

*the
California
Geographer*

Volume XI
1970

Annual publication of the

CALIFORNIA COUNCIL FOR GEOGRAPHIC EDUCATION

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THE QUALITY OF GEOGRAPHY

CARL O. SAUER

University of California at Berkeley

(Text of the banquet address by Mr. Sauer that highlighted the annual meeting of the California Council of Geography Teachers held on May 4, 1968, at California State College, Hayward. At this annual meeting, formal action was taken that led to the organization's change of name to the California Council of Geographic Education. Mr. Sauer, Emeritus Professor of Geography, University of California, Berkeley, was introduced by the C.C.G.T. President for 1967-68, Dr. William L. Thomas, Jr., who subsequently edited the text for publication.)

AS I LOOK over this vast concourse, the thing that impresses me most is the ruddiness of complexion of the participants. Thereby, I have the feeling that I am among my kind of geographers. This raises the question as to how you came to be geographers? When I was a young fellow, there were testimonial meetings, especially in wintertime, when people would gather together and testify as to how they came to undertake a Christian living. The same thing is of interest with regard to how you came to be geographers.

I start with the premise that you became geographers because you like geography. This is an important premise that does not apply to all people in all professions. The reasons are undoubtedly various, but they probably go back with most of you into quite early years. Perhaps the thing that you would find most common among yourselves is that you liked maps. I think this is important: all geographers who have been any good, in my judgment, have been people who have liked maps, or the conversion of maps into language.

THE MAP AS GEOGRAPHY'S SYMBOL

I think that there may be one person here—maybe only one—who remembers Miss Ellen Semple and her lectures. When Ellen Semple lectured, you could see the people trailing across the Appalachians and into the Bluegrass Region; you could follow them mile by mile. Or when she was dealing with the ancient Mediterranean, you could watch the ships turning the promontories on which the temples stood. You went with her! I think this is an important quality. With some it is a God-given gift; she had it. With others it is a learning that follows upon an inclination in that direction. The map is the common language.

There is an old saying, largely true, that "if it is geography, you can show it on a map." Maps speak an international language that, in large measure, is dissociated or quickly dissociated from particular training. The map, of course, is a wandering by the mind's eye; the feeling of wandering depends largely upon one's particular desire and yearning to wander.

Kids like maps! So far as I know, they genuinely *like* them. It may be that education gets in their way so that they no longer wonder about the world, taking pleasure in recognizing again on the map what they have known visually, adding to it some sort of insight into what they have not seen and may see or may not see. I think that the map is perhaps the best common ground by which we can identify the convergence of our interests.

I suspect that the map has been with us ever since there has been geography, and that is almost ever since man existed. I am thinking of the first human who scratched a line on the sand and, with a stammering speech, said: "Now you go this way and then you go that way and you get to that point and that's where the fat oysters are." Therein lies the beginning of geographic nomenclature. That place became known as "Fat Oyster Point," a proper name that had to be learned by the people who grew up in that community. I look on geographic thought as having that antiquity, supported by fundamental interests.

The map represents an assemblage of things that you think belong together. This "belonging together" business is one of the most rewarding and one of the most difficult things about trying to be a geographer.

I am reminded of a good parallel in psychology. Prominent some years ago was a form of psychology called *gestalt*, of which Professor Köhler was the principal exponent. Gestalt psychology has always been respected but not followed very much because it operates on the idea that the person or group is more than components, the parts. Not lending itself readily to analysis or experimentation, gestalt psychology is regarded as more of an intuition than a discipline. Well, I accept that same sort of thing for geography. One of the things that I have always hoped to do was to present life and nature as a whole in whatever area I had been studying. I know that this is not a matter that is satisfactorily subject to analysis; I have been trying for a kind of understanding that is other than an examination by analytic methods.

In addition to the inclusive map, from which one starts with information and extends his learning process, there is the topical map, which also is very old. A topical map is one on which there is no attempt to show the gestalt—the everythingness—but which establishes the distribution or ranges of some particular thing. This concern about the description and distribution of whatever you are working at and the concern as to the meaning of its range is the only thing that is recognized in the rest of the world as "the geographic method."

I have implied that geography is a broad subject, that it has always been broad, that it should remain broad, and that it has no lesser task than the one that it has always had. I have no sympathy with these people who say, "Well, let's not have anything to do with physical geography because it is not significant to the kind of human geography in which we are interested." I think that whenever a group who call themselves geographers try to reduce the field, to make it only the kind of field in which they are most interested, they are taking a step in the wrong direction.

We are now in a time when innovation is tremendously "in," when the only thing that is recommended for me to buy as being old is distilled liquor (and one beer, I believe). For the rest, innovation, the newness, is the thing that recommends it. In geography, we are having rather a time with innovators. I do not object to their playing their particular kind of a game, but I do object to these folks coming and saying, "*We* are the geographers." I do not object to a person who really likes statistics doing quantifying work; there are things that he probably can do that are worthwhile doing. I should even admit that a person is entitled to be a simulator and a model builder; if that is the game that interests him, that is all right. The one thing that I am worried about is when geographers offer themselves as decision makers. This seems to me to be going a bit far, that those who have a title in geography can then set themselves up as decision makers.

I think that if they take over in geography, my kind of geography is gone. If they take over in geography, I also think that public school geography is gone. Can you imagine getting grade school kids interested in regression analysis in order to study geography?

I think that ever since primitive man scratched the route to the oyster bed on the sand, the basic continuity of direction of geography has been set. We redefine geography in terms of our needs and our interests—but are these reformulations so very different? I do not object to one of the definitions: "Geography is the organization of space." But why be so esoteric about it? We all know, or ought to know, what the essential interests of geography are: the diversity of the earth, the patterns of resemblance and repetition, and (this is my personal addition which I find necessary) how things came to be.

By and large, geography has been historical. It has been historical in the physical sense, also. Professor William Morris Davis made the most gallant attempt ever to make physical geography non-historical, and he failed. No one may ever do as well as that again! When man is introduced into the geographic scene and into the geographic process, explanations can only be in terms of origins and changes. The Bible, as you

know, begins with *Genesis*, and the second book is *Exodus*. I think that is just about the way geography has its main problems presented to it. This is true, you know, of primitive geography (I am not apologizing for being interested in primitives). Primitive peoples have their creation myths and they have their migration myths, the equivalents of the Jewish *Genesis* and *Exodus*. There is a need in mankind to look back and see how he came to be and how he changed and how he went from one place to another. There is thus a greatly enduring reason why the historical approach has its basic place in geography.

THE CALIFORNIA EXPERIENCE

You are all well aware that I am not a California specialist, sometimes to my regret. But many of you are primarily interested in California, which is good. California geography, in my view, is a greatly under-cultivated field.

If I were to undertake its study, I would start with the first known human beings in California. This would take me to the Channel Islands off the coast of Santa Barbara, where an interesting story of human antiquity raises some very intriguing geographic questions. In establishing a reasonable view of where the natives lived and what they did, geographers have contributed very little. The notable study by the late Erhard Rostlund on Indian fishing in the streams of California is first-class geography, but there is not much along that line. There is, then, a field of Indian geography which is intellectually interesting and on which there is material available.

On the coming of the white man, I have done a little reading in the past few days. I want to share with you some discoveries of mine of new knowledge and new meaning.

For example, I think all Californians know the name of Cabrillo, since his voyage of discovery for Spain is taught in all the histories, but always his name is mispronounced. Cabrillo was not a Spaniard, but a Portuguese, which is rather interesting; his second in command was a Christian Levantine, which is also interesting; and the third was a Corsican. This expedition of two ships, one of which had no deck to it, started off from the known—which at that time was Cedros Island, halfway north along the coast of peninsular California. That far these people knew where they were; beyond was untrodden ground to civilized people. As they came north, their descriptions of the coast throughout are quite interesting. Although all the names they used have been forgotten with one exception, the whole route can be established quite well. The coast was pretty bleak until they approached the present-day Mexico-California border. Their interest picked up markedly when they sailed into the Bay of Ensenada, to use the current place-name. Ashore, they saw groves of trees and savannas of grass intermingled, and repeatedly herds of animals ranging from 100 to 150 in number. Even without their description of these animals, the mere designation of the savannas and the herds would establish prong-horn antelopes.

Farther north at San Diego, the Cabrillo expedition encountered unusually stalwart Indians. Nothing much happened in San Diego (sorry!), but then they went on to the Port of Smokes. Because this occurred in September or the beginning of October, fires were burning on the hills behind this Port of Smokes—San Pedro. Continuing to a point northwest (they were quite good in directions, not good on latitude), they came upon villagers living in houses, whereupon the story becomes quite interesting in human terms. From this point, which later is identified in the text as Mugu, they were then going through the Santa Barbara Channel for weeks, naming and counting the villages, 50 or more. They were impressed by the quality and the size of the canoes, made and used by the best native navigators anywhere south of Puget Sound. They were very freely served sardines, fresh and in great diversity. The houses interested them and are fairly well described.

They came to areas in the villages where there were poles. Spaniards are always kind of casual about the size of timber (for example, using the phrase *Palo colorado*, the "red pole," as their name for the redwood). But these poles were not redwoods, being described as painted and having figures on them. This is the first evidence that these Santa Barbara Channel people were kinfolk of the people of the Pacific Northwest, a suggestion that has had a good deal of reinforcement since then.

The Cabrillo expedition had a marvelous time in the Santa Barbara Channel country. They provide some very appreciative descriptions of how nice this country was and how nice the people were, but in so fooling around, they consumed several weeks of precious time. About the first of November, when they decided to go on, they learned a significant lesson about California's climate. They were just beyond Point Concepción when they were hit by their first storm, which drove them back south to the town of the sardines. They started out again, and the next storm took them in the other direction, chasing them north until they entered a bay where the pine trees came down to the water's edge. This was Monterey, and from then on they were in continual trouble. They were experiencing a season in which the fall and winter storms had come early and unusually hard. When they were being driven along the coast south of Monterey they recorded how the waves broke unceasingly against a cliffshore and how the mountains were so close and so high and covered with snow (in November, which is possible) that they feared the mountains might fall down and crush the ships. From their description, they did not know where they were a good deal of the time, because of being battered back and forth by storms. The question whether they reached as far north as Cape Mendocino or not, is academic and no longer of interest, really, to the geographer.

Here is a remarkably good first account of the presence of white men on the coast of California, from which I have taken some of the highlights. After this introduction to the historical geography of California, for 60 years there is nothing more. It is an interesting matter that there is no more concern with California for a while. But finally the colonial period begins with the settlement of the whites that leads on to all that you know so well about California in the 19th century.

Then in 1923, C. O. Sauer came to California, and that was some California! I am sorry that I never studied it; I just experienced it. To use the current term, I have had only some "environmental perception." We came out for the first time on the Santa Fe Railroad, all the way from Kansas City. During this trip, the train stopped for every meal and we put on our coats before entering the Harvey dining room, an interesting cultural note. Then we got to Southern California, to Pasadena, the goal of the old folks who had a moderate income. What a wonderful place these towns were down there: Pasadena, Sierra Madre (still a bit on the youngish side), and Laguna Beach!

