha*, *naphtha*, *petroleum*, *rock-oil*, etc., have been known and used from most ancient times, and much of our modern nomenclature is of actual Greek and Roman ancestry. These peoples distinguished three related substances,—the Greek *asphaltos* and Roman *bitumen* for the hard material,—Greek *pissasphaltos* and Roman *maltha* for the viscous, pitchy variety,—and occasionally the Greek and Roman *naphtha* for petroleum proper, although it is often enough referred to as liquid *bitumen* or liquid *asphaltos*.



The term *petroleum* apparently first appears in Agricola's *De Natura Fossilium* (p. 222), where

he says the 'oil of bitumen ... now called petroleum.' Bitumen was used by the Egyptians for embalming from prehistoric times, i.e., prior to 5000 B.C., the term *mummy* arising from the Persian word for bitumen, *mumiai*."

Mankind from around the world probably has used oil from natural seeps from the moment people and seeps first met. This story is about the experiences of California Indians who, through millennia, became masters of the craft—artisans of oil.

Quotation from a footnote by Herbert Clark Hoover (U. S. President Hoover) in the 1912 translation by Herbert Clark Hoover and Lou Henry Hoover of *De Re Metallica*, by Georgius Agricola (1556), p. 581-2, reprinted by Dover Publications, Inc.

Photo of an asphaltum flow across the beach in broad lobes, one-half mile east of Goleta Beach Park in Southern California, 1977, by Iris Priestaf. *Courtesy of the California Department of Conservation, California Geological Survey.*



f the Author

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CONTENTS

FOREWORD.....	ii
INDIANS AND OIL SEEPS DISCOVERED.....	1
TRADING.....	5
SYMBOLIC ROLES.....	6
DEATH.....	7
KNIVES, SPEARS, AND ARROWS.....	7
BASKETS AND WATER BOTTLES.....	8
MORTAR-RIM HOPPERS.....	8
DECORATION.....	10
MENDING.....	10
PERSONAL ADORNMENT.....	11
GAMES.....	11
MONEY.....	11
OTHER USES.....	12
SOLDERING WITH ASPHALTUM.....	12
PLANK CANOES AND ASPHALTUM.....	13
THE CHANGING PLANK CANOE—A PHILOSOPHY.....	19
IN CONCLUSION.....	19
EPILOGUE, ASPHALTUM FLOORS.....	19
AFTERWORD, FROM <i>DE RE METALLICA</i>	20
SELECTED REFERENCES.....	22

FIGURES

Figure 1. Indian tribes, groups, language families, and dialects of California in 1770..... 2

Figure 2. The oil fields of California..... 3

Figure 3. Twelve of the natural asphaltum seeps used by California Indians..... 4

ILLUSTRATIONS

Photo 1. A natural oil seep in Santa Barbara County..... vi

Photo 2. Pahmit, a Dumna Yokuts Indian..... 5

Photo 3. Chumash sunstick..... 6

Photo 4. Yokuts knife and arrows..... 8

Photo 5. Woven Chumash water bottle..... 9

Photo 6. A prehistoric, mortar-rim hopper..... 10

Photo 7. Asphaltum stains the lip of a stone mortar..... 11

Photo 8. Large Chumash sandstone bowl..... 11

Photo 9. Chumash serpentine bowl..... 12

Photo 10. Skirt weights of asphaltum..... 12

Photo 11. Dice made from black walnut shells..... 13

Photo 12. Wahnomkot, a Yokuts woman..... 13

Photo 13. The stone Indian women of *Wá-mil-ow*..... 14

Photo 14. A Maidu acorn-meal brush..... 14

Photo 15. Cabrillo’s caravel approached by plank canoes..... 15

Photo 16. Surveying driftwood..... 16

Photo 17. Chumash Fernando Librado *Kitsepawit*..... 17

Photo 18. Views of a Chumash plank canoe..... 17

Photo 19. Close-up of Chumash canoe planks..... 18

Photo 20. Paddling a plank canoe..... 19

Photo 21. Old Mission Santa Inés..... 20

Woodblock print from *De Re Metallica*..... 21

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Artistic depiction based on an eyewitness account of the march of Spanish soldiers from San Diego to Monterey, 1769. "At the head of the column rode the Comandante, Gaspar de Portolá, with Pedro Fages, Miguel Costansó, and the two priests." Reprinted from *The March of Portolá and the Discovery of the Bay of San Francisco* by Zoeth S. Eldredge, 1909, published by the Reception Committee of The California Promotion Committee.

"At a distance of two leagues from this mission there are as many as eight springs of a bitumen or thick black resin. This black liquid springs from the ground and runs amid the water of the streams without commingling with it or giving it a bad flavor."

—1775

Pedro Fages

(Note the sword Pedro Fages draws under his name.)



Photo 1. A natural oil seep in Santa Barbara County, California, about one-half mile east of Goleta Beach Park. Photo by Iris Priestaf, 1977, courtesy of the California Department of Conservation, California Geological Survey.

vessels; but, if there is little, it is collected with goose wings, pieces of linen, *ralla*, shreds of reeds, and other things to which it easily adheres, and it is boiled in large brass or iron pots by fire and condensed. As this bitumen is put to divers uses, some mix *pitch* [ed. emphasis] with the liquid, others old cart-grease, in order to temper its viscosity ... It is rare that such bitumen is not highly esteemed."

You will remember what the Chumash, Palatino, told John Harrington: that the Chumash would fill a big pot halfway with asphaltum, wait until it melted, and add pitch for thinning. If the asphal-

tum grew too thick, it was reheated and more pitch added—the exact method used in Saxony in the 1500s and probably for many centuries before.

In Agricola's woodblock that follows, the process is illustrated clearly. Notice the water boiling off as steam, just as it did for the Chumash.

The quotation and woodblock print are from *De Re Metallica* by Georgius Agricola, published in 1556 and translated from Latin to English in 1912 by Herbert Clark Hoover and Lou Henry Hoover. Printed in 1950 by Dover Publications, Inc., p. 582-3.



A—BITUMINOUS SPRING. B—BUCKET. C—POT. D—LID.

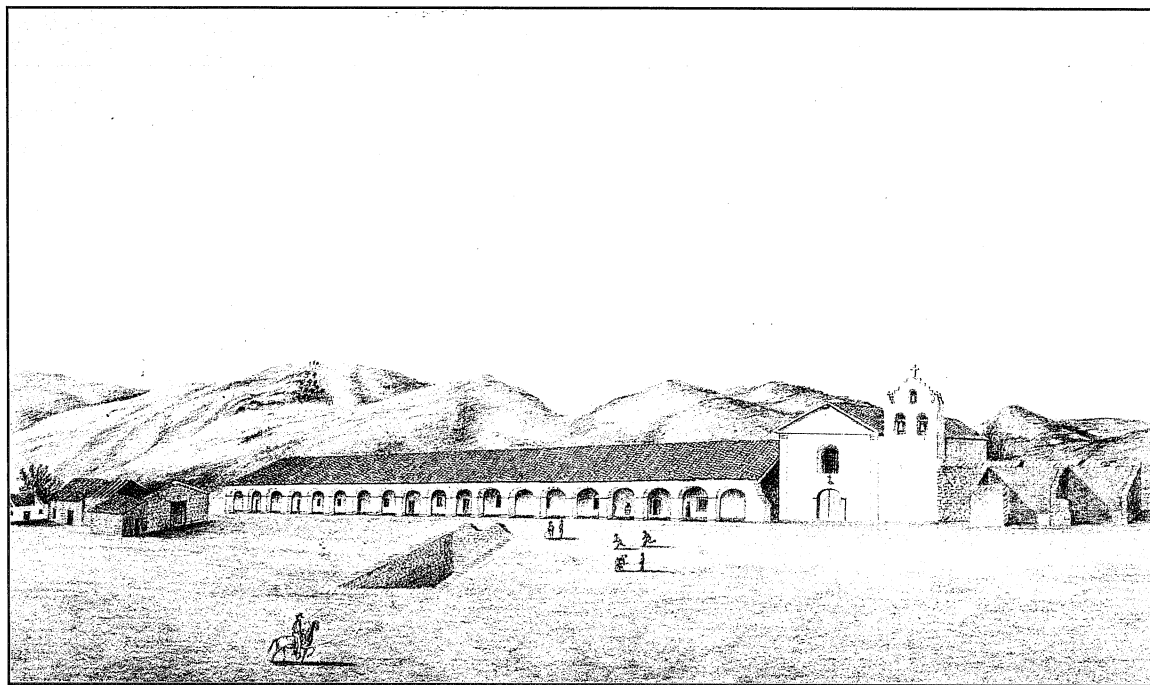


Photo 21. Old Mission Santa Inés, drawn by Henry Miller, 1856. Counting from the left, rooms behind the 8th through 10th arches had asphaltum flooring. Rooms behind the 12th through 19th arches never were excavated archaeologically and may have some asphaltum flooring, as well. *Reproduced courtesy of the Bancroft Library, University of California, Berkeley.*

nearby. (The 1850 mission records show 1,631 Indian baptisms, 497 Indian marriages, and 1,632 Indian deaths.)

Archaeologists working at the mission from 1986 to 1988 wrote of the floors, "Numerous large pieces of asphalt flooring were found in the Phase IV levels of Rooms 8, 19, and the northern end of Room 20. Over 50 large pieces (averaging 4 to 5 inches in length) were recovered for analysis. They were remarkably uniform in thickness, ranging between 1.0 and 1.7 inches ... Nearly all the examples had a hard, polished-looking surface that, although smooth, was gently undulating. A few pieces had a rougher surface, suggesting they had not been subjected to either purposeful smoothing or wear ... One example does, however, appear to contain an imprint of a wooden form ... and six pieces appear to have been manufactured with triangular corners, approximating 45 degrees.

