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Beginnings: From Fire and Ice to Indian Homeland

Fire and ice forged the physical setting of California's storied past. No matter how extensively humans have altered that setting with mining activities, transportation systems, aqueducts, and various other built structures, nature always has been integral to the state's history. Before there was a human record there was pre-history, or a time of beginnings, by far the longest period in California's timeline. During this genesis California literally rose from the Pacific, at times spewing flames and volcanic ash. Violent thrusts from below the Earth's surface formed mountains and valleys that later would be carved by huge rivers of ice. Before these glaciers began melting, some 15,000 years ago, America's first human inhabitants began making their way by foot and watercraft from Asia to North America. On reaching the New World, these mammoth-hunting migrants trekked southward and eastward, some settling in what would become California. Their seagoing Asian counterparts navigated North America's coastline southward to the Channel Islands and mainland. These trekking and sailing Paleolithic, or Old Stone Age, peoples were the first human occupants of this remarkable land. Some scholars speculate that Polynesian and Chinese Pacific voyagers visited Indian California centuries before Europeans arrived in the province.

Pacific Eldorado: A History of Greater California, First Edition. Thomas J. Osborne.

Timeline

30 million years ago	California's land mass was formed by Pacific geological processes, especially through plate tectonic subductions and lateral movements
13,000 years ago	Following the "Kelp Highway," Asian Pacific voyagers arrive in the Channel Islands, perhaps becoming the first Californians, according to archeologist Jon M. Erlandson and others
10,000 to 15,000 years ago	As climate warming set in and Beringia melted into the Bering Strait, the descendants of Paleo-Indian migratory hunters continue on their way eastward and southward throughout the New World in pursuit of game
11,000 years ago	The skeletal remains of the so-called Arlington Woman are found at a site on Santa Rosa Island along California's coast
4,600 years ago	A bristlecone pine (*Pinus longaeva*), located in California's White Mountains and dating back more than four millennia, is thought to be the oldest living thing on Earth
2,000 years ago	Some of today's California redwood trees, the world's largest living things, date to the time of Jesus of Nazareth and the Roman Empire
1000 CE	Chumash Indians build a seafaring culture in and around today's Santa Barbara and on a few of the Channel Islands
400–800	Early Polynesians may have reached California in watercraft, according to a small group of anthropologists and linguists
1500s	Specialists estimate that 15,000 Chumash lived in California at the time of European contact
Late 1700s	Between 300,000 and 1,000,000 indigenous people inhabited California most of them living in villages of 100 to 500 dwellers

Landforms

Not only was California born of the Pacific, also it is situated on the Ring of Fire, an intercontinental perimeter of volcanoes and earthquake faults that line the Pacific Rim in a sweeping arc from Japan to Chile. Like many other areas along the Ring of Fire, the state's varied landmass was assembled over time from geologic fragments of rocks and sediments, called "terranes," lying on the crust or floor of the Pacific long after the Earth was formed some 4.6 billion years ago. Before these fragments began uplifting from the ocean, North America's western shoreline extended to about where the Rocky Mountains are situated today. West of that ancient coastline loomed the vast, heaving Pacific.

According to widely accepted plate tectonics theory, formulated by geologists in the mid-1960s, California's landmass has evolved over hundreds of millions of years. The

process has been global and ongoing. Eons ago 20 huge subterranean masses of material, called plates, comprised the Earth's crust and upper mantle. These plates meandered due to heat and pressure from deep within the planet, creating continents. The largest of these subterranean masses, the Pacific Plate, lies beneath roughly two-thirds of the ocean by that name. The eastward-moving Pacific Plate collided with the western edge of the North American Plate in a zone somewhat west of the Rockies. At the point of collision the Pacific Plate subducted, that is, pushed beneath the North American Plate, thereby generating enormous heat. The heat, in turn, melted subterranean basalt rock that combined with deeply buried sediments to produce ores – including gold that in the mid-1800s sparked a worldwide rush to California – while pushing up the Earth's crust and forming granite outcroppings. In this way western mountains and their basins came into existence. The initial collision was followed by subsequent ones, called "dockings" or "accretions," that assembled California's topography, which included offshore volcanic islands. "Wherever you stand in this state," says geologist Keith Heyer Meldahl, "if your feet are on bedrock, the odds are that you're standing on an immigrant [piece of ground], reeled in by subduction from the far reaches of the Pacific in the process of assembling California." About 30 million years ago, when the area for the most part assumed its present geographical configuration, these west-to-east collisions stopped and a lateral south-to-north movement of the Pacific Plate began that continues to this day.

This lateral movement has had major consequences for the region, especially in terms of earthquakes. The Pacific Plate has been moving northwestward at about 2 inches a year. Consequently, part of Baja California was carried over millions of years to the coastline and interior reaches of southern California and up to San Francisco. This movement has been characterized by gnashing and grinding along the Pacific–North American plates' subduction zone. Stresses from the lateral movements of the two plates force an unlocking of surface-area terrain on both sides of the fissure known as the San Andreas Fault. The forced unlocking of these blocks results in powerful earthquakes along this fault system that extends from Point Reyes Peninsula just above San Francisco southeastward for 350 miles to the mountains of southern California. Earthquakes along that fault line have devastated cities, leaving many dead and striking fear into survivors. Such was the case in 1906 when much of San Francisco was flattened and burned (due to ruptured gas lines and water mains in the city) by a severe earthquake along the San Andreas Fault. Since 1769, when the Spanish began colonizing the province, there have been 117 measured or recorded earthquakes along this fault. Geology and geography augur more to come on this and other faults in the state.

Volcanoes, plate tectonics, earthquakes, winds, and waves have formed California's coastline, offshore islands, mountains, and basins or valleys. That coastline, with its many picturesque coves and tree-crested cliffs, is one of the most photographed and tourist-visited in the world, extending 1,264 miles in length. Monster waves, or tsunamis, generated by distant earthquakes, have on occasion reportedly reached 195 feet in height before bombarding northern California's shores. Such a wave struck just north of Humboldt Bay in 1913. Less noteworthy yet still powerful currents of wind and sea have been sculpting coastal California for eons.