After I had been in California for not too long a time, I was invited to a very august place right in the middle of the best of Southern California to make a geographical address. In reassuring my audience about California, I said, "You have a wonderful state here. You have people who enjoy it, who appreciate it, people who have the means and the good sense to come out here and choose it as a place to live, and you won't need to worry about the future. This is so because California has climate but it does not have the resources that will sustain industrialization. You will enjoy your citrus fruits, your palm trees, your living, and you're not going to be overwhelmed by industrial and urban growth." I am afraid that shortly after this I quit predicting the future!

AN APPRECIATION OF DIVERSITY

What a state this California was! And now we have a magazine called *Cry California*. Just this past week I was sent a copy of a new book by Raymond Dasmann, who was at Humboldt State College at Arcata for a good long time. He should have been brought into a geography faculty, but he did not have a Ph.D. in geography and, as you know, this is required now. Dasmann is now one of the members of the Conservation Foundation in Washington, and a very good observer; a wildlife man, among other things. His book is called *A Different Kind of Country*. It has California in it although it is not a book about California, but about what is happening to the United States at a dreadful rate. I refer to the loss of diversity, a thing that I have felt so very, very much in a particular way in respect to the farms.

When I left the Middle West, nobody would have thought that the then American farmer was on the way to extinction. By the American farmer I mean a person who grew a diversity of crops, who rotated his crop system, who had animals on the farm, who produced some of the food for himself, the pigs, the farm orchard, and that sort

of thing. This type of person is more nearly extinct in the American scene today than the Indian is. Nobody would have dreamed of that sort of thing a half century ago. The agricultural colleges, the experiment stations, were telling the farmer to keep on being a farmer of diversified crops, that the family farm was the good thing toward which American rural and small town life was looking.

I cannot describe this change for California as I can for the Middle West, which is my home country. Clover there was almost the sign of farming decency. Now, over the Mississippi Valley one must go a long way to find a field of red clover. I happen to be a farmer, in absentia, by inheritance. The farm used to be a farm; it is now just a piece of a larger operation in the middle of the best country in Illinois. It has yielded up to 210 bushels of corn an acre, which is something that no self-respecting piece of land can do by itself. This is just feeding it by the bottle. In that township I do not think there is a single living domestic animal; only a few birds and a very few bumblebees.

Now this is the sort of thing that has happened. The barn, over a large part of the United States, is as much of a relic as the hand pump in the yard. The farm houses are coming down. The land may even bring a somewhat better price if it does not have a house on it. The change between the world of my youth and the present rural world is fantastic!

There are other illustrations of this process in California, but here more strongly compounded with actual urban and industrial expansion. I am talking about the greatest granary of the world and the manner in which the American Midwest has become completely unrecognizable as to the way of life.

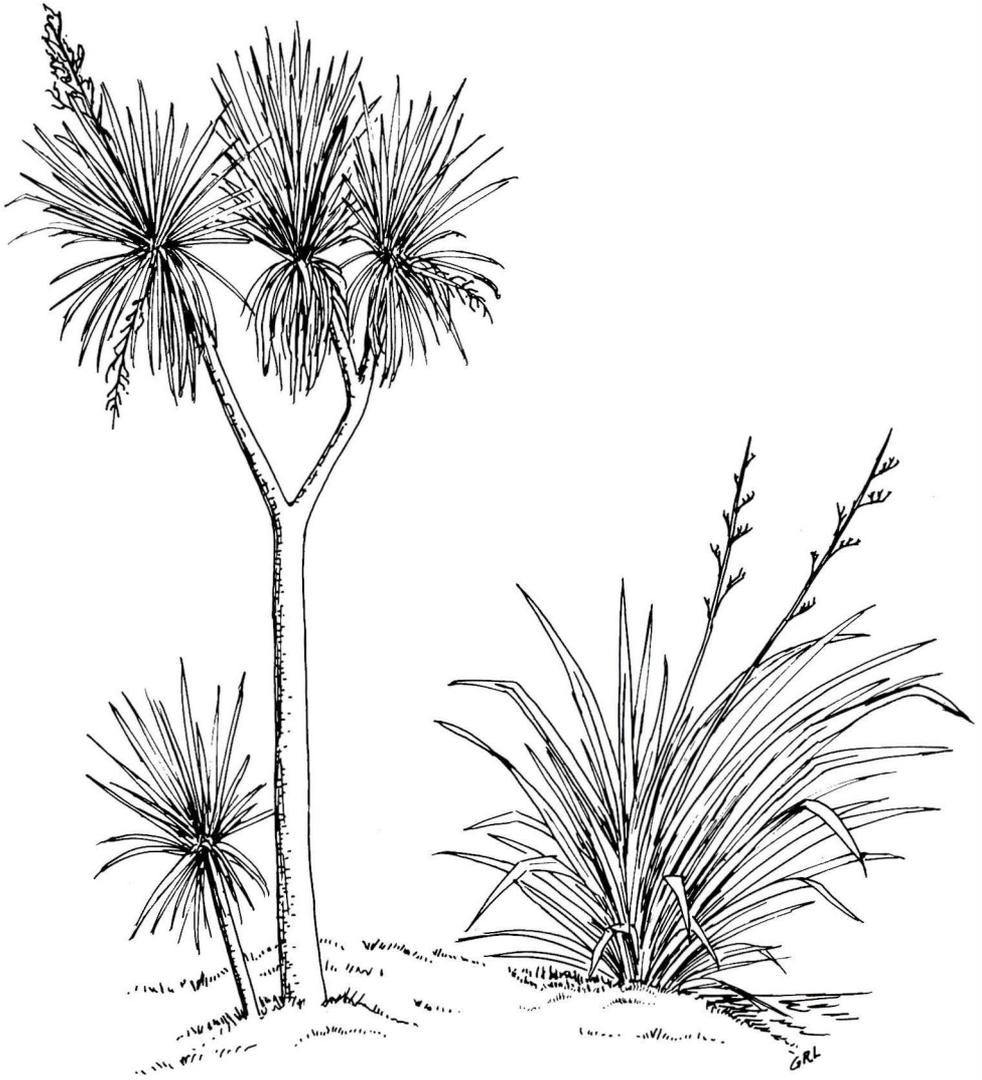
The thing that scares me is how fast things can come in this country. In the early 1930s one rarely saw soybeans; if so, one was likely to stop and ask what they were. The American farmer had grown corn by the Indian method for more than 300 years, "laying by the corn." This was the final cultivation by which the earth was heaped up or "hilled" around the corn. The American farmer did all of his cultivation in the Middle West by the Indian method of mounding the earth around almost whatever he grew; corn, potatoes, and everything that he planted. It was not necessary to do it, but a tradition that lasted and lasted, although people no longer knew how it started. This hilling cultivation of the Midwestern American farm was knocked out, beginning in the 1930s. The cornfields of today are an entirely different sort of thing from the cornfields on which America lived for hundreds of years.

Not liking a lot of change, certainly not too much change, I come back to an old creed and delight, as a geographer, of enjoying the uses of diversity, which I think is one of the most attractive features of human living. For diversity we currently have substituted the word "development." As you may have gathered, I am very, very cool on development. Our old friend, Lewis Mumford, who I think is one of the most interesting people in this country, recently wrote a book on *The City in History*. Long before that he had introduced the term "megalopolis." Concerned about the life of cities (before there were riots or anything like that), Mumford thought that large cities represented a great and possibly insoluble problem, an impasse for civilization. Then along comes a geographer, Jean Gottman, who writes a book called *Megalopolis*—in which all is sweetness and light.

I should like to call to your attention the fact that geographers do not worry enough. I worry a lot, but I cannot get enough people to worry along with me. I am terribly worried about megalopolis. I am very worried about underdeveloped countries, mainly because I am afraid of how they are being developed.

This is a finite world. It is a terrible truth, but what a truth it is! We are running along as though everything was infinitely expandable and we are not concerned about the expansion. I believe that more geographers should become recorders of where we are. A very, very serious question is whether we are going to have a world that is kept tolerable by the restraint of its civilized people who realize the importance of diversity in making the world attractive.

In closing, I have just one question to ask. It was asked of me by a youngster, and I think it is the biggest question of all: "Do you wish you were a teen-ager now?"



Cordyline australis (left) and *Phormium tenax* (right)

CORDYLINE AND PHORMIUM

GORDON R. LEWTHWAITE
San Fernando Valley State College

THE SAN DIEGO CONFERENCE and New Zealand may be a little thinly threaded together in these pages, but threaded together they are. For this bicentenary of San Diego's founding is also the bicentenary of Captain James Cook's first visit to New Zealand in 1769, an event which issued in the discovery of two plants which now flourish in California gardens, *Cordyline australis* and *Phormium tenax*.

But Cook's discovery was not the first time these species caught the eye of man. Perhaps a thousand years earlier—if current dating holds good—the Polynesians sought compensation for their lost *Cordyline terminalis*, the *ti* (or *ti pore*) of the myriad isles of tropical Oceania. Not that the cordylines were confined to Oceania. In wild form or tame, they flourished across a broad swath of tropical Asia and the Pacific, and, as Sauer pointed out, they were probably first domesticated in the ancient culture hearth he postulates for Southeast Asia.¹ The Polynesians preserved *C. terminalis* in more than a dozen varieties—Henry, indeed, pronounced it “perhaps the most notable of all Polynesian plants”²—and various *ti* not only provided foliage for thatch and oven, hula skirts, and sacred temple grounds, but they also provided saccharine-rich roots for a relish. Their very name, *Cordyline*, in fact refers to the club shape of their root.

But when the Polynesian ancestors of the Maori came to New Zealand, they all but lost their favorite *ti* root. True enough, some *ti pore* grew in the warmer parts of the north, but not very extensively; in fact, some think they were confined to the far north of Auckland peninsula³ and even there they were “a very occasional ‘occasional’” in the diet⁴—a sugary morsel to boost the warrior's energy on the warpath.

But in its place the New Zealanders found the native *C. australis*, the rugged *ti whanake* or *ti kouka* of Maori terminology. And this species could be put to something of the same use as *ti pore*. The leaves were strong and fibrous, excellent when extra toughness was required by the native craftsman; the great rhizome, baked or steamed in the Maori oven, provided a sugary nourishment analogous to *ti pore*, and the green leaf-heart provided a modicum of vegetable food—whence the “cabbage tree” of practical *pakeha* nomenclature.

There were other native cordylines too—the long-leaved *C. banksii*, the grass-like *C. pumilio* of the north, and the exceptionally tough-leaved *C. indivisa*. But it was *C. australis* that was the cordyline *par excellence* of Maori New Zealand. It was abundant enough, flourishing throughout the length and breadth of the land, crowding the margins of stream and swamp, and even lending a rather deceptive touch of tropicality to the semi-arid grasslands of the eastern South Island. But the Maori was not content to view it solely as a plant to be gathered. In some regions, at least, he planted groves near his villages and across the tussocky plains, but even so, it seems to have been merely a planted rather than a truly cultivated species—somewhere in the twilight zone where gathering faded into arboriculture.

Another native species was also fitted into this intermediate zone, namely *Phormium tenax*, a much more significant species in the ecology of the Maori. For as with *Cordyline terminalis*, so with the sennit-and-leaf-yielding coconut and *Brousonettia papyrifera*, the *aute* or paper mulberry tree that provided the *tapa* cloth of the islands. The coconut was completely expunged, while the *aute*, like the *ti pore*, could grow in warmer northern New Zealand—but only just. All Cook found when he arrived were a few stunted specimens that provided nothing but a little cloth for ear ornaments and kites.