"The bodies of the samples were a uniform, homogeneous black tar ... The pieces were remarkably hard and breaking them required a hammer and some effort. Several pieces exposed to the sun for a week of more than 100° F days showed no discernible softening."¹

Here, once again, is the Indian knowledge of asphaltum and the careful asphaltum workmanship we have come to expect.

AFTERWORD, FROM *DE RE METALLICA*

Georgius Agricola, author of *De Re Metallica*, was born in Saxony in 1494, just as Columbus returned home from his great discovery of the New World. More important for Agricola, however, was that he was born 40 years after Gutenberg printed his first book.

For Agricola was an author. His many books include the first on physical geology and the first systematic mineralogy. His best-known book today is *De Re Metallica*, describing the mining practices he observed in the booming mining district where he lived. He sent the book to the printer in 1553 and for the next 180 years it remained the premier textbook and guide for miners and metallurgists. Written in Latin, it was translated into German and Italian and reprinted many times.

Here is what Agricola says about bitumen. "Liquid bitumen, if there is much floating on springs, streams, and rivers, is drawn up in buckets or other

CALIFORNIA INDIANS, ARTISANS OF OIL

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INDIANS AND OIL SEEPS DISCOVERED

Traveling through California, Pedro Fages wrote, "... at a distance of two leagues from this mission [San Luis Obispo] there are as many as eight springs of a bitumen or thick black resin that the natives call *chapopote*; it is used chiefly by them for caulking their small watercraft and tarring the vases and pitchers the women make for holding water."²

Fages played an important role in the Spanish history of California. Although governor of the Californias from 1782 to 1791, from 1769 on he journeyed through the territory as a Spanish soldier, twice traveling by horseback on expeditions from San Diego to Northern California. On the way he passed natural oil seeps and talked with the Indians using oil. Fages recorded impressions from this period in a book he titled, *A Historical, Political, and Natural Description of California*, written in 1775—one of the earliest accounts of California life.

Of course the oil that Fages saw two and a quarter centuries ago had an average age of about 25 million years, much older than the Indian cultures he found using it. Indians came to California about 13,000 years ago and the Indian tribes, groups, language families, and dialects of 1770 are shown in figure 1. Those living near oil reservoirs were first to find the natural oil seeps, which come in all

sizes. Figure 2 shows California oil fields and figure 3 notes 12 of the seep locations California Indians used, taken mostly from historical accounts of the 18th and 19th centuries.

The sites in figure 3 are identified as *asphaltum*—not *oil*—seeps. This is because oil coming from seeps is called *asphaltum*, defined as oil changed chemically by exposure to air. Often the oil hardens, but it can remain a viscous liquid.

An oil or gas seep forms where oil or natural gas emerges at the surface from a subsurface source. Frequently, seeps are associated with water springs: oil floating to the surface of the water and natural gas bubbling out and escaping into the atmosphere. Seeps are often transitory features, appearing and disappearing through the years on no set schedule. For the most part, this is caused by changes in the oil or natural gas source; changes in the water table; changes in the surface temperature; and changes in the fissure network, including seepage routes blocked by intrusions, chemical alterations, and earth movements³¹. The process is the same for onshore and offshore seeps.

With a few exceptions, California's natural oil seeps—and oil reservoirs—are located in the state's southern half, along the coastal areas and in the vast, central San Joaquin Valley. For more on California's natural oil seeps, visit the websites listed in the references^{38,39}.



Figure 1. California Indian tribes, groups, language families, and dialects in 1770 (Pedro Fages first marched with Portolá through California in 1769). Map adapted by Heizer and Whipple from Kroeber, 1925. Reprinted with permission from The California Indians, A Source Book, compiled and edited by R. F. Heizer and M. A. Whipple, second edition, published by the University of California Press, Berkeley, Los Angeles, London.

describing the ride. "It launched easily through the surf, was very stable in the water, and moved swiftly. At one point off Santa Cruz Island with a following wind and swell, the plank canoe achieved a speed of seven knots, about that of most small, motorized watercraft today."³⁷ The plank canoe amazed everyone with its "... agility, speed, and grace on the water," wrote Hudson, Timbrook, and Rempe¹⁵, a craft at home in an ocean or an estuary.

THE CHANGING PLANK CANOE— A PHILOSOPHY

Chumash Fernando Librado *Kitsepawit* used the plank canoe to illustrate his philosophy of life when he spoke with anthropologist John Harrington. Fernando said, "The first man in this world said that all the world is a canoe, for we are all one ... When the first canoe was finished, the first man who made it called others to pay close attention to his canoe making. Later this maker and his contemporaries died.

"The next generation remembered how the first man had made a canoe, so they too made one. There was always a little difference in their work, so their canoe was a little different from the first one. This generation died and another followed ... Many men arrived here from their own lands, and they saw also how a canoe was built and paid attention to it. Several years later they made their own canoes, continuing to make changes in size and form. Today we see that all canoes are beautiful. They have changed that which is necessary from the first canoe to those that they make now. There are boats called ships, and there are steamships, and there is the canoe that rolls on the earth ... with the force of fire."¹⁷

IN CONCLUSION

If "the canoe that rolls on the earth" is a car—and the "force of fire" is the gasoline that powers it—then our transportation is not so unrelated to that of these California Indians. Oil was a linchpin of their artistic, religious, and practical experiences, and oil is a linchpin of our own.

EPILOGUE, ASPHALTUM FLOORS

While others took control of their lands and lives, the Indians remained asphaltum masters. This is seen from asphaltum flooring found in the Old Mission Santa Inés, about 45 miles northwest of Santa Barbara and first built in 1804 in the heart of Chumash territory (photo 21). Several Chumash villages were close by²¹.

In 1851 and 1852 at the mission, Reverend Eugene O'Connell laid perhaps the first asphalt floors in present-day Santa Barbara County. A person named Oak, visiting in 1874, noted that the *convento* "... has modern floors of asphaltum and is occupied by one padre."¹ It seems probable the workers who laid the asphaltum flooring were Indians living

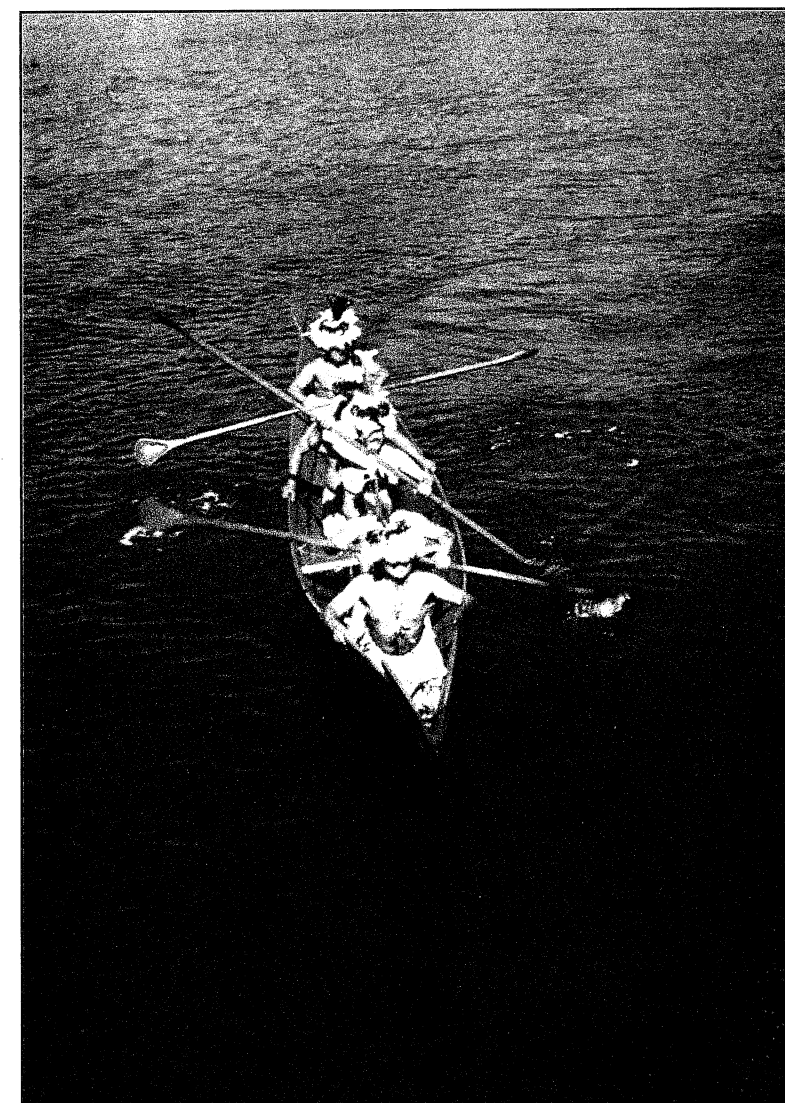


Photo 20. Paddling the plank canoe made by the Santa Barbara Museum of Natural History using Fernando Librado *Kitsepawit's* instructions recorded in 1914. Photo courtesy of the Santa Barbara Museum of Natural History.