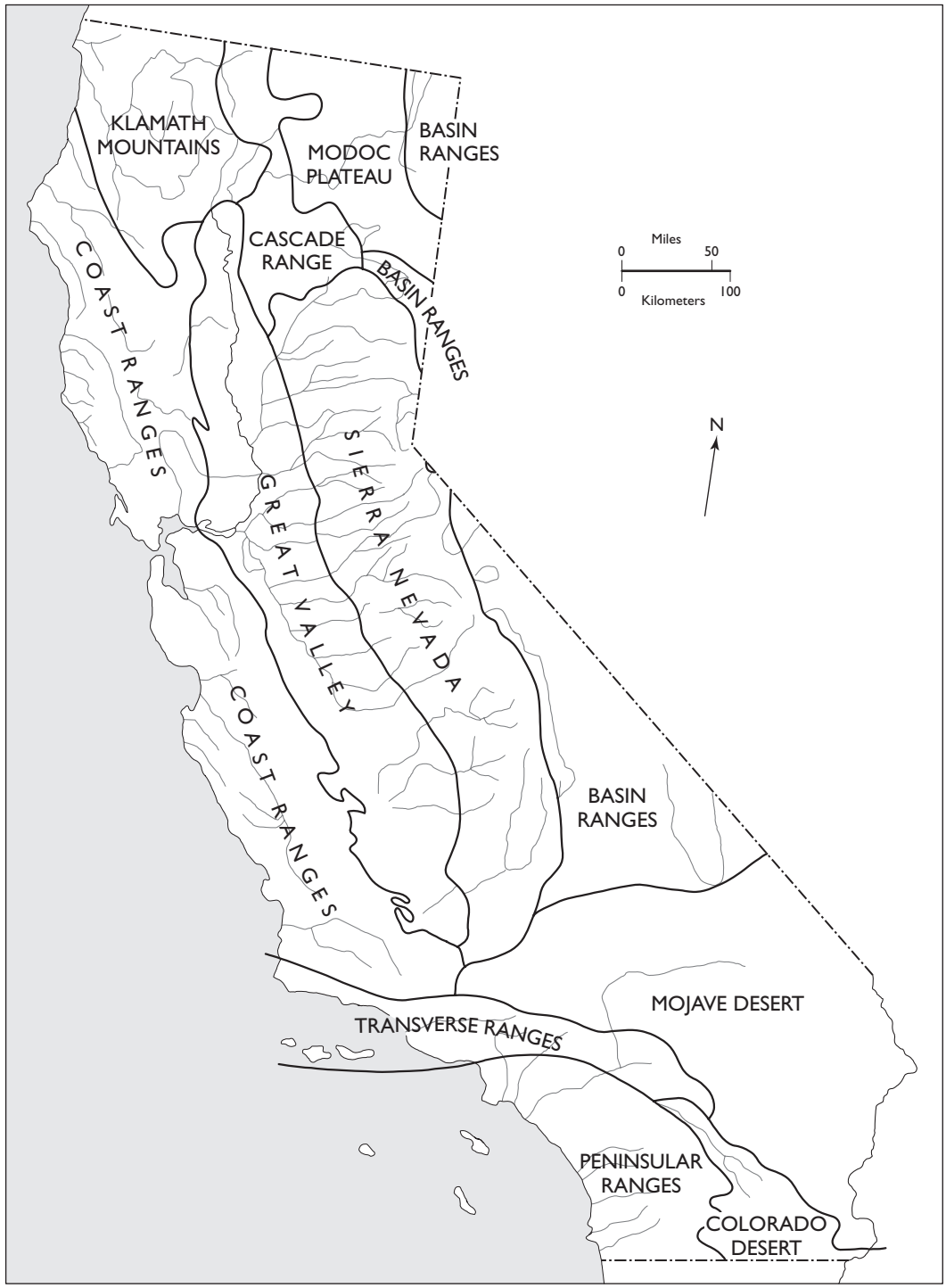

Figure 1.1 California topography. The variation in the state's topography is unmatched nationwide. Based on Mary Hill, *California Landscape: Origin and Evolution*, revised edition (Berkeley: University of California Press 1985), p. 24. Reprinted by permission of University of California Press.

Inland from the coast, mountain ranges and plateaus of dramatically varying elevations dominate most of the state's nearly 100 million acres of surface area. America's third-largest state, after Alaska and Texas, California features at least half a dozen ramparts.

Two mountain chains and a high plateau occupy much of the far northern reach of the state's boundaries. The Klamath range is located in the northwest corner of the state. Two major rivers, the Klamath and Trinity, flow through the mountains' gorges, emptying into the Pacific. To the east the volcanic-created Cascades, which lie on a north–south axis from Washington to northern California, feature such peaks as Mt. Shasta (14,162 feet) and Mt. Lassen (10,457 feet), both of which resulted from thunderous, fiery eruptions along the Pacific Ring of Fire. Mt. Shasta's volcanic origin goes back about 50 million years ago, while Mt. Lassen is around 200,000 years old. The Modoc Plateau, covered with rugged lava flows and site of an 1873 war between whites and Indians, is tucked in the northeastern corner of the state.

Slightly south of the Cascades, California's highest range – the Sierra Nevada – begins its more than 400-mile span along part of the state's eastern boundary. This relatively young rampart, the world's longest and some 50 million years old (according to a team of Stanford scientists), is still rising, unlike the Appalachians in the eastern United States. The twin jewels of the Sierra, some say, are the glacial-carved Yosemite and Hetch-Hetchy valleys. The former is world-renowned for its granite cliffs and majestic waterfalls; the latter was transformed into a reservoir for San Francisco in the early twentieth century. A major obstacle to early overland migrants and the major construction challenge to builders of the nation's first transcontinental railroad, the Sierra boasts the highest peak in the contiguous 48 states – Mt. Whitney (14,495 feet). Fifty other Sierra peaks measure above 13,000 feet. The eastern slopes of the Sierra Nevada, which rise abruptly out of a largely treeless basin, are especially steep as those who have hiked in that region will attest.

Beyond impressive recreational opportunities and perhaps unparalleled aesthetic endowments, the Sierra Nevada range has been a storehouse of riches in pelts, ores, timber, and water. For, example, Chinese miners in the 1850s referred to the Sierra as *Gam Saan*, Gold Mountain. Other valuable ores, like tungsten (used in weapon-making), were mined in the twentieth century. Rivers flowing from the Sierra, like the Feather and Tuolumne, have furnished hydroelectric power and water to farmers and thirsty Californians. Sapphire-blue Lake Tahoe, the state's largest body of fresh water, is but one of the many lakes carved by Sierra glaciers.

The Great Basin – comprising parts of Utah, Arizona, and California – lies just east of the Sierra. Its historical importance has much to do with the early twentieth-century diversion of the Owens River into an aqueduct built to provide the inhabitants of Los Angeles with water. The resulting conflict between Owens Valley farmers and the City of Los Angeles became a major event in California's more recent past. East of Owens Valley the White Mountains extend across the state border into Nevada.

Close to and paralleling the Pacific seaboard, the Coastal Ranges run much of the length of the state from Cape Mendocino down to Point Conception. The ranges were formed by the same subduction process, described above, which produced the state's larger landmass. Younger than the Sierra Nevada, the Coastal Ranges – with some exceptions – generally ascend to between 3,000 and 4,000 feet. In addition to shale and sandstone, a good deal of serpentine, the state rock, can be found in these mountains.

Situated between the Coastal Ranges and the Sierra, the 450-mile-long and 50-mile-wide Central Valley was once immersed in sea water. The retreating ocean left in its wake what would evolve into one of the most fertile and productive farmlands in America, watered by the southward-flowing Sacramento River and the northward-flowing San Joaquin River. Together these two rivers formed a delta region in the state's interior that remains linked to the Pacific by San Francisco Bay's tributaries. The Bay's narrow entrance and 400 square miles of inlets, which render Stockton and Sacramento Pacific ports, make it one of the world's finest natural harbors.

Two more ramparts complete the mountainous profile of California. The southern end of the Great Valley gives way to the Transverse Ranges, so called because they extend for about 250 miles along an east–west axis that stretches to the offshore Santa Barbara Channel Islands. Still farther south, the Peninsular Ranges form the northernmost extremity of mountains that run the length of Baja California.

The state's final landform comprises the adjoining Mojave and Colorado deserts, occupying California's southeast corner. Death Valley, located in the Mojave, has the distinction of being the lowest point (282 feet below sea level) in North America. South of Death Valley, the Colorado Desert stretches to the Mexican border.

Climates

Just as California's land mass was Pacific-born much the same is true for its climates, which are as diverse as its topographic features. Rainfall, temperature, and sunlight vary so significantly throughout the state that meteorologists speak of its micro-climates. Even *within* distinct geographical areas climates, especially temperatures, can fluctuate dramatically on a seasonal basis. Since the beginning of European settlement in California, climate has become increasingly important in shaping the state's economy.

As elsewhere, California's climates are influenced by many variables including wind patterns, ocean currents, and high-elevation mountains. The dominant weather pattern is for the westerly winds (precipitation-bearing onshore winds from the Pacific) to blow during the winter months, depositing rain – and in some places snow – from the northern to the southern end of the state. These somewhat warm winds have a swirling effect that draws colder ocean water to the surface, creating coastal fogs from the resulting air–moisture mix and condensation. Inland from the fog-shrouded coast, high-elevation mountains intercept the moisture carried by the prevailing westerlies while blocking their flow eastward. Hence the much drier and often arid weather east of the Coastal, Sierra Nevada, San Gabriel, and San Bernardino mountains.

The flow pattern of the westerlies is largely inoperative in the spring, summer, and early fall months when hot, dry winds blow from interior deserts toward the ocean. In southern California, for example, the Santa Ana winds often produce drought conditions, which, in turn, have resulted in hazardous fires. The Witch (Creek) fire in October 2007, for example, destroyed more than a thousand homes north and east of San Diego. Drought and Santa Ana wind gusts of up to 100 miles per hour forced the closure of many schools; the entire

town of Julian was evacuated. Such wildfires have become more frequent and severe in recent decades.

Drought and wildfires occur throughout California despite the plentiful rainfall in the northern as compared to the southern part of the state. Temperatures rarely rise above 70 degrees Fahrenheit (F) in the northwestern corner of the state, where average annual rainfall exceeds 100 inches. The Mojave Desert in the southeastern part of the state represents the other end of the climate continuum. There temperatures can swing from below freezing in winter to summer highs above 120 degrees F. The average annual precipitation is 1.5 inches. In Furnace Creek, Death Valley, located in the Mojave, the American heat record was set on July 10, 1913, when the thermometer reached a hellish 136.4 degrees F! In what is billed as "the world's toughest foot race," athletes compete annually in the Badwater ultra-marathon, a grueling 135-mile run from Badwater, Death Valley to Mt. Whitney – from the lowest to the highest elevations in the 48 contiguous states. The race is held in mid-summer when Badwater temperatures reach a blistering 130 degrees F.

