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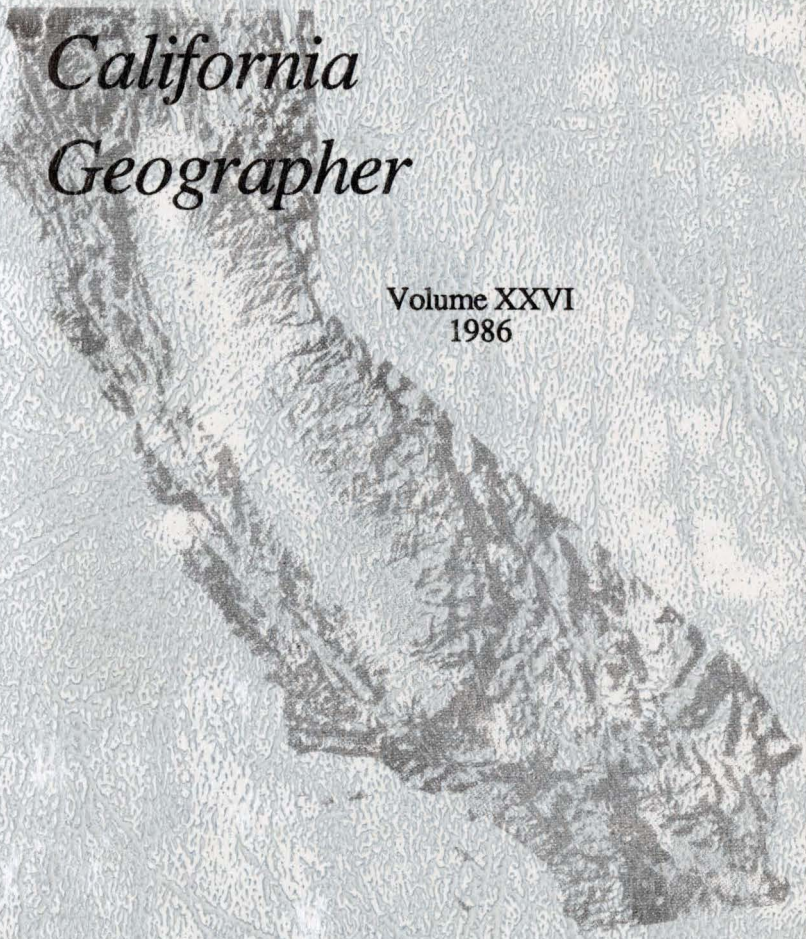

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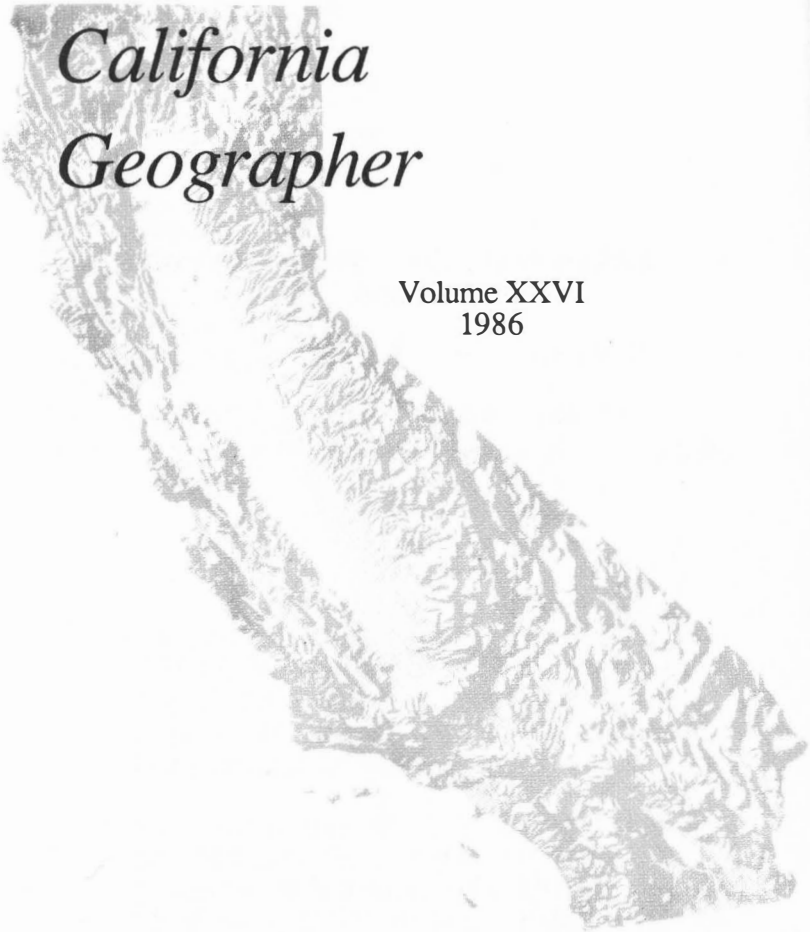

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CALIFORNIA GEOGRAPHICAL SOCIETY
Volume XXVI, 1986

SOVEREIGN CALIFORNIA: THE STATE'S MOST PLAUSIBLE ALTERNATIVE SCENARIO

*Henry J. Bruman**

Since long before the Gold Rush, California had been considered by many impressionable visitors as one of the most attractive places on earth, as a region of such superb natural endowment as to have the potential to become a second paradise. In recent years more perceptive residents have come to rue the persistence of this excessively favorable reputation, as the continuing influx of ever more people has degraded the very qualities that attracted them. But California in earlier years was undeniably wonderful, harboring some of the most benign and pleasantly habitable areas on this planet.

I would like in this paper to comment on several interrelated themes:

1. The environmental uniqueness of California in North America and the scarcity of similar areas elsewhere;
2. The late settlement of the area as compared to central Chile, the only climatic analogue in the Americas;

**Dr. Bruman is Emeritus Professor of Geography at the University of California at Los Angeles.* *He extends thanks to his colleagues Raymond H. Fisher and Norris C. Hundley for their helpful suggestions.*

3. The reasons for California's deep sleep, that period of 160 years in the seventeenth and eighteenth centuries when the region, although discovered, lay completely ignored and abandoned by Europeans, to be followed by a period of unprecedented acceleration in the historic process; and finally
4. The identification of a decisive moment when California came to a strategic crossroads, and a speculative scenario of what might have happened had a royal command been obeyed.

There are in the world five areas that have what geographers call a Mediterranean climate, characterized by summer drought, winter rainfall, and generally benign temperatures (Figure 1). The largest of these by far is the classical Mediterranean itself, with the climate found mostly along the fringe areas of the inland sea, but extending into the Atlantic to include Madeira and the Canaries and eastward past the Levant into Iran. The other areas are smaller: the tip of South Africa; two separated regions in southwestern and southern Australia; a small stretch of central Chile; and part of California. In every case the influence of the Mediterranean climate is extended some distance beyond its strict limits into a surrounding fringe of drier steppe country. The climatic characteristics are the consequences of the workings of atmospheric physics within specific latitudinal limits on the western sides of continents and are fairly similar in the five cases. The adaptations of plants and animals in the five areas have many parallels. But indigenous human cultures have displayed enormous differences in content and level of sophistication.

The classical Mediterranean realm is the area in which most of the roots of Western civilization are found. The

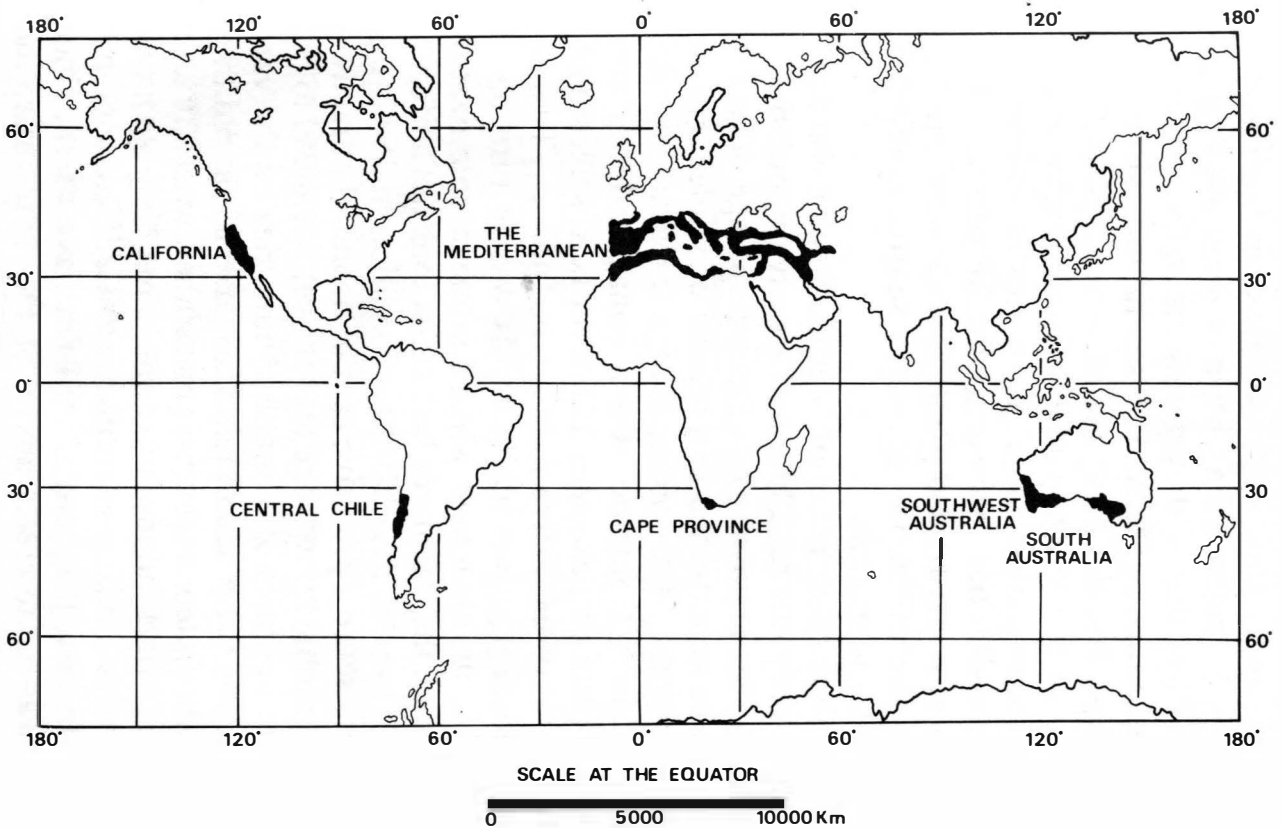

Figure 1. Areas of Mediterranean Climate.

history of agriculture is ancient here, and a great assemblage of plants for food and other uses has been domesticated from the native flora. Most of these native plants are cold starting, that is, they germinate in the winter and early spring, utilizing the cold season rainfall, since summers are dry. But the great age of agriculture in the region has given rise to many adjunct technologies, such as terracing and irrigation, which have greatly widened agricultural possibilities, permitting the introduction from other areas of domesticated plants that are warm starting, adapted to the utilization of warm season rainfall for germination and growth.

Of the four other areas of Mediterranean climate in the world, only central Chile had a native population of farming peoples in possession of an assemblage of domesticated plants accustomed to a regime of winter rain and summer drought. California, except for a narrow strip along the lower Colorado, was a nonagricultural area, and useful plant domesticates had never been selected and improved out of the native flora by the Indians. This absence of locally grown native foods was to turn into a considerable disadvantage when European colonization began.[1] When the Spaniards had a first look at California through the eyes of the Cabrillo expedition in 1542, this was in every sense a primitive area of no initial attractiveness. Geographic knowledge had not yet advanced to the point where the facts of climatic symmetries on the various continents were accurately known.[2] Little did they realize, in the sixteenth century, that if there was any area in the New World that deserved the name New Spain on geographical and climatic terms, it was California and not Mexico. In fact, they might well not have cared, since their aim was not to create a New Spain but to enrich the old one (Figure 2).

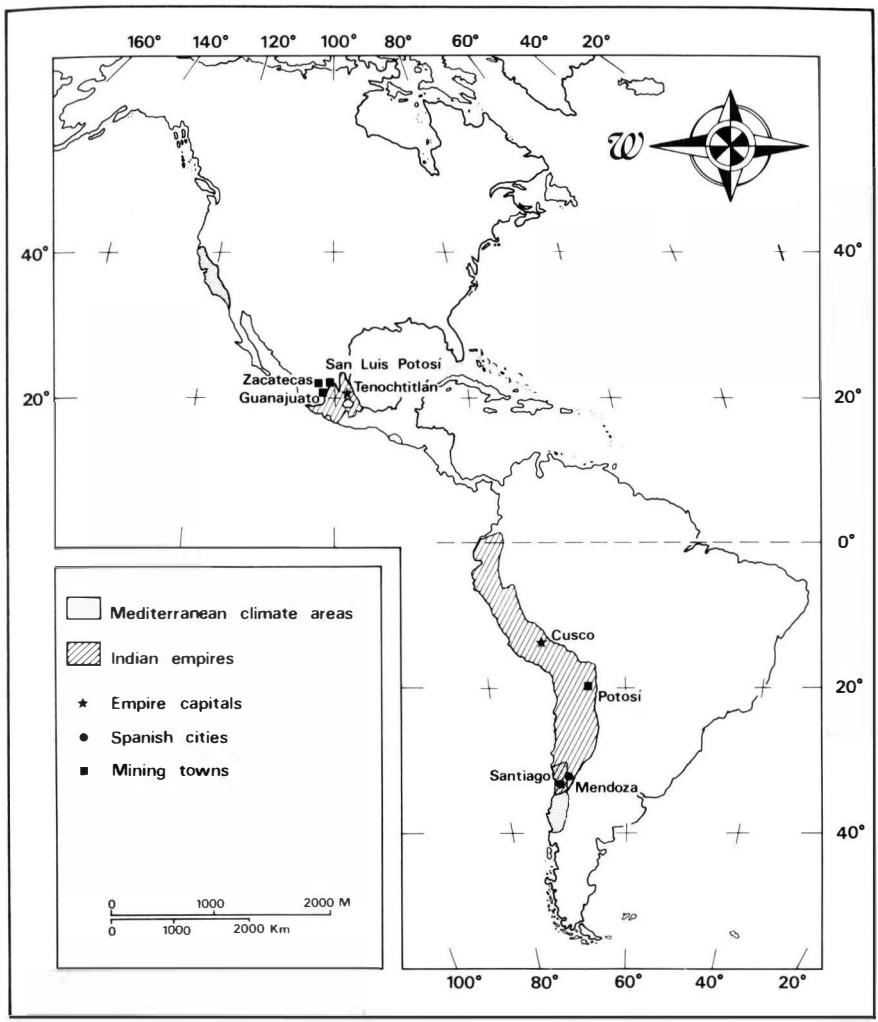

Figure 2. Location map.

One of the extraordinary contrasts between California and Chile lies in the sequence of their historic development by the Spaniards, even though their first stages were oddly similar. They were discovered about the same time, in the early 1540's, as mopping-up or supplementary operations after the conquest of the Aztecs and the Incas.[3] But the Cabrillo expedition came back having

found little of interest to the Spaniards, whereas Valdivia and his successors immediately began to establish permanent settlements. Thus we have this extraordinary gap between the dates of founding of the first Spanish towns: Santiago, Chile, 1541; San Diego, California, 1769; and to pick two others in the drier country farther from the coast: Mendoza, Argentina, 1561; Riverside, California, 1870. Such a great discrepancy is really extraordinary,[4] given the similar environmental attractions of the two areas, and it deserves an explanation.

As I see it, there are basically two explanations, and they reinforce each other. The first is rooted in the obvious fact that the initial requirement from the Spanish point of view was to eliminate the independent functioning of the native states and the power of the indigenous military forces. The Incas, with their capital at Cusco in 8° S latitude, had extended their sway along the Cordillera of the Andes and along the coast north to the equator and south into central Chile. They had expanded as far south as the Río Maule, near 36° S latitude, even beyond the heart of the region of Mediterranean climate, where they encountered the belligerent Araucanians, with whom they had not yet achieved a stable relationship when the Spaniards came. The Spaniards thus faced an unstable southern realm, *La Frontera*, just south of the Mediterranean area, and were forced to devote some attention to this region for the sake of security.

In the case of the Aztecs the area dominated was smaller, more compact, and covered a lesser latitudinal spread. Whereas the Inca Empire extended over more than 4,000 kilometers north and south, the Aztecs managed barely a fourth of that. Tenochtitlán at 18° N latitude was close to the northern boundary of the empire in a rather exposed march or border site in spite of its lake,

and the Aztecs had not yet been able even to take over the Tarascan state, located not far to the west of their own capital, let alone extend their control northwest along the Gulf of California or the Pacific Coast. The conquest of the Aztec state did not lead the Spaniards anywhere near California, which lay far beyond the limits of higher culture. The discovery of the "island" of (Baja) California by the men of Cortés was not so much the result of a military advance (as was the thrust into Chile by Valdivia) as it was a simple exploratory penetration into the unknown. In any event, southern Baja California is climatically more analogous to the Atacama than to California itself. This difference, then, between Chile and California in the extent of the important native states and the complementary military and governmental response of the Spaniards is one of the great reasons for the disparity in time of development between the two New World areas with a Mediterranean climate.

A second reason emerges in the early colonial period. The neutralization of native military strength was followed by the confiscation of native treasure and the organization of subjugated peoples to produce and pay tribute. Next came the search for the sources of native treasure and the identification of the great silver lodes, Potosí in Peru, and Zacatecas, Guanajuato, and San Luis Potosí in Mexico. Problems of providing the new mines with labor, food, work animals, and charcoal had then to be solved. In the case of Peru the main difficulties were environmental: extreme elevation, extreme aridity, and the lack of all needed supplies in the vicinity of Potosí. Supply regions were organized mainly to the south, beyond the subtropical desert, in Mediterranean Chile and east of the Andes in what is now northwestern Argentina. Thus these southern hemisphere regions of climatic at-

tractiveness and impressive economic potential were integrated almost at once into the main economic activity of colonial Peru, the mining, processing, and transportation of silver.

In Mexico the problem was not so much environmental as cultural. The elevations of the mines were much lower than in Peru, and climatic conditions much less rigorous. Unfortunately, the mines were located mostly north of the native agricultural frontier; in lands of nomadic, nonfarming Indians. Out of necessity supply areas for the mines were established by the Spaniards in the old agricultural areas farther south. As for the area of Mediterranean climate comparable to that of central Chile, it lay in southern California, 3,000 kilometers to the northwest, unknown, not identified as the true "New Spain" from the climatic point of view, and never integrated into the mainstream of Mexican colonial activity.

The English

Let us now turn briefly to the Elizabethan interlude. Drake had come into the Pacific through the Strait of Magellan, being buffeted eastward afterwards near the southern tip of South America. The Spaniards at first refused to credit this, preferring to believe that he must have found the Northwest Passage. After sailing far to the north on an unsuccessful quest of this mythical strait, he turned south once more to find a place to careen and caulk his ship. This he may have found in the lee of Point Reyes, a promontory probably seen by Cabrillo but still effectively beyond the Spanish realm (Figures 3, 4, 5).

For much of our information about Drake's circumnavigation we depend on his chaplain Francis Fletcher. Fletcher's description of the winds, fog, and cold that Drake and his crew encountered along the California

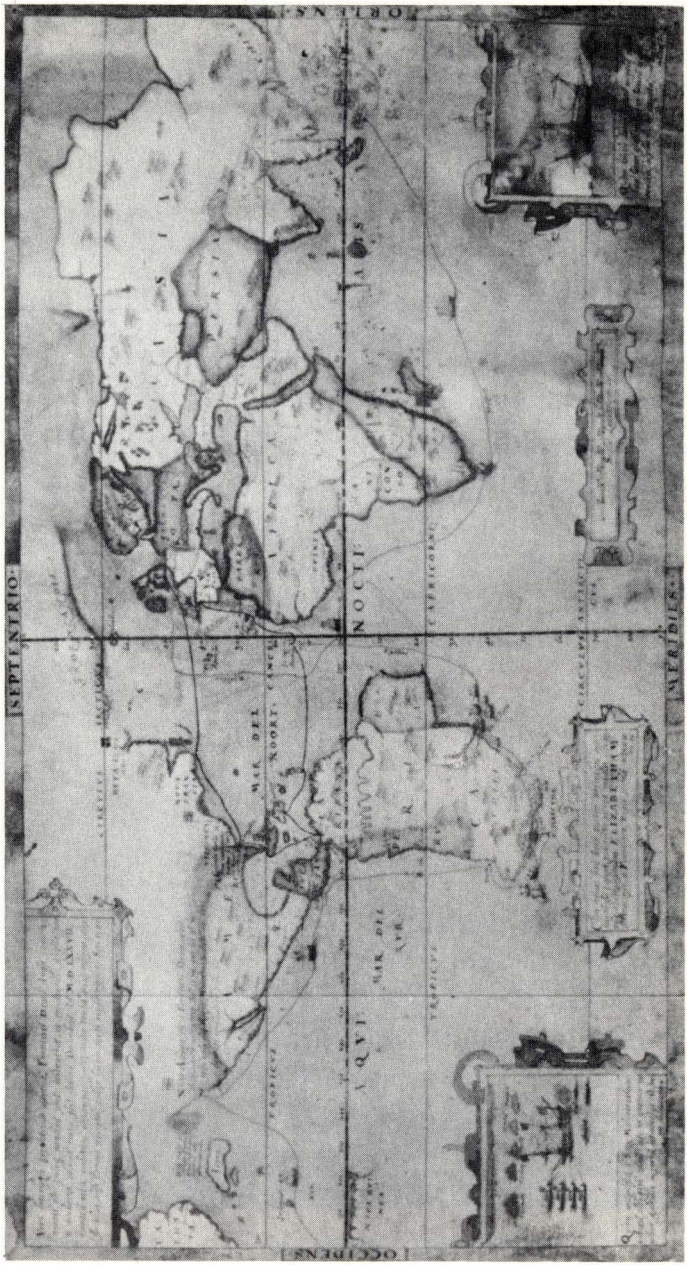

Figure 3. Drake-Mellon map ca. 1583 showing Drake's passage around the world.