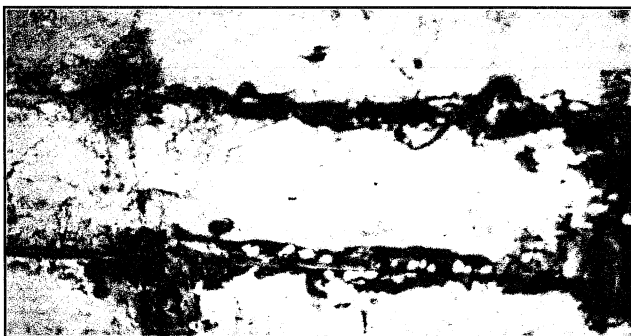


Photo 19. Close-up of Chumash canoe planks affixed with asphaltum. The canoe is in the Santa Barbara Museum of Natural History, on loan from the San Diego Museum of Man. Photo by Susan Hodgson, with permission.

Finally the Chumash inspected the work. Sometimes a board had moved, either because it was badly worked, the *yop* had not hardened well, or the props were not well adjusted. This board was removed and scraped clean of *yop*. New *yop* was applied and the board was restuck to the others, propped, and left to dry.

Industrial emergencies of a sort did occur. If a bowl of *yop* ignited accidentally, it could be covered with a hide to extinguish the fire. Fernando said you never threw in dirt, which spoiled the *yop*. He said that adding water was ineffective and sometimes it was just better to let the *yop* burn.

For added strength after the canoe was fashioned, holes were drilled through the ends of the boards, which were laced together with waxed milkweed fibers. The wax for the fibers was made in a little abalone-shell dish by mixing boiling *yop* with more pitch to prevent the *yop* from hardening. The wax was rolled into a firm ball. Holding it in the right hand, the Chumash pushed the natural fiber down into the wax with a thumb and used the left hand to pull the fiber through the ball. The waxed fibers were inserted in the plank holes and tied together, ending with a special finishing knot glued in place with *yop*. When all the ties were done, the holes and ties on the hull were covered with *yop* inside and out. After the *yop* had dried, any excess was scraped away.

When only the gunwale was left unfinished, a single crossbeam was installed in the middle of the canoe and affixed with *yop*. After all the boards were attached to the canoe, it was turned over and the seams were caulked. Tule reeds were forced into the cracks and all the cracks, seams, and joints were painted with *yop*. The hull was scraped smooth with a well-fashioned abalone shell and painted red and black with red ochre mixed with pitch and animal fat.

Now all the lines, joints, and fiber ties inside and outside of the canoe were covered with a black asphaltum paint applied with a raccoon-tail brush. Whenever designs of inlaid abalone shell were added, a spot on the board was carved out, filled with asphaltum, and decorated with the shells.

A Craft Afloat ¹⁴

Two to four crewmen were normal for a plank-canoe voyage and up to 10 or 12 people or ample cargo could be accommodated in the largest canoes. Rowers knelt on mats of woven grass or seaweed. Sometimes little stools inlaid with abalone shells affixed to asphaltum were set inside the boat. The paddles were inlaid with shells and asphaltum, as well. Besides the captain and crew, a boy or an old man often sat in the middle of the canoe with a small basket or an abalone shell and bailed out any leaking water.

Beginning a plank-canoe journey—before the boat was launched through the surf—four men would carry a canoe to the water's edge and chant a prayer to the world ¹⁶.

Give room!
Give room!
Give room!
Give room!
Do not get discouraged!
Do not get discouraged!
Do not get discouraged!
Help me to reach the place!
Help me to reach the place!
Help me to reach the place!
Hurrah!
Hurrah!
Hurrah!
Hurrah!

Describing the ride, Father Pedro Font wrote in 1776, "They [the Indians] carry some poles about two *varas* [about six feet] long that end in blades, these being the oars with which they row alternately, putting the ends of the poles into the water, now on one side and now on the other side of the launch. In this way they guide the launch wherever they wish, sailing through rough seas with much boldness." ⁵

About 200 years later in 1975, using Fernando's instructions, a plank canoe was built the Chumash way for the Santa Barbara Museum of Natural History (photo 20). "Once it was ballasted properly and the crew had some practice launching and paddling, it worked very well," said Jan Timbrook of the Santa Barbara Museum of Natural History,



Figure 2. The oil fields of California. Courtesy of the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

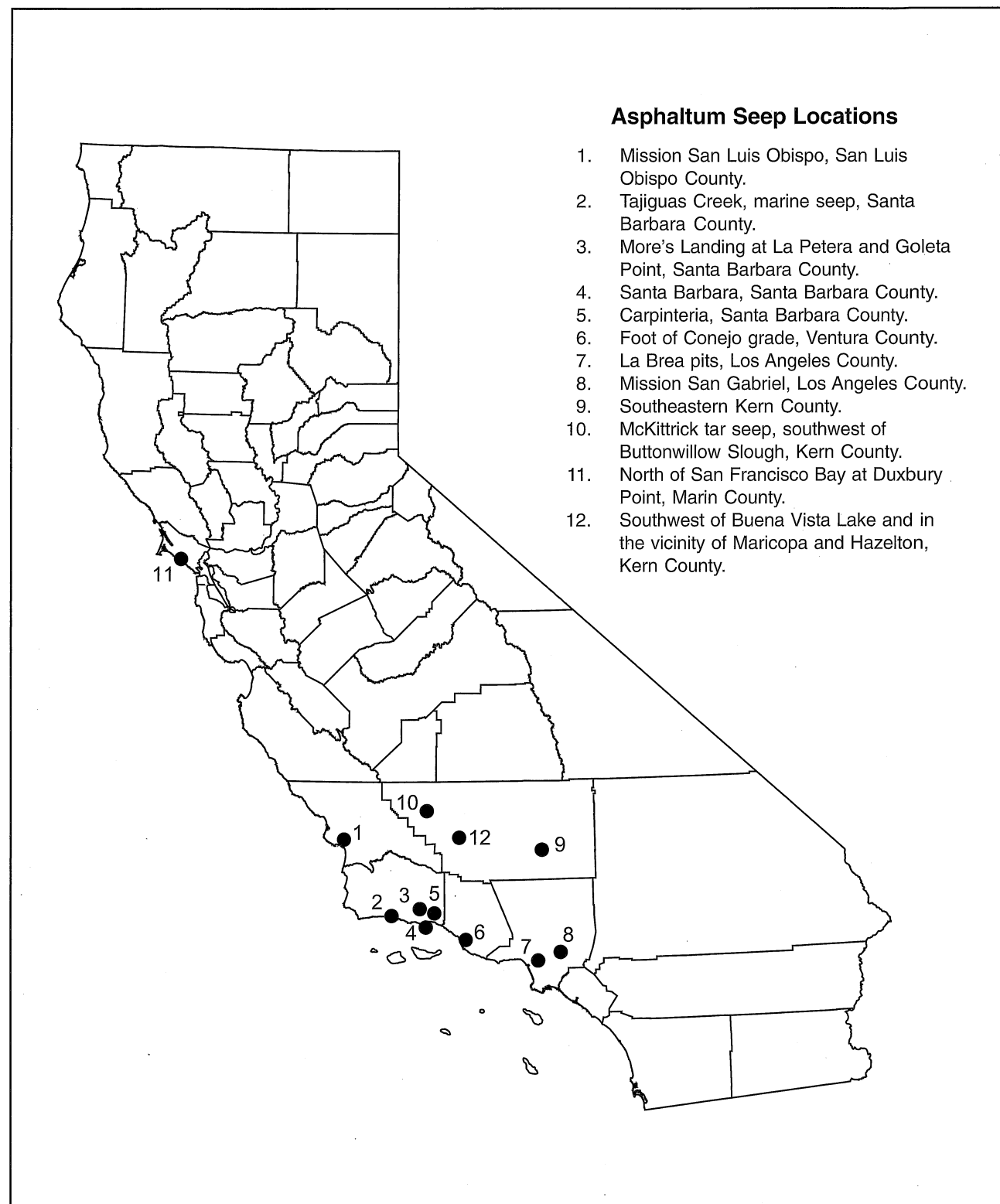


Figure 3. Twelve natural asphaltum seeps used by California Indians, taken mostly from historical accounts of the 18th and 19th centuries. *Adapted from a map by R. F. Heizer and A. E. Treganza.*