The most problematic and consequential aspect of California's rainfall pattern is that three-fourths of the state's water supply originates in the mountain snow packs in the northern third of the state while more than three-fourths of the demand comes from agriculture and the teeming population in the southern two-thirds. As a result, the state has constructed one of the world's most extensive systems of aqueducts and dams to redistribute water to the otherwise parched farmlands in the Central and Imperial valleys as well as to Southland residents.

From this survey it is clear that there is no single California climate. Still, to the extent that there is a public image of such a climate, that image is based on the so-called Mediterranean weather conditions that prevail along the coastline from Santa Barbara to San Diego. The weather in this region is the most moderate in the state; summers are warm and dry and winters rarely get down to freezing while rainfall seldom exceeds 12 inches. This rare climate is found only in three parts of the world other than California and the Mediterranean Basin: central Chile, the Cape of South Africa, and southern and western Australia.

Such an ideal climate is marred principally by firestorms (already discussed) and smog. Smog (a term concocted from the words "smoke" and "fog") is an unhealthy gray haze created when nitrous oxide, an air pollutant, reacts with sunlight to produce ozone. In the Los Angeles Basin the ozone is trapped by a combination of mountains, westerly winds, and temperature inversions. Instead of the ozone escaping into the atmosphere, which would happen under normal conditions, it is blocked by warmer air above it and sealed in the Basin by nearby mountains. Consequently, the ozone stagnates near ground level causing respiratory and other ailments among humans, and in the lower-elevation forests it slows tree growth, particularly that of the ponderosa pine. Smog has been a serious problem in southern California at least since the mid-twentieth century.

While air quality has suffered because of smog, the otherwise ideal Mediterranean climate in the Southland has spurred the regional economy. The movie and aircraft industries located in the region largely because of the weather. As a beach culture emerged in the twentieth century, bathing suits and other ocean-oriented apparel gave rise to a very profitable sportswear enterprise.

Plants and Animals

California's diversity of climates is matched by that of its plants and animals. From prehistoric times – when mammoths, mastodons, camels, and saber-toothed tigers roamed much of the area – to today, the environment has proved conducive to life in its many forms.

Redwood trees rank among the state's most prominent plants. These stately giants grow almost exclusively along the coast from Big Sur to Humboldt County and in Yosemite and Sequoia national parks. Only a small number grow outside California – in Oregon and China. Those growing in coastal California, *Sequoia sempervirens*, are the tallest living things in the world, ascending to heights of 370 feet or more. Sierra redwoods, *Sequoiadendron giganteum*, have the largest mass of any life form on Earth. The General Sherman tree in Sequoia, for example, is 273 feet high and 36.5 feet thick at its base. Its lower branches alone have more bulk than any single tree growing east of the Mississippi River. Redwood trees are both insect- and fire-resistant, yet require the heat from blazes in order to reproduce. Such heat causes the cones, which remain on the trees about 20 years, to burst and drop their seeds on the scorched ground where competing vegetation no longer remains. Rain and sunlight will then bring about germination. The life cycle that will follow is a long one: scientists have dated many living California redwood trees at more than 2,000 years old, to the time of Jesus of Nazareth and the Roman Empire. Experts consider such specimens as "old growth;" unfortunately, only 5 percent of the original two million acres still exist. Because of their sheer majesty and other distinctive qualities, the California legislature has designated both the coastal and Sierra redwoods as the official state trees.

In addition to redwoods, other notable California trees exist. The bristlecone pine, *Pinus longaeva*, is among them. These are the oldest extant forms of life in the world; some having lived 4,600 years. Bristlecone pines are native to the White Mountains. Numerous varieties of other pines grow throughout the non-desert parts of the state. The sugar pine is the largest and tallest of these in the world. One living specimen located on the western slope of the Sierra in Tuolumne County is 216 feet high and 10 feet in diameter. The Australian eucalyptus offers a good example of a non-native tree found in parts of coastal and central California. More importantly, the Australian tree should be thought of as being part of a transpacific exchange of goods, people, and diseases that have influenced much of California's history. Australian miners and sea captains brought eucalyptus seeds and seedlings to California aboard vessels crossing the Pacific during the gold rush years. In fact, many Australian ships sailing into San Francisco Bay were constructed of eucalyptus. By the 1860s and 1870s farmers used the trees for windbreaks and firewood, and developers for beautification of areas undergoing urbanization. Oil from the tree was thought to relieve pain and cure insomnia, malaria, dysentery, venereal disease, and much else. Nearly all of the above trees and others as well, like firs and oaks, have contributed to the profits of logging companies in the state. Three-fourths of the original acreage of conifer forests that existed 150 years ago has been cut down. Environmental organizations have mounted strong campaigns to save what is left of these old-growth stands of trees, especially the redwoods.

Palm trees, a southern California icon, were imported in the real-estate boom of the 1880s to give the area an exotic, biblical look. Only one species of palm – the fan palm – is native to the state and its habitat is found in the desert.

Since settlement by Europeans, California's environment has provided habitats for a variety of animals. The largest and most legendary of these has been the now extinct California grizzly bear (*Ursus californicus*), a representation of which graces the state flag and seal. Sitting atop the food chain, these powerful beasts coexisted with the California Indians. An estimated 10,000 roamed the coastal valleys, mountains, and even seashores when Spaniards began settling in the province. The giant bears ate mainly salmon, beached whales, and acorns. The last known grizzly in the state was killed in 1922 by a Fresno County rancher.

California, including its 15 islands (seven in the Farallon archipelago and eight Channel Islands) and coastal waters, has been home to many other animals as well. Among the terrestrial creatures are mountain lions, black bears, deer, elk, mountain sheep, badgers, bobcats, rattlesnakes, and more. Beavers, which are semi-aquatic, live in streams and lakes. They were hunted for their fur by California mountain men in the early decades of the nineteenth century. Trout and other freshwater fish have long populated the state's lakes and rivers, affording anglers an opportunity to test their skills. Salmon, which are fished commercially, spawn in many rivers flowing to the Pacific. Among marine mammals, the California sea otter, whose fur was prized in faraway Canton, China, was hunted to near-extinction in the first half of the nineteenth century. Migrating California gray whales provided a valuable resource for the San Francisco-based Pacific whaling industry in the latter half of that century. Located on the Pacific Flyway, a West Coast flight corridor for birds that extends from Alaska into South America, California is regularly visited by migratory waterfowl. Residentially based airborne animals include more than 500 species of birds. Of these the California condor, a vulture with a wing span of up to 9 feet, is the largest. Nearly extinct in the twentieth century, the state's condor population is beginning to rebound. More than half of the state's resident and migratory seabird nests are located on the Farallon Islands, situated about 30 miles west of San Francisco.

First Peoples and Their New Homeland

Who were the first Californians? When was the area settled? What is known about how the earliest aborigines lived? How did countless generations of their descendants interact with the natural environment? These are important questions for which there are few simple, definitive answers. This is the case for several reasons. Because there were few written records before the arrival of Europeans in the 1500s (the pre-contact period), historians are dependent on the often conflicting and tentative findings of scientists, especially anthropologists and archeologists. Also, what passes for the prehistory of California must correlate with what geologists, physicists, and ecologists have learned about landforms, the dating of human and animal bones, and sustainable habitats for game, plants, and people. Such correlations, likewise, can be problematic. For example, anthropologists

and archeologists sometimes dispute the results of radiocarbon tests used to date the arrival of the first humans in the area.

With these cautions in mind, historians are in general agreement that perhaps as early as 50,000 years ago humans had followed big game – such as mammoths, mastodons, and bison – eastward across the Beringia ice bridge that once connected Asia to Alaska. Ten to fifteen thousand years ago, as climate warming set in and Beringia melted into the Bering Strait, the descendants of these Paleo-Indian migratory hunters continued on their way eastward and southward throughout the New World in pursuit of game. They traveled through ice-free corridors, "Paleo-Indian superhighways" according to UC Santa Barbara anthropologist Brian Fagan, into lands that would become California and the remaining bulk of the Americas. From the California mainland, various groups built watercraft that carried them to the Channel Islands of the Santa Barbara Channel, contend some anthropologists. The skeletal remains of the so-called Arlington Woman at a site on Santa Rosa Island have been radiocarbon dated to as early as 11,000 years ago.