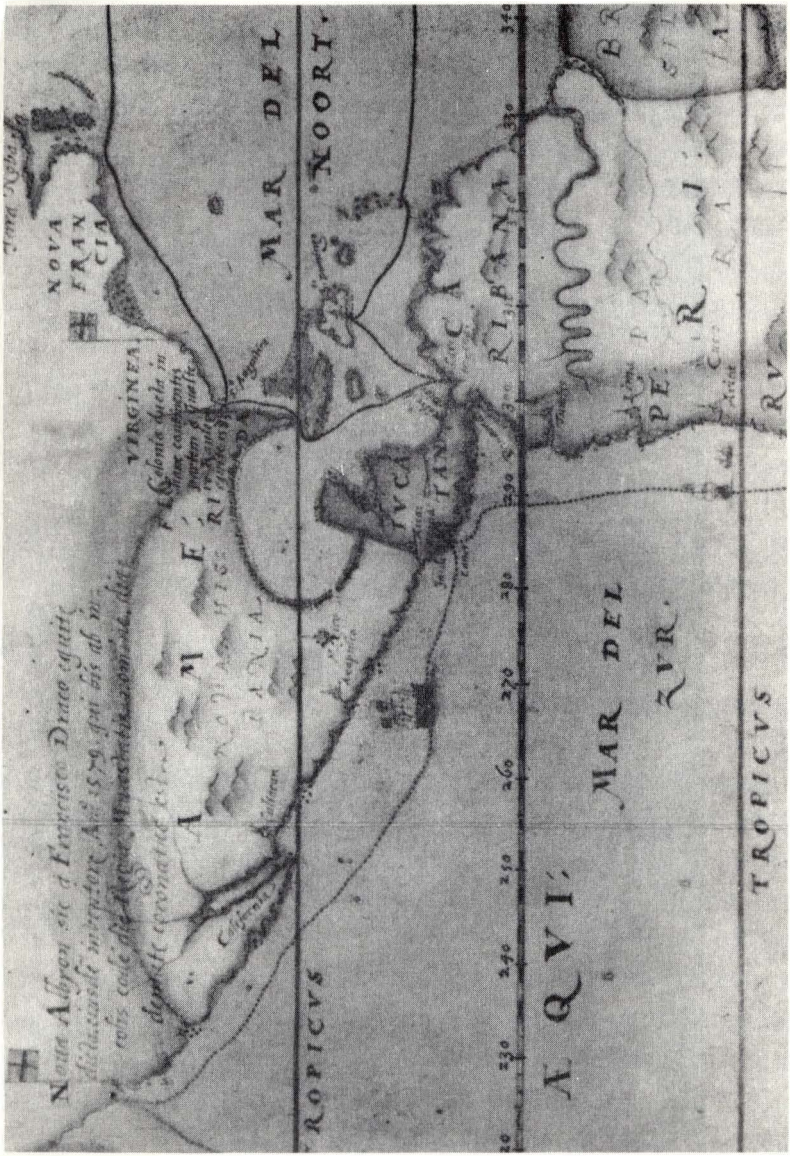

Figure 4. Drake-Mellon map, detail, showing Drake's anchorage in California and the extent of the claim of *Nova Albion*.

Figure 5. Map by Virginia Farrar, ca. 1670, showing the Virginia Colony in relation to Drake's *Nova Albion*.

coast is both graphic and extensive, spreading over five pages of the printed account.[5] He speaks of "extreame and nipping cold," of "pinching cold that did benumme them," of ". . . many extreme gusts and flawes that beat vpon vs, which if they ceased and were still at any time, immediately upon their intermission there followed most uile, thicke, and stinking fogges, against which the sea preuailed nothing, till the gusts of wind againe remoued them. . . ." He also guesses at the causes of the low temperatures, postulating that Asia and America spread out over large areas some distance to the north, so that they nearly or quite touch. From their high and snow-covered mountains cold north and northwest winds blow out,

". . . (the constant visitants of those coasts) . . . to the infecting the whole aire with this insufferable sharpnesse: not permitting the Sunne, no, not in the pride of his heate, to dissolve that congealed matter and snow, which they haue breathed out so nigh the Sunne. . . ."[6] He even relates that the hills overlooking the coast around latitude 38° were covered with snow—in June! Now it is true that the coast north of San Francisco is commonly cold and windy in the spring and early summer. Temperatures in the low fifties and high forties occur, reflecting the low temperatures of the California Current. But snow on the hills in June is difficult to credit, and one wonders what to make of this statement. And this is not all. He further says: "Besides, how vnhandsome and deformed appeared the face of the earth it selfe! shewing trees without leaues, and the ground without greennes in those moneths of *June* and *July*. The poore birds and foules not daring (as we had great experience to obserue it), not daring so much as once to arise from their nests after the first egge layed, till it, with all the rest, be hatched and brought to some strength of nature, able to help itselfe. Onely this recompence hath nature affoorded them, that the heate of their owne bodies being exceeding great, it perfecteth the creature with greater expedition, and in shorter time than is to be found in many places."

It is true that in the section where he records Drake's brief foray into the interior to see the Indian settlements and "to be the better acquainted with the nature and commodities of the country," he paints a more attractive picture: "The inland we found to be farre different from the shoare, a goodly country, and fruitfull soyle, stored with many blessings fit for the vse of man. . . ." But the statement is short and does little to undo the pronounced negative picture he has presented before. One thing is

certain: The overall effect of his description was not one to make Nova Albion an attractive goal for future Elizabethan enterprise, even if other circumstances had permitted it. Only if there had been clear evidence of the availability of precious metals or other treasure would the virtues of New Albion (as it came to be known later) have assumed a more desirable aspect in Elizabethan minds. But there were none; the gold of the Mother Lode did not reveal itself to Drake.[7] And thus, because the qualities of New Albion were mediocre as reported, because no convenient access by way of a Northwest Passage around northern North America had been found, and because New Albion by way of southernmost South America was as far from England as any place on earth, no serious attempt was made to follow up on Drake's discovery until the coming of another age, some two centuries later, in the days of Captain James Cooke and Captain George Vancouver. Instead, English efforts in the New World came to be focused on the Atlantic Coast of North America, on Virginia[8] and on the area to the north that came to be called New England, an echo of the earlier name New Albion.

Spain and the Manila Galleon

One consequence of the Magellan-Elcano circumnavigation of the world (1519-1522) was Spain's claim to possession of the Philippine Islands. Because of prior agreements with Portugal over spheres of influence, contact with these islands could be maintained only by way of America and the Pacific. By 1570 a quasi-permanent maritime communication schedule was in operation, with Acapulco and Manila as the termini (Figure 6). This traffic, which the Spaniards called "La Nao de la China," and which we have come to know as the "Manila Galleon,"

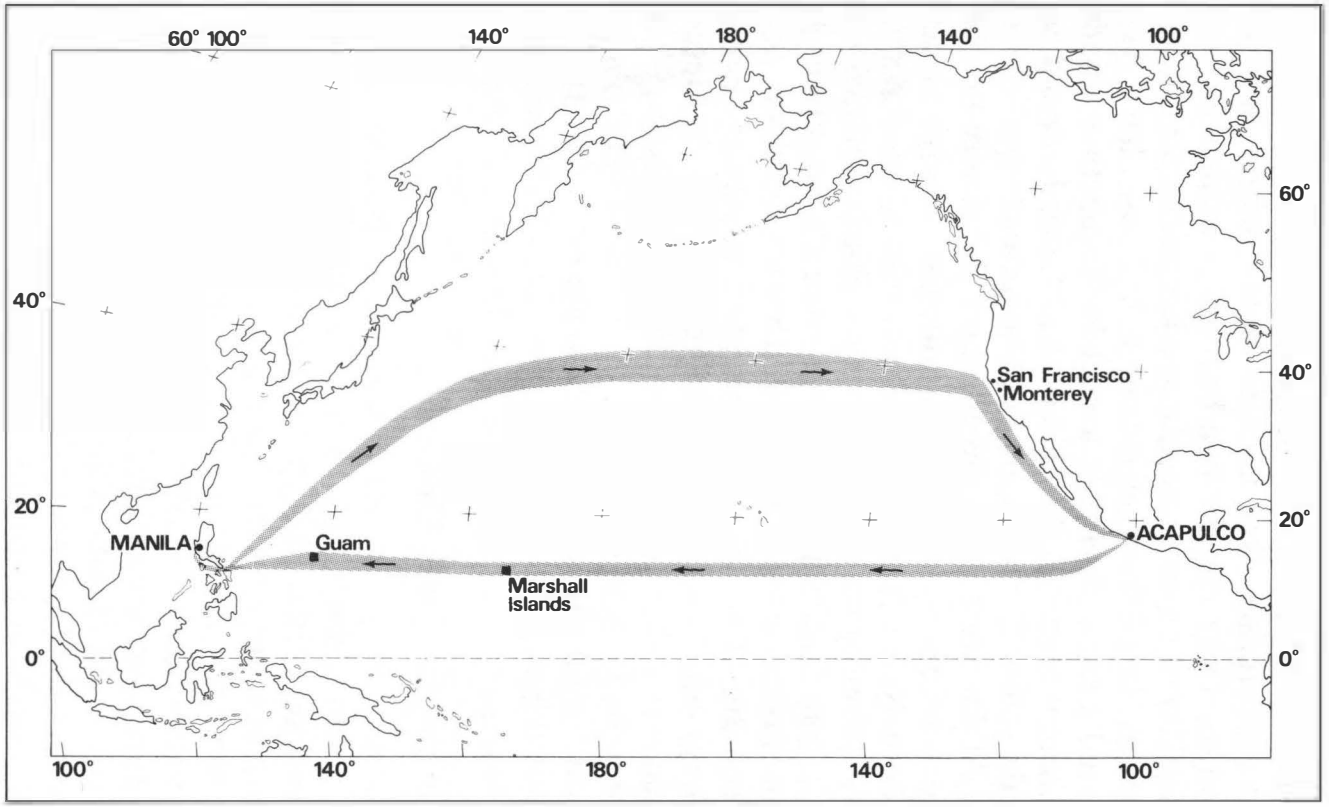

Figure 6. Generalized tracks of the Manilla Galleon.

continued to function, mostly on an annual basis, until the War of Independence in Mexico in the early nineteenth century.

The Manila Galleon was mainly a far-ranging commercial enterprise, profitable for some, exchanging Mexican silver for silk, porcelain, and tea from the Far East. Overall it operated at a loss, but it continued to be subsidized by the Spanish Crown, as it was also a vehicle for the maintenance of governmental, military, and ecclesiastical affairs in the Philippines. A troublesome problem stemmed from the great length of the voyage, normally two or two and one-half months with the NE trades from Acapulco to Manila, but often four to six months and sometimes seven or eight months by the changeable westerlies on the return. The eastward voyage was commonly so arduous that by the time the first land along the California coast was sighted provisions of all kinds were near exhaustion and the health levels of both officers and crew were dangerously undermined.[9]

The common seamen were mostly Filipinos, especially on the return voyage to Acapulco, and conditions on the galleon were so miserable that large numbers of them jumped ship and refused to make another trip across the Pacific. For example, the galleon *Espírito Santo* arrived in Acapulco in 1618 with seventy-five Filipino seamen. Only five of them made the return voyage.[10] Before the end of the sixteenth century it became evident that a reprovisioning post somewhere along the California coast, preferably near the first landfall between 42° and 37° N latitude, would be a great help to the galleon trade and a boon to the beleaguered crews. A fortified base for defense of the treasure-laden galleons against intruders in the tradition of Drake and Cavendish was also desirable, especially since it appeared to the Spaniards that the

Elizabethans must have discovered the Northwest Passage and could thus prey upon north Pacific shipping at will (Figure 7).

Early in 1593 the viceroy was ordered by the Crown to institute explorations of the California coast to seek the desired haven for returning galleons. The first response was the unfortunate voyage of Sebastián Rodríguez Cermeño, which resulted in the shipwreck of the fully laden returning galleon *San Agustín* in Drakes Bay in 1595. To the Indians it may have seemed like an extraordinary sequel to the Drake visit sixteen years earlier, although Cermeño does not mention this, but to the viceroy it was a bitter disappointment and a lesson that coastal exploration is not best carried out by crews tired at the

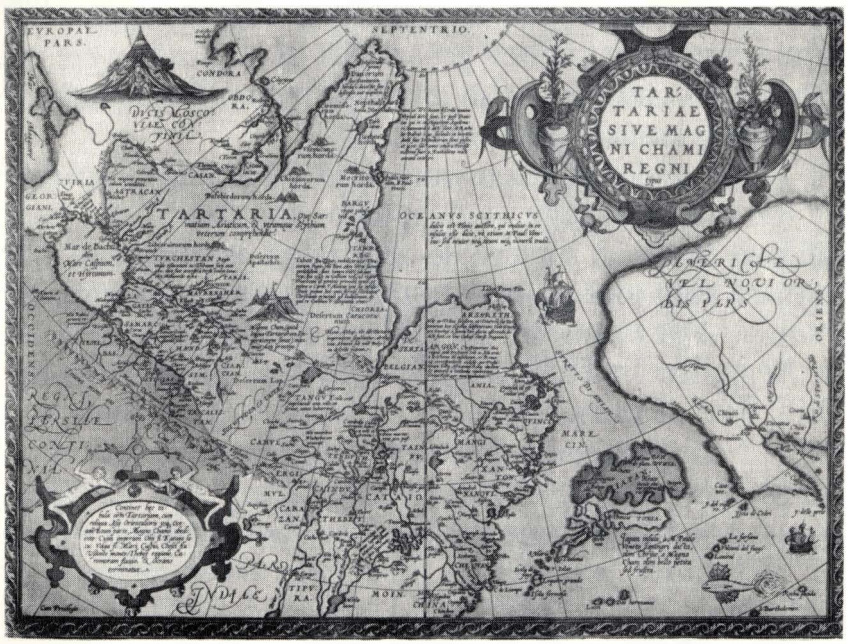

Figure 7. Map of Tartary by Abraham Ortelius, 1584, showing a narrow North Pacific Ocean and California firmly attached to the mainland.

end of lengthy and exhausting voyages. Accordingly, a new approach was tried, with an expedition sent out direct from Mexico with the sole assignment to reconnoiter the outer coast of California and to find the needed harbor. Assigned to command the expedition was Sebastián Vizcaíno.

The story of Vizcaíno and the California harbor for the galleons is lengthy and tortuous, and at times reads somewhat like a comedy of errors.[11] Two suitable bays were identified by Vizcaíno along the California coast in 1602, San Diego and Monterey. Monterey, first written Monterrey, and named in honor of the viceroy, Gaspar de Zúñiga y Acevedo, Conde de Monterrey, was preferred over San Diego because it lay closer to the first landfall of the galleons in the eastern Pacific. Like other navigators before and long after him, he did not discover the Golden Gate and San Francisco Bay. Through the efforts of Vizcaíno and the viceroy, who no doubt was pleased by the choice of name, assent was obtained from all appropriate authorities, and in 1606 a Royal Order was sent to Mexico spelling out in detail how the Monterey settlement was to be founded under Vizcaíno's command with supplies and settlers to be brought from the Philippines by the next galleon. Unfortunately, another viceroy was in charge in New Spain by this time, Juan de Mendoza y Luna, Marqués de Montesclaros, who was not in agreement with the plans for Monterey. Whether the fact that it was to be named after his predecessor influenced his position is not clear. Because of the great lapse of time, owing to the slowness of dispatches, it was not necessary for him to oppose the king's command directly. He merely pointed out that the ship for Manila had left a month before the Royal Order was received and that Vizcaíno had returned to Spain some months before. He further recommended

that plans for developing Monterey be abandoned, and that a reprovisioning point for the galleons be established farther west, at the (mythical) islands of Rica de Oro and Rica de Plata, since by the time the ships reached California they were only twenty-five or thirty days from Acapulco. He was supported in his position by Fray Antonio de la Ascensión, who had been with Vizcaíno in California waters, and who wrote the king that Monterey Bay was insecure and that the whole plan was a scheme by Vizcaíno to gain personal wealth. Accordingly, a Royal Order in 1608 suspended the Order of 1606 and ordered a search for Rica de Oro and Rica de Plata, but Monterey was to be settled in case they could not be located. The two islands were of course never found, but Monterey was not settled for over 160 years. Ascensión himself advocated the settlement of Monterey in a letter to the king in 1620, but without result. Bureaucratic proceedings relative to the possible settlement of Monterey continued in the 1620's and 1630's, but came to an indecisive end. Thus, by default, Spain passed by her chance to neutralize English claims to New Albion and to settle California as a counterpoise to English settlements in Virginia and New England.[12]

And so the deep sleep began. The galleons continued to sail across the Pacific, bringing their cargoes of oriental goods, manned by scurvy-ridden, sick and dying crews. The longer the time of the voyage, the greater the cost in morbidity and mortality. Already in Vizcaíno's lifetime the efficacy of both citrus juice and palm wine as antidotes to scurvy had been published,[13] but the information was not widely disseminated and the galleon crews continued to suffer. After the establishment of Jesuit missions in Baja California the galleons, beginning in the 1740's, would sometimes stop near Cape San Lucas for

succor and provisions, even though they were by then on the last leg to Acapulco.

The end of the deep sleep did not finally come until 1769, when Fray Junípero Serra and his Franciscan friars established the first of the Alta California missions at San Diego. Since the time of Vizcaíno there had been little Spanish activity in the far northwest of New Spain, except for the gradual advance of the Jesuits beginning in the 1590's in Sinaloa and ending at the time of the expulsion in 1767-1768 with a net of missions extending into Arizona and covering the entire peninsula of Baja California. Other nationalities had very little contact with California, and the danger of pirates in east Pacific waters had largely disappeared by the beginning of the eighteenth century (Figures 8, 9, 10).

But then the situation changed drastically. From its long period of neglect California, and with it the entire Pacific Northwest, emerged into international prominence, and Spain was suddenly aroused out of her complacency and forced into countermoves to protect her interests. The major new political or quasi-political threats beginning about 1750 and continuing well into the nineteenth century included:

1. Russia's activity in Alaska and her gradual expansion toward the southwest as far as Fort Ross and Bodega Bay.
2. The scientific exploring expeditions of England, France, and Russia in the northeast Pacific.
3. The territorial claims of England from central California northward, based on New Albion, the westward expansion of the Hudson's Bay Company, and the discoveries of Captain James Cook.

Figure 8. Map of North America by Nicholas Sanson, 1700, showing California as an island, based on Fray Antonia de la Ascension's false conjectures.