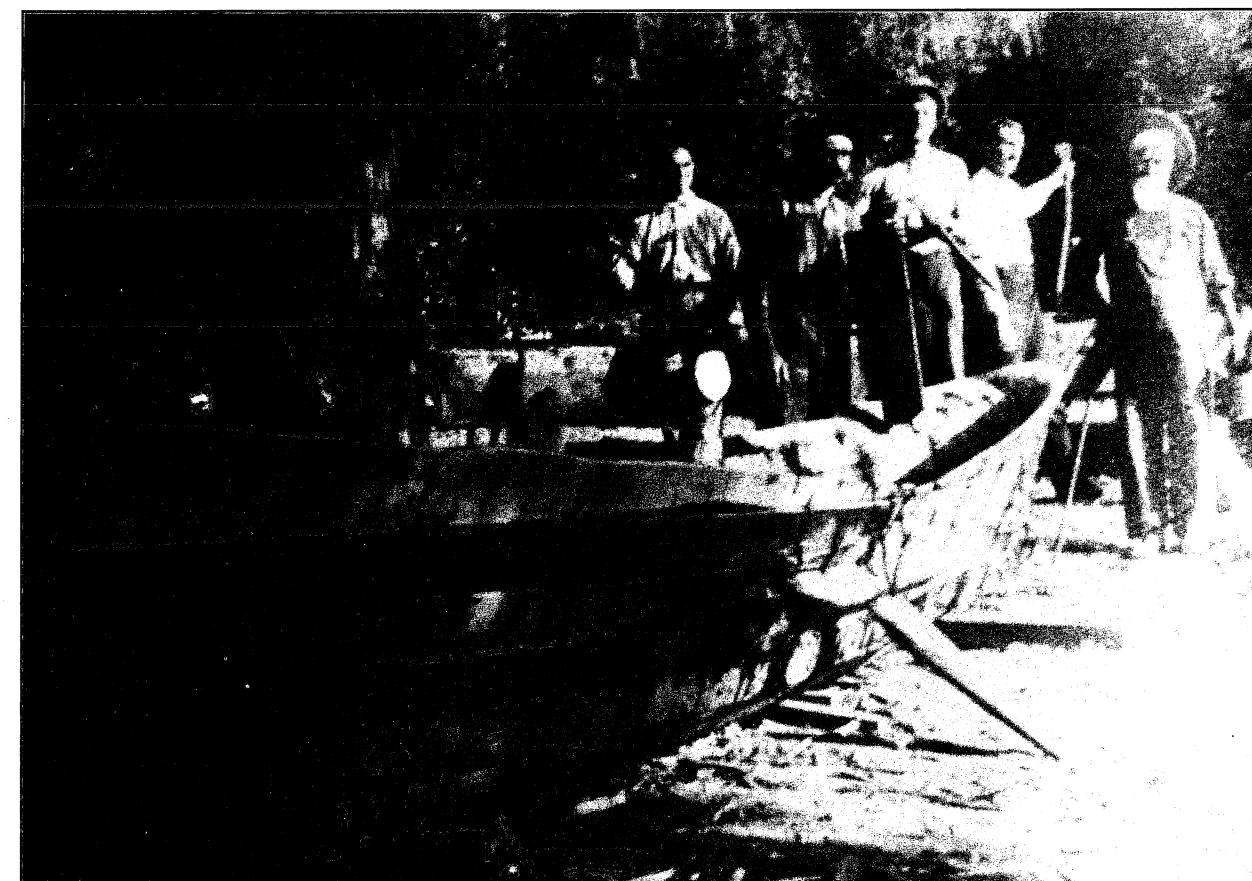


Photo 17. Chumash Fernando Librado *Kitsepawit* (photo right), next to the Chumash plank canoe he and others made for John Harrington (standing in the middle) in 1914. *Photo courtesy of the Santa Barbara Museum of Natural History.*

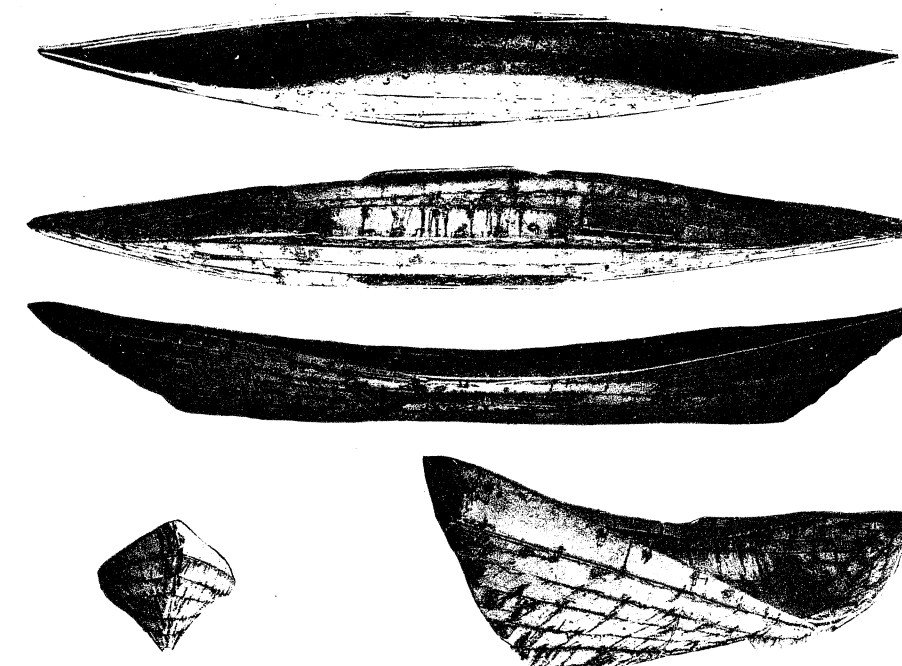


Photo 18. Views of the Chumash plank canoe pictured in photo 17, 23 feet long, built in 1914 at Highland, California, by Chumash Fernando Librado *Kitsepawit* when he was 110 years old. The planks are bound together with plant fibers and caulked with asphaltum. The canoe is in the Santa Barbara Museum of Natural History, on loan from the San Diego Museum of Man. *Photo courtesy of the San Diego Museum of Man.*



Photo 16. Surveying driftwood washed up on the shore near Santa Barbara. From supplies like these the Chumash made planks for their canoes. *Photo courtesy of the Santa Barbara Museum of Natural History.*

The three asphaltum mixtures needed to build the canoes were refined from *wogo*, each especially blended and boiled—a process that evaporated the water often associated with oil seeps. The first, called *yop*, was the basic mixture used to hold the planks together firmly—a blend of asphaltum and pine pitch. To make *yop*, the Chumash used a mortar and stone to break up chunks of asphaltum, which they put in a pot and boiled until the pieces melted. Now pine pitch from the mountains nearby was pounded into fine grains, added to the asphaltum, and stirred until dissolved. A Chumash named Palatino said he would fill a big pot halfway with asphaltum. Once it was melted, he added two double handfuls of pitch. He knew all the proportions. He would stir this briskly and always used more asphaltum than pitch. If the *yop* grew too thick, it was reheated and more pitch added; if it was too runny, more asphaltum was used.

To waterproof milkweed fibers used to bind the planks together, *yop* and more pine pitch were mixed together into a very waxy substance, a second, refined mixture. Finally to glue, caulk, and seal the paint, Fernando said *yop* was mixed with red ochre into a third, refined mixture. (Another mixture of pitch and red ochre also was used as a paint sealant.)

Plank Canoe Construction ¹⁴

Before canoe construction began, the *yop* consistency was tested overnight. Two canoe planks were tarred and stuck together and, in the morning if the joint was strong, the *yop* was judged good and the tarring pot fired up. However work was cancelled on very hot days. The *yop* wouldn't harden in the heat, making the canoes lopsided. About five quarts of *yop* were needed to caulk a canoe 26 feet long. With two or three brush strokes, runny *yop* was spread along the edges of the first two planks, which were quickly stuck together and aligned. One person held the boards in place while another propped sticks in the ground to support the boards as they dried. Drying boards were left alone lest touching spoil them.

Now the remaining boards on the first side were painted with *yop*, positioned, and propped up as before. When one side of the canoe was finished, work began on the other until all the boards were painted with *yop*, aligned, and propped. The canoe was covered with tule mats and left to dry for three days. The *yop* hardened during this period, making the canoe firm and the seams watertight. The canoe's strength lay in the workmanship and the hardness of the *yop*—cooled *yop* does not chip away easily.

Just as oil from any reservoir can be “fingerprinted” by its unique characteristics, the oils in natural seeps can be distinguished, as well. The Indians educated themselves about the oils they found. Indians Pedro Fages spoke with called the oil *pismu*, which he translated into Spanish as *chapopote*. Additional Indian oil vocabulary is on pages 15 and 16 of this publication.

The Indians learned which seep oils worked best for what purposes and the methods needed for using them. Eventually Indians came to use oil from natural seeps for a wide variety of symbolic, decorative, and practical purposes ^{12,13,35}. Sometimes the objects transcended the utilitarian, becoming folk art reflecting the aesthetic values of the artisans themselves. In fact, the astounding variety of Indian uses of petroleum resembles our own.

TRADING

Indians living near the seeps traded both liquid oil and hand-formed cakes of asphaltum with peoples

farther away. At the edge of today's Coalinga oil field was an ancient Tachi Yokuts village called *Poso Chaná*—or *O'-joo-ee'*. Here coastal and Tachi Yokuts Indians met to trade, arriving at night under a full moon. In the morning the coastal traders and the Tachi villagers would gather together, the Tachi traders moving to a shady spot, trading baskets swinging against their shoulders, singing: “*We come to trade. Now.*”²³

For trading, some brought liquid oil in baskets like water bottles or balls of hard asphaltum called *chah'-ki*. An old Tachi chief said that *chah'-ki* balls were wrapped in grass and rabbit skins to prevent sticking and uniformly made about the size of modern-day baseballs ²³.

Pahmit, a Yokuts Indian living north of Coalinga in the San Joaquin Valley, gathered and traded asphaltum from about 1830 on (photo 2). Living to be well over 100, in his last years he watched many settlers collecting asphaltum from the same seeps he had used for over a century ^{11,22}.



Photo 2. Pahmit, a Dumna Yokuts Indian, when he was about 105 years old. He extracted asphaltum from the San Joaquin Valley north of Coalinga. *Drawing by Jim Spriggs, from a 1929 photo by Frank Latta in Handbook of Yokuts Indians* ¹¹.

SYMBOLIC ROLES

Asphaltum played important symbolic roles in the lives of California Indians.

Curing

Frank Latta believed Pahmit was what the Yokuts called a *Trip'-ne* doctor, one whose work entered the supernatural realm. Pahmit claimed oil and asphaltum were *Trip'-ne* and compared shiny black blocks of freshly broken asphaltum to freshly broken obsidian, also *Trip'-ne*, noting the asphaltum was used to waterproof sinews attaching *Trip'-ne* obsidian points to arrows. Pahmit said Tachi Yokuts and other West Side Yokuts doctors painted their faces with asphaltum or crude oil before dances with supernatural acts.