Until recent years, this ice-free corridor explanation was clearly the dominant one regarding the earliest human inhabitants of North America's western coastline. Today, however, anthropologist Jon M. Erlandson of the University of Oregon and other researchers have found that prehistoric Asian seafarers most likely voyaged along the northernmost coastal waters of the Pacific Rim, reaching California's Channel Islands at least 13,000 years ago, and possibly even millennia earlier. This so-called coastal migration theory refers to the ancient offshore route as the "Kelp Highway," in reference to the clusters of edible marine life inhabiting these lush kelp beds, as well as accessible birds and nearby terrestrial game.

Archeological evidence, including fish hooks and other gear, have been excavated on the Channel Islands and carbon-dated to 13,000 years ago. Moreover, Erlandson claims that geologic evidence suggests that the ice-free corridor may not have been passable until 14,000 years ago, if then, and archeological remains found in 14,300-year-old caves on Oregon's coastline seemingly predate the ice-free corridor migration. In short, a growing body of scientific evidence holds that California's first human inhabitants were probably northeast Asian Pacific Rim voyagers. Whether or not they predated the Beringia land-crossers (the archeological debate continues), ancient Pacific seafarers were clearly among the first human settlers of what became California.

As the Arlington site suggests, Indians have been living in California for between 12,000 and 15,000 years or longer. For thousands of years afterward the growing aboriginal population spread into all regions of the land, adapting to the diverse, ever-changing environmental conditions they encountered.

Long before Europeans arrived, California natives had lived in considerable harmony and balance with their natural surroundings. Food, prepared by the women, was usually plentiful and its sources were diverse. Indians ate ocean and freshwater fish, mollusks, sea otter, deer, elk, birds, reptiles, insects, acorns, piñon seeds, mushrooms, squash, corn, and more. Nutritionally, their diets were superior to those of the Europeans who would later claim the land. Men hunted and fished; women gathered, stored, and processed acorns and other foods. Acorns were a high-fat dietary staple that required leaching out the tannic acid

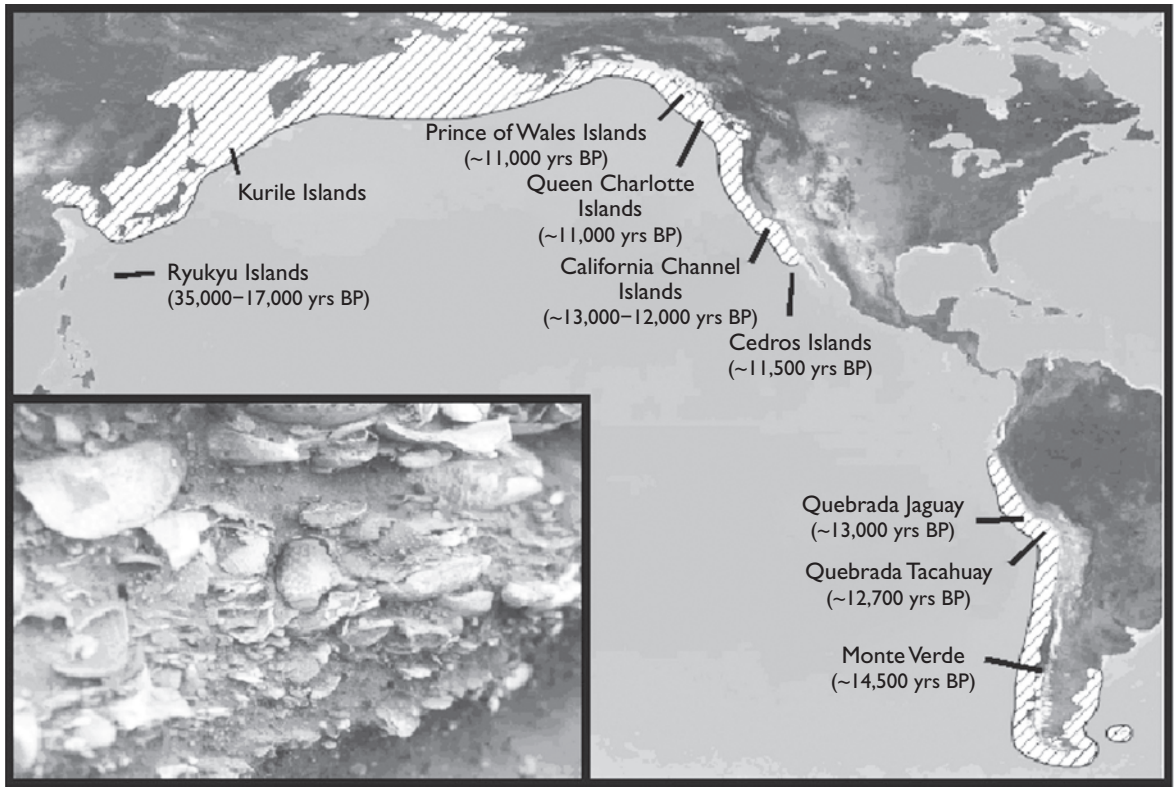

Figure 1.2 The Kelp Highway. Drawn by Michael H. Graham. Source: Jon M. Erlandson, Michael H. Graham, Bruce J. Bourque, et al., "The Kelp Highway Hypothesis: Marine Ecology, the Coastal Migration Theory, and the Peopling of the Americas," *The Journal of Island and Coastal Archaeology*, 2/2 (2007). Reprinted by permission of Taylor & Francis Ltd and Michael H. Graham.

by rinsing and using mortars and pestles for grinding the meal into flour for cooking. While these activities entailed work they seldom required excessive labor since many carried out these tasks. If ever there were a Pacific Arcadia, a terrestrial paradise of rustic beauty and relatively simple living, California came as close as anywhere else to realizing that ideal.

During the millennia before European contact, California's Indians built an extraordinary knowledge base about how elevation and climate related to food resources, about edible and medicinal plants, and forestry management. Tribal territories sometimes spanned different elevation levels, each level featuring its own edible vegetation and animal resources as well as climatic characteristics. For example, Indians crowded into the foothill woodland areas because of the widespread availability of acorns. The Indians in the Colorado Desert used creosote bushes to treat nausea and other intestinal problems as well as respiratory ailments.

By the standards of their time and today, the California Indians of the distant pre-contact period excelled in forestry management and plant cultivation. Their major management tool was the controlled burning of trees and the dense underbrush that otherwise choked more valuable vegetation. The frequent fires they set in forests and oak woodlands favored the growth of such flame-tolerant trees as black oak, giant sequoia, and ponderosa pine. Certain native grasses also benefited. As a result of less cluttered forests native hunters could better see game and dangerous predators, like grizzlies, black bears, and mountain lions. By pruning trees and plants, and relocating some species, natives sought to maximize the productivity of their environment.

As forestry managers, California's early Indians lived sustainably and close to nature's rhythms and balance, which they understood well. Their interactions with the environment were governed by two precepts: do not waste; do not hoard. Hunting, fishing, gathering, and farming were conducted accordingly, ensuring ample food resources for the future. Favored by an environment of plenty, the natives' stewardship of resources and the land fostered the ecology of aboriginal California.

Tribal and Linguistic Groupings

The word "tribes," when applied to California's Indians, requires a brief explanation. Usually the term suggests Indian groupings tied to specified or recognizable territorial boundaries. However, when anthropologists and linguists refer to California tribes the term is often meant to differentiate between language families traceable to general living areas rather than to designate a social group with a strong sense of shared identity and a leadership structure.

When Indians had California to themselves their numbers expanded and their distinct groupings enjoyed a large measure of self-determination. On the eve of colonization in the late 1700s, between 300,000 and 1,000,000 indigenous people inhabited California. Most of them lived in villages of 100 to 500 dwellers. The village residents constituted an autonomous social group that anthropologists call a "tribelet." Generally, the dwellers in these village communities, or tribelets, recognized only the authority of their local chieftain or headman, who resided in a central village. These leaders were responsible for managing the tribelet's food and other resources and settling disputes. Except among the relatively more militant Mojaves and Yumas in the southeastern region, political organization and a broad sense of group identity were lacking, which eased the work of Spanish missionaries.

The absence of a broader Indian identity was due in part to the fact that natives tended to live within the territorial boundaries of their respective tribelets. This resulted in what anthropologist Robert Heizer characterized as a "deep-seated provincialism and attachment to the place of their birth." For example, Mattole mothers impressed on the children of their northwest coastal tribelet that wandering beyond their group's boundaries was perilous. Still, such boundaries were somewhat permeable; neighboring tribelets at times negotiated agreements allowing border-crossings for hunting, gathering, and trade. Also, Indians at times traveled beyond California's borders to exchange goods.