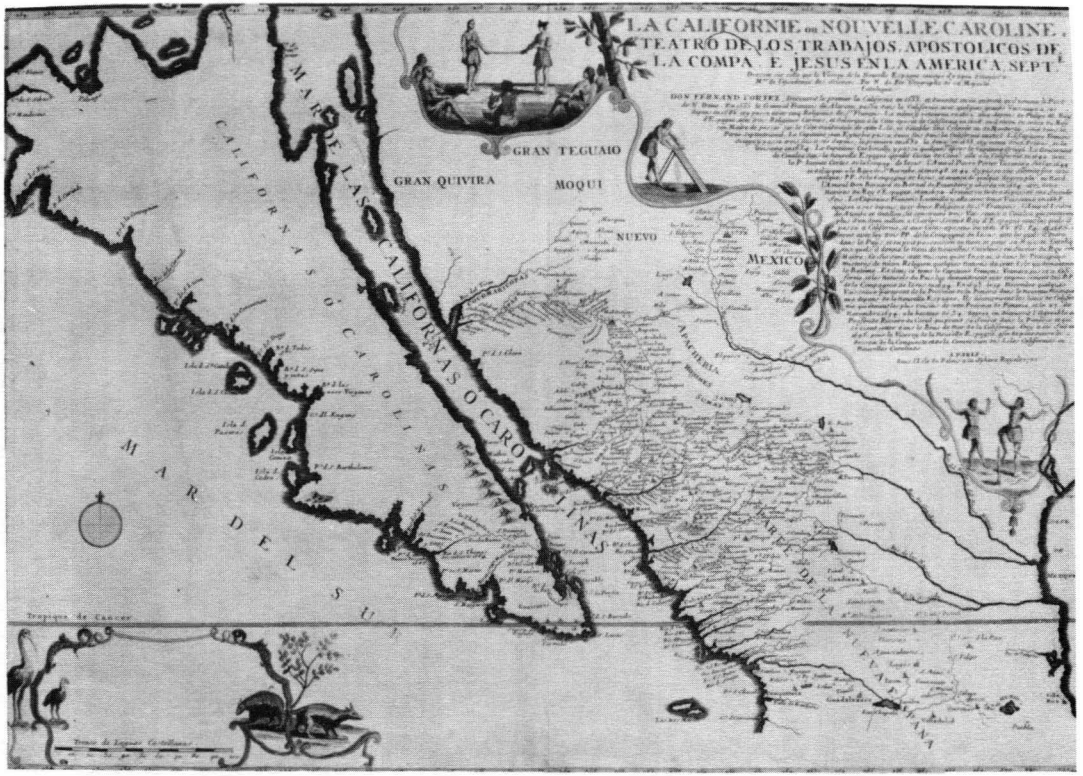

Figure 9. Map by Nicholas de Fer, 1703, with California shown noncommittally as either an island or attached to the mainland.

Figure 10. Map in Miguel Venegas, *Noticia de la California* (Madrid, 1757), based on father Kino's explorations of 1697 to 1699 as depicted on the map of father Consag, showing Baja California as a peninsula.

4. The expansive activities of the newly independent United States, including the explorations of Lewis and Clark to the mouth of the Columbia River and the settlement of Fort Astoria to promote the hunting of sea otters.

To counteract the serious foreign threats to her interests, Spain initiated three parallel programs of her own:

1. The scientific exploration of the Northwest Coast.
2. The missionization and military occupation of Alta California.
3. The exploration by land from Sonora for the support of the new settlements in California.

Although the Spaniards recognized the increasing danger to the security of their northwestern outposts in Alta California and beyond, they showed a curious residual complacency verging on blindness with respect to their colonization policy. Since the late sixteenth century the Jesuit, Dominican, and Franciscan missionaries had tried in vain to keep secular settlers away from the neighborhood of the missions because of their disruptive influence on the lives of Indian converts. This policy was later extended to the presidios and continued to be enforced by law to the very end of Spanish sovereignty in the nineteenth century, even though the greatest need for strategic security was a more massive Spanish presence on the land. Alexander von Humboldt quotes with approval from the diary of Dionisio Galiano:

> It is really distressing that military men, who have a hard and difficult life, cannot settle down in the country in their old age and devote themselves to farming. This regulation against building [private] houses near the presidio is against all the dictates of common sense. If whites were allowed to engage in the tillage of the soil and the raising of livestock, if military

> men, by settling their wives and children on individual farms, could prepare a haven for themselves against the need to which they are only too often subject in their old age, New California would in a short time become a flourishing colony, a port of infinite usefulness to Spanish seamen who trade with Peru, Mexico, and the Philippine Islands.

He adds his own comment:

> If the obstacles we have just mentioned were removed . . . the shores of San Francisco and Monterey would be settled by a large number of whites. But what a striking contrast [there is] between the colonization policies observed by the Spaniards and those through which Great Britain has in a few years created villages on the east coast of New Holland [Australia].[14]

The Russian Challenge

The only foreign penetration of California in Spanish times that threatened to carve out a permanent fief for a foreign state was that of the Russian American Company. It was a brief but intense challenge that was limited mainly by the aftereffects of the Napoleonic wars and the low reproduction rate of the sea otter.

By 1750 the Russians had discovered the riches in otter skins that could be obtained in the Aleutian Islands with the help of Aleut natives. Initially it was a plentiful resource with a ready market in the internal Russian trade as well as in China. A limiting factor gradually became evident in the slow rate of reproduction of the sea otter, a pair rarely producing more than one pup a year. The rapidly growing market for the attractive skins brought about a decimation of the otters in the Aleutians between 1770 and 1780 and a need to shift the main hunting grounds farther east and south along the Gulf of Alaska. Founded in 1799, New Archangel (Sitka) became in 1808 the headquarters of Russian activity, and Aleuts were brought to the new frontier because of the unsuitability of

the local Indians. Here too a prompt decline in the otter occurred, and even further advances down the coast became necessary,

The need for a supplementary food supply led first to a contact with the San Francisco Presidio in 1805, whence wheat supplies were obtained on an increasingly reliable basis well into the Mexican period, and second to the founding of Russian California at Fort Ross and Bodega Bay on lands claimed but not settled by Spain. The contrast between the rigors of Alaska and the benign plenty of California made a profound impression on the Russians, as did the evident weakness of the Spanish hold on the area. Numerous were the recommendations to the Tsar that at least part of California be acquired for Russia. It was thought of mainly as a food supply base for the northern otter hunting grounds, but in at least one case the suggestion was made that families of peasants be introduced from European Russia[15] (Figure 11).

The most serious efforts came in the aftermath of the Napoleonic wars, when Spain's hold on her American empire was crumbling. The wars of Latin American Independence were under way, and the Monroe Doctrine had not yet been pronounced. A temporary dispatch in the *Neue Geographische Ephemeriden* from a Washington correspondent, here retranslated, gives an insight into the rumored negotiations.

Concerning the Cession of California to Russia

Washington, November 18 (1819). Our newspapers recently reported that the Russians would acquire land in California. They limited themselves to reporting the news and to expressing their amazement, no doubt because they did not know the background. Although the affair is still covered with a thick veil of secrecy, it is not really so secret that one could not see through it. In the confidential circles of our statesmen the following rumor is making the rounds. At the Congress of

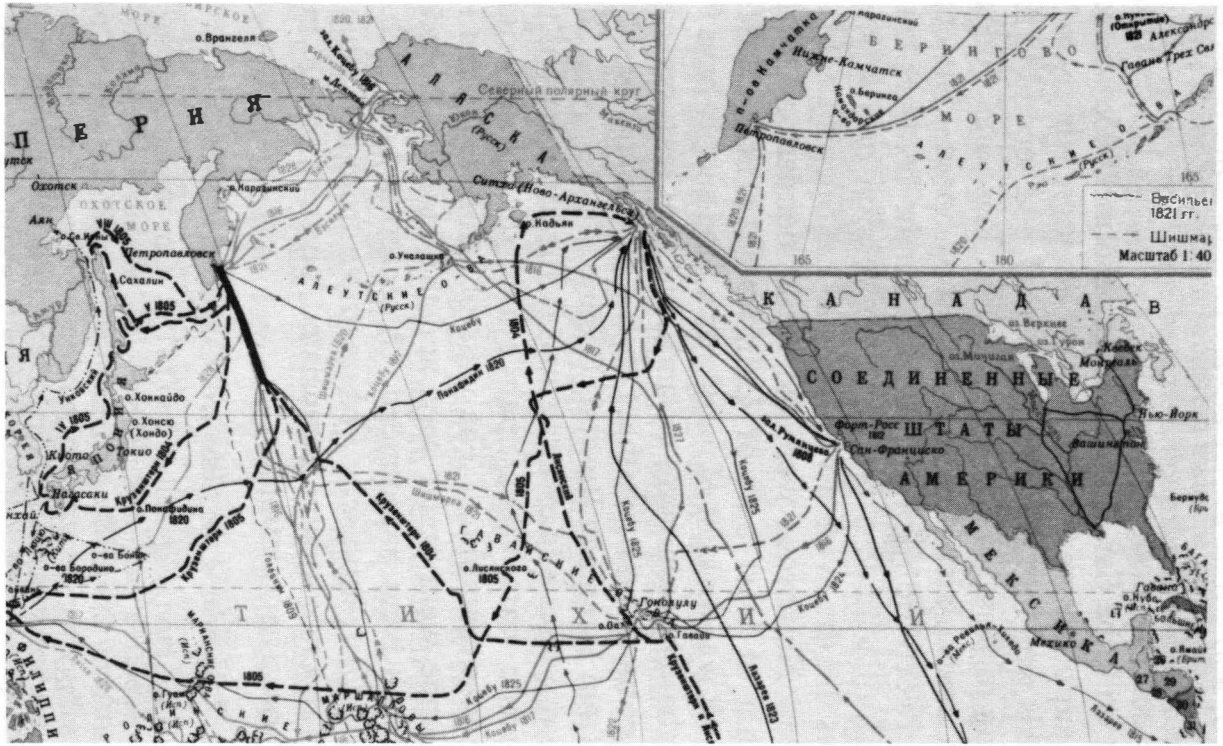

Figure 11. Portion of a map from *Atlas istorii geograficheskikh otkrytii i issledovanii*, ed. K. B. Martova (Moscow, 1959), p. 54, showing tracks of Russian explorers and trade routes and the location of Sitka, Fort Ross, and San Francisco on the coast of North America.

> Vienna the former Spanish Minister Pizarro had several private meetings with Tsar Alexander, in which the California question was decided in secret. The reason for not sharing the news of this agreement with the Congress [of Vienna] was mainly the fear that the English Ministers would express their opposition. Nevertheless, the latter suspected soon enough that a secret understanding had been reached between Russia and Spain. But these were only suspicions which were not transformed into certainties until the Russian fleet set sail for Cadiz. The British Cabinet repeatedly and with emphasis demanded an explanation from the Spanish Government, which was finally compelled to admit that an agreement had been reached whereby Spain would cede a considerable portion of California to Russia. The English government protested vigorously and declared that a consummation of the agreement would be considered a hostile act. This threat caused the dismissal of Minister Pizzaro. From this point on there was disagreement between the Ministers of England and Russia in Madrid. It appears that Spain, in addition to dismissing Pizarro, has promised the English Minister that the offensive agreement would be canceled. Since then, as far as can be seen, there has been no more talk of it. If, however, the facts mentioned in the papers are true, as is largely believed, one must assume either that Spain and Russia would honor the agreement, even against England, or that the latter had finally consented, since everything indicates that England, instead of following her threat to begin hostilities against Spain, will instead support her in the fight which she will probably have to face with us [the United States] in respect to the Floridas.[16]

Such a cession of all or part of Alta California to Russia in exchange for goods or military assistance could have seemed attractive to Spain as a means of salvaging at least something from an otherwise hopeless situation, but it did not materialize. In 1822 the rumor was still current, this time in the form that Tsar Alexander I would help Ferdinand VII to regain his lost American colonies in exchange for California.

The establishment of Mexican sovereignty in 1822 brought profound changes to California. Large-scale

clandestine trade, which had been carried on for a generation, was now legalized, and the ports were opened to foreign shipping. Foreigners were permitted to settle down and buy land. The role of the missionaries was reduced. In 1833 the missions and all their lands were taken over by the Mexican government and were largely secularized and in part sold to private individuals by 1840. The near extinction of the sea otter and the continuing inadequacy of Russian California as a base of supplies finally persuaded the Russians to relinquish their California holdings (1841)[17] and retreat to Alaska, where they were to stay for another generation before quitting America for good (1867). As more foreigners came into California, especially Yankees from the Eastern Seaboard, a quickening of economic and political life occurred and events from other parts of the continent began to exert increasing influence. When, in 1846, the war between Mexico and the United States began, California quickly became a focus of prime importance.

Texas had broken away from Mexico by Yankee activity a decade earlier, and it set a pattern for what was to happen in California. One of the problems was how to lay claim to the Rocky Mountains and to the "Great American Desert" that lay between the Great Plains of the Louisiana Territory and the sought-after Pacific Coast. Here, from the Mexican point of view, the ingenuity and ruthlessness of the Yankee reached great heights by reducing the whole problem to one of perceptions and nomenclature. At the Treaty of Guadalupe Hidalgo in 1848 the American party produced a map of Mexico which had been made in Philadelphia in the previous year (Figure 12) in which the name Alta California was spread over all of northwestern Mexico, over precisely the lands the United States wished to annex.[18] Never before had California, as perceived by

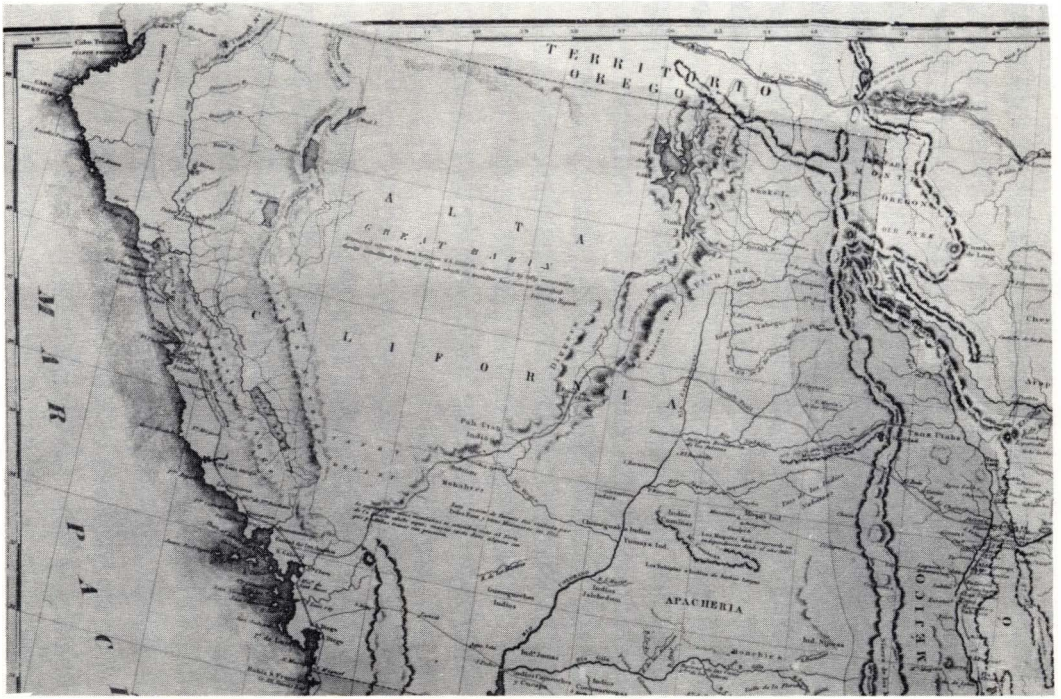

Figure 12. Map by John Disturnell, 1847, setting forth claims of the United States at the Treaty of Guadalupe Hidalgo. Note the American claim that Alta California extends eastwards to the Rocky Mountains (see note 18). This extravagant claim is reminiscent of that of the English for Nova Albion on the Drake-Mellon map (Fig. 4), where the claim extends all the way across the continent to Florida.

Mexico, included parts of New Mexico, or the lands later to be made into Colorado, Utah, Nevada, and Arizona. But the much younger Mexican nation was defeated and disheartened by the all too evident military superiority of the United States, and thus manifest destiny was served. In one stroke Mexico gave up nearly half her territory, finally admitting that Texas was lost, and signing over all the northwestern interior as well as the crown jewel, California. In retrospect, Spain had done very little with California in her more than two and a half centuries of possession, and Mexico had had neither the time nor opportunity to do much in her twenty-five years of control. The greatest irony of all was that California's gold, except for minor placers, lay undiscovered throughout the Spanish and Mexican periods, and then, in the same year as the treaty with the United States, 1848, there occurred that famous find at Sutter's Mill. As a result California became one of the most glamorous places in the world, and the rest is history. Statehood followed in two years.

The Scenario

I would now like to point to a crucial juncture in the history of California, when a small change in policy, a different perception of opportunity, might have made an extraordinary difference in future events. I realize that with the benefit of hindsight one could easily enumerate dozens, or hundreds, of possible modifications of history that would have had important consequences, but there is a really dramatic one in California's past that deserves another look.[19] I will leave out any speculations about alternative scenarios where the geographic or historic facts make them obviously untenable. There were, for example, no Golden Cities of Cíbola for Cabrillo to discover on the California coast, and so the possibility of an

early major thrust by the Spanish to conquer another rich empire was never a real one. Similarly, alas, geographic reality vetoed the early role of England in New Albion. A usable Northwest Passage did not exist, and continued access by sea in the sixteenth and seventeenth centuries was not really feasible for England in either direction around the earth. Nor did the early hope materialize that New Albion might be just a few days march west of Virginia (Figure 5). The size of the earth, the disposition of the lands and the seas, and the location of New Albion with respect to England were all factors that, in combination with historical circumstances, directed a delay of two centuries before England could again play a role along the Northwest Coast.

But what of Vizcaíno and his plans for a harbor in California to aid the returning Manila Galleon? Vizcaíno's proposal was accepted by the Audiencia de Mexico, the viceroy, the Council of the Indies, and the king, and the Royal Order came that the plan be carried out. Only the glacial slowness of dispatches, the replacement of the viceroy by another less well disposed to the plan, and the reassignment of Vizcaíno before the Royal Order arrived kept it from being carried out in 1608. It was a near miss. What if it had been implemented? How might the future course of California events have been altered? I am inclined to believe that the probability at the time of the successful establishment of Spanish settlement at Monterey was greater than the probability that it would not happen. Its not happening was a direct contravention of the royal command. Funds for the settlement were made available in the decree, supplies were to be provided in the Philippines to be transported to Monterey Bay on the returning galleon, and Vizcaíno was to have full authority over the choice of settlers and over the details of site. As

a reprovisioning depot for returning Manila ships, Monterey would have been called upon to furnish mainly fresh water, animals for slaughter on board, and a new supply of staples such as corn, wheat, and dried beans. Fresh fruits, olive oil, and wine would have been highly prized. Other ship's stores might be required for vessels damaged en route and limited repair facilities might be desirable, but always the need was to get the merchandise as rapidly as possible to its destination in Acapulco and Puebla. Limited ranching and animal husbandry were required, and a certain amount of farming was essential. The California Indians knew nothing of raising crops. Depending on how quickly they could be pacified, their first usefulness would probably be more in helping with the animals than in working the soil. Filipinos would be mainly employed, with a leavening of Spaniards to teach irrigation agriculture in the Mediterranean manner.

What is most intriguing is what might have happened next, and what would certainly have happened after a little more familiarity with the area had been acquired: the discovery of San Francisco Bay. From the site of Monterey the nearest hilltop from which the southern end of San Francisco Bay can be seen is only fifty miles away, and from the northern end of Monterey Bay to the same place is only twenty miles. Knowing what we know about how rapidly the Spaniards were reconnoitering in Nueva Vizcaya at this time, it is not credible to delay the probable discovery of San Francisco Bay for more than a few years after the founding of Monterey in 1608, the year of Vizcaíno's scheduled return from the Philippines with a party of settlers.

A settlement would then have been put on San Francisco Bay which would in a short time have become the main Spanish strong point in California, undoubtedly re-

placing Monterey as the California way station of the galleon traffic. No doubt it would have been raided by foreign ships, but in classical military terms San Francisco Bay is one of the strongest natural sites in the world, and cross fire across the Golden Gate would have been effective even in the early seventeenth century. No doubt Spanish forts would have been placed on both sides of the narrows, as well as on Alcatraz Island.

Had this scenario materialized Spain would have had a head start in California by 160 years. The settlement would have been made in the full flower of Spanish vigor and wealth. In possession of perhaps the finest natural harbor in the world, Spain would have strengthened it and populated its shores. The main thrust would have been secular, with some establishment of missions in peripheral areas. Permanent contact by land with the rest of New Spain would have had to wait a century or more. It would have been an isolated settlement, supported by sea, and more from the Philippines than from Mexico.

Miners were very active already in the mountains of north-central Mexico, and some of the more enterprising might have been tempted to try their luck in the new land to the north. Exploration by ship would have been relatively easy up San Pablo Bay, Carquinez Strait, Suisun Bay, and the Sacramento River, just as it was two hundred years later.[20] A major gold strike could conceivably have been made. The Mother Lode itself might have been turned up before the end of the seventeenth century. We know it was there, and we know the miners would have looked. Had it been found, such a strike in the seventeenth century would not have set off a vast international gold rush as it actually did in the mid-nineteenth. It would have been perceived as another of the great Spanish bonanzas in the tradition of Potosí and Zacatecas, but gold

this time, not silver.[21] Thousands of people from Spain, New Spain, and the Philippines would have been attracted to the mines, and a Spanish-Mestizo-Filipino combination would have created a new and distinctive racial type in California. Cities would have grown in time around the mines and around the harbor, and a separate Audiencia de California would have had to be established.