Pahmit said *Trip'-ne* doctors used asphaltum and crude oil to cure, the only mention that I found for medicinal uses of asphaltum and crude oil by California Indians ²⁴.

Sunsticks

Chumash shaman-priests used a sunstick in winter solstice rituals to mark the solstice passage and "... to 'pull' the sun back again on a northward course," according to Hudson and Underhay ¹⁸. "The entire sunstick was regarded as a metaphor for the central

axis of the world ¹⁸ and the disk itself (called a *helo*) symbolized the sun." ¹⁹

To make a sunstick, an end of a stick about 16 inches long was coated with asphaltum and inserted at an 18° angle into the center of a dark gray sandstone disk about 5 ¾ inches in diameter (photo 3). "The shaft extends a short distance beyond the disk to form a stubby, bulbous projection jacketed in thick asphaltum and fiber cordage wrappings. A jacket of asphaltum and cordage also occurs below the disk where it meets the shaft. Both these jackets kept the stone from slipping out of position," Hudson and Underhay wrote ¹⁸.

Of a sunstick found in Bowers Cave near Santa Barbara, they thought that the "... three-disk bead pattern set in asphaltum on the side of the protruding knob could be a stellar representation. The pattern of beads aligned in a north-to-south position on the 'western' face of the sunstick would correspond to the stars in Orion's Belt, and we know from ethnographic data that these stars served as the month marker for the summer solstice." ²⁰

The Tar Woman ³²

Salinan Indian lands, located near Vandenberg Air Force Base on the Southern California coast and a bit inland near Santa Maria, have many natural oil seeps. Maria Ocarpia was a Salinan who in 1916 recounted

As the sun rose above the eastern horizon the Chumash Bear Dancer pointed his hand-held staff at it, and sang:

*Darkness goes blind
like a blind man.
Then light bumps into it,
and light will last
forever.*

—Fernando Librado *Kitsepawit* ¹⁸

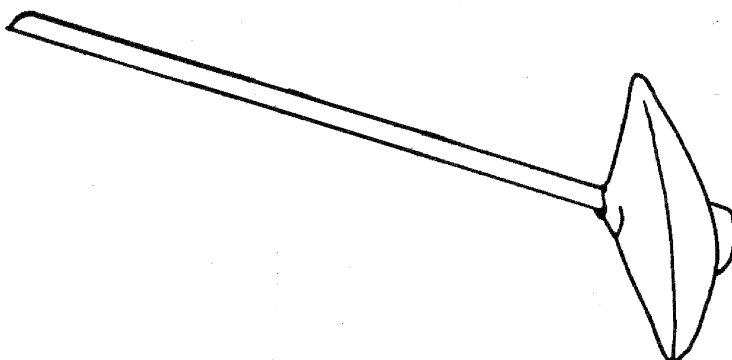


Photo 3. Profile view of a Chumash sunstick. From T. Hudson and E. Underhay ¹⁸.



Photo 15. Juan Rodríguez Cabrillo's caravel is approached by Chumash Indians rowing their plank canoes, 1542. Painting by Robert Geise. Reprinted with permission of the Cabrillo National Monument Foundation.

"The following Tuesday, the 17th, they traveled three leagues with calm weather, and from dawn there were many canoes traveling with the ships. The captain gave them many gifts, and all the coast along which they passed was inhabited by many people. The Indians brought in their canoes fresh and very good sardines." ³³ (photo 15)

Almost 250 years later in 1775, Pedro Fages admired the Chumash plank canoes, praising them as "... well joined and caulked, and of quite graceful lines." ³

The next year in 1776, Father Pedro Font of the second Juan Bautista de Anza overland expedition watched Chumash Indians building a plank canoe. He wrote, "They are very carefully made of several planks, which they work with no other tools than their shells and flints. They join them at the seams by sewing them with very strong thread and fit the joints with pitch by which they are made very strong and secure. Some of the launches are decorated with little shells and all are painted red with hematite." ⁵

The plank canoes ranged from 12 to 18 feet long to up to 30 feet long, were rowed with double-bladed paddles, and were built mostly with redwood driftwood from northern forests washed up on southern beaches (photo 16). A patchwork of many uneven small boards on both sides was affixed to one large, wide board on the bottom (photos 17 and 18). The wood was gathered, cut to size, sanded with sharkskin, and caulked together with refined asphaltum (photo 19). For extra strength, as Father Pedro Font noted, the boards were tied together at the ends with plant fibers coated with another refined asphaltum.

Refining Asphaltum for Plank Canoes ¹⁴

The Chumash never made plank canoes from *malak*, their name for the soft asphaltum washed on the beach from the natural, submarine oil seeps. Instead they used *woqo*, the hard asphaltum gathered from land deposits, including the one near the present-day Carpinteria wharf. The Chumash named an especially abundant asphaltum site *Woqwoqo*, meaning "much asphaltum."



Photo 13. The stone Indian women of *Wa'-mil-ow*, south of Friant, California. According to legend, the three stone figures standing around the stone tray, or *ti'-won*, once were Dumna Yokuts women who went to a neighboring village to play *Huutch Uish*. During the game, they gambled away all their belongings. For this, Raven, a skillful gambler, had Eagle turn them into stone. Drawing by Jim Spriggs, from a photo by Frank Latta^{11,30}.

Carpinteria was a perfect place to make plank canoes. Not only was it situated by the ocean with piles of redwood driftwood floating in from Northern California, but large, nearby oil seeps supplied all of the asphaltum needed. The Chumash plank canoe—known as a *tomol*—was a crowning achievement of Chumash technology and perhaps the most unique and culturally intriguing invention of California Indians. The three kinds of processed asphaltum developed for plank canoes were the first oils to be refined in California—and perhaps in the Western Hemisphere.

Our knowledge of how the asphaltum was refined and used to build plank canoes and how the canoes were built comes from the narratives of Fernando Librado *Kitsepawit*, an extraordinary Chumash man 110 years old speaking in 1914 to John Harrington, a prominent California anthropologist. Because of Fernando's age, his knowledge dated back to the 1820s and he had devoted much of his long life to learning his people's customs, crafts, songs, and stories. A Spanish woman once met Fernando walking in Ventura with a large dictionary he had just purchased for 20 pesos. "What do you want with that book, Fernando?" she asked. "To know things, Miss," he replied^{7,15}.

Fernando's keen mind and memory provided a remarkable trove of information gathered by Harrington at the last possible minute—for Fernando died the next year at age 111. He is buried in an unmarked grave in the poor section of Santa Barbara's Calvary Cemetery¹⁵. A plank canoe that

Fernando Librado *Kitsepawit* made for John Harrington was displayed at the Panama-California Exposition in San Diego on January 1, 1915.

How Plank Canoes Looked

Juan Rodríguez Cabrillo and his crew, sailing two caravels north along the western coast of North America in 1542, saw many Chumash plank canoes. As they passed the Chumash regions in October, Cabrillo's log (now lost but summarized by Juan Páez—nothing but his name is known) mentions the canoes. Páez wrote, "On Monday the 16th navigating along the coast they sailed for four leagues, and they anchored in the afternoon in front of two towns. As always, the canoes came out to the ships, and indicated that ahead were much larger canoes."

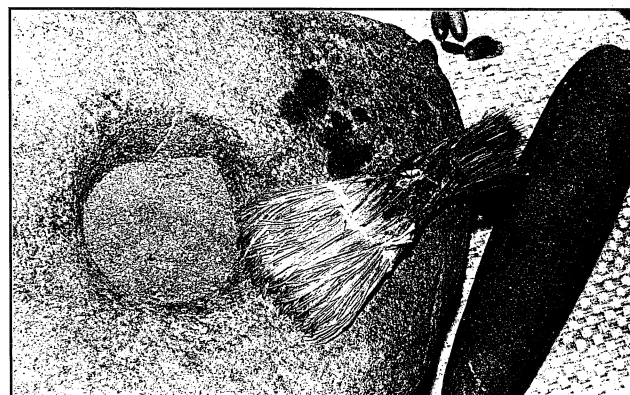


Photo 14. A Maidu acorn-meal brush resting on a stone mortar holding acorn meal. The brush made of soap-root fibers is glued with asphaltum and laced with string. Photo by Jim Spriggs, from the collection of the California State Indian Museum¹¹.

this story. "In former times there was an old woman known as Chahe. Her stomach was a basket full of boiling tar that she carried on her shoulder. She would entice people to approach her and then throw them into the boiling tar where they were digested."

Maria said that one day, sitting on a hill, Chahe was approached by Prairie-Falcon and his uncle, Raven, with their magic flutes. She invited them to ride on her shoulder, crying "Wayawaye! Hesekola!" or "This which I am going to kill!"

Standing on his flute on her shoulder, Raven slipped off into the basket of tar—this is why he is black. Luckily Prairie-Falcon reached down in time, caught him by one feather, and revived him. Then using their fire drills, the two birds set the tar on fire.

As flaming tar burnt her body, Chahe cried out, "Oh, grandfather!" and moved frantically into the earth, trying to extinguish the blaze. Failing, she jumped up and ran away, leaving behind her drops of burning tar—and at each spot, mescal sprouted. She is still running today, dropping seeds of mescal.

NOTE: Pedro Fages told how Indians combined fire and mescal, writing, "There is a great deal of century plant of the species which the Mexicans call *mescal*." A bud, after roasting in hot embers for 24 hours, becomes "... juicy, sweet, and of a certain vinous flavor; indeed, very good wine can be made from it."²

DEATH

Asphaltum played a part in the mourning and burial practices of California Indians. In 1933, Yoi'-mut, an 85-year old Choo'-nut Yokuts woman, was the last full-blooded member of her tribe and the last to know the language. She said that as a symbol of mourning, crude oil sometimes was smeared on the faces and hair of Tachi Yokuts widows and female relatives mourning for a dead husband, father, mother, sister, or brother. The oil stayed in place until the annual mourning ceremony²⁴.