So, once again, the Maori was driven to cull the indigenous plant associations for

replacements. If tradition yields a valid clue, he may well have done some experimentation with the native *nikau* palm (*Rhopalostylis sapida*) and the "lacebark" of the ribbonwood tree (*Hoheria populnea*), while the leaves of the *kiekie* (*Freycinetia banksii*) had a modicum of utility, especially in some cool upland areas. But it was *Phormium tenax*—the *harakeke* or New Zealand "flax"—that emerged as the dominant textile and cordage plant of Maoriland.

As von Hochstetter wrote, "What the bamboo is to the inhabitants of southern and eastern Asia, this plant is to the natives of New Zealand. The various uses it is put to are innumerable."⁵ The leaves, of course were what mattered most, but the flower-stalks or *korari*, up to a dozen or more feet in length, made good fire-sticks or were bound into bundles and built into simple rafts or *mohiki* for river-crossings. In the Chatham Islands, some hundreds of miles to the east, the Moriori people replaced their canoes with great wash-through sea-rafts to fish and fowl by cliff and outlying islet. And the flowers themselves were rich in nectar which was collected in gourds for human consumption or left to attract the bellbird, the *tui*, and the *kaka* parrot that thronged the flax-reserves at flowering time, both cross-pollinating the phormium and providing an abundant catch for the fowler. As for the flax-root and leaf-base, medicinal elements could be extracted and the gum that bedeviled later European machinery found its role in the caulking of native canoes as well for Maori chewing gum.

But such items were a mere bagatelle in comparison with the foliage. The great sword-shaped leaves were packed with a fiber which, even if it lacked something of the softness of *tapa*, was ruggedly adequate for Maori needs. As Sir Joseph Banks—the first botanist to view it—wrote in his Journal:

"Of all the plants we have seen among these people that which is the most excellent in its kind . . . is the plant which serves them instead of Hemp and flax . . . Of the leaves of these plants with very little preparation all their common wearing apparel are made and all strings, lines, and cordage for every purpose, and that of a strength so much superior to hemp as scarce to bear a comparison with it. From the same leaves also by another preparation a kind of snow white fibres are drawn, shining almost as silk and likewise surprisingly strong, of which all their finer clothes are made; and of the leaves without any other preparation than splitting them into proper breadths and tying those strips together are made their fishing nets."⁶

The fishing nets were often huge—up to 500 fathoms or more in length in some cases—and Banks could have gone on and on with an account of the utility of phormium and its significance to Maori culture. And, in fact, he did touch on its hardiness and ubiquity, the way it flourished "on hills and in valleys, in dry soil and the deepest bogs,"⁷ but most particularly in the latter. For though it grew without let or hindrance in a fair range of ecological niches, and though *Phormium colensoi* was a species of the dry hill slopes, the common flax was partial to the swampy flats.

The very name that was conferred upon it—*Phormium tenax*—signified its utility as a tough basket-making material, but to the Maori, as has been intimated, its uses were legion and many a variety was selected for special purposes. Some, particularly those with variegated leaf edges, were deemed particularly decorative and planted accordingly around the hamlets, but most were selected for utility rather than decoration. The *korako*, for instance, was used for the best cloaks of the Taranaki district⁸—a notable exporting center—while the *ngaro* (an excellent all-purpose plant elsewhere) was selected for rough garments in that region. The *tapoto* was chosen for fine mats, and the *ate* for eel nets and baskets. More than 60 varieties were recognized . . . and by no means all were cultivated. Some particularly common kinds needed for baskets and some superior varieties used for cord, fishing lines, and mats were oft-times planted handily near the villages, and communities which lacked easy access to swamplands were inclined to carve out some patches in the bush. Indeed, Colenso, early missionary and botanist, affirmed he could often detect the sites of abandoned villages by their lingering phormium plantations.⁹ But flax was spontaneously so abundant that real tillage was scarcely necessary: most communities could rely on the sea of wild flax that flourished nearby. Like cordyline it was only partially assimilated into the crop complex of the Maori.

Then came the *pakeha* or European, and with him a new surge of interest in the

flax plant. As was quickly observed by Banks and publicized by Hawkesworth, “so usefull a plant would doub[t]less be a great acquisition to England, especially as one might hope that it would thrive there with little trouble.”¹⁰ And the prediction proved true. Even if the particular seeds Banks took home with him failed to thrive, some New Zealand flax was growing in Kew gardens by 1789 and, by the turn of the century, the plant was flourishing in the bogs of Ireland and western Scotland.¹¹ The widespread dissemination of both cordyline and phormium was under way.

But it was in New Zealand that the main economic impact was felt. The primary fibers that were used in the industry and on the sailing ships of maritime Europe and Britain in particular came from the shores of the Baltic Sea, and sources east of the Sound were notoriously unreliable in wartime. Besides, the settlers arriving (often willy-nilly) in Australia were in need of clothing. James Matra, an American Loyalist who had sailed with Cook, wrote that the New Zealand species might well “serve the purposes of hemp, flax and silk,”¹² and Governor King of New South Wales rather cavalierly ordered the kidnapping of a “flax-dresser or two”¹³ to teach the art of flax-dressing to the colonists in Norfolk Island—a subtropical outlier where phormium flourished luxuriantly. The Maoris, duly feted and enriched by their adventure, were returned home, but they proved to be too high in rank to have been bothered with such a mundane matter as flax-dressing. Nevertheless, the idea caught on, and by 1810 the flax trade was fairly under way. During the next four or five decades, many a ship that called to do commerce with the Maori sailed away with bundles of phormium fiber stacked in its hold.

The repercussions were considerable, and they spread through Maori society. Good flax fiber and solid timber were eagerly exchanged for iron hoes and European cloth, grog, and, above all, muskets and powder—more than ever vital if enemy tribes secured them first. Whole communities reshaped their lives to take full advantage of the trade. Fortified villages were shifted nearer the wet swamplands rather than built on the healthier ridges, warfare and slavery were exacerbated as the demand for labor outgrew the immediate supply, and, in a self-defeating cycle, the patient and discriminating art of Maori flax-dressing gave way to more hectic and slovenly methods as tribe after tribe hustled to join the game.

For all the praise it sometimes attracted, phormium was always liable to swell or break in somewhat brittle fashion, and the new flood of hastily scutched and poorly dried flax did nothing to build a reputation on the discriminating European market. Despite the incentives given by the British government—eager to reduce reliance on Baltic sources—the factory built at Grimsby in England in 1831 soon failed, and the Maori flax-trade remained a sporadic and uneven affair. It struggled on with only intermittent success until the Maori wars of the sixties closed the era.

It is not the intention here to do more than touch upon the ups and downs of successive European enterprise save to note that by the eighteen-forties *pakeha* plantations were beginning to supplement the Maori swamps. As Sparrow records the fact, some 30 acres of Wanganui land were given over to a European flax plantation in the forties, and a patch of Taranaki soil was planted with 75,000 selected plants.¹⁴ The settlers imported and tested some newly invented flax-dressing machinery, and a few “ropewalks” were established in the burgeoning centers of settlement. It was even hoped that “the flax may become, eventually, the staple of the colony, as wool is of New South Wales,”¹⁵ and after the Maori wars were over, a flurry of mechanical inventions—some 28 patents were taken out between 1861 and 1871—together with considerable talk of well-run flax plantations, seemed to herald substantial progress. In 1873 some 300 flax mills were in operation, and over 6,000 tons were exported.¹⁶

But phormium was fated to disappoint its promoters and lose ground in international competition. Tropical fibers all began to find their place in the sun, and sisal, manila hemp, and Bengal jute yielded more flexible and durable fibers that kept coarse and high-cost phormium in a state of almost chronic depression. The flax mills were scarcely models of efficiency, either. Small and generally shoddily built, they exemplified a form of “primitive shifting industry” that cut out the neighboring swamps and constantly moved on to fresh fields and marshes new.

Thus, there was no real plantation development, and precious little in the pattern of price fluctuations to encourage it. True enough, there were occasional winds that blew New Zealand good, like the epidemic in the Philippines that disrupted the *abaca* harvest and the socio-political unrest that reduced the sisal crop of Mexico, and the Spanish-American war. But these brought only temporary bonuses to phormium. More solid progress, perhaps, accompanied developments in the rigging of sailing ships and the invention of the mechanical binder for the harvest—for flax fiber was good enough for binder twine, especially after quality standards were imposed in 1902. And demand peaked again when World War I broke out; the 32,000 tons exported in 1916 was an all-time record. But collapse came with the armistice and the surplus cordage that was released, and sisal plantations flourished in Africa and Indonesia.

So the pattern of sporadic growth and general depression has gone on, though a measure of stability came, especially as phormium production contracted to fit the New Zealand market and the leveling effect of government action was felt. In 1933 the "woolpacks" factory was established near Foxton and the government thereafter purchased the Moutoa Estate and turned it into the "Phormium Development Area." More recently the biological base of the industry has been improved by a scientific attack on the main threat from the virus-induced "yellow leaf disease," while varieties resistant to "yellow leaf"—stronger in fiber and better adapted to milling—have been searched out. The technological aspects of flax growing—planting, spacing, and cutting—have shown promise of progress through mechanization. New patterns of farming—the integration of planted flax with pastureland and the exploitation of otherwise intransigent patches of swamp—have been tentatively tried, while a government bonus to the flax grower has sought to lift his income to the sheep farmers' level. Furthermore, phormium has found new or modified uses—pure or in combination with sisal or rayon—for matting and upholstery, for fibrous plaster and for carpets. But it is woolpacks that provide the primary market: about one-third of New Zealand's wool is baled in native flax and, given the pressures on overseas funds, there are prospects for expansion.

But—to put this in perspective—neither phormium nor cordyline are really significant as economic species today, though a dozen or so flax-stripping mills are at work in New Zealand and phormium has been a mainstay for the island of St. Helena far off in the South Atlantic. But both cordyline and phormium continue to play their distinctive roles in the green parks and wild swamp-and-bush landscapes of New Zealand, as they also do—in a curious reassociation—in the trimly landscaped gardens of Southern California.

REFERENCES

- ¹ Carl Sauer, *Agricultural Origins and Dispersals*, Bowman Memorial Lectures, American Geographical Society, New York (1952), p. 27.
- ² Teurira Henry, *Ancient Tahiti: Compiled from the Notes of J. M. Orsmond*, Bernice P. Bishop Museum Bulletin 190, Honolulu, Hawaii (1928), p. 37.
- ³ Elsdon Best, *Maori Agriculture*, Dominion Museum Bulletin No. 9, Wellington (1925), pp. 136-7.
- ⁴ Kathleen Shawcross, "Fern-Root, and the Total Scheme of Maori Food Production in Agricultural Areas," *Journal of the Polynesian Society*, Vol. 76 (1967), p. 346.
- ⁵ Hochstetter, Ferdinand von, *New Zealand. Its Physical Geography, Geology, and Natural History* . . . trans. by E. Sauter, J. C. Cotta, Stuttgart (1867), p. 150.
- ⁶ Beaglehole, J. C. (Ed.) *The Endeavour Journal of Joseph Banks, 1768-1771*, Angus and Robertson, Sydney (1962), Vol. II, p. 10.
- ⁷ Beaglehole, *op. cit.*, p. 11.
- ⁸ Goulding, Jeanne Hannington, "Flax," in A. H. McLintock (ed.) *An Encyclopedia of New Zealand*, R. E. Owen, Government Printer, Wellington (1966), Vol. I, p. 703.
- ⁹ W. Colenso, "On the Vegetable Food of the Ancient New Zealanders," *Trans. of the New Zealand Institute*, Vol. 13 (1880), pp. 18-19.
- ¹⁰ Beaglehole, *op. cit.*, p. 11.
- ¹¹ Christopher J. Sparrow, "The Growth and Status of the Phormium Tenax Industry of New Zealand," *Econ. Geog.*, Vol. 41 (1965), p. 335.
- ¹² Robert McNab, *Historical Records of New Zealand*, Vol. I, Wellington (1908), pp. 36-37.
- ¹³ J. B. Condliffe, *New Zealand in the Making*, George Allen and Unwin, London (1959), p. 131.
- ¹⁴ Sparrow, *op. cit.*, p. 336.
- ¹⁵ Charles Terry, quoted in Sparrow, *op. cit.*, p. 336.
- ¹⁶ Goulding, *op. cit.*, p. 705.