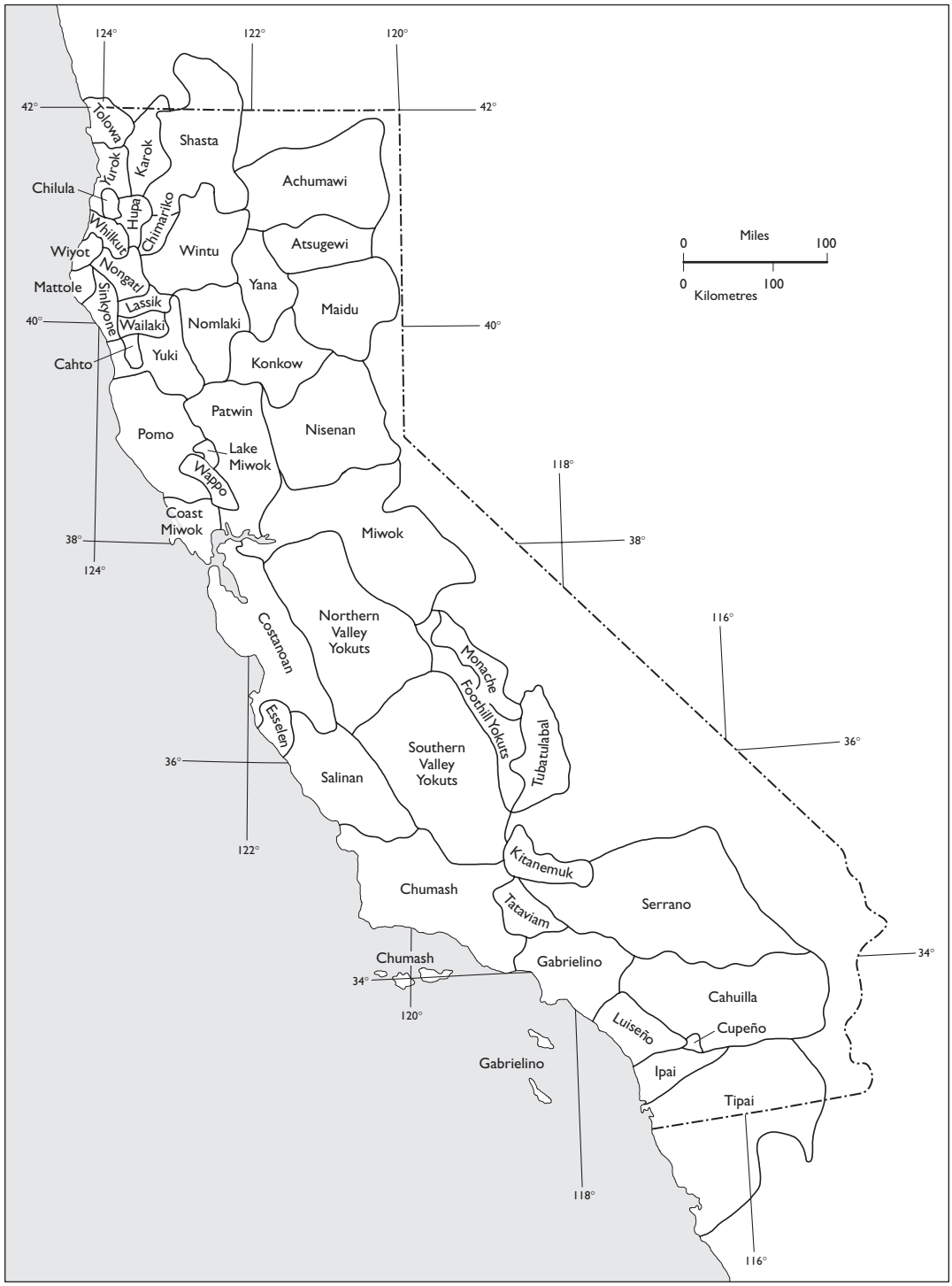

Figure 1.3 Indian living areas. Based on Robert F. Heizer, *Handbook of North American Indians: California*, vol. 8 (Washington, D.C.: Smithsonian Institution, 1978), p. ix. Used by permission of the Smithsonian Institution.

The provincialism and boundary-consciousness of native Californians were both a cause and a result of the numerous languages they spoke. These Indians constituted one of the most linguistically diverse populations in the world, surpassed in this regard only by the peoples of the Sudan and New Guinea. They spoke up to 80 languages that derived from five of the Native North American language stocks. Each language stock, in turn, split into hundreds of mutually unintelligible dialects, making communication even within the same basic language more difficult.

Material Culture

By the beginning of Spanish colonization, indigenous Californians had developed an array of non-metal weapons, tools, and other material artifacts. They built watercraft, erected facilities for meetings and ceremonies, dug wells and irrigation channels, fashioned jewelry, and excelled in other crafts and art forms as well. Additionally, they engaged in an ever-growing commerce.

The Indians' weaponry and tools were those of highly skilled Stone Age hunter-gatherers; any iron used was acquired from Europeans. Bows often were made from fir trees and ranged from 3 to 6 feet in length, the longer bows being better suited to distant targets. Among the Yuroks in the northwest, arrow shafts made of reeds and cedar wood were tipped with sharp volcanic glass points. On entering a human body the arrow point shattered on the bone, causing festering followed by severe infection and death. Northern Indian arsenals also included wooden clubs, obsidian hatchets, lances, and javelins. Indian tools consisted of obsidian knives, deer-bone punches, sticks for lighting fires, woodworking adzes (sharp-edged cutters), mauls, and wedges. Fishing and marine mammal hunting required equipment such as nets, hooks, and harpoons. Mortars and pestles, shaped from stones, were used by many tribelets to pulverize acorns and other plants used in cooking.

Some tools, such as adzes, were particularly useful in boat-making. Long before European contact California's Indians had been building seaworthy redwood dugout and plank canoes, as well as tule boats for inland waterways. Tribelets living along the northwest coast, in the vicinity of Humboldt Bay, dug out half of a redwood log to build canoes that they used in coastal waters and the interior reaches of the Eel River. In coastal southern California the Shoshonean and Chumash islanders constructed plank canoes that were exclusively maritime watercraft. These vessels were used to hunt seals, sea lions, and dolphins for subsistence, as well as for transport between the mainland and the Channel Islands. For fishing and transport, Indian groups utilized Tule balsa boats, constructed from hand-twined marsh plants, in coastal wetlands and inland waterways.

In addition to boat-making, roundhouses, sweathouses, granaries, and irrigation projects attested to native construction skills. A roundhouse was a large, circular, wood-framed structure, part of which was below ground while the top was supported by

rafters and covered with earth. It was used for rituals. Sweathouses served as ceremonial centers and men's saunas. The sweathouse consisted of a sealed room heated by an open fire. When sufficiently hot, males exited and bolted to nearby ponds of cool water and submerged themselves. These rituals were intended to cleanse the body of scents that could alert game to a hunter's presence as well as to appeal to spirits in nature. Women in the central region customarily built thatched granaries for food storage, some of which reached 15 feet in height. The Owens Valley Paiutes used communal labor to dig irrigation ditches and dam streams to enhance the productivity of edible wild plants.

In basketry California's Indians were virtually unsurpassed worldwide. Women dominated the craft and art form; Pomo males were the only ones of their gender to make baskets. These portable containers had multiple uses: gathering, storage, and cooking of food; the carrying of infants; headwear; ritual observances; and commerce. They often featured geometric and animal designs. Some were so tightly woven that they could carry water, even without tar caulking, and be used for cooking. Pomo baskets were particularly ornate, exhibiting intricate designs coupled with decorative feathers and inlaid mother-of-pearl.

Clothing was fashioned from sea otter, rabbit, and deer skins, as well as plant materials; the latter also were used by men and women for body painting. In summer men often wore nothing, while women dressed in skirts made of plant fibers. Both sexes covered themselves in furs during colder periods of the year. Special rituals called for more elaborate apparel: feathered headdresses and capes, shell necklaces, and jewel and shell earrings. Footwear for most northern tribelets consisted mainly of moccasins; southern groups preferred sandals. Body tattoos, sported by men and women, were common in Indian California. Yurok girls, for example, received facial tattoos beginning at age 5. Black stripes were etched into the skin from the corners of their mouths to below their chins. Every five years another line was added, making clear their age. Imagine what age-concealing women in the Western world would have thought about that practice!