Author Frank Latta said the most elaborate uses of asphaltum by prehistoric Yokuts Indians he had seen were at graves. One body among the Indian graves in Alamo Solo in the San Joaquin Valley was probably the skeleton of an important chief or medicine man, possibly both. The ancient burial had been disturbed, but the beads and asphaltum put about the body remained. A death mask of asphaltum decorated with pieces of abalone shell had been pressed over the entire face. Several balls of asphal-

tum about the size of tennis balls were close to the breastbones and several asphaltum-decorated objects had been placed in front of the body. A staff by the body had been coated with asphaltum and decorated with small, white beads. At least one asphaltum-lined basket was buried in the grave, set over or in back of the head. The thin asphaltum layer remaining bore the imprints of woven grasses²⁴.

Gutman writes that asphaltum with basketry impressions was excavated from beneath the heads of burials at Rincon—the woven grasses themselves had disintegrated⁶.

From December 1933 through March 1934, under the Civil Works Administration, the Smithsonian Institution conducted an extensive archaeological study of the old Tulamni Yokuts village of *Tulamniu* seven miles east of Taft. Here dozens of excavated specimens were of asphaltum or included it. *Bulletin 130*, the Smithsonian project report, states, "Asphaltum-smearred basketry encased or adhered to portions of three skeletons. In one the legs and feet were contained in what appears to have been a large basket. Another had the hands liberally daubed, while in the third the tarry stuff closely surrounded jaws and teeth."²⁴

KNIVES, SPEARS, AND ARROWS

California Indians used asphaltum in many practical ways. The Yokuts commonly fastened stone knives and spear points to wooden handles with an asphaltum adhesive, which also waterproofed the sinew wrappings securing the blades²⁴.

San Joaquin Valley Indians used very hard, dry asphaltum to attach feathers to hunting arrows and to attach arrowheads to arrow foreshafts (photo 4). Stickier varieties of asphaltum would have melted from the hot valley sun and body heat of the hunter, gluing together the arrows and foreshafts in the quiver or foreshaft pouch.

On hunting arrows, asphaltum was used to waterproof the sinews binding the arrowheads to the foreshafts. Without this, blood from a wounded animal could soften the sinews and allow the arrowhead to separate from the foreshaft, possibly delaying the animal's death. For this same reason, no asphaltum was used on the sinews of war arrows. Here arrowheads were bound to the foreshafts as loosely as possible, allowing the arrowhead to remain in the enemy's body after the foreshaft was extracted²⁶.

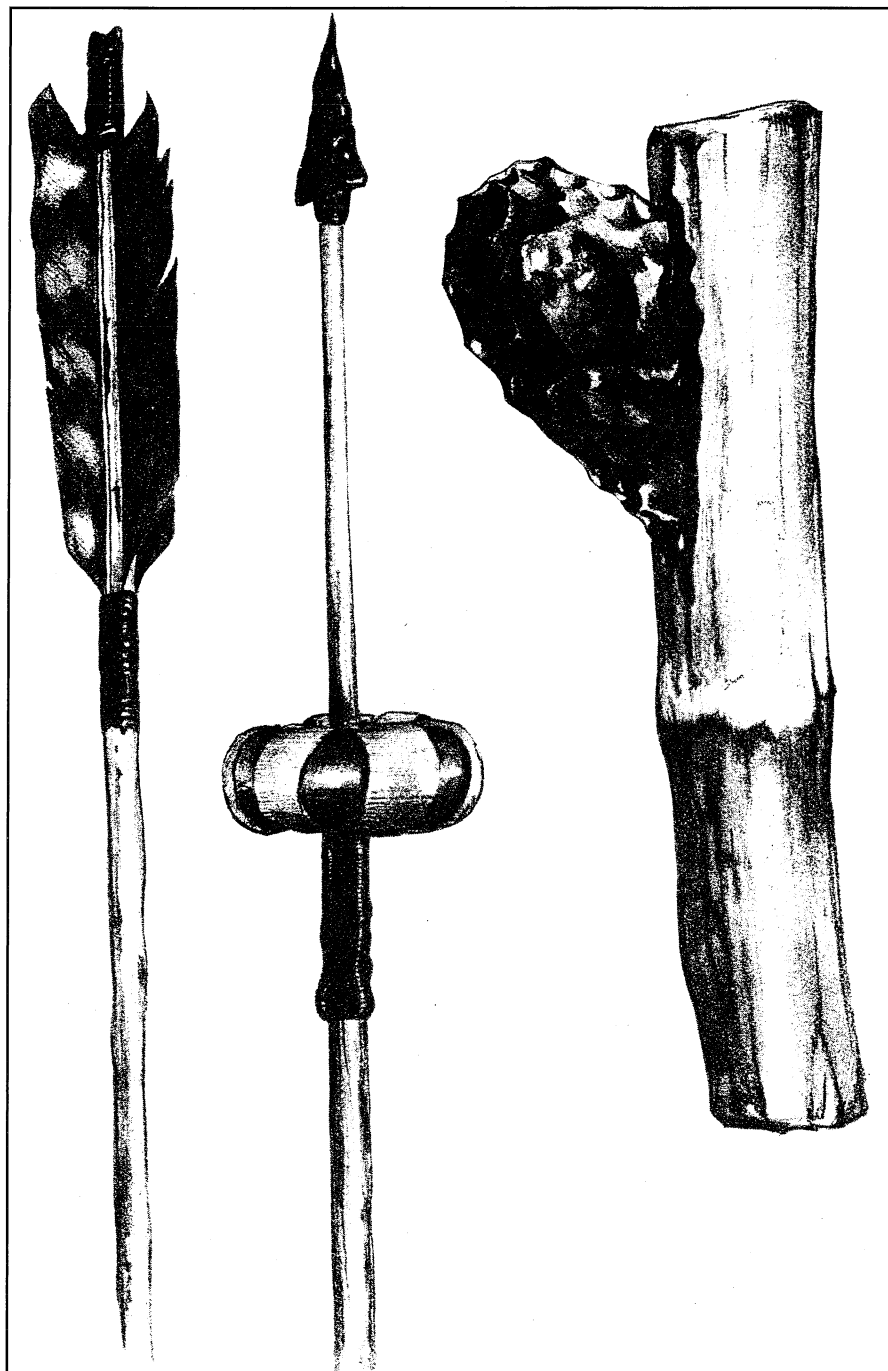


Photo 4. Yokuts knife and arrows made by Wahumchah, last surviving male of the Yowlumne tribe. The chipped stone knife (right) is set with asphaltum into the wooden handle, and asphaltum waterproofs the sinews used to bind the arrowhead to the foreshaft (center) and bind the red-tailed hawk feathers to the shaft (left).

The arrow with the ring of tule reeds held in place with asphaltum (center) is a skip-bomb arrow used for shooting water birds and animals. Unlike an ordinary arrow that dives soon after it hits the water, a skip-bomb arrow moves forward along the water surface. The radius of the reed ring keeps the arrow point at the correct height for striking a bird below the back.

*Drawing by Jim Spriggs, from a photo by John García in Frank Latta's Handbook of Yokuts Indians*¹¹.

BASKETS AND WATER BOTTLES

Some woven baskets and woven water bottles were waterproofed inside and out with asphaltum by Yokuts and Chumash Indians. Asphaltum usually was applied to the outsides of water bottles—from the lip to just below the neck (front cover and photo 5). Small water bottles holding about a quart of liquid were woven for travel and much larger ones were made for domestic purposes.

To waterproof the woven bottles and baskets on the inside, hot pebbles were placed in the vessels along with small chunks of asphaltum. Then the vessels were swirled over a fire until the melted asphaltum uniformly coated the sides and bottoms. The weight of the revolving pebbles helped press asphaltum deep into the weave²². Some of the pebbles, evenly coated with asphaltum, were found in the Yokuts shell mounds at *Tulamniu*, site of the Smithsonian study²⁴.

MORTAR-RIM HOPPERS

Although not used by all California Indians, woven mortar-rim hoppers helped contain grains and seeds being pulverized by a plunging pestle in stone and wooden mortars. The woven sides kept the meal from flying off in all directions (photo 6). The woven hopper sides, with edges well bound, were about six inches high, flaringly funnel-shaped, and sturdily built of wicker and grasses³⁶. To make a stone mortar base, Rogers writes, a circular groove was cut on the top of a flat stone to the measurements

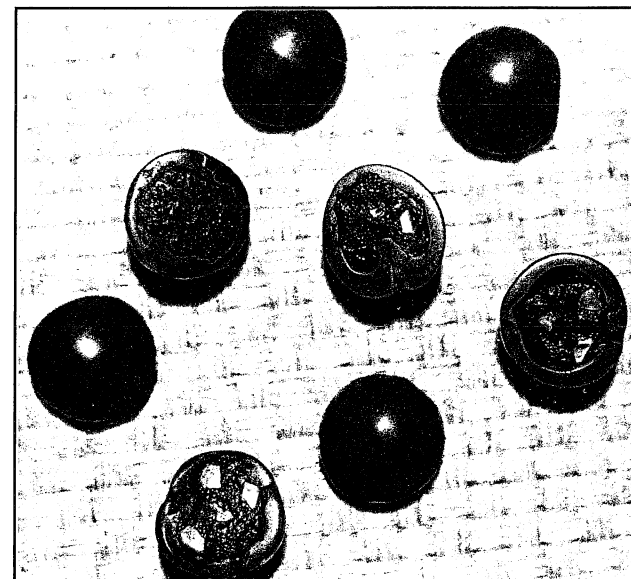


Photo 11. Dice made from black walnut shells were filled with asphaltum and decorated with abalone chips. *Photo by Jim Spriggs, from the collection of the California State Indian Museum*¹¹.