A MATTER OF PERCEPTION: LOCATIONAL CONSIDERATIONS OF INDUSTRIALISTS IN GUATEMALA*

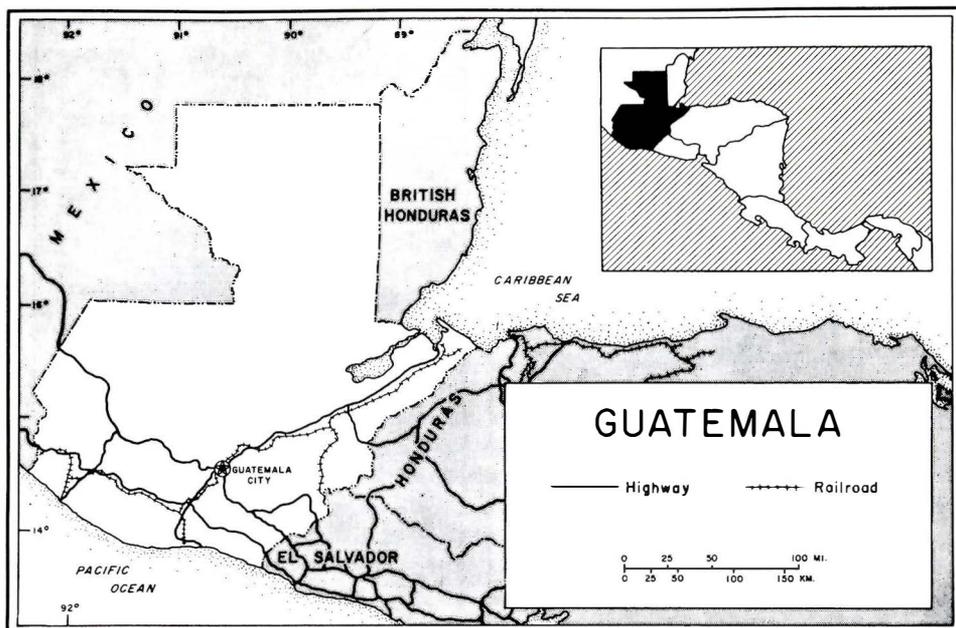
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HUMAN DECISION MAKERS determine the environment into which an industry is placed. This location process is one that is extremely subjective, as it is a reflection of how a potential setting is perceived by an individual or group. Industrial plants do not perforce develop at all favorable sites or in the most desirable situations. Indeed, there is no principle, economic or otherwise, that can guarantee the location of a plant in the best or most rational site. The decisions of men can be reasoned or effected by bias. And industry's important locational considerations are not necessarily found in textbooks or in the abstract simulations of the real world constructed by model builders. Truth lies in the description and analysis of the situation as it exists.

The objective of this study was to determine why industry located in Guatemala. It is a problem approached through an examination of the locational considerations perceived in the attitudes of the entrepreneurs themselves. The question posed was: "Why did you locate your plant here in Guatemala?" The data utilized represent the responses of Guatemala's 1,076 largest manufacturers. Some of the typical responses are shown below:

1. This is my home. (candle-maker)
2. My grandfather built this business with his own hands. When he arrived in this country (from Italy) there wasn't a single.....manufacturer in Central America. It was an opportunity he recognized and took advantage of. (non-metallic mineral products manufacturer)
3. My uncle worked for over eight years in a.....plant in the United States. When he came back home he borrowed money from my father to build a factory. We really didn't expect him to be so successful but when he was we bought in. We raise coffee too but the sale of..... makes more for us now. (textiles products)
4. I went to school in the United States. Do I come home to raise pigs with a degree in engineering? (plastics manufacturer)
5. While I was in the service I passed through this lovely little country and fell in love with it. After the Korean thing was over I came back and started the business just to see what I could do with it. I never thought that it could snowball into something like this. (furniture products)
6. We've sold in this area for years and, quite frankly, were afraid that if we didn't put in a branch plant they would fence us out with a damn tariff. (chemical products)
7. Competition . . . , and moved in here so we felt we had to, too. (chemical products)
8. As far as we were concerned the country was ideal. Not only is the climate pleasant but Guatemala is centrally located with respect to the whole region. It (Guatemala) was our biggest buyer (in Central America) before we moved here. (transportation products)
9. The choice was between Costa Rica and here. The very day that the board was deciding, Irazu (a volcano near the proposed plant site in Costa Rica) blew its top and the decision was made to come to Guatemala. (pharmaceuticals)
10. Our market for was dying a slow death in the States while our exports to Latin America continued to grow. We made a survey of the region and found we could produce the same product here, do it for less in costs, and sell it for the same price. The local government went out of its way to assist us so Guatemala was the choice. (metal products)
11. Have you ever noticed how much and cost in the stores here? They used to be just about half as much but still more expensive than our home price. Honestly, it was possible for us to clear a better profit margin using labor and local resources and we did want to put up a branch plant here in the region anyway. (food products)

*Preliminary Field study in Guatemala in 1966 under a grant from the Institute of International Studies and Overseas Administration, University of Oregon. Field work completed in 1967-1968 under contract with U.S. AID, Guatemala.



Principal roads and railroads in Guatemala

Table 1
 PERCEIVED LOCATIONAL CONSIDERATIONS OF INDUSTRIALISTS IN
 GUATEMALA

Factor	First Response	
	Number	Percent
Market	699	65
Labor	118	11
Raw Materials	96	9
Communications and Transportation	76	7
Special Incentives	76	7
Other Factors	11	1
Total	1,076	100

Source: Personal interviews by the author, 1967-1968.

12. We've got a good market here now and labor is a helluva lot cheaper, but don't think we're in the region to exploit the people . . . we're just here to live within the economy. (chemical products)

13. Well, let's look at it this way—we pay nine cents a pound for . . . (a raw material) in the States and sell . . . (the product) for about thirteen or fourteen cents a pound. Here we get our raw materials for next to nothing and sell the finished product for twenty-five cents a pound. (food products)

14. To make money, what else? (clothing products)

The untypical response to the locational query came from an American firm of international standing:

None of your . . . business. All you bleeding heart idealists think we're here to screw the damn people regardless of how much good we do. Forget it . . . we don't answer any questions we don't have to.

MARKET

The most often-cited factor for plant location in the Republic of Guatemala was market. In fact, almost 65 percent of all respondents specifically indicated market as the prime motivation in the selection of their business site. Moreover, this basic economic element was mentioned as an important locational consideration during virtually every interview. It appears that market has grown to prime significance as a perceived influence because of the increasing demand for all manner of manufactured goods within the country and the Central American Common Market (CACM).

However, in spite of this market expansion, there are still many products that will probably never be economically feasible for production in the area. For example, no matter how much the market expands, its needs for machine tools, sophisticated electronic apparatus, and heavy industrial products are better filled by industries lying outside the region in the more developed areas—primarily from North American, European, or Japanese sources. But market is industry's prime attraction to the area.

Guatemalan industry is oriented to three levels of market service: (1) local, (2) national, and (3) international, with a strong emphasis on exchange within the Central American Common Market countries. The smaller manufacturers producing goods for immediate or local sale are almost ubiquitous in the republic. These firms include such activities as baking, shoe production, printing, and woodworking. However, the medium-sized plants (25 to 99 employees) and large-sized firms (over 100 employees) tend to cluster along the region's major transport lines and in the central places connected by those lines such as Guatemala City, Quezaltenango, or Escuintla.

The cities provide a strong local market base for sales, furnish an available labor pool for the larger factories, serve as collection points for raw materials, and also maintain the more reliable city services required for the operation of the more mechanized large industrial plants. Typical firms in the urban centers that would fit into the large-sized category are textiles manufacturers, breweries, mechanical bakeries, assembly operations of all types, and pharmaceutical plants.

LABOR

Guatemalan labor is largely unskilled or, more accurately, untrained. Manufacturers must teach their employees the skills they require through on-the-job schooling. In the industrial establishments interviewed, the average wage of workers was determined to be \$2.50 per day. However, it must be noted that "average" tends to be misleading since wages ranged very widely—from less than \$1.00 to as high as \$5.50 per day. The employees working in the less-mechanized plants received the lowest wages, while those that earned the most were found classed as semi-skilled or skilled laborers and involved in more technical operations where some skill or mechanical aptitude was required. Production output is highly variable, but generally tends to be low per man-hour and per man-day. Also, the wages of labor are relatively low when compared to the cost of living in the highly urbanized areas such as Guatemala City.

Although the purchasing power of the average industrial worker is limited, he at least receives some hard cash for his labor. Most of the Guatemalan people are rural agricultural folk who customarily live at a level that does not yield much in the way of wages. This small real cash income of the bulk of the population has operated as a limiting factor on the expansion of the potential domestic market. Indeed, perhaps

less than 14 percent of the people in Guatemala make up the present market for most industrial goods. The industrial labor force, therefore, may also develop into the region's most important group of consumers. Without such growth, manufacturing will cease to expand.

Labor relations in Guatemala were one of the most frequently mentioned problems for industry. Nonetheless, cheaper labor was one of the factors cited for its importance to location. Foreign firms tend to follow policies of hiring and training personnel that are more enlightened than their national counterparts. There are two reasons for this: (1) it is less expensive to hire a Guatemalan national for a job if the foreigner must be transferred in from outside, and (2) it also makes for good public relations if the firm can demonstrate its "national character." In spite of this, however, in the foreign firms key positions in the business hierarchy are filled by foreign managers and technicians.

There is at present no really unreasonable attitude toward industrial management by labor. Unions in the manufacturing industries are, at best, weak. The problem with labor is more a problem of discipline. The traditional pattern of Guatemalan culture dictates a paternalistic relationship in the society. He who controls takes care of his workers; they are dependent upon him for survival. By most foreign standards, this is a much different business arrangement than is desired; nevertheless, foreign industry has accepted the cultural challenge.

The highest wages paid to labor are noted in foreign firms. If anyone follows the labor laws of the country to the letter, it is a foreign firm. Thus, as a general rule, the foreigners provide the best working conditions and are the most concerned for their employees' welfare. More familiar with working in advanced societies where labor is frequently more demanding of management, the foreign industrialists have gone out of their way to prevent labor discontent. If anyone is exploiting labor it is the Guatemalan businessman . . . the national. Foreigners are outsiders and they are well aware of the fact that because of this they are more subject to criticism—deserved or not. Consequently, labor fares relatively well under foreign management. In fact, given a choice most Guatemalan laborers prefer to work for foreign concerns. The pay is better, the fringe benefits are greater, and there is usually more opportunity for advancement.