Of course, the deeper we look into the crystal ball, the dimmer the image gets, and I am conscious of the old adage that fools step in where angels fear to tread. I don't know how to appraise what the Russians might have done around Bodega and Fort Ross with such a powerful Spanish presence on the Bay. Most likely they would not have hunted otter on the Bay, and they probably would not have put in semi-permanent installations. Nor do I know how to appraise the larger and better-defended Spanish colony with respect to independence, local autonomy, American penetrations, or a Mexican war.

The actual population of California shortly after the time of independence from Spain was not much more than 20,000.[22] Some thousands of these were Indians; less than a hundred were priests or monks. Even by the 1840's the effective civilian population consisted of no more than a thousand or fifteen hundred families, of which only a few dozen were big land owners. Such a sparse group, dependent on their own limited military strength except for a handful of undermanned presidios, and already containing some dozens of Yankee sons-in-law, were no match for the military forces of the United States.

I am postulating in my scenario, given 160 years longer and much greater local production of wealth, a population in California of 300,000 to 500,000 at the time of independence from Spain, among whom would be

15,000 to 20,000 *Californio* families widely distributed over the central and southern part of the area of the present state. They would have been fully capable of raising their own armies and perhaps of providing them with locally manufactured arms and munitions. They could, in fact, have acted as a considerable counterpoise to English and American strength along the Atlantic Coast. One is entitled to wonder whether the ambitious young sons-in-law or the forces of the United States in the first half of the nineteenth century would have been able to take over; whether, in fact, a take-over attempt would have been made. The crystal ball gets dark, but I think there is the likelihood that California today would be an independent Latin American republic and that the lands of the contiguous United States on the Pacific would be confined largely to the former Oregon Territory.

Perhaps the moral of all this is that we should leave history well enough alone. If my scenario had materialized, we today in this spot would be in another country.

This paper was first read at the William A. Clark Memorial Library, Los Angeles, on May 12, 1979, at an all-day seminar devoted to Early California. In 1981 it was published by the Clark Library as part of the monograph *Early California: Perception and Reality*. It is reproduced here with permission of the Clark Library.

NOTES

1. Even today, when California has become the leading agicultural state in the United States, not a single crop native to the area plays a significant role in commercial production, either in California or anywhere else. Of course, timber trees, such as Douglas fir, which are gown on tree "farms" are excluded.

2. The formulation of a rational climatic classification and the delineation of generalized climatic distributions on an idealized continent had to wait until the late nineteenth and early twentieth centuries. The first explicit mention, to my knowledge, of the climatic similarities among California, central Chile, and southern France, and of analogous agricultural potential, was made by the great French explorer Lapérouse, who spent part of September 1786 in the Monterey area. His insight into the geographic relationships was given a material dimension when he gave the mission fathers at Carmel some potatoes he had brought from Chile. He felt they would do well in the light, rich soils around Monterey, and that this was perhaps not the least significant present he left behind. (Jean-François de Galup de Lapérouse, *Voyage de Lapérouse autour du monde pendant les années 1785, 1786, 1787, et 1788* [Paris: Club des libraires de France, 1965], pp. 161-163, 176.)

3. I am confining my considerations to Alta or Nueva California. The conquest of Central Chile was assigned to Pedro de Valdivia, one of the lieutenants of Francisco Pizarro. It was an operation to secure the southernmost outpost of the Inca Empire and to contain Araucanians. The reconnaissance of the California coast had originally been planned by Pedro de Alvarado, one of the lieutenants of Hernando Cortés, in the hope of finding fame and treasure in Cíbola or Quivira. When Alvarado, already in his mid-fifties died in the Mixton War in 1541, his ships were entrusted to his younger lieutenant Juan Rodriguez Cabrillo (a navigator of Portuguese birth then working for Spain) by the viceroy Mendoza, to be used for an exploring expedition up the California coast.

4. Only one other case of delayed development of a Mediterranean area comes to mind, that of south Australia, first seen by Europeans in the early seventeenth century and not settled until toward the end of the eighteenth. But the delay in this case was only about half as long, and discovery and ultimate settlement were carried on by different maritime powers.

5. W. S. W. Vaux, ed., *The World Encompassed by Sir Francis Drake*, The Hakluyt Society, 1st ser., no. 16 (London, 1854).

6. His idea that Asia and America came close together farther north was a felicitous guess, since no European had yet seen

the Bering Strait. There is also at least partial understanding that large land areas in high latitudes tend to be colder than adjacent water areas. The theory that lowlands near snow-covered uplands and mountains would be colder than other lowlands because of their proximity to the snow and ice held on well into the nineteenth century.

7. There is mention of treasure in the famous statement where Drake takes possession of the land in the name of the queen: "Wherefore, in the name and to the vse of her most excellent maiesty, he tooke the scepter, crowne, and dignity of the sayd countrie into his hand; wishing nothing more than it had layen so fitly for her maiesty to enjoy, as it was now her proper owne, and that the riches and treasures thereof (wherewith in the vpland countries it abounds) might with as great conueniency be transported, to the enriching of her kingdome here at home, as it is in plenty to be attained there. . . ." A variant account printed by Hakluyt even interpolates this sentence: "There is no part of earth here to bee taken up, wherein there is not some speciall likelihood of gold or silver. . . ." But there is nothing in the accounts to lead us to believe that Drake saw substantial "riches and treasures" among the Coast Miwok, or any evidence of the presence of gold or silver. The statements must be considered window dressing or wishful extensions to New Albion of mineral wealth known to exist many degrees farther south in Spanish realms. It must be admitted that California had not disclosed many of its potential attractions to Drake. The benign Mediterranean climate of which we have made much was not manifest in the "most uile, thicke, and stinking fogges" and the frigid winds that belabored Drake and his crew. The low coastal growth and wind-sheared shrubs around Point Reyes gave little promise of fertile tree-covered valleys in the interior. It is doubtful if Drake or any of his men ever saw a sequoia. And the Indians encountered were not impressive. They looked like savages, and that is precisely what they were from the point of view of the Elizabethans. They had no wealth that was recognizable as such in European eyes—no gold, no pearls, no precious stones. Had gold been a trade item between the Coast Miwok and the inhabitants of the future Mother Lode, Drake's and England's appraisal of New Albion would have been more enthusiastic and efforts to

maintain contact and possession might well have been more emphatic even in the absence of a Northwest Passage.

8. "*Virginia-Britania,* is a country in America; that lyeth betweene the degrees of 30. and 44. of the north latitude: . . . as for the West thereof the Limitts are vnknowne, only yt is supposed there be found the Discent into the South-Sea . . . and sure much about the height of our Bay, *Sir Francis Drake* his *Noua Albion* . . . is well conceyved to be, on the westsyde of vs, within that supposed South-Sea. . . .

   "It is a spacious and ample Tract of Land, from North to South, vpon a right lyne, yt may be 700. miles: from East to West in the narrowest place, supposed some 300. myles, and in other places 1000. . . ." (William Strachey, *The Historie of Travell into Virginia Britania (1612)* , ed. Louis B. Wright and Virginia Freund, The Hakluyt Society, 2d ser., no. 103 [London, 1953], pp. 31-32.)

9. For a further discussion see Henry J. Bruman, "Early Coconut Culture in Western Mexico," *Hispanic American Historical Review*, Vol. 25, No. 2 (1945), pp. 212-223.

10. To escape punishment they frequently went to remote areas in Mexico and sometimes joined Indian tribes. It was by escaped Filipino sailors that the manufacture of distilled liquors was introduced into Huichol culture and that the use of palm wine was brought to the Colima coast. (Cf. Henry J. Bruman, "The Asiatic Origin of the Huichol Still," *Geographical Review*, Vol. 34, No. 3 [1944], pp. 418-427.)

11. The tale is developed at length, utilizing the relevant documents, in W. Michael Mathes, *Vizcaíno and Spanish Expansion in the Pacific Ocean, 1580-1630* (San Francisco: California Historical Society, 1968).

12. Alexander von Humboldt, whose relationship to British scholarship was at times rather cool, and who in his diplomatic duties for the king of Prussia sometimes saw cause to distrust British political motives, takes the position that Drake and England had at best only a weak claim to New Albion between 38° and 43° N, since that coast had been discovered by Cabrillo and Ferrelo for Spain more than a generation earlier. The most England could claim by right of discovery based on Drake's voyage was the strip from 43° to 48° N. "D'après des données historiques certaines, la dénomination de

Nouvelle-Albion devroit être restreinte à la partie de la côte qui s'étend depuis les 43° aux 48°. . . ." (Alexander von Humboldt, *Essai politique sur le royaume de la Nouvelle-Espagne*, 8° ed. [Paris; F. Schoell, 1811], 2:437.) The contrary English position is discussed in John T. Juricek, "English Territorial Claims in North America under Elizabeth and the Early Stuarts," *Terrae Incognitae*, Vol. 7 (1976), pp. 7-22. Humboldt's point of view is fully supported by the German historian Georg Friederici, whose great work on the discovery and conquest of America has not been fully appreciated by non-German scholars. In fact the latter declares that Spain's accomplishment in discovering and to a degree settling the coasts from Florida around the Gulf of Mexico and the Caribbean, again from south of Brazil to the tip of South America, and on the Pacific with but minor exceptions the entire stretch from farthest south to 55° N represents in its totality the greatest geographical accomplishment in scope, content, and significance for world history that any people can point to. (Georg Friederici, *Der Charakter der Entdeckung und Eroberung Amerikas durch die Europäer*, 3 Vols. [1925-1936; reprint ed., Osnabrück, Otto Zeller, 1969], Vol. 1, pp. 347-356.) He is actually conservative in setting the limit at 55° N. There is evidence in the log of navigation that the schooner *Sonora* under the command of Juan Francisco de la Bodega y Quadra reached almost 58° on 22 August 1775, more than a year before Cook on his third expedition reached these and higher latitudes (*Colección de diarios y relaciones para la historia de los viajes y descubrimientos* [Madrid: Instituto Histórico de Marina, 1943], Vol. 2, pp. 102-133+, Table for August 1775 and Lámina 4.)

13. Bartolomé Leonardo de Argensola, Conqvista de las Islas Malvcas (Madrid, 1609), p. 9: "[Las Malucas] son agradables a la vista, pero no sanas, y menos para los estraños, todos los quales estan sugetos a la enfermedad Berber, comun en aquella tierra. Hincha los cuerpos, inhabilita los miembros; pero con el clauo y vino de las Filipinas beuido con gingibre, ò con el vso de cierta yerua, conocida de los naturales, se preseruã, y se curã; y los Holãdeses cõ çumo de limones, remedio hallado por el temor, y por la experiencia."

14. Humboldt, *Essai politique*, Vol. 2, pp. 449-450 (my translation). Galiano, a former officer of Malaspina, was captain of the schooner *Sutil* which along with the *Mexicana* explored

the north Pacific in 1792 and accomplished the first circumnavigation of Vancouver Island.

15. Three of the more useful recent items for a study of the Russian presence in California are: James R. Gibson, *Imperial Russia in Frontier America: The Changing Geography of Russian America, 1784-1867* (New York: Oxford University Press, 1976); Kyrill T. Khlebnikov, *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832* , trans. Basil Dmytryshyn and E. A. P. Crownhart-Vaughan (Portland, Oreg.: Oregon Historical Society, 1976); and Gottfried Pfeifer, "Frontera del Norte Kaliforniens, 1800-1846: Russen, Spanier, und Angelsachsen," *Tübinger Geographische Studien*, Heft 34, Sonderband 3 (1970), pp. 255-278.

16. "Über die Abtretung Californiens an Russland," *Neue Geographische Ephemeriden*, Vol. 6, No. 4 (Weimar, 1819), pp. 476-477. I do not wish to make too much of this episode because the degree of reality behind these rumors appears to be uncertain even now. It may be that historians have not yet studied the relevant archival materials. However, in the same year the following prescient comment appears in a book devoted to the new lands along the Ohio and Mississippi rivers: "We think it will not be romantic to predict that the period is not far distant when the United States and the potent empire of Russia will be the two great master nations of the world. If the extensive coast of California be ceded to the latter, we may, perhaps, without being taken for maniacs, hazard an opinion, that the people of this western region will eventually be compelled to defend themselves against the encroachments of that gigantic power. Should this event happen after a disunion, how bitterly would posterity curse those progenitors who effected it! But we will not anticipate so disastrous an event." (Edmund Dana, *Geographical Sketches on the Western Country: Designed for Emigrants and Settlers* [Cincinnati: Looker, Reynolds & Co., 1819], p. 62.)

17. A last effort was made by Governor Wrangell in the 1830's to acquire lands for the company in the area north of the bay and west of the Sacramento River, but the best lands near the San Rafael and Sonoma missions were being rapidly converted into ranchos and sold by Mexican authorities, in part to forestall Russian designs. When Wrangell failed, the company decided to abandon California.

18. The American claim extending California to the Rockies appears to have been more the result of an innocent cartographic error committed some years earlier in England than a tactical psychological pressure play. In the late 1830's the English cartographer John Arrowsmith prepared a map to accompany the rare first edition of Forbes's *California: A History of Upper and Lower California from Their First Discovery to the Present Time* (London: Smith, Elder & Co., 1839). This map, entitled "The Coasts of Guatimala and Mexico from Panama to Cape Mendocino with the Principal Harbours of California. 1839," shows Upper or New California extending eastward through the entire drainage basin of the Colorado River to the continental divide, including even some areas south of the Gila River that had been part of Sonora for two hundred years. According to the preface, Alexander Forbes remained in Mexico while his brother John saw the manuscript through the press. Thus the map was undoubtedly prepared and published without revision by the author.

Where did Arrowsmith get his notion about the longitudinal extent of California? There appear to be no precedents for his version, either in Spanish or Jesuit maps or in those of Alexander von Humboldt, many of which would have been available to him at the Royal Geographical Society. The answer may lie in an ambiguity in the Forbes text itself. In part 2, chapter 3, Forbes says:

> The part of Upper California at present occupied by the missions and settlers is about five hundred English miles in length, and the breadth from the sea to the first range of hills may be stated at an average of forty miles, which will give an area of twenty thousand square miles and about thirteen millions of English statute acres. This however is but a small part of Upper California, as the whole country extending to the Rio Colorado, and to an undefined limit northward, is included in its territory. . . . The whole extent of Upper California properly so called presents a superficies equal to many of the most extensive and powerful kingdoms of Europe.

Such a statement, in the absence of more specific data, could perhaps be given cartographic expression in the expansive way Arrowsmith adopted, although Forbes does not say that California extends to the Colorado along its entire length, let alone that it includes the whole drainage basin, and it is

clear from the text that he is getting most of his topographic information from the journal of the Garcés expedition of 1775, which traversed the region between Sonora and southern California. When he takes California all the way to the Colorado River, he is referring to southern California only.

But Arrowsmith's published map was to have a strong influence on conceptions of California in the United States in the 1840's. The idea that California began at the Rocky Mountains fitted well into the contemporary geopolitical thrust of the young republic. John C. Fremont accepts the name California for the country west of the continental divide in his *Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the Years 1843-'44* (Washington, 1845). Perhaps following his lead, perhaps relying directly on the Arrowsmith map, several United states map makers in the early and mid 1840's adopt this usage. They are listed and discussed in Carl I. Wheat, *Mapping the Transmississippi West, 1540-1861*, 5 Vols. in 6 (San Francisco: Institute of Historical Cartography, 1957-1963), Vol. 2, pp. 179-184, Vol. 3, pp. 35-37, 81-87.

On the fine map of Oregon and Upper California drawn by Charles Preuss to accompany Fremont's *Geographical Memoir upon Upper California, in Illustration of His Map of Oregon and California* (Washington, 1848), California is shown extending eastward almost to the Rio Grande (called Rio del Norte). In the *Memoir* itself Fremont divides California into the Great Basin, the Sierra Nevada, and the "Maritime Region West of the Sierra Nevada," adding the telling remark (p. 12) that the latter is "the only part to which the name applies in the current language of the country."

That comment makes explicit that the extension of the name California to lands east of the Sierra rests on a conceptual error. And yet, the fact that the term was commonly so used in the 1840's by educated Americans exonerates them from potential charges of perfidy in their reliance on the Disturnell map at the Treaty of Guadalupe Hidalgo.

I thank my friend Neal Harlow for expanding my knowledge of the cartographic literature on California in the 1830's and 1840's. This note is a direct result of his generous suggestion, although responsibility for the conclusions is mine alone.

19. I know many historians frown on this sort of thing as not being scholarly, and they may well be right. But in the hospitable halls of the Clark Library, where Clio, the Muse of History, must share her place on a basis of equality with the other eight, perhaps I can be forgiven.

20. Sailing ships in the seventeenth century should have had no great difficulty traversing the major channels of the delta or penetrating the lower Sacramento, just as they did not in South America when ascending the Paraná to Asunción.

21. The ancient rule of thumb among Spanish miners, coming straight out of astrology, that silver is the metal of the moon and to be found in high, cold places, whereas gold is the metal of the sun, to be found in low, hot places, would have been corroborated once again.

22. I am not including in this estimate the "wild" Indians in the remoter parts of the present state, but I do include the Indian population in the effective part of Spanish/Mexican California, which as Humboldt points out, was essentially a coastal strip from San Diego to San Francisco with a width of about ten leagues.

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RECENT INTRASTATE NET MIGRATION FLOWS OF THE ELDERLY IN CALIFORNIA

*Richard K. Ormrod**

Intrastate movement of the elderly has received little attention in migration literature.[1] Yet, such movements are important, for most elderly migrants relocate within their state of origin.[2] This study, utilizing data from the Bureau of the Census' public use microdata sample, explores what has been a neglected scale of migration through a reconstruction of California's major internal streams of elderly net migration for the period from 1975 to 1980.

Most studies of elderly migration flows have focused on interstate movements.[3] This situation exists primarily because, as Bohland and Treps have noted, origin/destination data collected by the census have been published only at the state or census region level.[4] As they further note, however, reliance upon these published data sources ensures continuing ignorance of major aspects of elderly migration systems. Such ignorance limits the ability of local communities to anticipate and plan for important shifts in their population structures, which, in turn, trigger shifts in tax bases and consumer patterns, as well as in demands for housing and social services. Many

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California communities, in particular, face major, potential elderly migration impacts because this state has more elderly persons than any other.

Data Base and Methodology

The data used to identify the migration streams are a 2.5 percent sample of individual responses to census questionnaire items. This information is found in unpublished form on computer-readable magnetic tapes at the California Census Data Center (Sacramento), which holds the public access copy of the state's public use microdata sample. The data tabulation unit used by the Bureau of the Census for this sample does limit the spatial detail available to researchers, since only counties of 100,000 population are reported individually. Smaller counties are lumped together into county groups, which function as additional data units. In the case of California, this pattern of aggregation does not create a major problem because many of the state's counties meet the minimum size criterion. Aggregation reduced the available data units from an initial fifty-eight counties for the state to thirty-six counties and county groups, a number considered to be adequate for capturing the main dimensions of the intrastate migration system.

The specific questionnaire item which produced information on migration streams reports a county resident's place-of-residence at a date five years previously. Although these data allow identification of a move from one location to another, they do suffer some shortcomings as a source of migration information. In particular, critics have noted that (1) multiple moves within the five-year period are not identified, (2) persons who moved within the five-year period but died before the census are not counted, and (3) data do not include institutionalized per-

sons.[5] As a consequence under-reporting occurs. Nevertheless, as the purpose of this study was not to project numbers of migrants, but rather to identify the major streams of net movement, these data were considered adequate. Estimates of the relative value of flows are considered reliable.

Data on all intrastate movements of sample respondents age sixty-five years and older were obtained through a request to the California Census Data Center. They were inserted into a 36-by-36 cell matrix summarizing the flows from each county or county group to all other counties or county groups and then converted to net migration values. Although the movement of elderly migrants can be specified by this matrix, an analysis of all intrastate flows between all counties and county groups would produce a complex and confusing spatial pattern. In this study, a reduction has been sought by focusing on the state's primary out-migration sources and on the migration streams which linked those sources to specific destinations. In this way the major migration streams which account for the bulk of California's recent elderly net migration can be isolated. Net migration patterns, rather than gross migration patterns, are described because they identify the resultant population shifts brought about by the overall movement.

Net Migration Patterns

The major in-state sources and destinations of elderly migrants were determined by examining each data unit's overall migration balance. The spatial patterning of the leading in- and out-migration centers suggests a strong flow of elderly migrants from north to south in the state, as most of the major net out-migration units are found in northern California and most of the major net in-

migration units are located in the far south. An important exception to this apparently simple regional pattern is the presence of the foremost net out-migration unit, Los Angeles County, in southern California. Furthermore, the fact that the two leading net out-migration counties are Los Angeles County and San Francisco County, respectively, suggests that there is also an important urban dimension to the migration pattern.