To apply asphaltum so exactly, the Indians developed a technique similar to modern soldering. Rogers wrote, "One end of a long stone was heated and held against a cake of asphaltum until it ran to the desired place, where it hardened quickly, adhering closely to every object with which it came in contact."³⁶ The stones chosen were all easily held and had one small, rounded end for asphaltum distribution. Today the stones are recognizable by the remaining black tip of asphaltum and by the clear fact that once they had been heated.

PLANK CANOES AND ASPHALTUM

The Chumash Indians lived along the Pacific Coast from Estero Bay south to Malibu Canyon, and on the three northern, large islands of the Santa Barbara archipelago. Through the years, Spaniards in several expeditions watched the Chumash building plank canoes, sometimes at a mainland site the Spaniards called *Carpinteria*, meaning "Carpentry Shop," a name still used today.



Photo 12. Wahnomkot, a Yokuts woman, throwing eight, black walnut-shell dice on a basket tray, or *ti'-won*, in a game of *Huutch Uish*. The tray is woven in the brant goose design. *Drawing by Jim Spriggs, from a photo by Frank Latta*^{11,30}.

OTHER USES

Many California Indian groups made brushes by coating the end of a bundle of fibers with asphaltum. A Maidu acorn-meal brush made of soap-root fibers has such a handle (photo 14). Asphaltum was used for plugging whistles, flutes, and other musical instruments, and for connecting wooden or bone stems to stone or clay pipes ⁶.

Sometimes asphaltum was molded into balls and burned by the Yokuts, providing black smoke for signals. A large cooking basket was raised and lowered over the fire to make smoke puffs. A long series of short puffs raised an alarm and a long series of widely separated puffs meant all was well ²⁸.

Other asphaltum balls were kept as a domestic supply and some asphaltum was chewed like gum ²⁵.

SOLDERING WITH ASPHALTUM

Objects with asphaltum discussed in this publication—and similar ones I have seen—have something in common, a quality that I long took for granted. The asphaltum was applied evenly, delicately, and

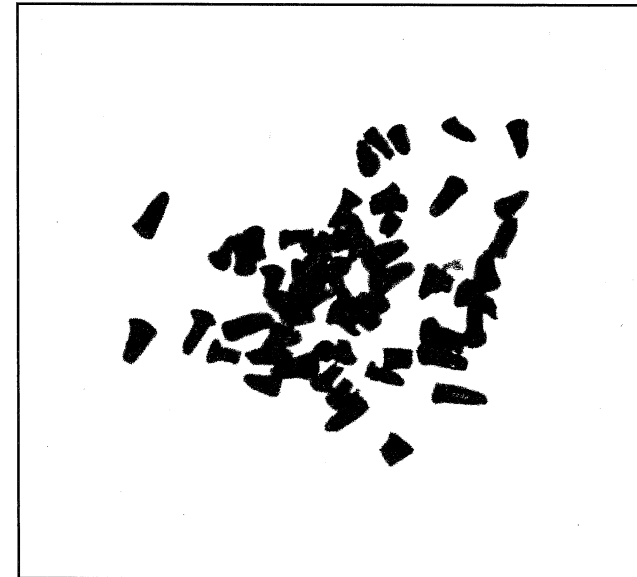


Photo 10. Skirt weights of asphaltum, from the collection of the Santa Barbara Museum of Natural History. *Photo by Susan Hodgson, with permission.*

inside the borders of where it was meant to go without smearing the edges (note the bowl below). This took skill—for how many times do we apply glue with specially made tubes and still mess the edges?

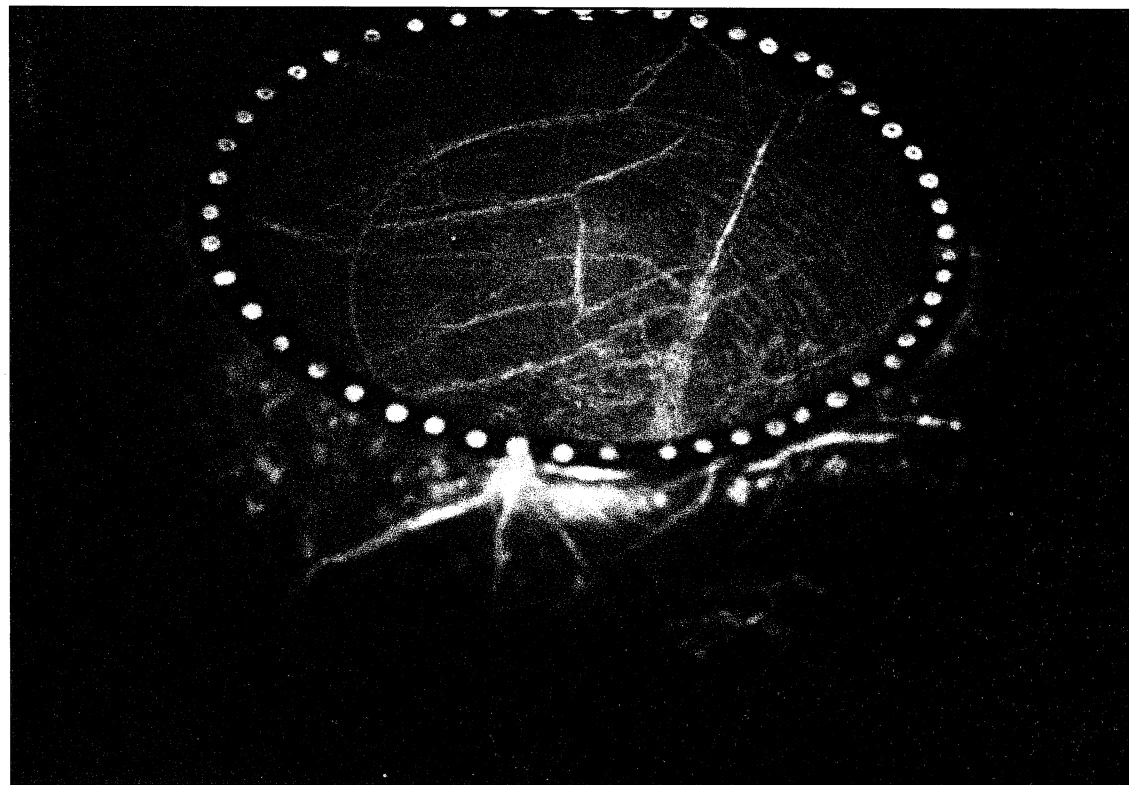


Photo 9. Chumash serpentine bowl decorated with asphaltum and olivella shells, from the collection of the Santa Barbara Museum of Natural History. *Photo by Susan Hodgson, with permission.*