Indian art was gendered. Just as women excelled in basketry and costume design, men dominated wood and bone carving, storytelling, music, and rock-carving (petroglyphs) and rock painting (pictographs). Most of these art forms were practiced widely, though the petroglyphs and pictographs were limited to the interior parts of southern California. The Chumash were particularly adept at executing these artworks. Boulders and the walls of caves were used to carve and paint representations of humans, animals, and assorted abstract shapes – all of which usually derived from religious beliefs.

Some of the Indians' material artifacts became articles of exchange in a steadily growing commerce. By the time of European colonization, native Californians had been carrying on a brisk trade with both neighboring and distant aboriginal groups. Surplus food, redwood dugout canoes, abalone shells, whalebone, baskets, and many of the weapons and tools mentioned above were both bartered and sold (often using shell currencies). Commercially, Indians exchanged their goods in a "greater California." Trails crisscrossed and extended beyond California's current borders into Arizona, Nevada, Oregon, and the Baja peninsula of Mexico, thereby facilitating long-distance trade.

The near-absence of metal in aboriginal trade was an important factor in earlier assessments of the California Indians' material culture. Coupled with the lack of a written language, unfamiliarity with the wheel, and relative non-use of animals as beasts of burden, the absence of metal instruments led some earlier whites to disparage the California Indians. Nineteenth-century fur trappers and, later, some writers viewed the natives as culturally and racially inferior to Euro-Americans and other North American indigenes. They often used the term "Digger" when referring to Native Californians, some of whose women used pointed sticks to unearth roots and wild vegetables, presumably for food. Only primitives, many whites believed, would subsist on such a crude diet. The term "Digger" was a racist misnomer since the plant material that California Indians dug up was used mainly for basketry, though they ate some roots and bulbs. More importantly, white Americans' use of the term showed little understanding of the wide array of Indian foods and the natives' sophisticated grasp of plant ecology. Dehumanizing California's aborigines in this fashion made it easier to divest them of land and other resources. In recent decades scholars have repudiated this older view and recognized the modern environmental stewardship at the heart of the natives' material culture.

Religion and Social Practices

The natives' religious beliefs shaped their social practices. Considerable variation existed in both matters, rendering generalization difficult. Still, some commonalities can be identified as long as important qualifications and exceptions are noted.

Most California Indians believed in the existence of a hierarchical universe comprised of three interrelated worlds, or in a variation of this view. An upper world was inhabited by quasi-human and animal-like beings in the form of the Sun, Moon, and constellations. A second or middle world contained humans, their environment, and non-mortal beings. A third or underworld was home to reptilian and amphibious spirits harmful to people. In short, to natives, spirits were everywhere, punishing or rewarding humans depending on how faithfully they followed their religion.

The religions of the California Indians were ecologically based. A core principle ran through virtually all of their spiritual beliefs: The earth and all life on it comprised a sacred, interdependent whole of which humans were but one part among all the other coequal parts. Instead of being separate from the environment and above other species, humans – in order to survive – must reverence their connection to the Earth and care for it. This is not to say that California's Indians always practiced environmental stewardship, for in fact they at times over-hunted and over-fished. The important point is that they learned from their mistakes, as survival was a grim teacher.

Caring for the Earth would assuredly address the needs of generations to come, but Indian seers also believed that in the distant future the universe would be depleted of life-sustaining energy and that nature's bounty would eventually give out. Such a religion-inspired cosmology is consistent with the modern notion of entropy, of considerable interest to physicists who foresee a similar ending of the Cosmos.

Other beliefs also reflected the importance of the natural world in Native Californian religions. Indians, for example, differed on whether there was one god or many. Most groups believed in the existence of many deities or spirits that were to be found in animals, places, streams, trees, natural processes, and landforms. The spirits would punish wasting and hoarding, that is, behaviors that upset the ecological balance and threatened life. Being on good terms with the spirit world, then, was required for the maintenance of a stable, predictable environment.

Rituals aimed at conciliating the spirits followed from these and related beliefs. Ceremonies marked the year's first salmon catches and acorn harvests. Though tribelets differed in the ways they conducted ceremonies, indigenous rites in and beyond Indian California focused largely on the major stages of the human life span: birth, puberty, marriage, sex, childbearing, sickness, and death.

Coming-of-age or puberty ceremonies were held for both sexes, though such rites were generally more involved for girls than for boys. For girls on the cusp of womanhood a lengthy dance was usually performed. Many northern California native groups believed that a female's potential for evil greatly intensified when going through puberty. Accordingly, elders gave pubescent girls detailed rules for gathering firewood and performing other chores as well as for comporting themselves with modesty. In the southern parts of California tribelets applied direct means to counter the supposed consequences of the physiological changes associated with blossoming womanhood. Warmth was thought essential in this process. Adolescent females were not allowed to drink cold water and bathing had to occur only in heated water. Among the Gabrielino and Luiseño peoples girls being initiated were placed in a warm pit simulating roasting in an earthen oven. In this instance the elders saw themselves as providing for the girls' future health rather than combating any presumed evil tendencies.

Initiation rites for males often included the infliction of pain and suffering, such as being whipped by a bow string and fasting. Such were the ways of the Achomawi and Shasta natives in the northeastern corner of California. Additionally, the Achomawi pierced young men's ears. Completion of these rites gained males (and in some locales females) membership into California's two major religious cults, the Kuksu and the toloache. The former cult impersonated spirits by using distinctive disguises in their rituals. The latter cult used jimsonweed (*Datura stramonium*), a narcotic, to induce sacred trances.

For young initiated natives – indeed for virtually all North American Indians – shamanism, the belief that priests have powers drawn from the spirit world that among other things cause and cure diseases, was a central component of religion. Sickness was thought to result from foreign objects that had lodged in one's body. Shamanistic cures, therefore, involved the removal of any such objects, usually by sucking, accompanied among the Colorado River tribes by blowing tobacco smoke on the injured body area. Throughout California singing and dancing were often integral to the curing process as well. A shaman's presumed power to *produce* diseases at times led to inter-tribal war, especially in cases where rival groups attributed a disease to a shamanistic curse imposed by their foes. As can be seen from the fact that priests in the northwestern areas usually were women, shamanistic customs varied throughout Indian California.

As mentioned, Indian social practices derived largely from religion. This was partially true with respect to war. Connections between religion and social practices are also evident in matters of class and wealth distribution, gender roles, and marriage.

Regarding war, California natives engaged in occasional violent conflicts but overall were comparatively peaceful, except for the Mojave and Yuma groups, as noted. In addition to charges of being victimized by the casting of shamanistic curses, other causes of war included poaching game, boundary intrusions, and the capturing of women. The Chumash are reported to have gone to war over insults directed at their chiefs. Though gruesome, hostilities usually did not last long. The weapons of choice included bows and arrows, war clubs, stones, and slings. The Yuma, Mojave, and Diegueño were the only tribes to use shields – usually constructed of unornamented animal hides. Generally, prisoners were not taken. Men seized in battle were summarily killed and decapitated; women and children were slaughtered, though females sometimes were taken as captives. With the exception of warring northwestern Shasta, and Wintun groups, victorious tribes commonly took scalps.

A consideration of Indian wealth, its importance, and its distribution illustrates the importance of looking beyond California's physical borders when attempting to understand its past. Significantly, the Indians of northern California were culturally linked to the aboriginals of Alaska and the Pacific Northwest (Oregon and Washington), who attached great importance to wealth and the social status it represented. Northern Indians with the most property controlled rituals. For them, religion and socio-economic status were closely linked. In northwestern California, Indians enslaved one another for unpaid debts. Servitude existed nowhere else in the province during the pre-contact period. Throughout much the rest of California, Indians showed relatively little interest in property acquisition and class distinctions.

Gender roles throughout California, on the other hand, tended to be more clearly defined than class distinctions and, again, had a religious dimension. Females raised the children, assisted with births, and made family clothing. As mentioned, they gathered, processed, and cooked foods, and constructed granaries. Mothers transmitted knowledge, both practical and folkloric, to their children. They weaved baskets, danced, and sang. Among the Chumash, with their highly advanced hunter-gatherer culture, matrons often ruled villages; in more northern areas, as shown, females served as priests. Men hunted, fished, fought, gambled, controlled most of the property, and wielded the bulk of political and religious authority.

California natives viewed the family as society's most important institution, and marriage lay at the heart of it. Bride-purchase was practiced widely, except for groups east of the Sierra and along the Colorado River. Sometimes marriages involved religious rites; in other instances tribelets recognized a couple as being married if the two had lived together for a length of time. Divorce was rare but possible. Husbands often had more than one wife; this was particularly true for chiefs and shamans, who valued the multiple political ties afforded by polygamy. Among some tribelets, if a wife was unfaithful the husband could claim the wife of his wife's lover. Prostitution was practically unknown.