The spatial patterning of the state's net out-migration counties and county groups suggests that three primary source regions can be identified. The first of these is Los Angeles County, a highly urbanized, relatively densely populated county that, by itself, produced 35 percent of the state's elderly net out-migrants (Figure 1). The second source region consists of San Francisco and Alameda Counties, which constitute the older, urban core of California's Bay Area metropolitan cluster (Figure 2). This region produced 15 percent of the state's elderly net out-migrants. The third important source region is composed of nearly all the counties and county groups located in the northern third of the state (Figure 3). With the exception of Sacramento County, members of this regional grouping are either smaller metropolitan or nonmetropolitan counties. This region contributed 29 percent of the state's elderly net out-migrants. Altogether these three source regions account for 79 percent of the total intrastate net migration identified by the sample.

The net migration which occurred between each of these primary source regions and remaining counties and county groups was calculated from the migration matrix described above, and the major destinations associated with each source region were identified. A major destination was considered to be any county or county group which received at least 3 percent of a source region's total

net out-migration. A 3 percent threshold ensures that only the upper half (or less) of the destinations for each source are identified, focusing attention on the major flows.

In each case, when the major destinations and the associated net migration volumes were mapped, clear-cut out-migration fields were apparent. The great majority of Los Angeles County net out-migrants remained in southern California, moving to nearby suburban counties (Figure 1). Southern counties captured over 90 percent of this source's net out-migration. The pattern for the San Francisco-Alameda source region was a bit more complex (Figure 2). As was the case with Los Angeles County, the bulk of the net out-migrants moved to nearby counties with growing suburban communities. A significant minority, however, abandoned the local metropolitan region and moved considerable distances to destinations in southern California. About 67 percent of the source region's net out-migrants relocated to Bay Area destinations, while an additional 20 percent went south. In contrast to the Los Angeles and San Francisco-Alameda source areas, the out-migration field of the northern source region was dominated by long-distance movement (Figure 3). The majority of its net out-migrants, 81 percent, relocated in southern California.

Discussion of Findings

It is clear from this reconstruction of California's major internal elderly migration flows that two spatial trends were dominant during the study period: (1) a "Sunbelt"-type stream, as many elderly left northern counties and resettled in the far south, and (2) a net outward movement within the state's two major metropolitan regions, as many elderly left the older urban cores and

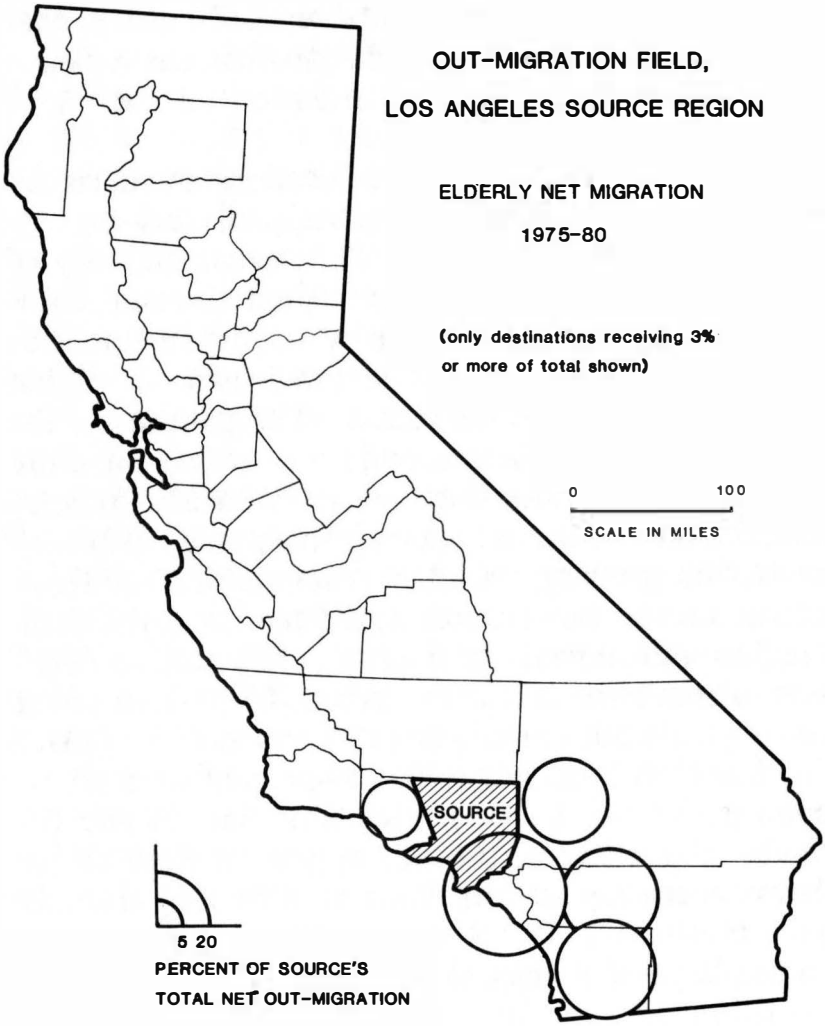

Figure 1

relocated in suburban counties. These intrastate flows closely parallel and mirror trends reported at the national scale.

The Sunbelt bias of much of the migration of the elderly at the national level is well-known and has been

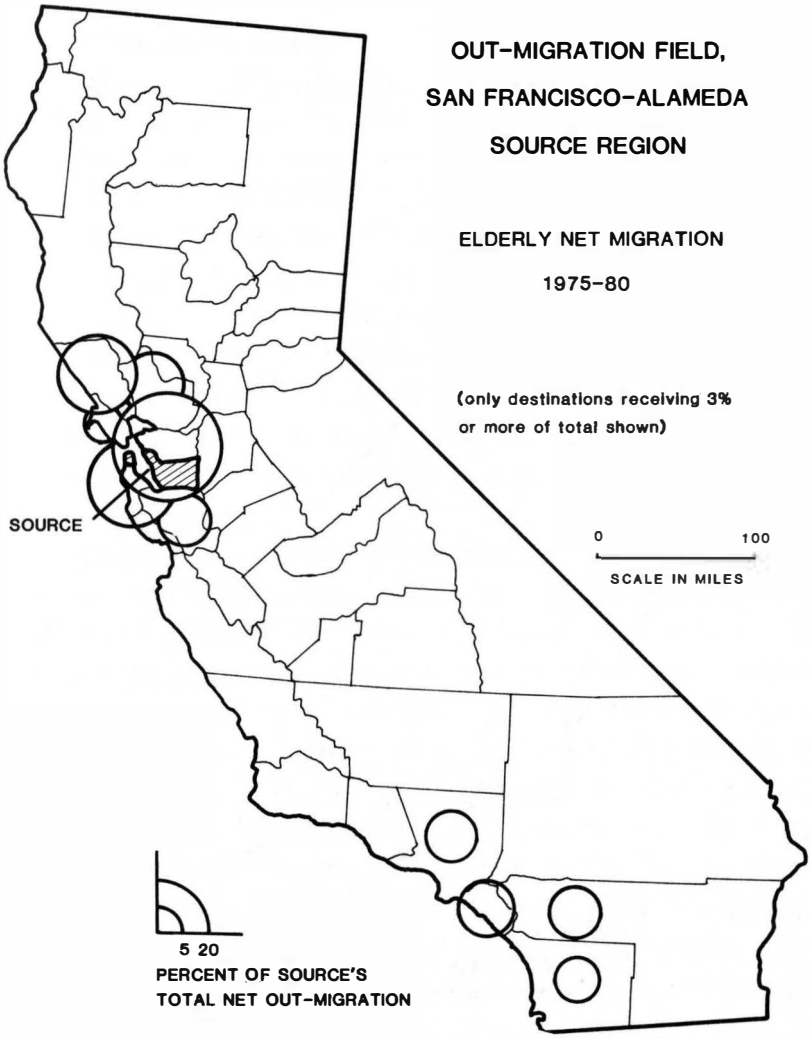

Figure 2

documented.[6] For example, Biggar found that, between 1965 and 1970, 58.2 percent of all elderly interstate migrants were bound for Sunbelt states.[7] In the case of California, 79 percent of the elderly net migrants from the three primary source regions resettled in southern coun-

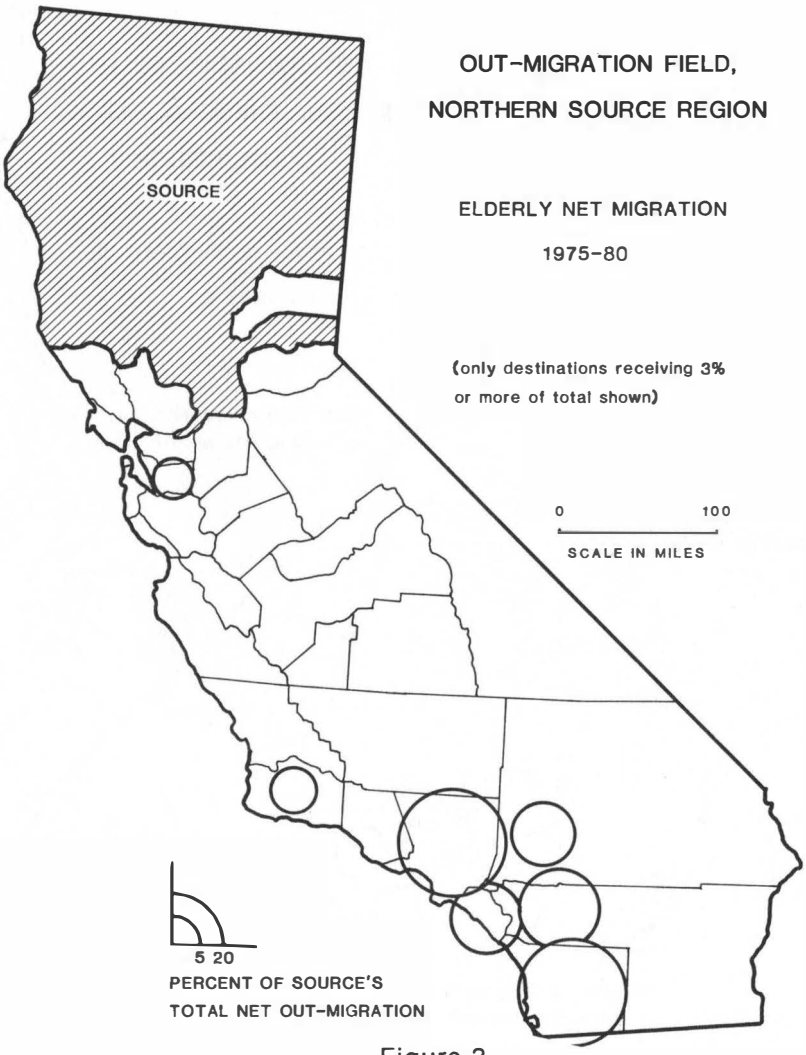

Figure 3

ties, that is, in warmer, "Sunbelt" locations. Of course, the significance of this state figure is somewhat confounded by the fact that one of the source regions is, itself, in the south. Nevertheless, when only the two northern source regions are considered, it is noteworthy

that 61 percent of their net out-migrants were southward bound.

This southern flow is congruent with data from several Bureau of the Census Annual Housing Surveys which report "wanting a change of climate" as a reason for moving often specified by elderly migrants.[8] A composite total of 39 percent of respondents to those surveys gave "change of climate" as their primary reason for moving, which made it the second ranking reason, following "to be closer to relative," reported by 43 percent. Although the surveys focused on interstate migrants, it seems reasonable to expect climate-oriented intrastate migration within states which possess their own areas of climatic contrast.

The general migration of elderly to the suburbs and beyond at the national level is also well documented.[9] For example, this trend has been effectively described by Golant, using aggregate census data on previous place of residence, by residential category, for elderly movers for the 1970-75 period.[10] He demonstrated that the dominant pattern of residential category change for the nation's elderly was from central city locations to suburban and nonmetropolitan locations. Furthermore, he found that a large majority of elderly movers remained within the same metropolitan region. Clearly, the net out-migration systems of the Los Angeles and San Francisco-Alameda source regions mirror this dominant national pattern. Presumably, they also reflect the effects of the same "push" and "pull" factors Golant identified as important in shaping the national urban decentralization pattern, including, among other factors, unacceptable social changes occurring in central cities, perceptions of central cities as unsafe locations, problems of maintaining the older structures prevalent in central cities, perceptions of suburbs as

safer and less congested, and the high probability that one's children or other relatives will be in the nearby suburbs.[11]

It is not clear which of the two trends was dominant within California. Strictly speaking, there were more intrastate elderly migrants moving from city to suburbs than from north to south. As noted above, however, the southern location of Los Angeles County eliminates any potential for a clearly identifiable Sunbelt migration stream from that source region. It seems likely that many of Los Angeles County's elderly out-migrants were encouraged to stay within the metropolitan region because of its warmer climate. Thus, simply dividing the state's elderly migrants into an urban-to-suburbs stream and a Sunbelt stream, and then comparing the relative numbers found in each, is likely to be misleading. In fact, comparison of net out-migration rates for the three source regions indicates that migrants leaving the northern source region were the ones most strongly motivated to move; and most of them went south. Specifically, the northern source region had a net out-migration rate, based on the public use microdata sample, of thirty-two per thousand elderly in the base population, compared to rates of sixteen per thousand and thirteen per thousand for the San Francisco-Alameda and Los Angeles source regions respectively. It thus appears that within California, the Sunbelt exerts a stronger pull than do the suburbs.

In any case, there is a concentration of elderly net migration flows into and out of a limited set of California counties, with a consequent concentration of local impacts. The potential local effects of elderly in- or out-migration are diverse, ranging from increases in basic income via transfer payments to retirees, to increases in

demands for social services. It is generally assumed that an increased elderly population means greater social service consumption, although Crown has shown that in some situations elderly in-migrants generate more income than costs.[12] On the other hand, selective out-migration of affluent elderly may undercut local tax bases. The local nature of impacts will depend on the number of migrants, their characteristics, and the direction of net movement. This study has not attempted to specify those migration impacts, but it has identified the places in California most likely to feel their weight.

This reconstruction of intrastate net migration flows of elderly persons has permitted a look at a scale of events which has been very little studied. Nevertheless, it is noteworthy that California's experience closely mirrors the dominant national patterns, with major migrant streams apparently reflecting strong desires for improved comfort, increased access to amenities, and an overall enhancement of the quality of life.[13] In California, these goals are being sought in the nearby suburbs or in suburban environments in the state's warmer, southern region, producing net shifts in elderly population to those locations.

NOTES

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12. T. O. Graff and R. F. Wiseman, "Changing Concentrations of Older Americans," *The Geographical Review*, Vol. 68 (1978), pp. 379-393, p. 380; Golant, 1979, op. cit., footnote 5, p. 37; S. L. Barsby and D. R. Cox, *Interstate Migration of the Elderly* (Lexington, Mass.: Lexington Books, 1975), preface; R. Perlman, "Social Services and Population Redistribution," in B. J. L. Berry and L. P. Silverman, eds., *Population Redistribution and Public Policy* (Washington, D.C.: National Academy of Sciences, 1980), pp. 228-252,

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LAND-USE CONFLICT IN THE KINGS RIVER CANYONS

*Lary M. Dilsaver**

The battle for Hetch Hetchy, on the Tuolumne River, is a well-known story in California conservation history. The struggle over this canyon, within the established boundaries of Yosemite National Park, took place between a thirsty City of San Francisco and a fledgling preservation movement. The combatants for San Francisco included engineers, civic officials, and men for whom pragmatic use of frontier resources was both common and correct. Opposing them were John Muir, his Sierra Club, and those who espoused the burgeoning public ideal of wilderness protection. In 1913, after a short and sharp conflict, Muir's forces lost this battle. Today, nearly three-quarters of a century later, the loss is still bemoaned by preservationists.[1]

Approximately 100 miles to the south of Hetch Hetchy, another conflict took place over two equally spectacular canyons on the Kings River. On the Middle Fork, Tehipite Valley is a spectacular gorge, lined by towering,

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granite cliffs and glacially-scoured domes (Figure 1). Waterfalls, lush meadows, and the turbulent river add a majesty which led John Muir to compare Tehipite favorably with the more famous Yosemite Valley.[2] The South Fork of the Kings River passes through miles of rocky gaps which widen into another Yosemite-like canyon known as Cedar Grove, after its only area of development. It, too, is marked by towering vertical cliffs, a flat, partially-forested floor, and numerous examples of glacial scouring and deposition (Figure 2).

The conflict for Tehipite Valley and Cedar Grove embroiled a host of contestants with widely varied and incompatible plans. The City of Los Angeles, San Joaquin Valley irrigation interests, recreation developers, the National Forest Service, and the National Park Service competed for the canyons for more than six decades. The intent of this paper is to outline the major elements of that conflict, to demonstrate how the uncertainty and variety of threats to the canyons froze development by all parties, and, finally, to show that this state of confusion persisted long enough for a public spirit to arise which favored minimum development and the retention of pristine conditions

Early Conflicts over Land Use

From the late nineteenth century until 1935, each interest group attempted to implement its plans. As early as 1902 engineers published scientific reports on the water storage potential of the Kings River.[3] These led the Fresno Irrigation District and other local water agencies to convene meetings in an effort to determine the best manner of water collection and use. In addition, the river's potential for power generation was noted, partic-

Figure 1. Tehipite Valley on the Middle Fork of the Kings River. Source: Sequoia National Park Photo Collection.

ulary in a 1919 investigation by the Los Angeles Bureau of Power and Light. In June, 1920, the Federal Power Act spurred action by creating a commission to be headed by the Secretaries of Agriculture, Interior, and War. They were invested with the power to license water and power projects in national forests and on other government lands. A few months later, the City of Los Angeles proposed an elaborate plan to control the Kings River. The plan called for principal units to be constructed at Cedar Grove and Tehipite Valley, with subsidiary units on tributaries above the canyons and on the main channel below[4] (Figure 3). The new Federal Power Commission took the plan under study, and Los Angeles prepared to fight the expected opponents. Los Angeles did not have

Figure 2. View of the eastern end of the canyon of the South Fork, Kings River, often called Cedar Grove after its only developed area further west. Source: Sequoia National Park Photo Collection.

long to wait. San Joaquin Valley residents, in particular, were angered at this territorial intrusion and feared that their area might become another parched Owens Valley. Before the Federal Power Commission was entirely sure of its duties and limits, the San Joaquin Light and Power Corporation filed a proposal for the same sites on behalf of local interests.[5]

The National Forest Service watched the growing water and power controversy with interest and considerable detachment. Acting upon its philosophy of multiple-use, in 1933 the Forest Service began plans to develop a resort complex at Cedar Grove and blast a road through to Tehipite Valley for possible later develop-

ment. Local businessmen and civic officials quickly joined in promoting these potentially lucrative projects. One plan, authored by a Forest Service landscape architect, envisioned replacing the miserable nineteenth-century camp at Cedar Grove with a 600-acre complex, including 500 campsites, up to six resort hotels, several stores and service centers, access roads from three directions, and even an airstrip.[6] Other Forest Service proposals were more modest, but all planned Cedar Grove to be a model, large-scale resort exemplifying the superiority of Forest Service recreation management.[7]

Meanwhile, from 1881 through the late 1920's, in order to protect the Kings River drainage and the two

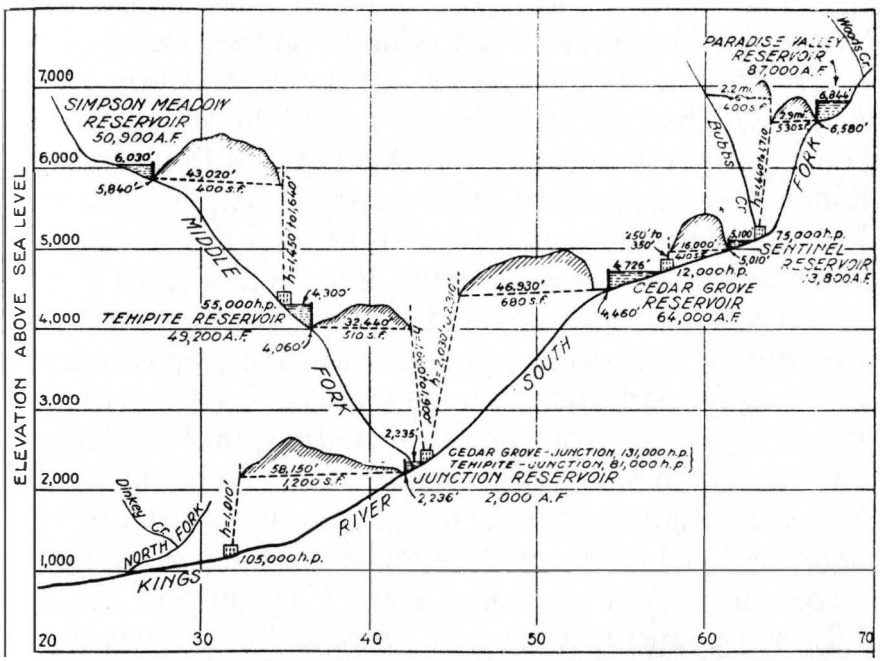

Figure 3. Diagram of potential power developments on the Kings River Middle and South Forks as proposed by Los Angeles. Source: Randall, 1930.