RAW MATERIALS

The requirement for production materials is an important consideration of all industries. As a location factor, therefore, it is an influence of considerable import, especially for the operations where perishable products or weight loss are involved. Few major Guatemalan industries listed this influence of prime concern to their location. But some of the country's largest industrial concerns were among the respondents who cited raw materials as their prime location factor. Industries that reported a strong raw materials orientation were, for example: the producers of cement, pumice, concrete products, lime, wood products, lumber, sugar, cotton processing, and the various food industries.

The raw materials for Guatemalan industry come from both internal and external sources. Domestic agriculture provides the base for most industry, with coffee being predominant; yet, other products of the fields are becoming increasingly important. Sugar cane is the base for the production of *panela* (unrefined sugar), sugar, liquor, industrial alcohol, and yeast. Domestic cotton ultimately ends as thread, yarn, clothing, other textiles products, animal feed, and oil—all goods produced within the country. Animals provide meat, dairy foods, hides for leather goods, tallow for soap and candles, and bone for fertilizer. Oil derived from the citronella plant is used as an ingredient in chemical manufacturing. And some soft wheat is grown and utilized in the milling and bakery industries.

Other raw materials are provided by forest and mineral resources. Guatemala's forests furnish chicle for gum and the various woods that are employed in the manufacture of lumber, furniture, and similar types of items. Mineral resources yield such basic materials as limestone for cement, clay for bricks and pottery, and the precious and semi-precious metals and stones that provide a basis for the jewelry and handicraft

industries. Except for chromite and salt, very little has been done to develop other mineral resources, but sulphur and nickel hold much future promise.

Chemicals, paper, metals, petroleum, some textile fibers, e.g., nylon, rayon, kenaf, and other materials in short supply locally, are imported and consumed by the domestic manufactures. Under the protection of the Central American Common Market, a great many industries have come into existence that rely on imported inputs in their operations. For these manufacturers, of course, national resources mean very little, but the question is: how realistic are activities of this type? Guatemala needs to find new ways to utilize its existing resources, but it needs to press the search for other resources as well.

COMMUNICATIONS AND TRANSPORTATION

Sure means of communication and transportation are basic requirements for all industry. Through communications the needs of markets are ascertained, orders are placed, and the flow of industrial activity is maintained. Efficient transport facilities insure delivery of both raw materials and finished commodities on demand. For industry, the ideal is to have several alternatives in communications and transport, but both of these have been major problems for Central America. As a result, industry has gravitated toward those countries with the largest populations (market) or toward population clusters with the best communications and transport linkages, as is the case in the northern part of the region where Guatemala and El Salvador have both the population and transport linkages that are desired.

Overland transport has been difficult to develop and very costly in Central America, largely because of the nature of the terrain and the area's traditional economic orientation to foreign nations rather than adjacent countries. This picture is changing, though. As the Common Market has developed, the increase in its trade has encouraged changes in the orientation of commerce and improvements in transport. Yet, much still remains to be done.

Central America is deficient in communications and transportation lines. It is not only served by inadequate systems; in fact, no systems exist. Telephone connections, for example, are being built, but at best they are only serving the capitals; outlying parts of the region rely almost solely on radiophone or telegraph for communications. The picture in Guatemala, although somewhat better than it is in some of the other countries, is still bleak. All of Guatemala's principal population centers are served by routes open to all-weather vehicular traffic, but less than 20 percent of the country's estimated 12,000 km. (7,500 miles) of roads are paved. The bulk of all domestic and interregional traffic moves on these highways.

Rail shipment is also available to industry in Guatemala, but it is not a major consideration for locating factories. Although the country has only some 1,280 km. (800 miles) of rail line, the railroad links both coasts, Mexico, and El Salvador by means of narrow-gauge track. Rail efficiency, however, varies a great deal, as does reliability. Industries located along the tracks reported both dissatisfaction and satisfaction with service. Generally, industrialists felt that door-to-door shipment via trucks was more desirable, a great deal more reliable, and far superior.

Over a third of Central America's international traffic moves through Guatemalan ports.¹ On the Pacific, the major ports are San José and Champerico; however, both lack the ability for adequate and efficient cargo handling. Located on a harborless coastline, these ports require lighter service to shuttle goods between the ships and their "port facilities" (piers). On the Atlantic side, both Puerto Barrios and Matías de Gálvez are larger and better equipped to handle shipping. The bulk of Guatemala's imports and exports via the sea, therefore, justifiably move through the Caribbean ports.

Air service for freight and passengers is available for industry throughout Guatemala and internationally. Aviateca, the Guatemalan national airline, provides domestic and international service. However, Pan American Airways is the major international carrier, even though other lines such as KLM, Lufthansa, and TACA provide similar types of services. LACSA and SAHSA furnish minimal connections to other Central American states. The large companies are the chief means of transport

for international air traffic. Internal air freight is primarily moved by regional carriers or through contracts with individual pilots. The republic's major air terminal is situated in Guatemala City; smaller landing strips are distributed over the country, but these are primarily for private use. Thus, except for the capital, there is a lack of air service for industry in Guatemala.

As far as most industrialists in Guatemala are concerned, transportation is really a market ministering problem. And, since the bulk of the market for manufactured goods lies in the northern part of Central America where transport facilities are best developed, their interests have brought them there.² Communications and transportation were considered by entrepreneurs, but essentially in relationship to the prime locational factor—market service to Guatemala and El Salvador, the two countries that account for 50 percent of all intra-CACM trade by value.³

SPECIAL INCENTIVES

Guatemala is now committed to a policy of industrial expansion. This is evident in the government concessions that have been extended to industry. Manufacturers have obtained virtual grants of monopoly, tax breaks, duty-free imports of raw materials and machinery, and even shipping assistance when required. In addition, tariff protection is extended to many commodities to encourage the purchase of domestic-made goods. Most recently, loans acquired through the influence of the United States have been earmarked for use within the country's economic development program. Thus, the influence of government in all phases of development presently seems to be a strong motivation to industrialization.

Investment incentives offered by the Guatemalan government have been instrumental in attracting industry into the country. During this survey almost every large firm interviewed made some reference to the "special privileges" made available by the government. Probably the most important of these, however, was tariff. High tariffs protect goods made within the region by keeping out non-CACM competition. Nevertheless, this is also potentially dangerous for development since it may force people to pay more for goods made in Central America than if they were imported. But, as one factory manager put it:

We had a choice—either move into the region with tariff protection now before we had any real market going for us . . . or wait until the competition moved in first, established a market, and fenced us out with a tariff. Frankly, we felt caught between the devil and the deep blue sea . . . this is a worldwide concern with an international reputation to maintain, so what could we do?

OTHER LOCATIONAL FACTORS

There are several other considerations for industrial location that were indicated by business entrepreneurs in Guatemala, but they are not considered of great importance. Most of these were mentioned only once or twice during the interview period, and all are more appropriately classed as secondary locational considerations or specific site factors. These would include such things as: water availability, land, climate, warehouse space, already existing plant facilities, power, and similar factors. Most industrialists gave more than one reason for plant location. In the end, however, market is the major factor affecting the development of industry in Guatemala.

REFERENCES

¹James R. Snitzler and Enrique Soto, *Central American Transportation Study*, Regional Office for Central America and Panama Affairs (ROCAP), Agency for International Development of the U.S. Department of State, Guatemala, 1965, Table V - A-2.

²Guatemala and El Salvador have five times as much improved road (508 miles per 1,000 square miles) as the Central American average (100 miles per 1,000 square miles). Bureau of International Commerce, *International Commerce*, Vol. 74, No. 14 (April 1, 1968), p. 4.

³*Ibid.*, p. 3.

THE SONORAN MINERS:
A CASE OF HISTORICAL ACCIDENT IN
THE CALIFORNIA GOLD RUSH*

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CALIFORNIA'S GREAT GOLD DISCOVERY, made in January, 1848, at Sutter's Mill, attracted more than Americans alone. By the end of 1848, many shiploads of foreigners had already arrived from nearby lands in advance of the great horde of '49. From Latin America and the Hawaiian Islands they arrived very early, preceding by some months the large influx of Americans. The role of foreign miners in the Gold Rush has been acknowledged by a few scholars, but these miners' contributions have generally been buried under the more "American" aspects.

At this, the 200th anniversary of the founding of the City of San Diego by Spanish missionaries, it is appropriate to recognize another group of Spanish-speaking people in California's past. From the state of Sonora, Mexico came hundreds of Sonoran miners to the Southern Mines of California. Their tenure was short and their role was quickly overshadowed by the rapid process of Americanizing the state. Though little remains of their past occupancy, the Sonoran miners' role in shaping patterns in the Southern Mines was entirely out of proportion to their number. This paper will examine the movement of the Sonoran miners into California, their influence in establishing the permanent trade and service center of the Southern Mines region, and their sudden departure and its consequences.

THE SONORAN MIGRATION

As the first small groups of native *Californios*, possibly including some Sonorans, began entering the mining districts of California as early as July, 1848, word of the discovery was spreading to other parts of Latin America.¹ In Sonora, Mexico, news of the discovery reached a large number of experienced gold and silver miners.² Beginning in 1848, large masses of Sonorans and other Mexicans from the states of Sinaloa, Chihuahua, and Durango traveled overland in caravans to the Southern Mines, usually departing from Mexico early each spring.^{3,4} Spending the warm summer months in the mines of California, most of them made the return trek to Mexico in the autumn before the onset of winter rains. This back-and-forth movement nearly ceased by 1854, though many Mexicans remained in the mining district for years.^{5,6,7}

The number of persons involved in the Sonoran migration—which included women and children—is unknown, but an observer estimated that during the six months between October, 1848, and March, 1849, some five to six thousand persons left the state of Sonora, most of whom entered California by land:

Puede asegurarse sin temor de equivocacion que solamente de Sonora emigraron a la California, desde Octubre del año proxima pasade de 1848, en que salio la primera caravana de Hermosillo hasta Marzo del corriente de '49, de 5 a 6,000 personas, la mayor parte por el camino de tierra.⁸

The migration of Sonorans and the route they traveled has been described by Guinn as:

... starting from Tubac, on the border of Sonora, they traveled the old Anza trail to Yuma, then across the burning sands of the Colorado desert to the Pass of San Gorgonio, down the valley to Los Angeles, and up the coast to the mines.

They traveled in squads of from fifty to one hundred, their meager belongings packed on mules or burros. They came in the early spring and returned to their native country in the autumn.⁹

* This study summarizes certain aspects of Mr. MacKinnon's master's thesis, which was supervised by Prof. James J. Parsons [*The Historical Geography of Settlement in the Foothills of Tuolumne County, California* (Berkeley: University of California, 1967), 203 pp.].

THE SOUTHERN MINES DISTRICT

The Mother Lode gold belt in the Sierra Nevada foothills extended from Mariposa County on the south to Sierra County on the north. One especially active area, lying between the Stanislaus and Tuolumne rivers, became known as the "Southern Mines." Embracing the Southern Mines, Tuolumne County was organized in 1850. Into this wooded, unsettled, and unbroken environment came the Sonoran miners.