Usually the lineage (a large, extended family of blood relatives and in-laws) was traced through the man's ancestry. Lineages, far more than tribal affiliations, marked a person's identity and exerted authority over individuals.

Pacific Profile: Anthropologist Alfred L. Kroeber

When the last survivor of the Yani tribe emerged starving and near-naked in the northern California town of Oroville in 1911, the so-called "savage" ended up in jail. California's leading anthropologist, Alfred L. Kroeber, on hearing about the capture, telegraphed the arresting sheriff in clipped language: "Hold Indian till arrival professor State University who will take charge and be responsible for him. Matter important account aboriginal history." Given custody of reportedly the last Stone Age Indian in America, Kroeber named his new ward "Ishi" – meaning "man" in the Yahi subgroup dialect of the virtually extinct Yani tribe. Subsequently, the anthropologist and the Indian formed a short-term working relationship that made possible the recovery of the language and culture of an indigenous people who otherwise would have vanished through the cracks of California history. Lacking immunity to whites' diseases, Ishi lived for a little less than five years after being brought to the University of California at Berkeley for study. Saddened and depressed by Ishi's death in 1916, Kroeber sought psychoanalysis for a while before returning to his research in cultural anthropology. Theodora Kroeber, the anthropologist's second wife (his first having died of tuberculosis in 1913), told the Indian's story and described her husband's relationship with him in *Ishi in Two Worlds: A Biography of the Last Wild Indian in North America* (1961).

Alfred Louis Kroeber (1876–1960) was born in Hoboken, New Jersey, and grew up in New York City. As a Columbia University graduate student he studied Eskimo languages and the cultures of several Californian tribes – the Yurok, Yokut, and Mojave. While finishing his studies, Kroeber secured a job as curator of the anthropological collections at the small California Academy of Sciences in San Francisco. Shortly after receiving in 1901 the first doctorate in anthropology awarded by Columbia, the young scholar accepted a teaching position in the University of California at Berkeley's newly established anthropology department.

In addition to teaching dozens of graduate students, some of whom became leading anthropologists, Kroeber poured himself into travel research and publications on indigenous cultures in California, Mexico, and Peru. His massive *Handbook of the Indians of California* (1925), an anthology of writings, secured his reputation as the preeminent authority on the subject matter. During World War II the U.S. government commissioned him to teach an Army Specialized Training Program at Berkeley in Chinese, Japanese, Thai, and Vietnamese languages to select military personnel who would accompany American invasion forces in Asia. A heart attack forced Kroeber to carry out this task only in an advisory capacity.

Toward the end of his lengthy career, Kroeber became a venerated generalist, devoting himself to studying the diffusion of culture based on his findings regarding California's aborigines. One major product of this shift was his 1923 publication of the first textbook in his field, titled *Anthropology*. The work, updated in 1948, is noted for its position that there is no objective evidence indicating the inferiority of any racial group. This view stood in opposition to earlier and popular Euro-American pronouncements about the supposed inferiority of the California Indians. He died in 1960, revered for his work on the indigenous peoples of the Golden State and parts of the Pacific Rim.

The Chumash: Pacific Coast Mariners and Traders

According to anthropologists, no group of California Indians was more skilled and involved in seafaring than the Chumash. Their trade goods, currency, and wealth derived largely from maritime resources.

Around 1000 CE (Common Era, equivalent to AD) they began settling villages in central California, along the coast from San Luis Obispo to Malibu, and on a few of the Channel

Islands. Some Chumash goods, however, circulated far beyond this settlement area and even beyond California's borders. For example, their shell beads produced in Santa Barbara and the Channel Islands have been found in Oregon, the Southwest, and the Great Basin.

The Chumash maritime region was rich in resources that provided for a flourishing economy. Coastal waters and those surrounding the Channel Islands abounded with kelp forests (kelp wraps were used to cure leg swelling), fish, sea otters as well as other marine mammals, and valuable shells (used in fashioning money, and in making fish hooks and ornaments). Islanders exported to the mainland shell beads, fish, otter skins, and steatite ollas (soapstone cooking pots from Santa Catalina Island). In return, mainlanders exported to the islands acorns, seeds, bows and arrows, furs, roots, and baskets. Villages in and around today's Santa Barbara served as exchange centers in commerce that brought together natives from the interior, the mainland coast, and the Channel Islands.

The same waters that abounded in resources also abounded in seagoing hazards. Watercraft sometimes capsized in high seas and drownings were common. Fernando Librado, a Chumash boat-builder and expert on tribal lore, told an anthropologist in the early twentieth century: "Canoe faring is dangerous, and drownings are frequent. There would be no coming home, for a wind or wave might capsize a *tomol* [boat]. . . ." When the Santa Ana winds blew, Chumash canoes remained on the beach due to high waves. The natives rarely made passages during the night; when they did they navigated by the stars.

Chumash sailors usually built the ocean-going vessels they rowed. These seamen comprised a select group known as the Brotherhood-of-the-Canoe. In order to protect their monopoly on inter-island and island to mainland shipping, they guarded closely their knowledge about plank-boat construction, seamanship, and currents. Canoe owners, usually chiefs, paid Brotherhood members to conduct the voyages and load and unload cargoes. As this payment and the commerce with which it was connected suggests, the Chumash maritime economy constituted an early form of capitalism.

Modern researchers estimate that about 15,000 Chumash lived in California at the time of European contact in the 1500s; by the late nineteenth century few remained. Visiting the Santa Barbara Channel coastline in 1602, Spanish navigator Sebastian Vizcaíno wrote in his journal that the Indians were "well formed and of good body, although not very corpulent [fat]." Though the Chumash enjoyed a bountiful environment, they experienced their share of self-imposed suffering that was only compounded by the arrival of the Spanish. Physical evidence indicates that during times of stress, for example food shortages, the Chumash turned on one another in occasional outbursts of violence that led to deaths. Polluted water on the Channel Islands, coupled with possible venereal disease throughout the tribal area, also led to population declines.

For all of these difficulties, on the eve of European contact the Chumash and their fellow California Indians had registered impressive achievements. Their knowledge of plants and animals as well as their sustainable ecology especially stand out. They excelled in basketry and rock art. With the possible exception of indigenous Alaskans, the Chumash may have been unsurpassed in all of native North America in seafaring. Despite all these accomplishments, in the early 1500s California's Indians were about to see their homeland visited and later invaded by a light-skinned people who had traveled from afar.

Figure 1.4 A replica of a Chumash plank canoe (*tomol*/*tomol'o*), ashore on San Miguel Island, located off Santa Barbara's coast. Watercraft like this may hold clues regarding the possibility of pre-Columbian Polynesian voyagers visiting California's coast. Courtesy of the Santa Barbara Museum of Natural History.

Other Possible Early Voyagers to California

Before the arrival of light-skinned people, or Europeans, had other non-Indian Pacific voyagers reached California in ancient times? Scholarly speculation centers around two possibilities: Polynesian and Chinese Pacific-crossers.

A small group of anthropologists and linguists is currently investigating whether early Polynesians reached California in watercraft sometime between 400 and 800 CE. UC Berkeley linguist Kathryn Klar and Cal Poly San Louis Obispo anthropologist Terry Jones published an article in the July 2008 issue of *American Antiquity*, claiming linguistic and archeological evidence for ancient Polynesian voyaging to southern California. They noted, for example, that the Chumash Indians, who inhabited the area around present-day Santa Barbara, continue to use the word *tomol* or the variant *tomolo'o* for "boat." Moreover, *tomol* or *tomolo'o* did not refer to simply any kind of boat; instead it described an

ocean-going, hand-sewn, redwood plank canoe. Polynesians are known to have used such canoes, built from redwood logs carried along Pacific currents to distant islands across that ocean. Klar and Jones note that the term *tomolo'o*, which appears in no other North American Indian language, is rooted in a Polynesian word. From this fragmentary evidence, the two scholars and others reason that the Chumash may have learned their extraordinary skills as Pacific mariners from ancient Polynesians who likely visited southern California's shores centuries before the arrival of Europeans. Research into this matter is robust and ongoing.

A second possibility, based on scantier evidence than the first, is that in 458 CE an Afghan Chinese Buddhist monk, Hwui Shan, sailed across the Pacific with several other Chinese monks, exploring much of North America's western coastline from Alaska southward to the tip of Baja California. According to Chinese records dating to the late fifth century CE, such a round-trip voyage was undertaken and Hwui Shan noted his sighting of tall trees of red wood and topographical features resembling the diverse land masses found from the Northwest Coast to that of Baja. While such a voyage was possible, physical evidence remains lacking and present-day scholars in the United States are hesitant to affirm or deny a Chinese discovery of America nearly a millennium before Columbus.