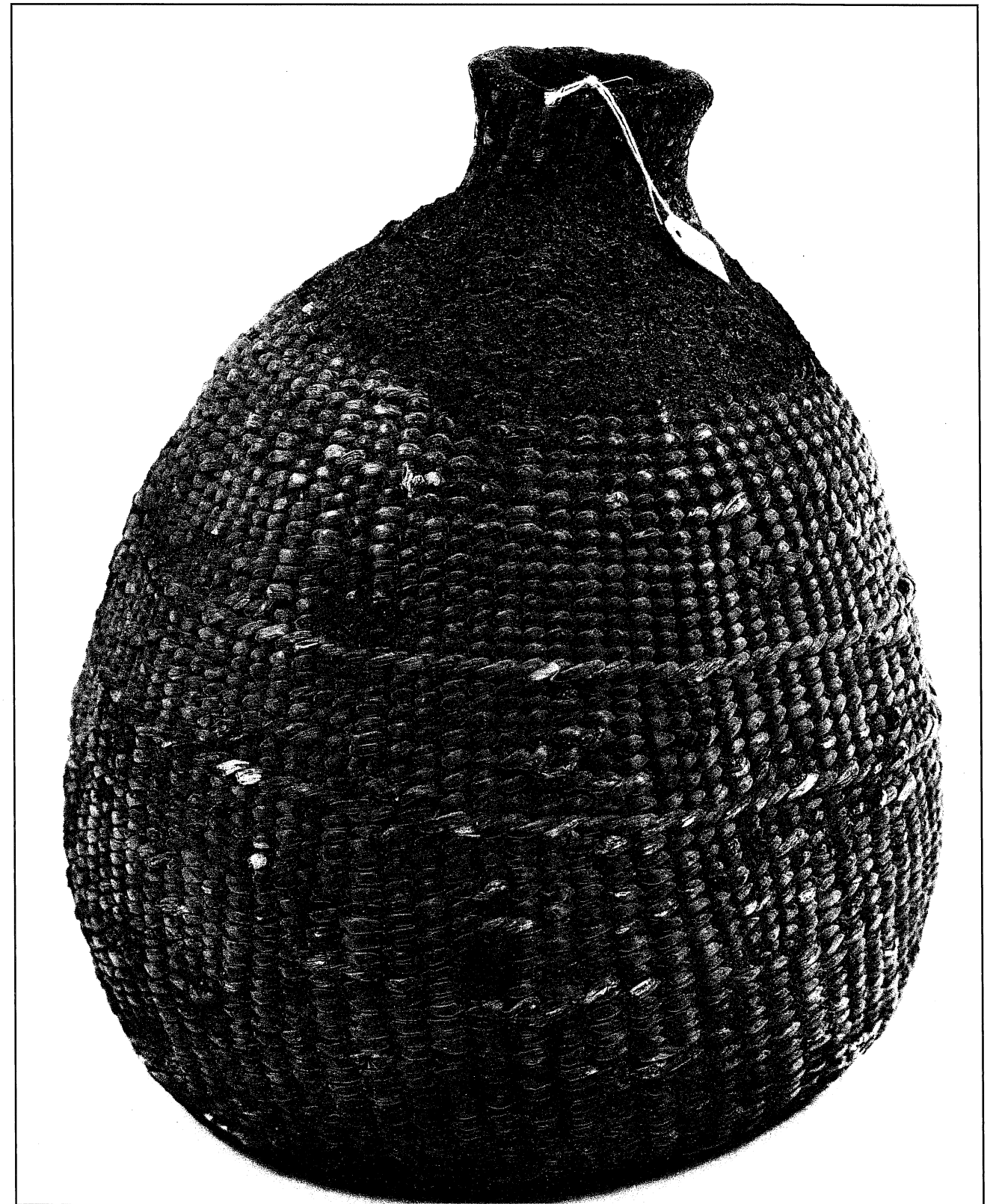


Photo 5. Woven Chumash water bottle found in a Santa Barbara County cave. The basket was waterproofed inside by a layer of asphaltum. Asphaltum was applied on the outside down to an area just below the neck. *Photo courtesy of the Phoebe Apperson Hearst Museum of Anthropology and the Regents of the University of California, cat. no. 1-14501 ¹¹.*

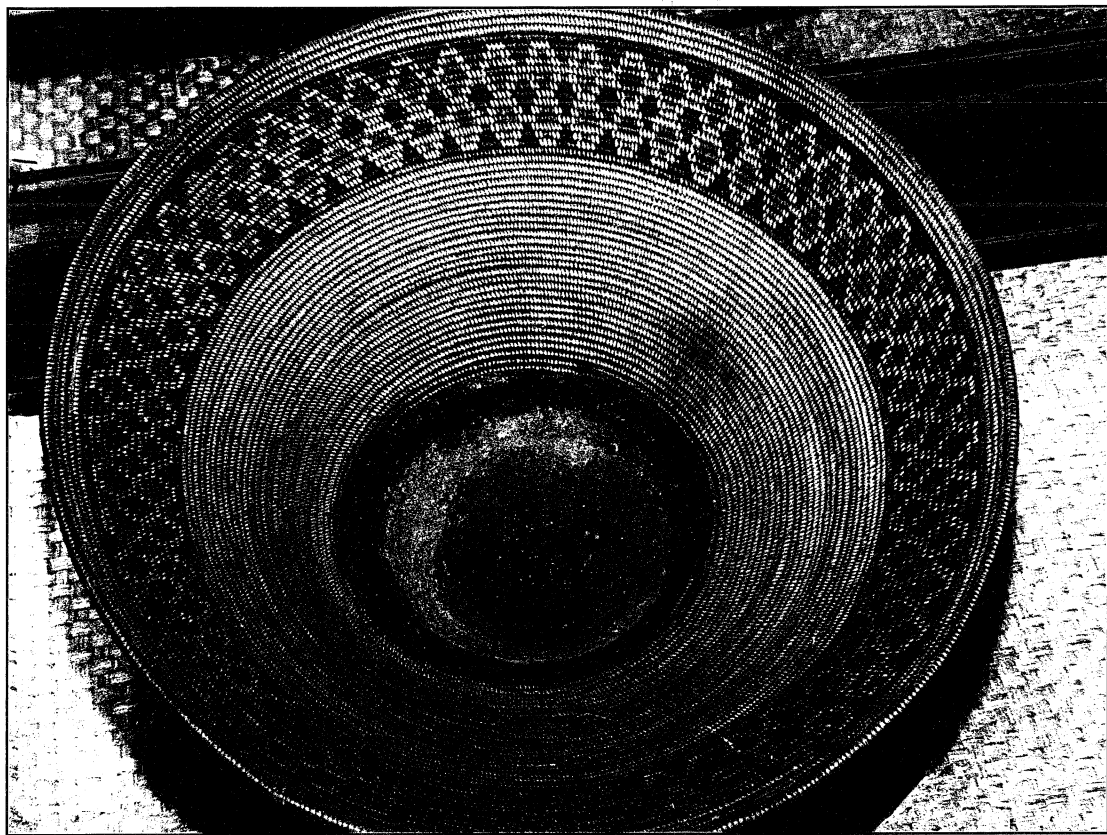


Photo 6. A prehistoric, mortar-rim hopper from the Chico area in Northern California, made from a basket whose base had worn out. Asphaltum glues the basket sides to the stone mortar. The rim is about 14 inches in diameter. *Photo by Jim Spriggs, from the collection of the California State Indian Museum*¹¹.

of the lower diameter of the hopper sides—usually between 7 and 8 inches. Then the woven hopper was set in the groove and asphaltum was poured around it, “fastening the two inseparably.” Many mortars have deep bowls, including the one in photo 7. The depth indicates long use³⁶.

Yoi'-mut, an elderly Choo'-nut Yokuts woman, told Frank Latta that after the bottoms of old baskets wore out, the sides were cemented to stone mortars with asphaltum²⁴.

DECORATION

California Indians decorated many articles with inlays of asphaltum and chips of abalone and other shells. The objects included brush handles, death masks, ceremonial staffs, amulet bags, wooden boxes, utensils, knives, and bowls. Pedro Fages admired the artistry, writing how the Indians “... know how to make very beautiful inlaid work of mother-of-pearl on the rims and sides of stone mortars and various other utensils.”²

One large Chumash bowl at the Santa Barbara Museum of Natural History is about 18 inches wide,

carved from dull-gray sandstone (photo 8). The heavy, monochromatic bowl has a narrow band of black asphaltum circling its rim. The band is about one-third of an inch wide and inlaid with beads of tiny, white, olivella shells. About 30, two-inch-long rows of the same pattern drop evenly off the band, achieving a dignified delicacy. The beautiful bowl is from a site called Mescalitan Island that no longer exists. It was destroyed to make way for the construction of the Santa Barbara airport during World War II, according to the Santa Barbara Museum of Natural History.

MENDING

A Chumash sandstone bowl at the Santa Barbara Museum of Natural History shows how asphaltum was used for mending valued objects. A wedge once broken from the side of the bowl was reaffixed with asphaltum.

Yokuts soapstone cooking vessels were thin-walled and easily broken. Sometimes they were fixed by drilling holes in the broken pieces and the adjacent walls and lacing them together with wild hemp. The holes were filled with asphaltum²⁴.



Photo 7. Asphaltum—once used to affix a woven, mortar-rim hopper—stains the lip of a stone mortar. *Photo by Jim Spriggs.*

PERSONAL ADORNMENT

Asphaltum was used for personal adornment. Yokuts women attached small pieces of hardened asphaltum to the bottoms of their tule reed and hemp skirts, weighting them so the skirts hung correctly²⁴ (photo 10). The pieces, sometimes painted red for beauty, clinked lightly together as the women walked.

Chumash men wore hair coiled in a knot into which they inserted long, decorated deer-bone ornaments. One end of the bone might have a lump of asphaltum elegantly covered in tiny shells.

GAMES

Rules for the popular gambling game of *Huutch Uish*, played by Yokuts women, varied only slightly among Indian women throughout the San Joaquin Valley. The Yokuts filled black walnut-shell dice with asphaltum decorated with abalone shell chips (photo 11). Eight dice at a time were thrown across a *ti'-won*, or “basket tray,” and tallies were kept of the numbers of shells landing face up and face down. Games could continue without interruption for several days and nights²⁹ (photos 12 and 13).

Stephen Powers watched Yokuts women playing in 1870 and wrote, “There are eight dice, and they scoop them up in their hands and dash them into the basket, counting one when two or five flat surfaces turn up. The rapidity with which the game goes forward is wonderful, and the players seem totally oblivious to all things in the world

beside. After each throw that a player makes she exclaims, *yet'ni* or *wi-atak*, or *ko-mai-ch*, which are simply a kind of sing-song or chanting.”³⁴

Coastal Indian women in the San Luis Obispo area played a variation of the game, which Pedro Fages described, writing, “One [game], which is participated in by women only, is like this: Many of them being seated in a circle, they take a large basket or reed tray beautifully decorated, into which they put a number of small shells filled with tar (*chapopote*). These are cast from the hand by the one who plays, who rubs them all so that they may fall with the mouth down, against the bottom of the tray, in order that they may roll. The game is decided by the number of shells that stop mouth up, whether they are fewer, an equal number, or more than those which stop mouth down. The turn passes to another when one loses. Thus the play goes round from hand to hand in turn, each one wagering some little article appropriate to woman's use.”⁴

MONEY

The money the Yokuts valued most were shapes cut from Pismo clam shells. A hole was drilled in each piece and most of the edges were decorated with incised geometric forms in several designs. “Indications are,” wrote Frank Latta, “that originally the incisions were rubbed full of asphaltum. This bright black material contrasted strikingly with the white of the clam shell, making them the most spectacular and impressive forms of stone or shell money, or ornaments produced by the Yokuts.”²⁷



Photo 8. Large Chumash sandstone bowl with a delicate design made of asphaltum and olivella shells. *Photo by Susan Hodgson, with permission, from the collection of the Santa Barbara Museum of Natural History.*