The foothill area of Tuolumne County, with its county seat the city of Sonora, was one of the earliest settled regions in California after acquisition by the United States on February 2, 1848. According to the census of 1852, it held some 7 percent of the state's population (including the then nonexistent Stanislaus County). Much of its early growth was attributed to the many foreigners who flocked there in preference to the Northern Mines.^{10,11,12}

FOREIGNERS IN THE SOUTHERN MINES

From the very beginning, the Southern Mines were known for the predominance of foreigners, especially Mexicans. Early visitors to the city of Sonora were strongly impressed by the great number of Mexicans and others of Spanish blood, one claiming that "the residents are chiefly Mexicans and Chilenos, of whom there are some twelve thousand."¹³ His estimate may have been exaggerated, though Perkins estimated some ten thousand foreigners were present in the area in May, 1850.¹⁴ Nevertheless, throughout all of 1849 and part of 1850, Mexicans constituted Sonora's most important consumer element, being catered to by a great number of fandango houses, cafes, stores, and gambling places.

There were several reasons for the predominance of foreigners in the Southern Mines. First, Americans who came overland usually followed routes which led more directly to the Northern Mines. Furthermore, the early discovery of gold in the northern region had made that area much better known. Knowledge of the Southern Mines grew more slowly at first, in part due to the foreigners there—people with but limited contact with Americans. Some authorities credit the more temperate climate of the Southern Mines as another reason.¹⁵ But this is doubtful, for the Mexicans coming from the south likely stopped at simply the first profitable-looking place. And the non-American tone of the Southern Mines, particularly Sonorian Camp, must have been itself an attractive feature for many foreigners.

Besides Sonorans, who were the most important foreign element, there were miners from nearly every nation, often in substantial numbers. To these were added the Americans. Some of the other more numerous groups were Chileans, Chinese, French, Italians, Irishmen, Hawaiians, Australians, and Peruvians. Early place names in the area suggest the great variety of nationalities, languages, customs, and skin colors present.

As Sonorian Camp—soon to be known as Sonora—became a melting pot of virtually all nationalities, it gained a reputation as the champion of the rights of foreigners and minorities. True, violent strife developed between different factions in all parts of California, including Tuolumne County, but Sonora long held a special reputation for its liberal attitude toward strangers and foreigners. William Perkins, who kept a journal of life at Sonora between 1849 and 1852, was an early spokesman for the foreign minorities of Sonora. In his words:

I have a little pride in saying that I am a great favorite with the foreign population. The French call me, *L'ami des Etrangers*; the Spaniards, *El Amigo de los Etranjeros*, a title that I am proud of, as it has been acquired by continued exertions on my part to defend the rights of these people against the sometime brutality and injustice of the Yankee lord of the soil. I will do the latter the justice to say, however, that as a general rule the Americans have behaved nobly and generously with the foreigners in California. But there are many exceptions; and the character of the Americans often leads them into errors in reference to people from other countries.¹⁶

Mining camps in the Southern Mines were often dominated by persons of a single nationality or from a particular state, especially during the first year or two. Sonorian Camp was established very early by Sonorans from Mexico or others of Spanish blood; the north end of town, called *Sonorita*, or "Little Sonora," was completely given over



"Horse Auction at Sonora" from Frank Marryat, *Mountains and Molehills; or Recollections of a Burnt Journal* (London: Longman, 1855). This sketch illustrates the variety of foreigners present at Sonora during the flush days of the Gold Rush. The figure second from the right is probably a Sonoran. Courtesy of Bancroft Library.

to their interests.¹⁷ The great number of other foreigners who came to the Southern Mines encouraged the establishment of other "nationalistic" type camps, each protecting its own best interests.

Jamestown, three miles to the west, was probably established soon after Sonora, possibly as early as August, 1848. Called American Camp for a brief period, Jamestown became a center of American interests.

CAMPS BECOME TOWNS

The Southern Mines were deluged with people during the first several years and miners were scattered into every canyon and gully, over every hillside, and along every stream. Where concentration points developed, the miners' tents sorted out into haphazard rows with a muddy path between. The tents soon became cloth houses and rough cabins, and paths were widened to accommodate more people, horses, and wheeled vehicles. For those few camps which got beyond the tent stage, the widened paths became roadways, and rough cabins became shops and businesses, restaurants, hotels, and houses of more substantial character. Before many months a number of communities, including Sonora, Jamestown, and Columbia, had assumed a pattern which has lasted until today. For others, their names have been perpetuated on maps alone, for little or nothing remains. In this process whereby a few of the rough mining camps became permanent towns, the Sonoran miners played an active role.

THE ESTABLISHMENT OF SONORA AS THE TRADE CENTER OF THE SOUTHERN MINES

Sonora was recognized as the central place for trade and business long before it was incorporated on May 1, 1851.¹⁸ Having reached a peak population of more than five thousand persons during the fall of 1849, Sonora was a place of great activity, economic and otherwise; its reputation was established as ". . . nearly as large as Stockton, and far ahead of it for gold, gals, music, gambling, spreeing, etc."¹⁹ Herbert Lang, in his *History of Tuolumne County*, records that in Sonora in 1850:

. . . There was invested in merchandising the sum of three hundred and fifty thousand dollars, with at least one hundred business houses of a substantial character, and a large and constantly increasing number of comfortable dwellings. Large stocks of goods were carried by the business houses . . .²⁰

It was a marvel to visitors that such a variety of goods, services, and activities could be found in so remote a place. In Sonora, ". . . even from the earliest times it has always been possible to purchase nearly every article of comfort or luxury that the fancy could dictate . . ."²¹

There is little reason to believe, however, that Sonora occupied the best location for the functional center of the Southern Mines; in fact, it was initially somewhat less suitable. Before the discovery of gold at Columbia in March, 1850, Jamestown occupied a more centrally located position. Nearly surrounded by level to rolling terrain, Jamestown was not disadvantaged by being located in a ravine, as was Sonora.

Gambling was probably the primary reason that Sonorian Camp became the functional center of the Southern Mines. The Mexican miners' love of amusements and sports caused a regular concentration of wealth in the form of gambling stakes at Sonorian Camp, soon making it a hub for the "exchange" of gold and other opulence. Though the Mexican miners and others of Spanish blood have been credited as early occupants of the region, their direct responsibility for the rise of Sonora as the center of the Southern Mines has never been properly recognized. Here, among all the camps and towns of the "Southern Diggings," was where the real excitement was located.

The Mexican miners' basic character and love of gambling had developed before they came to California. Describing the miners of Sonora, Mexico, Sylvester Mowry wrote, in his 1866 edition on Arizona and Sonora, that:

. . . the majority of Mexican miners . . . were of the most spendthrift, gambling disposition. Their lavish, gambling mode of life, their negligence and laziness . . .²²

And upon entering the Southern Mines, their character and habits were little changed. In October, 1848, Walter Colton recorded in his diary,

... A Sonoranian [*sic*] digs out gold simply and solely that he may have the wherewithal for gambling. This is the rallying thought which wakes with him in the morning, which accompanies him through the day, and floats through his dreams at night. For this he labors, and cheerfully denies himself every comfort.²³

The Sonorans set up crude gambling tables in a ravine, the present site of Sonora, California, and provided themselves with a variety of amusements. As early as October, 1848, Colton wrote of visiting "the great camp of the Sonorians" where "hundreds were crowding around to reach the bank, and deposit their treasure on the turn of a card."²⁴ Thomas Butler King, in his rare edition of 1850, wrote that:

At a place called Sonoranian camp, it was believed that there were at least ten thousand Mexicans. They had quite a city of tents, booths and log cabins [doubtful]; hotels, restaurants, stores, and shops of all descriptions . . . An enclosure made of the trunks and branches of trees, and lined with cotton cloth, served as a sort of amphitheatre for bullfights; other amusements, characteristic of the Mexicans, were to be seen in all directions.²⁵

The favorite game of the Sonorans was *monte*, a suspense-filled game with high stakes. Classed as a "banking game," monte players attempted to "break the bank," frequently for fabulously large sums of gold or other valuable commodities. The cumulative amount of gold at stake upon the monte tables must have been considerable. "On either side of the street were ranged gambling tables . . . in the centre of which would be displayed a *bank* of perhaps a thousand ounces, in silver dollars, gold doubloons, or small bags of gold dust . . .", wrote Perkins.²⁶

Americans and others were soon attracted to the gambling and amusements offered at Sonorian Camp, and the Sonorans' gambling mode of life quickly caught on to all newcomers. In his journal, Perkins wrote:

The game always was *Monte*, the great national game of Mexico; and the Yankees soon became expert hands at it, and made such immense sums by it that it became a temptation too strong to be resisted . . .²⁷

The atmosphere in Sonorian Camp must have been similar to a fair or carnival—plenty of food and drink most of the time, games and amusements, excitement, and women—attracting men from a wide area to partake of its worldly pleasures. An atmosphere of great permissiveness prevailed during the first few years, when it was said that:

Sonora is advantageously situated in one respect, inasmuch as it is irresponsible for the morals and conduct of its floating population; if Sunday is desecrated in Sonora by five thousand pleasure-seekers, Sonora washes its hands of that.²⁸

The continued number of Sonoran miners pouring all their personal wealth into gambling and amusements, and the attractive carnival-like atmosphere, provided further momentum to the historical accident which had initially caused Sonorian Camp to become a center for the concentration of gold in the area. Horse trading and auctions rapidly followed as early characteristics of Sonorian Camp, and were soon joined by the establishment of numerous regular business houses. In addition to its amusement and business functions—and with its name now shortened from earlier forms—Sonora became the local governmental center for the region in 1850, when it was made the county seat. The discovery of gold at Columbia, some three miles north, in March, 1850, and an eastward extension of settlement placed Sonora in a more balanced location to continue as the functional center of the Southern Mines.

The Mexican miners did a great service in discovering many of the richest diggings in the Southern Mines, and the simple but effective mining technology they brought soon rubbed off on others. Though often driven out, their contribution in making Sonora the center of the Southern Mines region has been a lasting one.

THE FOREIGN MINERS' TAX AND THE DEPARTURE OF THE SONORAN MINERS

On June 1, 1850, a new law imposing a \$20 monthly tax on all foreign miners in California became operative in Tuolumne County.²⁹ A new and unusual form of

nativism—directed primarily toward the Mexican miners but extended to include all foreigners—the Foreign Miners’ Tax seemed something that “neatly wrapped up all the nagging problems of labor, competition, foreign monopolies, taxation, bondage, immigration, and mob violence [in California] . . .”³⁰

But the amount of \$20 per month was too high. Although gross production of gold in California increased through 1852, the foreign miners’ inability to pay the tax was clear evidence that the rich, “unlimited” surface placers were beginning to show signs of depletion as early as 1850. A declining production of gold in many areas was being shared between an increasing number of miners.³¹ Instead of raising much-needed revenues, the law had a quite different effect.