canyons, congressmen representing preservation groups and the National Park Service made frequent attempts either to establish a new park or to enlarge nearby Sequoia National Park. The two most serious of these efforts culminated in the creation of Sequoia and General Grant National Parks in 1890 (Figure 4) and in the enlargement of Sequoia National Park in 1926. Each of these proposals actually began several years earlier, and agitation by preservationists and other supporters kept the Kings River watershed in the public eye on a consistent basis.[8]

The result of these conflicting proposals was an atmosphere of such confusion and desperate antagonism that most politicians and government officials not directly representing one of the groups avoided the controversy. Hence, the Federal Power Commission took nearly three years before it rejected the 1920 power application of Los Angeles. The City immediately refiled, however, and the controversy continued.[9] Repeated efforts to include the Kings River watershed in an enlarged Sequoia National Park clouded the issue when the Federal Power Act was amended to exclude National Park lands from power development. Many concluded that if the Federal Power Commission approved a project while the area was under proposal for park status, the ultimate achievement of such status would suspend project construction.[10] Congress also found the Kings River controversy too hot to handle. The campaign to enlarge Sequoia was extremely well organized and engineered, lasted seven long years, and in 1926 succeeded in adding Kern Canyon and the Mt. Whitney country to the park (Figure 5). However, the original proposal which included all the Kings River watershed proved too controversial. Faced with fierce local opposition on the grounds of potential water and

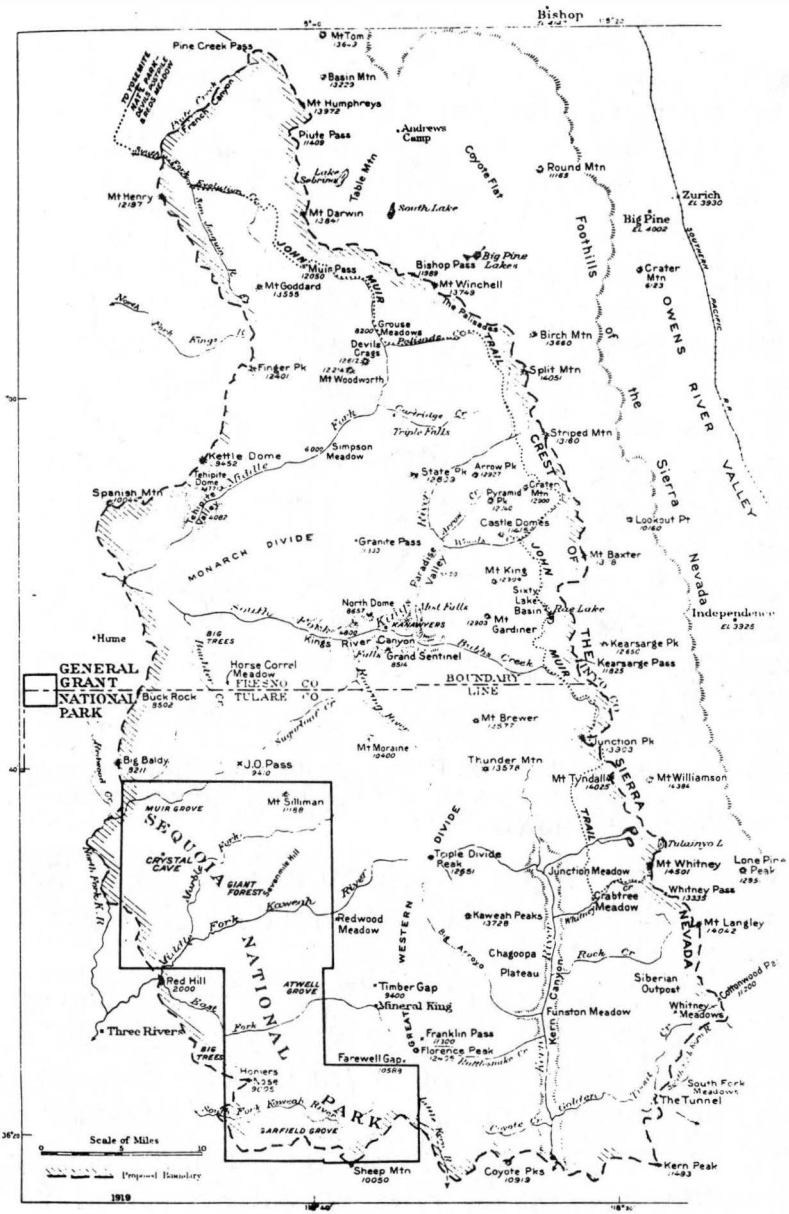

Figure 4. Map showing Sequoia and General Grant National Parks, as established in 1890, and the area proposed for a larger Roosevelt-Sequoia National Park in 1921. Both forks of the Kings River were to be included. Source: National Park Service Bulletin, 1922.

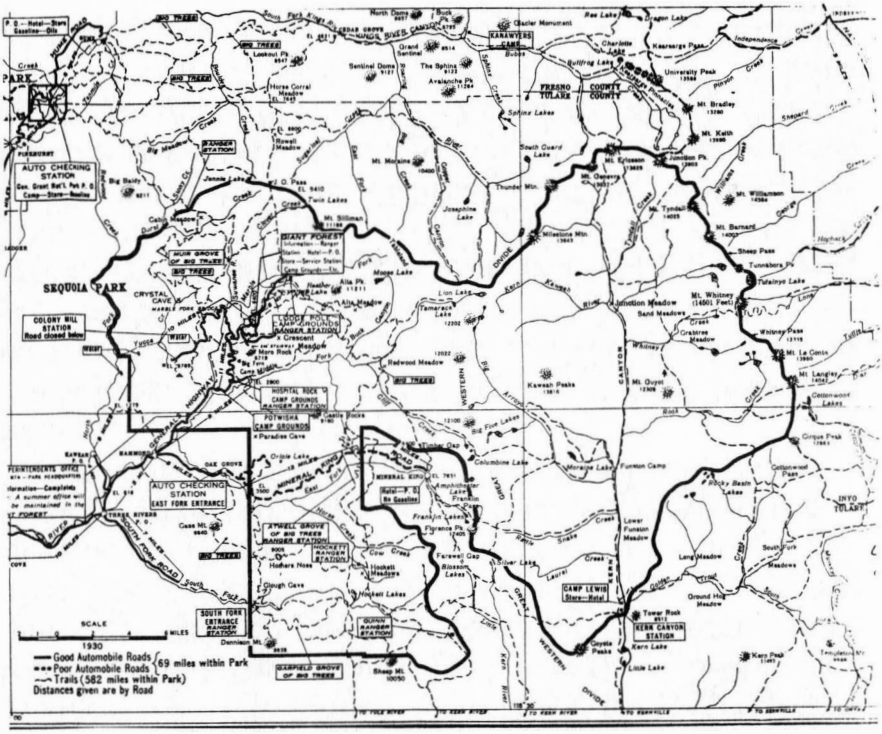

Figure 5. Sequoia National Park after the addition in 1926 of Kern Canyon and the Mt. Whitney area. Source: National Park Service Bulletin, 1935.

power needs and the perception that the Forest Service would encourage greater commercial development, Congress excluded the entire region.[11]

By 1930, a harried Federal Power Commission organized its own water resource survey. Although water storage and power potentials for the two canyons were slight in comparison to areas outside the proposed parkland, survey engineers made no recommendations.[12] Recreation developers, however, quickly seized the figures to show the illogic and waste inherent in any project that would flood Cedar Grove and Tehipite Valley. They suggested that it would be far more economical, and preferable, to build a dam on the lower Kings River at a

foothills site known as Pine Flat, and thus save the canyons for recreation.[13]

The Forest Service, which actually administered the land through this time, exercised considerable caution in implementing its plans. The threat of inundation forestalled their grand construction plans in Cedar Grove. An additional threat came in the form of the possible loss of the area to the National Park Service. Over the years, a deep philosophical division had developed between the two government agencies. Forest Service personnel were convinced that their multiple-use policy was inherently superior to the Park Service's "single purpose" approach, which the foresters believed entailed strict preservation.[14] The Park Service, on the other hand, regarded many of the Forest Service's plans as environmentally irresponsible, or at least unsuitable for areas of great natural beauty. Curiously, this conflict was stronger at the local and regional levels than at the national level, and it was a powerful issue in California development as well as in the behavior of both agencies.[15]

With these concerns foremost, the Forest Service was content to engage in the slow, but steady, construction of a paved road from the edge of General Grant National Park to Cedar Grove. In the canyon, four campgrounds and a tiny ranger station were established. Tehipite Valley road plans became part of an enlarged campaign to build a high-elevation highway from Kern County in the south to Lassen Volcanic National Park in the north. The Tehipite plan foundered, however, when the construction of this "Sierra Way" proved too expensive.[16]

The Creation of Kings Canyon National Park

The year 1935 marked one of the turning points in the history of the watershed and the two canyons of the Kings

River. Secretary of Interior Harold Ickes entered the conflict and proposed a bill to create Kings Canyon National Park and, further, to make it a wilderness preserve. While horse trails, footpaths, controlled use by commercial packers, and camping were to be encouraged, roads, hotels and other large-scale developments would be banned.[17] The Secretary had become interested in the Hetch Hetchy conflict many years earlier and, subsequently, through his friendship with National Park Service Director Stephen Mather, taken an interest in wilderness preservation. Ickes had a powerful influence on President Roosevelt, and his sudden appearance in the conflict alarmed most of the contestants.[18] Opponents and proponents of park status were surprised when, at the urging of Ickes, a previously disinterested Senator Hiram Johnson of California introduced the "Wilderness Park" bill in 1935. A storm of protest followed as most local irrigation interests, power claimants, recreation developers, and Forest Service representatives opposed the bill. Regional Forester S. B. Show later described Ickes as "overambitious, ignorant, egocentric, ruthless, unethical and highly effective."[19] Whatever the truth of these allegations, by dangling certain lures and, according to Show, illegally undermining his opponents, in 1940 Ickes hammered out a compromise with Fresno-area farmers and other San Joaquin Valley residents which allowed creation of Kings Canyon National Park.

Although Los Angeles suspended its vigorous assault for the canyons after the completion of Hoover Dam on the Colorado River, local citizens continued to regard the big metropolis as a threat to their water and power, indeed, to their very survival. Accordingly, they set three conditions for their support of the park bill. First, they demanded that their immediate water needs be met. As

Secretary of Interior, Ickes also controlled the Bureau of Reclamation and thus was in a position to promise that other water development projects would be guaranteed. Chief among them was the large, flood and irrigation structure at Pine Flat (Figure 6). Ultimately, this dam would contain 67 percent of the total annual flow of the Kings River. In addition, projects on the North Fork of the Kings River, outside the proposed park, would be sanctioned.[20]

In addition to satisfaction of their immediate needs, the local irrigationists demanded that Cedar Grove and

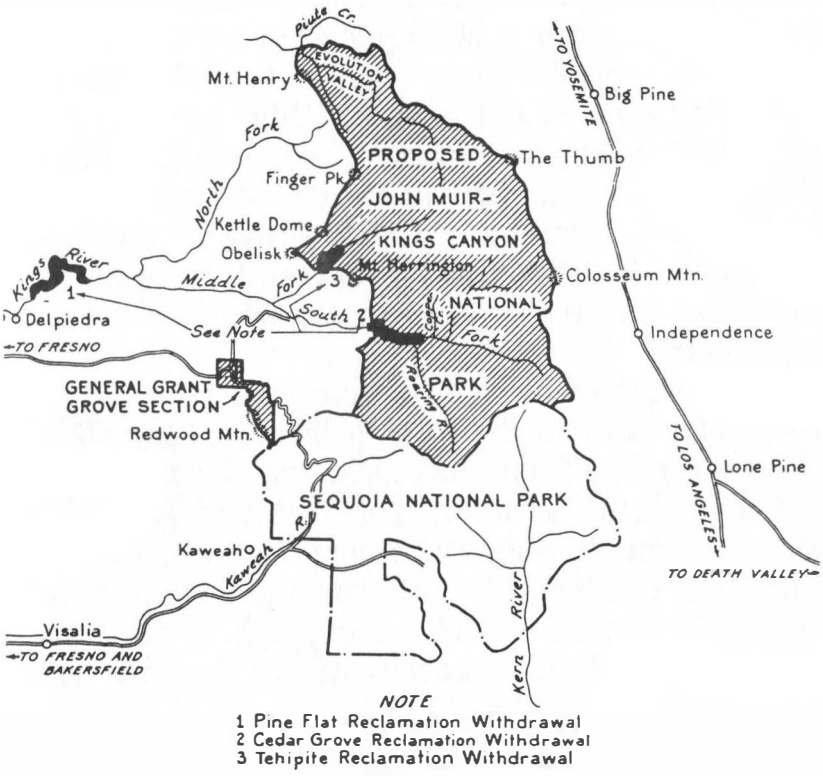

Figure 6. The reclamation withdrawals demanded by local irrigationists in 1939, including (1) Pine Flat, (2) Cedar Grove, and (3) Tehipite Valley. Source: Bureau of Reclamation, 1939.

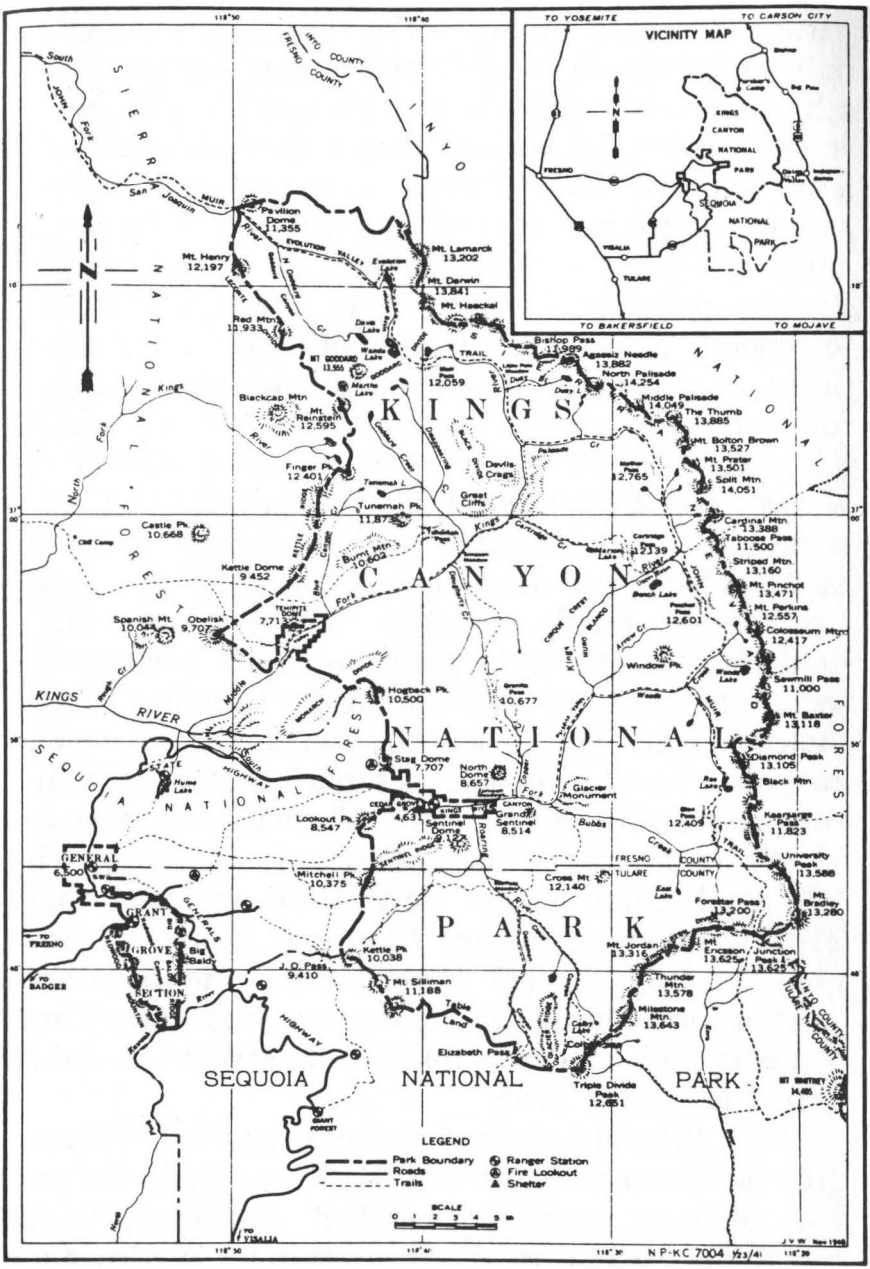

Figure 7. Kings Canyon National Park as founded in 1940 excluding Cedar Grove and Tehipite Valley. Source: National Park Service Bulletin, 1940.

parties, launched another series of attempts to dam not only Cedar Grove and Tehipiti Valley, but also several other sites within the new park (Figure 8). The purpose, stated to both the Federal Power Commission and the State Board of Water Resources, was to generate necessary power for booming urban expansion.[24] Once again anger and panic rocked San Joaquin Valley residents. Rumors spread that Los Angeles wanted to build the dams to generate power that it did not need, but could sell at a profit. Another story accused Los Angeles of planning a fourteen-mile tunnel below the Sierra Nevada to deliver Kings River water to its Owens River Aqueduct.[25] The Kings River Conservation district quickly filed for the same sites, but confided to the Park Service that it only meant to block Los Angeles.[26] As the 1950's progressed, Los Angeles finally withdrew from the battle, but not until after the Federal Power Commission summarily rejected its claims to sites within the National Park and indicated a favorable response to local claims for the two canyons. Local irrigationists further benefitted from the completion of Courtwright and Wishon Dams in the early 1960's by the Pacific Gas and Electric Company. These two small dams on the North Fork provided another 250,000 acre feet, or some 18 percent of average annual flow, for irrigation and power needs. Hence, a subsequent effort to bring the two canyons into Kings Canyon National Park met only token local resistance and succeeded in August, 1965.

Thus, the water and power needs specified in the compromise between Ickes and the Kings River irrigation interests were eventually satisfied. However, the third part of the agreement, development of Cedar Grove tourist facilities, proved to be a problem. The unusual status of the valley created an imposing threat to any recreation

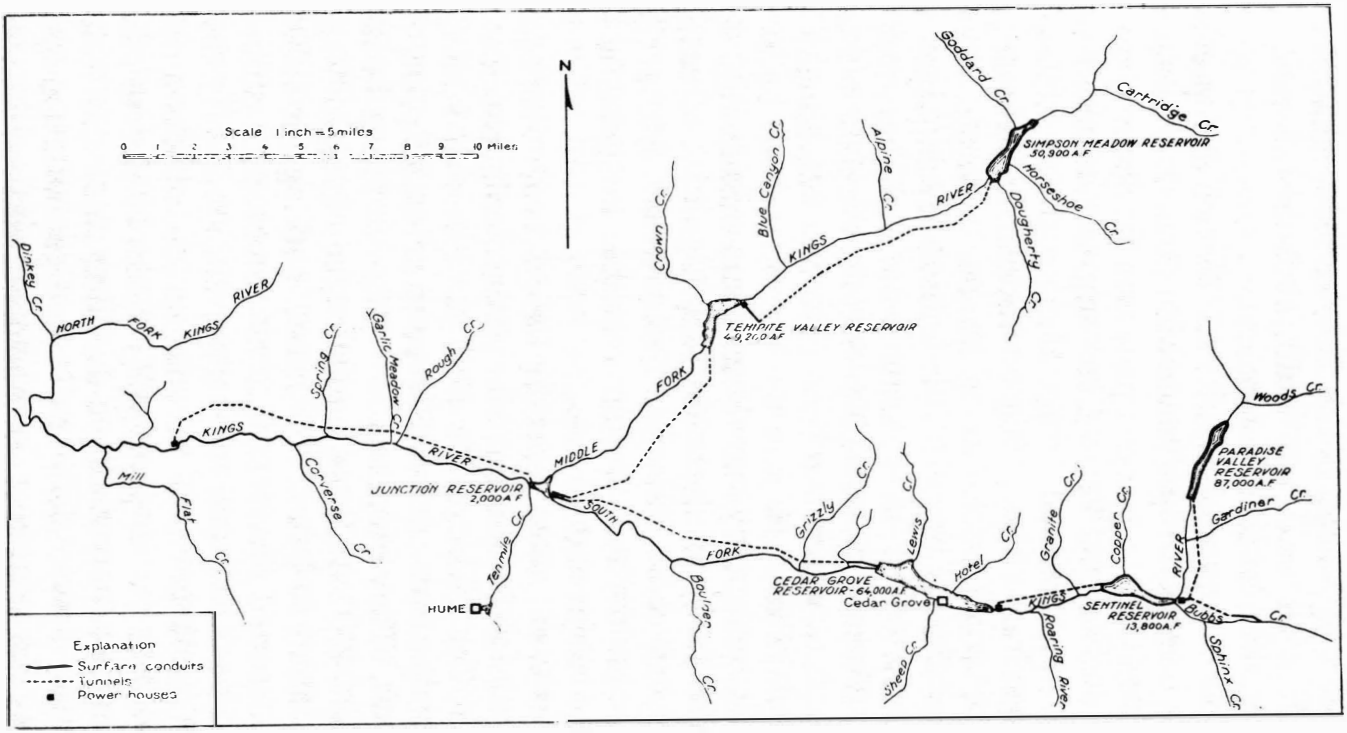

Figure 8. Reservoirs and power complexes proposed by Los Angeles in the 1920's and again in 1948. Source: Randall, 1930.

investor. It was on Forest Service land, administered by the Park Service, but withheld from the park due to potential reservoir development.