SUMMARY

California's land mass, climates, and other physical features were shaped largely by Pacific forces, and these features profoundly influenced the state's subsequent human history. The earliest human inhabitants migrated from Asia's Pacific Rim in watercraft and afoot, and lived mainly in coastal areas, adapting their cultures – especially their foods, dress, and tool-making – to a hospitable marine environment. This was less true, naturally, for tribelets living in the interior regions, though trade between coastal and hinterland Indians remained brisk throughout most of the pre-European contact period. California's tribelets were severely provincial, as evidenced by the scores of languages and hundreds of dialects they spoke, making communication between these linguistic groups extremely difficult. Anthropologists give the physically healthy California Indians high marks not only for living in an ecologically sustainable manner, but also for their artistry, especially seen in their basketry and petroglyphs. Alfred L. Kroeber, an early researcher of California's native peoples, attained a national reputation and helped shape the field of his expertise throughout most of the twentieth century.

Among all of California's Indian groups, the Chumash developed the most advanced maritime culture, based on a trade network that extended in many directions beyond the present boundaries of the state. In short, their economy embraced a Greater California. Aside from Paleo-Indian seafarers, California may have been visited by Polynesian and Chinese Pacific-crossers centuries before the arrival of Europeans in the province. Much more evidence, however, will be needed to substantiate the likelihood of Polynesian and Chinese transpacific visits to California before the arrival of Europeans in the 1500s.

REVIEW QUESTIONS

- In what ways were California's landmass and climates shaped by Pacific forces?
- How and when did California's first human inhabitants arrive in the area that much later became the Golden State? What was the so-called "Kelp Highway," as explained by anthropologist Jon M. Erlandson, and why was it significant?
- What evidence do scholars offer to support their claim that the lifestyles of California's Indians were sustainable before the arrival of Europeans?
- Who was Ishi and why was he significant in California history? What was anthropologist Alfred Kroeber's connection to Ishi?
- How did the Pacific maritime economy of the Chumash impact the interior reaches of California, Oregon, the Southwest, and the Great Basin?

FURTHER READINGS

Lowell J. Bean, "Indians of California: Diverse and Complex Peoples," *California History*, 71 (Fall 1992), 302–23. The author offers a readable and well-illustrated overview of the California Indians from pre-contact times to the late twentieth century.

Warren A. Beck and Ynez. D. Haase, *Historical Atlas of California* (Norman, OK: University of Oklahoma Press, 1974). Though dated, this is still a useful source especially for geography, climate, and other natural features of the state.

Thomas C. Blackburn, ed., *December's Child: A Book of Chumash Oral Narratives* (Berkeley: University of California Press, 1975). The study affords a description of anthropologist John P. Harrington's huge collection of unpublished notes and writings on the Chumash plus tribal oral narratives drawn from those materials.

Thomas C. Blackburn and M. Kat Anderson, eds., *Before the Wilderness: Environmental Management by Native Californians* (Menlo Park, CA: Ballena Press, 1993). This book covers Indian adaptations to California's diverse landforms and biological zones.

Joseph L. Chartkoff and Kerry Kona Chartkoff, *The Archaeology of California* (Stanford, CA: Stanford University Press, 1984). Readers are treated to a highly detailed and well-illustrated account of California's earliest Paleo-Indian settlers and how they lived.

J.M. Erlandson, M.L. Moss, and M. Des Lauriers, "Life on the Edge: Early Maritime Cultures of the Pacific Coast of North America," *Quaternary Science Reviews*, 27 (2008), 2232–45. This is a cutting-edge source for the maritime explanation of California's earliest settlements.

Brian M. Fagan, *Ancient North America: The Archaeology of a Continent* (New York: Thames & Hudson, 2005). A comprehensive college-level anthropology textbook, this volume pays particular attention to ancient peoples living along North America's Pacific coastline.

Brian M. Fagan, *Before California: An Archaeologist Looks at Our Earliest Inhabitants* (Walnut Creek, CA: AltaMira Press, 2004). An anthropological-archaeological tour through Indian-occupied California, this study contains testimonies drawn from travelers, scholars, and natives.

Philip L. Fradkin, *The Seven States of California: A Natural and Human History* (Berkeley: University of California Press, 1995). This work provides a traveling journalist's view of the state's major geographical regions and their respective histories.

Lynn H. Gamble, *The Chumash World at European Contact: Power, Trade, and Feasting Among Complex Hunter-Gatherers* (Berkeley: University of California Press, 2008). This specialized work offers a distillation of the most recent scholarly findings regarding the Chumash.

Ramon A. Gutierrez and Richard J. Orsi, eds., *Contested Eden: California Before the Gold Rush*, a special issue of *California History*, 76/2 and 3 (Summer and Fall 1997). See especially the articles by M. Kat Anderson, Michael G. Barbour, and Valerie Whitworth, "A World of Balance and Plenty: Land, Plants, Animals, and Humans in a Pre-European California" (pp. 12–47), and William S.

Simmons, "Indian Peoples of California" (pp. 48–77). These writings cover both the early and later history of the California Indians, particularly their ecologically informed lifestyles.

Derek Hayes, *Historical Atlas of California* (Berkeley: University of California Press, 2007). This book contains original maps and commentaries plus excerpts from historical documents related to the historical geography of California.

R.F. Heizer and M.A. Whipple, *The California Indians: A Source Book* (Berkeley: University of California Press, 1971). This is a classic compendium of information on California's Indians from prehistoric times to the late twentieth century.

David Hornbeck, *California Patterns: A Geographical and Historical Atlas* (Palo Alto, CA: Mayfield Publishing, 1983). This dated but otherwise excellent collection of maps and charts elucidates California history from the pre-contact period to the 1980s.

Douglas J. Kennett, *The Island Chumash: Behavioral Ecology of a Maritime Society* (Berkeley: University of California Press, 2005). This account offers a synthesis of the cultural and environmental history of the Northern Channel Islands and their Chumash inhabitants who arrived 13,500 years ago.

Theodora Kroeber, *Ishi in Two Worlds: A Biography of the Last Wild Indian in North America* (Berkeley: University of California Press, 2004). The author reveals the human and tragic consequences of a lone Indian's brief experience of living in a white world.

Leif C.W. Landberg, *The Chumash Indians of Southern California* (Los Angeles: Southwest Museum, 1965). This is a brief, scholarly yet readable introduction to the basic aspects of Chumash culture, including tools, foods, seasonality, and ecology.

Kent G. Lightfoot and Otis Parrish, *California Indians and Their Environment* (Berkeley: University of California Press, 2009). The author provides a recent synthesis of the latest scholarship on the complex and environmentally sophisticated cultures of California's Indians.

John McPhee, *Assembling California* (New York: Farrar, Straus & Giroux, 1993). This book is the starting point for understanding the role of plate tectonics in the geological formation of California.

Mains'l Haul: A Journal of Pacific Maritime History, 47/1 and 2 (Winter/Spring 2011). The theme of the issue is "Prehistory: Pacific Seafarers and Maritime Cultures." The articles make a strong case for Asian Pacific seafarers being the first peoples to inhabit the western coastline of the Americas.

Malcolm Margolin, *The Ohlone Way: Indian Life in the San Francisco-Monterey Bay Area* (Berkeley: Heyday Books, 1978). This work focuses on the pre-contact history of these northern California aborigines.

Keith Heyer Meldahl, *Rough-Hewn Land: A Geologic Journey from California to the Rocky Mountains* (Berkeley: University of California Press, 2011). The connection between California gold and the primordial floor of the Pacific Ocean is explained in this readable account of plate tectonics and the ever-changing Far Western landscape.

James J. Rawls, *Indians of California: The Changing Image* (Norman, OK: University of Oklahoma Press, 1984). With effect, the author argues that nineteenth-century white American images of Native Californians reveal more about the observers than those being observed.

John W. Robinson, *Gateways to Southern California: Indian Footpaths, Horse Trails, Wagon Roads, and Highways* (Arcadia, CA: Big Santa Anita Historical Society, 2005). This book connects early Indian trails with later Euro-American overland routes into southern California.

Allan A. Schoenherr, *A Natural History of California* (Berkeley: University of California Press, 1992). This is an encyclopedic work detailing the diverse landforms and flora and fauna of the state.