Denounced by the foreigners, the Foreign Miners’ Tax led to outright defiance in the Southern Mines, which had the state’s greatest concentration of foreigners. Acts of violence and strife followed. Veterans armed themselves into guards and Sonora braced itself for a small-scale war. Fortunately, direct confrontation of the “forces” did not occur, but within several days throngs of foreigners were leaving the region for good. Lang provides a vivid picture of the mass exodus, as observed by Walter Murray, then editor of the *Sonora Herald*:

Alas, as we marched along, what a scene of confusion and terror marked our way! Mexicans, Chilenos, *et id genus omne*—men, women, and children—were all packed up and moving, bag and baggage. Tents were being pulled down, houses and hovels gutted of their contents; mules, horses and *burros* were being hastily packed, while crowds upon crowds were already in full retreat. What could have been the object of our assembly, except as a demonstration of power and determination, I know not; but if intended as an engine of terror, it certainly had its desired effect, for it could be seen painted upon every countenance and impelling every movement of the afrighted population. . . .

. . . [I] never lost sight of the train of fugitives scattered along the road in every direction. Some were going north, some south. The great body were probably bound for home; some by way of the sea, others by way of Los Angeles and the Great Desert. Others, again, were scattering themselves over the country . . .³²

The departure of the foreign miners was not without repercussions, for they carried away a deep hatred of Americans. Along the way many acts of violence and bloodshed were committed, and for years the foothills of Tuolumne County were plagued with wandering bands of terrorists. One band, led by the infamous Joaquin Murietta, was headquartered near Columbia, and was held responsible for many atrocities committed in the area. According to Herbert O. Lang:

[The fleeing miners] were scattering themselves over the country, to commence the career of bloodshed and cold-blooded atrocities which for months afterward stained the pages of California history. Even those who were bound for home often left behind them, along the way, bloody traces of their deep-set hatred to Americans . . .³³

Serious economic consequences accompanied the foreigners’ departure, as the mines’ biggest consumer element had been harassed into leaving. It is estimated that some four-fifths of Sonora’s population departed in haste. Indeed, Lang records that only nine or ten persons remained in Columbia after the foreigners fled. The Mexicans had been especially good customers in the Southern Mines for, rather than hoarding their gold to send or take home, they took home goods or lavishly squandered whatever gold or money they had. And while the American miners saw their expulsion as a good thing, the business houses painfully felt their absence. Perkins observed the scene in Sonora:

The result of the departure of so many of these people, is that the town is dull and quiet; little gambling, which is an advantage; the mexican [*sic*] has always been the *bonne bouche* of the american [*sic*] Gambler. The nights are comparatively quiet, no *sandangoes*, music, noise nor dancing. Even Saturday nights and Sundays are becoming staid members of the week.³⁴

But most of the reputable business houses remained in operation. And still much gold remained, though future operations would require more sophisticated technology.

The summer of 1850 was a great turning point for the Southern Mines; as the “flush days” ended, there came a transition to a new era. Subsequent development of water resources and new waves of immigration from the East promoted more intensive mining operations. The region resumed its boom after only a brief lull. Thus it was

that by historical accident, the Sonorans had made their camp in a small Sierra Nevada foothill ravine rich in gold, and their gambling habits soon firmly established Sonorian Camp as the leading trade, service, and government center of the Southern Mines, and so it remained after their departure.

REFERENCES

- ¹ Richard M. MacKinnon, "The Historical Geography of Settlement in the Foothills of Tuolumne County, California" (unpublished M.A. thesis in Geography, University of California, 1967), pp. 44-47.
- ² Sylvester Mowry, *Arizona and Sonora: The Geography, History, and Resources of the Silver Region of North America* (New York: Harper and Brothers, 3rd ed., 1866), pp. 97, 123, *et passim*.
- ³ Rodman W. Paul, *California Gold: The Beginning of Mining in the Far West* (Lincoln, Nebraska: University of Nebraska Press, 1947), p. 26.
- ⁴ J. M. Guinn, "The Sonoran Migration," *Annual Publication of the Historical Society of Southern California*, VIII (1909-1910), pp. 38-43.
- ⁵ William R. Kenny, "History of the Sonora Mining Region of California, 1848-1860" (unpublished Ph.D. dissertation in History, University of California, 1955), pp. 25-27.
- ⁶ *Alta California*, August 2, 1851.
- ⁷ *Stockton Times*, May 11, 1850.
- ⁸ Jose Francisco Velasco, *Noticias Estadísticas del Estado de Sonora* (Mexico: 1850), p. 289, cited in William Perkins, *Three Years in California: William Perkins' Journal of Life at Sonora, 1849-52* (Berkeley: University of California Press, 1964), intro., p. 20.
- ⁹ Guinn, *op. cit.*, p. 42.
- ¹⁰ After Warren S. Thompson, *Growth and Change in California's Population* (Los Angeles: The Haynes Foundation, 1955), p. 19.
- ¹¹ Georges Sabaugh, "A Critical Analysis of California Population Statistics, with Special Emphasis on Census Data, 1850-1870" (unpublished M.A. thesis in Economics, University of California, 1943), *passim*.
- ¹² Owen C. Coy, *California County Boundaries* (Berkeley: California Historical Survey Commission, 1923), pp. 288-290.
- ¹³ Daniel B. Woods, *Sixteen Months in the Gold Diggings* (New York: Harper Brothers, 1857), quoted in Edna Buckbee, *Saga of Old Tuolumne* (New York: The Press of the Pioneers, 1935), p. 327.
- ¹⁴ William Perkins, *Three Years in California: William Perkins' Journal of Life at Sonora, 1849-52*, introduction and annotations by Dale L. Morgan and James R. Scobie (Berkeley and Los Angeles: University of California Press, 1964), p. 155.
- ¹⁵ Kenny, *op. cit.*, p. 215.
- ¹⁶ Perkins, *op. cit.*, pp. 201-202.
- ¹⁷ Thomas Robertson Stoddart, *Annals of Tuolumne County*, ed. and annotated by Carlo M. De Ferrari (Sonora, California: The Tuolumne County Historical Society [Mother Lode Press], 1963), p. 55.
- ¹⁸ There were several variations in the early name of Sonora. Most early accounts called it "Sonorian Camp"; "Sonoran Camp" was a rare usage. But even "Sonorian Camp" is often encountered in the literature.
- ¹⁹ *Alta California*, June 1, 1850.
- ²⁰ Herbert O. Lang, *History of Tuolumne County* (San Francisco: Alley, 1882), pp. 47-48.
- ²¹ *Ibid.*
- ²² Mowry, *op. cit.*, p. 130.
- ²³ Rev. Walter Colton, U.S.N., *Three Years in California* (New York: A. S. Barnes, 1850 [also Stanford, California: Stanford University Press, 1949]), pp. 302-303.
- ²⁴ *Ibid.*, p. 296.
- ²⁵ Thomas Butler King, *California, the Wonder of the Age* (New York: Gowans, 1850).
- ²⁶ Perkins, *op. cit.*, p. 105.
- ²⁷ *Ibid.*, pp. 105-106.
- ²⁸ Frank Marryat, *Mountains and Molehills; or Recollections of a Burnt Journal* (London: Longman, 1855 [also, Philadelphia: J. B. Lippincott, 1962]), p. 141.
- ²⁹ *Statutes of California* (1850), pp. 221-223.
- ³⁰ Leonard Pitt, *Decline of the Californios, A Social History of the Spanish-speaking Californians, 1846-1890* (Berkeley: University of California Press, 1966), p. 60.
- ³¹ MacKinnon, *op. cit.*, Graph I, p. 70.
- ³² Lang, *op. cit.*, pp. 32-33.
- ³³ Statement by Walter Murray, editor of *Sonora Herald*, quoted in Lang, *op. cit.*, p. 33.
- ³⁴ Perkins, *op. cit.*, p. 181.

LAND ALIENATION AND FOREST CONSERVATION IN THE USAMBARA HIGHLANDS OF GERMAN EAST AFRICA IN THE PERIOD, 1885-1914

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THE FINAL PARTITION OF AFRICA among the colonial powers in 1885 was followed by a steadily increasing influx of Europeans with various goals in mind. While the activities of the Europeans affected all spheres of indigenous life, a major and lasting effect was imparted through the alienation of some of the best agricultural lands in a number of the colonies.

The Germans were remarkably late to get involved with tropical Africa, and held their colonial empire only for about 30 years. Nevertheless, their influence was strong, and the German colonial period is noteworthy—and occasionally notorious—for its accomplishments. German East Africa (present-day Tanzania) was the scene of one of the earliest colonizing attempts, in the course of which the Germans alienated large tracts of land for plantations and for forest reserves. This paper examines the major aspects of the German policy toward land alienation and forest reserves in the Usambara Highlands, located in the north-eastern corner of Tanzania.¹

THE USAMBARA LANDSCAPE

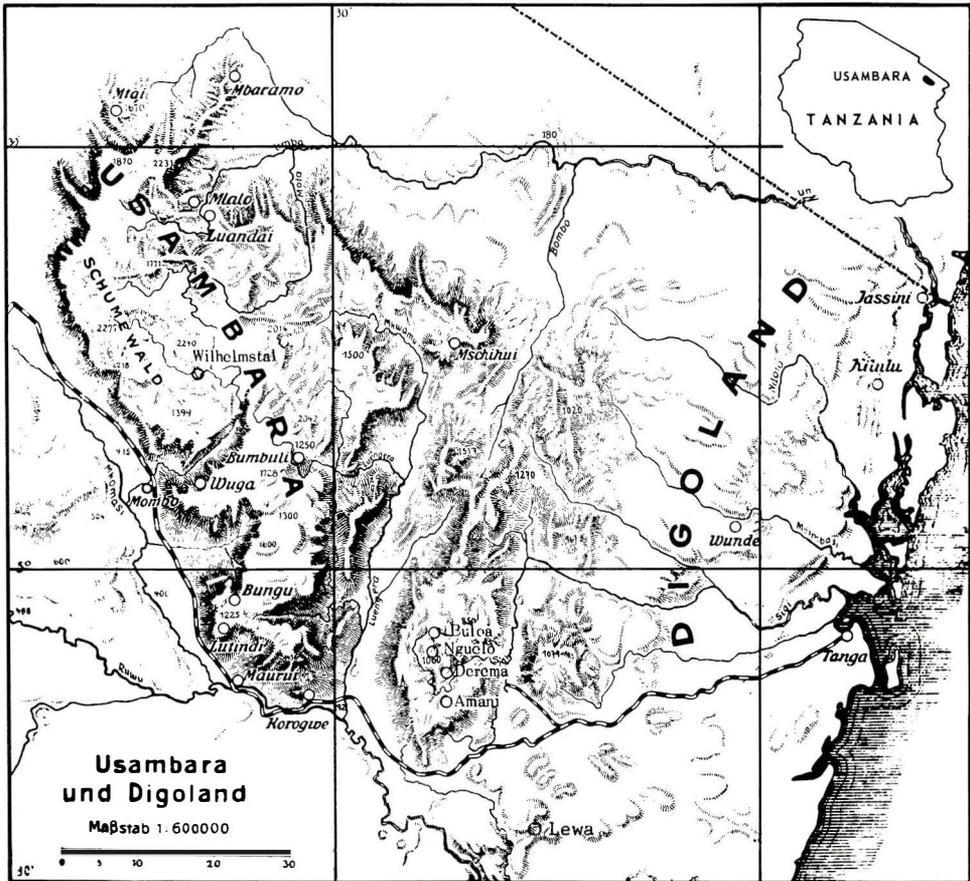
The Usambaras are a horst-and-graben formation approximately 70 miles long and 40 miles wide. Elevations range from 2,000 to 7,000 feet, increasing from east to west. The rainfall varies from 20 to 60 inches, decreasing westward; this trend is modified by orographic effect increasing in the westward direction. The dry season is severe in the lee side of the first ranges, and in the Luengera graben.