For various reasons the Park Service also preferred to allow one company a concession monopoly in each park. In Kings Canyon that company was the Sequoia and Kings Canyon National Parks Company, administered and partially owned by one George Mauger. From 1926 to 1966, Mauger ran a shoestring operation, constructing a few cabins at a time by using lumber salvaged from condemned buildings. With his limited development capital, he restricted his investments to the desirable areas of the Giant Forest in Sequoia National Park and the old General Grant Park which had been absorbed into Kings Canyon National Park. He had no interest in what he saw as a distant, seasonally-snowbound, and presumably doomed canyon far from the main park highway. Because the Park Service administered Cedar Grove, Mauger's company was the only option available for construction of visitor cabins and services.

For twenty-five years the Park Service tried to cajole, lure, and even threaten Mauger into enlarging the facilities at Cedar Grove. In 1947 the National Park Service regional office in San Francisco released plans for the canyon. They proposed to build or improve facilities to include 400 campsites, a picnic area for up to 40 groups, 250 cabins to house 700 guests, parking for 1,000 cars, plus assorted services, such as a store, post office, cafeteria, pack station, and ranger station.[27] By the early 1950's, planners had become somewhat less ambitious; but various master plans still envisioned dozens of cabins and up to twenty multiple-dwelling chalets as well as all necessary service facilities.[28] Mauger balked at spending money for construction, however, because he believed

that the area would eventually be inundated by reservoir waters. In a 1954 letter to the Fresno Chamber of Commerce, in response to its persistent urging, Mauger explained that his Washington, D.C., attorney had advised against construction due to the unclear legal status of the canyon.

According to Mauger and his attorney, there were three solutions to the problem. First, the canyon could be incorporated into Kings Canyon National Park, thus eliminating the threat of inundation. A second solution required the United States to build concession facilities and lease them to the concessionaire. This would place investment risk on the government rather than on the company. Finally, the Park Service could allow construction of facilities, and a road to serve them, within the wilderness portion of the existing Kings Canyon Park.[29] The Park Service declined these options, but assured Mauger that if he built facilities and they were later flooded he would be recompensed by the government. Mauger took a dim view of this promise; and, secretly, some Park Service personnel also questioned whether he would be fully reimbursed. This attitude may have arisen because the Park Service itself had never invested in major improvements during the two-and-one-half decades between the founding of the park and the addition of the two canyons.[30] Mauger also delayed installation of the commercial power lines necessary for a major complex by refusing to commit to a share of the cost.[31]

Accordingly, in 1965 when the two canyons became part of the Park, visitor infrastructure consisted of the campgrounds and ranger station built by the Forest Service thirty years earlier, a small, decrepit store, and a half dozen ramshackle tent-cabins. That year also marked the end of Mauger's forty years of operation. He sold his

interest to Fred Harvey Company, a major concessionaire in the National Parks of the Southwest. Shortly after the Harvey family bought the Sequoia and Kings Canyon operation, they entered into negotiations to merge with the Amfac Corporation. By the time these complicated corporate maneuvers ended and Amfac owned the company, their interest in Sequoia and Kings Canyon had flagged. In 1972, Amfac in turn sold the concession rights for the two parks to Government Services, Inc., or GSI (now Guest Services). Throughout the turbulent six years between Mauger's ownership and the takeover by GSI, very few investments were made in new structures; and even maintenance of existing buildings within the two parks was allowed to lapse. Interest in Cedar Grove development was nonexistent.[32]

The entry of GSI coincided with the completion of Pacific Gas and Electric power lines into Cedar Grove. For the first time a company with the will, the money, and the infrastructure for major development tackled the problem of Cedar Grove. During the more than three decades of confusion and inaction, however, thousands of people visited Cedar Grove and appreciated its serenity and relatively pristine condition. By 1972, more than 150,000 visitors per year sought Cedar Grove to escape the crowded conditions which prevailed in Yosemite Valley and parts of nearby Sequoia. Thus, when GSI presented its grand development plans, they were rejected by both the public and the Park Service.[33] The environmental movement and a strong constituency of people favoring little or no construction had appeared just in time to block the type of development that had been sought for so many years. Today, a modest, twenty-room facility with a small store and snack bar is all that exists at Cedar Grove. In 1985 a proposal to double the room

capacity was rejected by the Park Service.[34] Tehipite Valley to the north is now part of a wilderness area, a difficult two-day hike from the nearest road.

Conclusion

In summary, for more than two-thirds of a century Cedar Grove and Tehipite Valley were the foci of widely varied, competitive, and incompatible interests. Time after time, Los Angeles power developers, San Joaquin Valley irrigationists, and tourism proponents blocked each other's proposals. After an historic compromise in 1940, the status of the two canyons remained uncertain. The combination of continued proposals for reclamation and the refusal of the concessionaire to risk investment amid such uncertainty allowed a spirit of preservation to overtake the public and the National Park Service.

This odd history suggests several unrealized potential scenarios. For example, had the Park Service fully taken over Cedar Grove in 1940, it probably would have honored the third portion of Ickes' agreement and forced a reluctant George Mauger to develop a large resort. The same would no doubt have occurred if the various water interests had given up in 1940. On the other hand, if Los Angeles had not threatened so often, the 1940 compromise which created Kings Canyon National Park might never have been reached. Indeed, development projects of one sort or another so often threatened the canyons that they led to almost perpetual conflict and confusion, the end result of which was inaction and no development. The conclusion, therefore, is ironic; for, in a sense, the inclusion of these spectacular canyons in the National Park system is due to the bickering of the various developers who battled so fiercely for so long.

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PATTERNED GROUND AS AN ARID LAND PHENOMENON

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The *Dictionary of Geologic Terms* defines patterned ground as ". . . symmetrical surface patterns such as polygons, stripes, and circles, characteristic of, but not confined to soils subject to intensive frost action."[1] Despite this definition, researchers have been reluctant to use the term when describing features which occur outside areas of intensive frost action, especially when such features are observed in warm, dry environments. Most often, arid land patterned ground features are held to be relicts of some earlier climatic episode,[2] or are said to mimic or simulate features characteristic of cold climates.[3] Frequent use of the term "gilgai" to denote surface patterns observed in arid environments underscores this reluctance to consider periglacial and arid land surface patterns as related phenomena. Distinctions drawn between periglacial and arid land features tend to obfuscate the many similarities which exist between them, making more difficult the task of understanding the genesis of desert patterned ground.

The present work examines patterned ground features observed at several locations in California's Mojave

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Desert in order to demonstrate that patterned ground is a phenomenon of arid as well as periglacial environments. Further, an attempt is made to provide an explanatory description of a process which could account for the formation of the patterns observed.

Historical Perspective on Arid Land Patterned Ground

In recent years, most research into the genesis of desert surface features has occurred outside the United States. This was not the case for the period extending from the late 1950's to the early 1970's. During that time, many individuals and groups conducted studies in the Mojave Desert of California and Nevada. Hunt and Washburn, for example, collaborated on an intensive study of patterned ground features in and around Death Valley.[4] That study focused on the role of salt solution and precipitation coupled with temperature changes above freezing. Despite their demonstration of a close correlation between the presence of salt at the surface and the occurrence of patterned ground features, Hunt and Washburn were unable to establish whether the patterns formed due to salt, or the salt accumulated because of the patterns. In a later study, the same authors assumed that salt was, indeed, a major factor in the genesis of the patterns observed.[5] While salt features may, indeed, include surface patterns which could be classed as patterned ground (Figure 1), those features represent only one type of desert surface pattern. Patterns under consideration here are marked by the presence of pebbles at the surface, not salt frets.

Other descriptions of desert surface features have tended to give patterned ground features only slight notice. Cooke, in his study of desert pavements, did note that patterned ground features do, on occasion, interrupt

Figure 1. Polygonal surface pattern produced by salt fretting. Death Valley, California, May, 1972.

pavements.[6] Though this observation was quickly followed by a comment concerning frost action, Cooke did present a compelling argument for the upward movement of coarse particles through a clay matrix as an important factor in the formation of desert pavements. He did not, however, extend his argument to include the patterned ground features he observed. Similar conclusions regarding desert pavements were reached by Springer[7]; but, again, patterned ground was not a focus of the study and, therefore, not commented upon, even though such features are often observed in pavements (Figure 2). Springer did establish that desert soils do exhibit an active layer, which he called the "vesicular layer," through which transport could take place. This active layer, subject to a wet/dry cycle, is similar to the active layer of periglacial regions, subject to a freeze/thaw cycle.

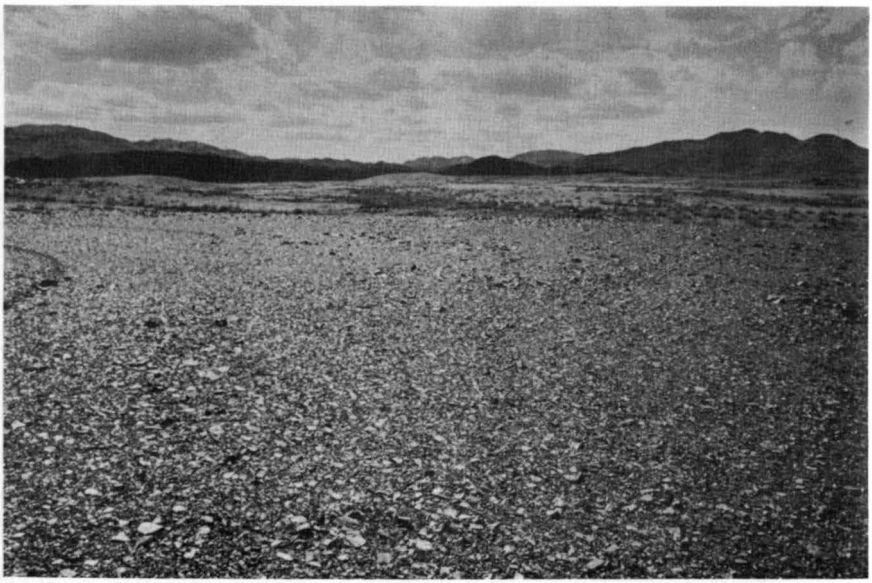


Figure 2. Typical desert pavement, these are often interrupted by patterned ground features.

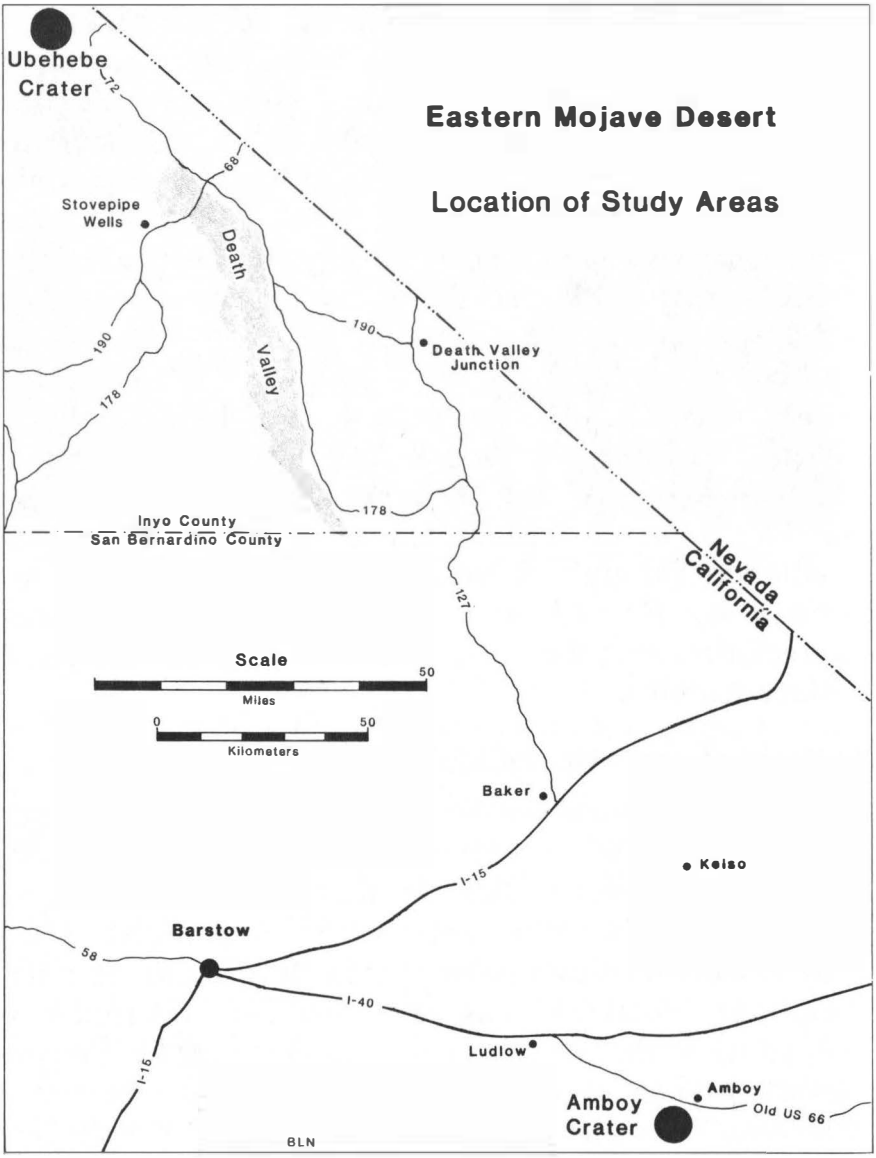
From the late 1950's to the present, many individuals were concerned with patterned ground or gilgai features found at various locations outside the deserts of California and Nevada. Harris undertook the classification of gilgaied soils in Iraq.[8] White and Bonestell examined similar features in North Dakota.[9] Tedrow studied frost action in periglacial soils and drew some comparisons between the features he observed and similar forms found in arid environments,[10] but he did not provide an explanation for the presence of such forms in deserts. Considerable research has been done in Australia where the term gilgai originated, and much work continues to be done there. Recently polygonal patterns have been observed in New Guinea, on slopes subject to an intense wet/dry cycle.[11] This latter study stresses the importance

of phase changes in water during the cycle, but does not explain the mechanisms which produce surface patterns.

The historical record suggests that simple observation and description of desert patterned ground features are insufficient to provide an explanation of the genesis of this desert phenomenon. To understand its formation more fully, desert patterned ground must be viewed in a broader context than that of traditional geomorphology and pedology, although these remain basic to understanding of all surface features. As will be discussed later, soils which are subject to an intense wet/dry cycle may behave as viscous fluids during the wet phase. Meteorology, a science which deals with the atmosphere and the behavior of fluids, can contribute to the understanding of desert surface features. Using techniques developed through cloud formation experiments described by Brunt,[12] it is possible to gain a broader appreciation and, therefore, understanding of desert soil surface features.

Patterned Ground in the Mojave Desert

Patterned ground features are well-known throughout the Mojave Desert. The variety of surface forms described in previous studies runs the gamut from frets and stones to stripes and pavement. Studies already cited provide detailed description of those forms and their distribution. Features considered here are restricted to polygonal forms which occur in association with recent basalts and their weathering products. Basalts are found at several locations in the eastern portion of the Mojave Desert. For the present study, detailed observations were carried out in two areas over a period extending from 1971 to 1983 (Map 1).


Eastern Mojave Desert
Location of Study Areas
Ubehebe Crater
Stovepipe Wells
Death Valley
Death Valley Junction
Inyo County
San Bernardino County
Nevada
California
Scale
Miles
Kilometers
Baker
Kelso
Barstow
Ludlow
Amboy
Amboy Crater
Old US 66
I-15
I-40
72
68
190
178
127
58
BLN

Map 1.

In both areas, recent cinder cones represent the dominant local landform. Amboy Crater near Amboy, California, dominates the southern study area (Figure 3), while Ubehebe Crater, near Death Valley, dominates the northern. Both craters are of fairly recent origin. It is assumed that basaltic materials found in their vicinity date from the era of most recent activity. Also, because local drainage tends to be internal, it has been assumed that both coarse and fine materials found at or near the surface are products of local basalt weathering.

Weathering products include blocks of vesicular basalt, pebble-sized fragments, and clay-sized particles.[13] Consistent with basalt weathering, the clays are predominantly montmorillonites.[14] As indicated earlier, salts play an important role in local weathering, as do other chemical and mechanical processes.

Figure 3. Amboy Crater viewed from the west, May, 1972. (G. O. Tapper photo)

The primary study area centers on Amboy Crater. The field area was first visited in May, 1971. At that time, the general distribution of polygons was noted, and slope characteristics were measured. The area was revisited annually until 1978, and field studies were undertaken in May of each year. This allowed the annual precipitation cycle to run its course. Since this portion of the desert exhibits a winter concentration of rainfall, May represents the end of the local wet season. Only minor changes were noted between annual visits in the size and distribution of polygons. Within the crater, polygons which formed near the margins of small playas (Figure 4) showed significant cumulative change. Here, the polygons actually grew during the course of the study.

In 1971, the mean diameter of selected polygons was 15.5 cm.; by 1978 the mean was 17.5 cm. This indicates

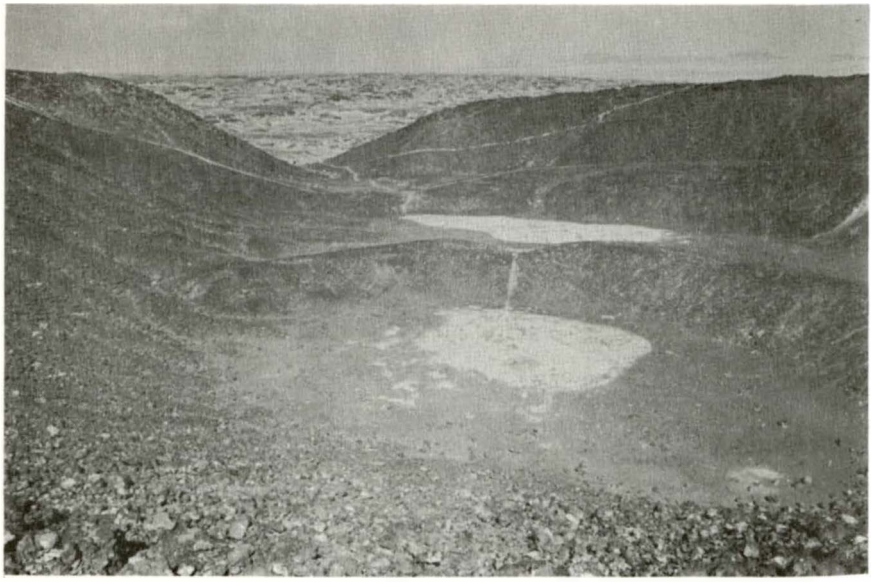


Figure 4. Small playas within Amboy Crater, an indication of internal drainage, May, 1971.

that polygon formation is an ongoing process, and that the features observed are not relict. In order to substantiate this, randomly selected polygons were excavated (Figure 5). The excavations showed that surface boundaries extended through the active layer, leading to the conclusion that the patterns observed represent a surface expression of cellular divisions within the active layer. Each polygon represents a clay lens extending through the active layer. As will be discussed later, the diameter of the polygon is an indication of the depth of the active layer.

Once excavation was complete, and measurements were taken, lenses were refilled. Coarse materials were placed within one of the lenses at a depth of 5 cm. In an attempt to determine if upward transport would take place, more pebble-sized material was placed in the lens

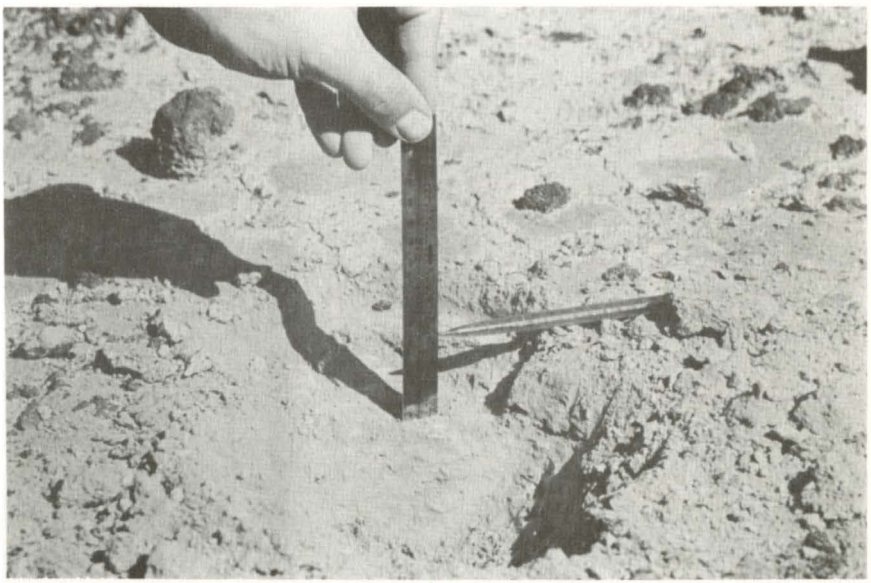


Figure 5. Excavation of a clay lens reveals the cellular nature of the active layer. Amboy Crater, May, 1978.

than had been removed. It was assumed that the presence of more coarse materials than in neighboring polygons would cause the polygon, if it reformed, to be distinct. It was further assumed that failure of the polygon to exhibit a different surface expression would indicate that material transport occurred laterally within the active layer, and that the cellular structure of the layer was impermanent. By May of 1983, the polygon had reformed. Its boundaries did show a higher concentration of pebble-sized particles than its neighbors (Figure 6), indicating that the basic structure of the active layer is indeed cellular, and that coarse materials were transported upward. However, at this point, the mechanism for transport was not determined.

Between 1978 and 1983, the Amboy Crater sites were not visited. Instead, it was decided to concentrate on

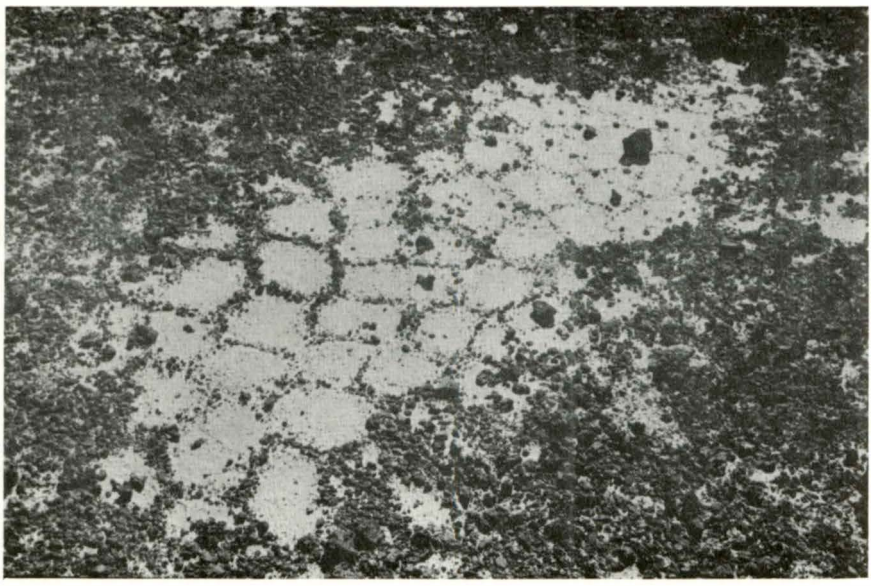


Figure 6. Hexagons reformed after five years. This is the same area which was excavated in 1978. Amboy Crater, May, 1978.

another area in hope of determining whether the polygons observed represented a merely local phenomenon, or whether generalities could be drawn which would permit the identification of areas where similar features could be found.

Comparisons of topographic and geologic maps at a scale of 1:62,500 indicated that the area in and around Ubehebe Crater exhibited surface conditions much like those found at Amboy. The areas were also similar climatically, with Ubehebe receiving slightly less precipitation. In an initial on-site inspection, polygons similar to those found at Amboy were observed, and their distribution and morphology were noted. Excavation of randomly selected polygons revealed that diameter/depth relationships fell within the range of those observed at Amboy (Table 1). Additional excavations made during the 1981 and 1982 field seasons confirmed that diameter/depth relationships remained constant. Demon-

Table 1.
Dimensions of Polygons as Determined by Excavation

	Depth of Active Layer	Diameter of Polygon	Location
1.	57.3 cm	17.8 cm	Amboy Crater
2.	46.2 cm	15.1 cm	120m. N. of Amboy Crater
3.	47.4 cm	15.4 cm	120m. N. of Amboy Crater
4.	50.0 cm	16.0 cm	75m. E. of Amboy Crater
5.	49.9 cm	16.1 cm	75m. E. of Amboy Crater
6.	52.5 cm	17.2 cm	Ubehebe Crater
7.	56.0 cm	17.2 cm	30m. W. of Ubehebe Crater
8.	55.8 cm	18.3 cm	1km N. of Amboy Crater
Mean	51.8 cm	16.6 cm	

strable similarities between the two areas of study led to the assumption that a general description of patterned ground associated with recent basalts and their weathering products would suffice for both areas. From this general description, conclusions might be drawn regarding the genesis of desert polygons.

Patterned ground features observed at both Amboy and Ubehebe tend to develop most rapidly and are most easily observed near the margins of small playas within and near the respective craters. It appears that evaporation and the energy transfers resulting from that process, combined with the swelling of clays, provides the force which moves coarse materials through the active layer. Polygon boundaries are marked on the surface by pebble-sized, rounded fragments of vesicular basalt. Because of their vesicular nature, the pebbles are relatively low density and are easily transported through the denser clay layer. The clay layer itself is composed of expandable, hydrophilic clays. It is assumed that the expandable nature of the clays plays an important role in starting the transportation process. Salts are important as an element in the weathering process, but probably play only a minor role in polygon formation.

The diameter of each polygon is dependent upon several variables, not all of which are presently understood. Polygons measured during the course of this study fell into the range of 15-18 cm. Although the basic shape of the polygons is hexagonal, distortions due to slope were noted. Polygons distorted by slope exhibited an elongation parallel to the axis of the slope (Figure 7). An earlier study indicated that at about 18 degrees of slope, the polygonal form would be replaced by stone stripes.[15] This is consistent with observations made during the course of this study.

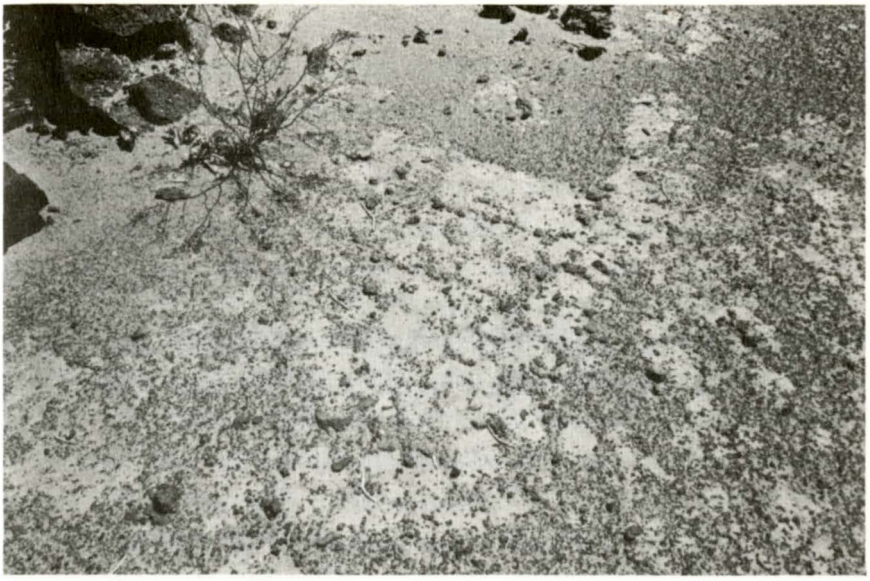


Figure 7. Distortion of polygons due to slope. These forms developed on a slope of approximately 15 degrees. Near Ubehebe Crater, May, 1979.

Excavation indicates that the depth of the active layer plays a controlling role in determining polygon diameter. The ratio between clay and pebbles present is also important. If there is a paucity of coarse material, the surface most likely will appear as a simple series of mud cracks. If there is a super abundance of pebble-sized material, the surface may simulate a desert pavement. The active layer itself is defined as that portion of the soil mantle which is subject to the wet/dry cycle. Its upper limit is marked by the soil/atmosphere interface, and its lower limit by the presence of an impermeable layer, such as bed rock or hardpan. This is the vesicular layer as described by Springer,[16] and it is analogous to the active layer which experiences a freeze/thaw cycle in periglacial environments as described by Davies.[17] From the several excavations made, it appears that the diameter of a surface

polygon is equal to approximately one-third the depth of the active layer. Distortions due to slope made it most difficult to determine whether the same relationship existed for elongated polygons.

Similarities between periglacial and arid land patterned ground abound. Not only do surface patterns appear similar, but subsurface patterns also mimic each other.[18] The major difference between the forms studied here and those in periglacial regions is scale. Periglacial polygons tend to be much larger than those studied here. Other relationships, however, appear constant. Since upward transport is a major factor in the formation of periglacial patterns, it would follow that a similar action would be involved in the formation of so similar a form as arid land patterned ground. This conclusion is consistent with the findings of several researchers concerned with arid land surface features, though debate still exists over a precise mechanism of transport.

Jessup, for example, concluded that soil turbulence produced the patterns,[19] although he did not account for the cause of the turbulence. Ollier speculated that vertical swelling and shrinking of expandable clays caused transport and produced the familiar patterns.[20] This matter of determining the precise mechanism of transport has caused great consternation and produced several lively debates in the literature. In all probability, elements of both processes are involved.

If the active layer is assumed to go through a variety of stages in the course of an intense wet/dry cycle, it may be considered a highly viscous fluid when saturated.[21] While in this fluid stage, energy is transported through the active layer, from the bottom to the top of the layer by convection. The clay lens then may be viewed as a simple convection cell. Because the active layer does experience

a fluid phase, and that fluid is divided into cells, it is possible to use principles of cellular convection, borrowed from the field of meteorology, in an attempt to enhance our understanding of desert surface polygons.

Cellular Convection and Patterned Ground

While in its fluid phase, the active layer is unstable. Also, clay particles within the layer swell. This condition of instability is ephemeral. As dessication begins, instability decreases and the clays shrink. A basic tenet of meteorology holds that when instability of a fluid initially at rest begins to break down, the fluid divides into a series of polygonal cells.[22] The process in question was first described by Benard,[23] and the polygonal forms which result from decreasing instability are commonly called "Benard cells." Motion within a Benard cell consists of upward movement at the center, outward at the surface, downward at the edges, and inward at the bottom as shown in Figure 8.

In arid lands, rapid evaporation at the surface and the subsequent movement of moisture and energy upward through the active layer produces instability. Coarse materials are transported upward through the clay. Once at the surface, these coarse materials are no longer surrounded by the clay matrix. Pebbles and other coarse materials can be pushed outward, but the downward motion at the edges of the cell do not affect them. When dessication is complete, stability is established, and the familiar polygonal arrangements are left at the surface. As in periglacial areas, the active layer experiences alternating periods of stability and instability as it goes through its solid and fluid or liquid phases. Energy is exchanged at the surface in both the arid and periglacial cases.

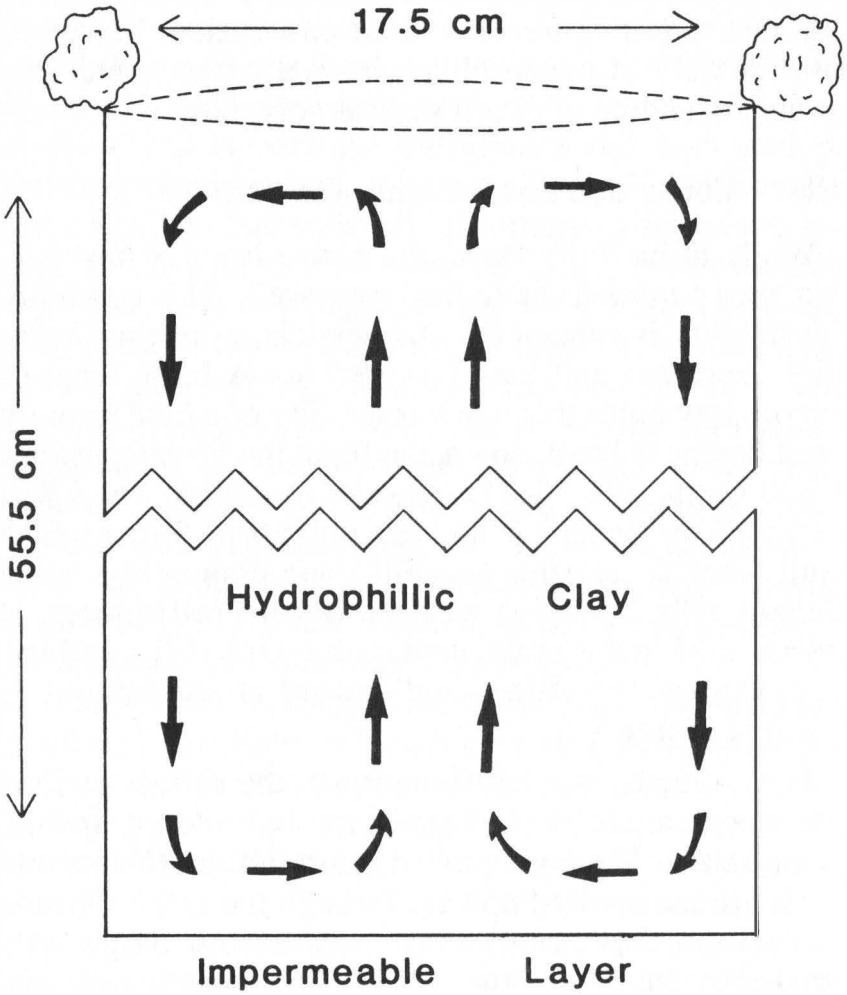


Figure 8. Idealized cross section of a clay lens. Arrows indicate direc-rtion of convectional movement in a Benard cell.

Not all soils which experience an intense wet/dry cycle, or freeze/thaw for that matter, exhibit polygonal surface patterns. Two factors could account for this: insufficient density gradients through the active layer, or the absence of coarse materials. With respect to the first of these, Lord Rayleigh theorized that ". . . no motion will occur in a 'statically' unstable liquid, unless:

$$\frac{p^1 - p^0}{p} > \frac{27\pi^4 kv}{4gh^3}$$

where p^1 equals the density at the top of the layer, p^0 the density at the bottom of the layer, and p the the mean density within the fluid; k is the coefficient of thermometric conductivity; v the kinematic coefficient of viscosity; and h the depth of the layer."[24]

Rayleigh's theorem suggests that the shallower the layer, the greater the difference in density required to produce motion and, therefore, Benard cells; and those cells will become smaller as depth decreases. Benard demonstrated that for a circular cell the ratio of its depth and diameter would be 3.285,[25] a figure close to that observed in the field.

As mentioned earlier, the amount of coarse material available also affects the formation of patterned ground. A lack of coarse materials leaves dessication cracks rather than stone polygons at the surface. If there is no limit to the amount of coarse material available for transport, a stone pavement will result. This latter helps explain why patterned ground features may interrupt desert pavements, and also allows for the assumption that desert pavements and arid land patterned ground share a similar genesis.

Conclusions

It is clear that many processes are involved in the formation of arid land patterned ground. The key to understanding the phenomenon lies in the mechanics of cellular convection. It is necessary to separate weathering processes from the mechanical process which produces patterned ground. Regardless of the role of various weathering agents (for example, salt), polygons will result as long as hydrophilic clays represent the dominant weathering product, and those clays are subject to an intense wet/dry cycle. When coarse materials are present, they will be transported upward to form a polygon, usually a hexagon. The Benard cell provides a reasonable model to describe the motion which occurs during the dessication process. The described motion provides the force which transports coarse materials through the clay matrix to the surface.

Forces and motions generated by the freeze/thaw cycle in periglacial environments are similar to those generated during the arid land wet/dry cycle. In both cases, cooling occurs at the surface of an initially unstable fluid. As instability decreases, the familiar patterns emerge. Similarities which exist between periglacial and arid land patterned ground lead to the conclusion that patterned ground is as much a phenomenon of arid environments as it is of periglacial lands, and that the same process accounts for its formation in both areas.

NOTES

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1986 ANNUAL MEETING
Coalinga, April 25 - 26

The 1986 Annual Meeting of the California Geographical Society was held at West Hills College in Coalinga. Opening day activities included: (1) an early afternoon field trip along parts of the San Andreas Fault, led by West Hills College geology instructor Dr. E. J. Fowkes, (2) a Santa Maria-style barbeque, prepared and served by the West Hills College Agriculture Department, and (3) an evening program of Polynesian dances and slides in the West Hills College Theatre.

California Geographical Society Awards were handled by Jim Switzer (Southwestern College) who presented the Distinguished Service Award to Charles Yahr and the Outstanding Geographic Educator Award to William Thomas. Clement Padick (CSU, Los Angeles) presented the awards for student papers; and George A. Peterson, Director of the Educational Media Division of the National Geographic Society, concluded the annual banquet, held at the Harris Ranch Restaurant, by speaking on the topic: "The Second Biggest Event in Five Years."

PRESENTATIONS

TIMOTHY BELL, Sonoma State University, **Teaching Geography in American History — Products from the California Academic Partnership Program (CAPP).**

ROBERT CHRISTOPHERSON, American River College, **American River and Sacramento Floods of February, 1986.**

ROBERT CHRISTOPHERSON, American River College, **The Coalinga Earthquake: Disaster in a Small Town.**

SUSAN CLARK, California State University, Hayward, **Change in the Distribution of Black Population in Three San Francisco Bay Area Cities from 1940 to 1950.**

CEDER COLE, Humboldt State University, **Del Norte County Residents and the Cal-Nickel Mine: Survey and Perceptions.**

ARNOLD COURT, California State University, Northridge, **Wings at San Diego and San Francisco in 1855.**

WILLIAM CROWLEY, California State University, Sonoma, **Geographers, Global Education, and the New California International Studies Centers.**

LARY DILSAVER, University of South Alabama, **Water, Power, Chalets, and Wilderness: The Conflict for the Kings River Canyons.**

VICTOR DIVITO, San Francisco, **Learning Place Names with the Memory-Code Method.**

DORINE FOSTER, University of California at Los Angeles, **Geographic Ignorance or Geographic Awareness?**

HAROLD GILMAN, University of South Florida, **Language as Territory: ASL and the Deaf Community.**

LAWRENCE HEIN, California State University, Northridge, **A Temperature Range Ratio as an Index of Continentality.**

DAVID HENDRICKSON, Fresno City College, **Manchester Revisited.**

GAIL HOBBS, Pierce College, **The Geography Connection.**

HILDI KANQ, Sunset School, Livermore, **Around the World in Eighty Days: A World Geography Contest.**

GLEN MARCUSSEN, Coalinga City Manager, **The Role of the City Manager in the Coalinga Earthquake.**

THEODORE MCDOWELL, California State University, San Bernardino, **Hazards of High Ground Water in San Bernardino, California.**

JULIE MUSSCHE, Orange County Administration Office, **Incorporation of a Geographic Data Base.**

CLEMENT PADICK, California State University, Los Angeles, **Surface Morphology Within the San Andreas Fault Zone.**

GARY PETERS, California State University, Long Beach, **Trends in Varietal Concentrations in California Wine Regions.**

I. E. QUASTLER and ALDO AREVALO, California State University, San Diego, **San Ysidro, California: A Special Landscape of the United States-Mexico Border.**

WILLIAM REID, California State University, Northridge, **The Climate of Baker, California, and the Eastern Mojave Desert.**

TOMAS ROYBAL, California State Department of Education, **Living in the Nuclear Age.**

KIT SALTER, University of California at Los Angeles, **The California Alliance and the National Geographic Society: A Productive Link for Geography.**

STEVE SLAKEY, La Puente High School, **A Framework for Understanding World Culture, History, and Geography.**

RODNEY STEINER, California State University, Long Beach, **Farm Ownership Patterns in the Sacramento Valley.**

JAMES SWITZER, Southwestern College, **Primary Steelmaking: A Geographic Focus on South Korea.**

HAROLD THROCKMORTON, San Diego Mesa College, **Wanderings in the Never-Never.**