The natural vegetation follows the pattern of rainfall, varying from "Closed Evergreen Forest" to "Deciduous Parkland," and is heavily modified by centuries-old shifting cultivation and, since the colonial period, plantation development. The dominant tribe of the area was and is the Washamba, which numbered around 70,000 in 1914. The total population of the Usambara Highlands was estimated around 17,500 in 1888, and approximately 100,000 at the time of World War I.² In 1914, about 100 Europeans were residing in the Usambaras; nearly all of them Germans.

ACQUISITION OF GERMAN EAST AFRICA AND EARLY LAND POLICY

The German claim to East Africa was established by a series of expeditions financed largely by the German East Africa Company. The claim to the Usambaras was laid by the fifth, or Kilima-Ndjaro, expedition in 1884, led by Dr. Karl Peters. Dr. Peters marched along the Pangani river to Masinde, where King Sembodja of the Usambaras signed over the whole of his domain to the Germans. Oscar Baumann, writing in 1888, caustically remarks: "For a few more yards of cotton goods perhaps he would have handed over the whole of Africa."³ With the imperial Schutzbrief (letter of protection) issued in 1885, the German East Africa Company acquired and practiced sovereign rights over a large part of East Africa, including the whole of the Usambara Highlands.

The numerous expeditions launched in order to explore and claim East Africa, 18 of them altogether, proved to be very expensive, and it was hoped that some of the costs could be recovered by selling parcels of land in the area under the company's jurisdiction. But the high prices charged—one rupee (approximately 40¢) for a hectare of undeveloped land—discouraged potential smallholders with limited means. It was estimated that a capital investment of 50,000 to 100,000 marks (approximately \$15,000 to 35,000), was necessary to establish a reasonably profitable plantation.⁴



Usambara and Digoland. Map prepared by the Germans, ca. 1910. (Exact source unknown.)

Besides, there was a wait of several years before these brought any returns. Eventually, large parcels of land were transferred to various plantation companies, none of which had previous experience in tropical Africa. Most of the plantations were established in the areas covered by the "Closed Evergreen Forest" which, as a rule, had a sparse population.

The planters desired a long-term lease or, even better, an outright ownership of the land for their plantations. Such property rights could originate in the early days only by agreement with the chiefs who claimed the land. But the African views of ownership and property were quite different from those of the white man; there existed a communal ownership in a traditional form unknown to the Europeans. The Africans did not believe that purchase of the land was possible; the land was wanted only for its products—usufruct—and for that purpose the Africans were willing to sell at a very low price.

A report in 1894 records the details of a typical land transaction. For the lease of 10,000 acres of land for a period of 100 years the German East Africa Company agreed to pay to the local chief a total of 100 rupees; that is \$40, or 40¢ per year. The first half was paid when the contract was signed, the other half was due in 50 years.⁵ Overall, only a small fraction—generally less than 20 percent—of the land alienated came under eventual cultivation.

In 1890, the German imperial government took over the Protectorate. The German East Africa Company gave up its sovereign rights over the coastal strip (10 miles wide), and received in exchange exclusive rights to occupy all unclaimed lands.⁶

As a result of this treaty and an additional one secured through the founding of the Usambara Railroad Company, the German East Africa Company came to control around 400,000 acres of land in the Usambaras. But the rights to the Usambaras were lost in 1899 when the government bought up all the land rights and interests. The total area in company possession was reduced from 400,000 acres to 27,000 by 1900.⁷

GOVERNMENT REGULATIONS OF LAND OWNERSHIP

After 1890 the government issued several laws and regulations in regards to land ownership. In general, these were designed to protect the lands cultivated by the Africans from expropriation, and to secure adequate reserves for future needs. In 1894, von Scheele, the governor, specified: "The size of the holdings taken up by the companies for the purpose of cultivation will depend upon their abilities and means of disposal for this purpose. This rule is adopted to forestall speculation in land."⁸

Another ordinance, issued in 1896, stated: "Over and beyond the presently cultivated areas by any native, village or community, an additional area four times that size has to be maintained in native ownership to provide for their needs."⁹

Overall, except where special provisions applied, the land rights, property laws, and other regulations involving real estate were those adopted verbatim from the General Prussian Land Code.¹⁰ The mining rights to the more important minerals and fuels were reserved by the government. However, the Africans were guaranteed the rights to mine iron, copper, and graphite to satisfy their personal needs.¹¹

In order to forestall expected malpractices by the various officials, Chancellor Caprivi issued an ordinance in 1893 which forbade administration personnel from acquiring real estate without his special permission, which was practically never given.¹²

By the terms of the Crownlands Ordinance of 1895, all the unclaimed (*herrenloses*) lands became crownlands; much of the Usambara Highlands was included in this category. Special rules applied to the sale and lease of crownlands as follows: (1) uncultivated land could not be sold, only leased; (2) duration of the lease was for 25 years; (3) cultivation had to start immediately; yearly one-tenth of the area leased had to be brought under cultivation; (4) the lessee had the right to buy four times the area under cultivation; and (5) the lessee had to arrange and pay for the survey of his property; all properties had to be entered in the land register (*Grundbuch*).¹³

The laws and regulations relating to land sales and ownership were circumvented by many settlers. In other instances, several excessive and conflicting claims were

advanced. The control and enforcement of land legislation was seriously handicapped by the perennial shortage of administrative personnel and the inadequate means at their disposal. By 1913 the amount of land alienated became a major concern of the government. In order to assure adequate areas for indigenous cultivation, Governor Schnee ordered the Tanga and Wilhelmstal districts, where the Usambaras were located, closed to further land alienation.¹⁴

There are no accurate records available of the amounts of crownlands sold and leased in the Usambaras during the German period. Measurements, carried out by planimeter on a map indicating the alienated lands in 1911, give a total of around one-quarter million acres, exclusive of forest reserves, or approximately one-third of the total area of the Usambaras.¹⁵ (The forest reserves amounted to about 75,000 acres in 1914). As noted before, much of this area was but sparsely populated; population increase became rapid only after the turn of the century, following the medical measures carried out by the administration and missionaries, such as vaccination against smallpox.

FOREST RESERVES

The Germans transferred to East Africa many of the concepts about land and forest conservation developed in Europe. The Crownlands Ordinance of 1895 specified that "forests must be preserved for the public interest and have to be excluded from alienation." Subsequently, large tracts in the West Usambaras were declared to be forest reserves.

The administration issued a number of specific laws and regulations to safeguard the forests. The ordinance of 1895, issued by Governor Wissman, incorporated a number of advanced concepts of forest protection. It forbade lumbering on either side of a mountain crest to a distance of 150 meters, and prohibited cutting on slopes over 45 degrees. On the valley slopes facing streams, parallel strips—each 50 meters wide and spaced 600 meters apart—had to be maintained. Along the streams a strip of forest, 50 meters wide on each side, had to be preserved.¹⁶

Another forest ordinance, issued in 1899, made it mandatory for every owner possessing more than 500 acres of forest to file a detailed utilization plan in the district office, indicating the areas designated for lumbering. This had to be done every year. The government had the rights to set aside one-fourth of the total forested area for reservation. Heavy penalties were set for noncompliance.¹⁷

The forest ordinance of 1908 further extended the measures involving private tracts. It stated that the government could forbid lumbering if this was thought to be necessary for forest conservation and protection. It could also limit cutting to trees over 25 cm. in diameter at breast height. Of the trees over this size, at least one-fourth had to be left standing. In case the continuous forest area was more than 250 acres, at least one-fourth of this was excluded from lumbering.¹⁸

The ordinance of 1909 expanded the conservation measures. It forbade cultivation and the grazing of animals in the forest reserves. The damaging of trees in any way was forbidden, including the slashing of trunks for boundary markings. Caravans passing through the forest reservations had to camp in designated areas. The forest reservations were at the same time declared to be game reservations where a large number of species were protected. However, the Africans received permits to secure poles, grass, and other necessary materials for building their huts.¹⁹

The Germans spent considerable effort and expense on reforestation projects. *Juniperus procera* and *Acacia decurrens* (black wattle), and several varieties of eucalyptus were the most widely planted species. By 1914, the total reforested area in the West Usambaras reached approximately 440 acres.

In 1914 the Wilhelmstal district, including the West Usambaras, had two German foresters assisted by ten uniformed African forest wardens and a headman.²⁰ Large sections of the lowland forests were surrounded by a 30-meter-wide firebreak. Along the railroad at the foothills of the Usambaras on both sides of the track a wide strip was planted to the latex-bearing tree, *Manihot glazovii*. The closed canopy of these trees effectively reduced fire hazard from locomotive sparks.

During the period of British mandate the reforestation project was enlarged and many of the conservation measures advanced by the Germans were carried on. As a result, at the present time the landscape of the Usambaras, and especially the forested regions, presents a scene rather uncommonly found in tropical Africa.

REFERENCES

- ¹ Map No. 1. The Usambaras are the mountainous area located north of the railroad, and west of Digoland.
- ² Statistical data of the colonial period are to be treated with caution. They are all approximations, and might be up to 20 percent off.
- ³ Baumann, O., 173.
- ⁴ Samessa, P., 24-30.
- ⁵ *Deutsche-Kolonial-Zeitung*, 1894, No. 1, 6. The land was "sold" in 1897.
- ⁶ Kurtze, B., 193-194.
- ⁷ *Ibid.*, 174.
- ⁸ *Deutsche-Kolonial-Zeitung*, 1894, No. 9, 122.
- ⁹ *Deutsches Kolonialblatt*, VIII, 1897, 125.
- ¹⁰ *Ibid.*, V, 1894, 389.
- ¹¹ *Ibid.*, IX, 1898, 725.
- ¹² *Ibid.*, V, 1894, 1.
- ¹³ *Usambara Post*, 1903, No. 41.
- ¹⁴ *Deutsches Kolonialblatt*, XXII, 1913, 23.
- ¹⁵ Many of the records of the German administration were destroyed or lost. Surveying of the Usambaras was completed around 1910, but its accuracy was never verified.
- ¹⁶ *Deutsches Kolonialblatt*, VII, 1896, 4. By 1914 the total area of forest reserves amounted to approximately 75,000 acres in the Usambaras.
- ¹⁷ *Der Tropenpflanzer*, III, 1899, 450.
- ¹⁸ *Amtliche Anzeiger für Deutsch-Ostafrika*, 1908, No. 18.
- ¹⁹ Siebenlist, Th., 60.
- ²⁰ *Berichte über Land. . . .*, III, 1909, 296.

BIBLIOGRAPHY

1. *Amtliche Anzeiger für Deutsch-Ostafrika*. Dar-es-Salaam. Kaiserlichen Government für Deutsch-Ostafrika, 1900-1914. Irregular.
2. *Berichte über Land und Forstwirtschaft in Deutsch-Ostafrika*. Amani: Biologisch-Landwirtschaftliches Institut, Dar-es-Salaam, 1903-06, Heidelberg, 1906-1914(?).
3. Baumann, O., *In Deutsch-Ostafrika während des Aufstandes*. Wien und Olmutz; E. Holz, 1890.
4. *Deutsches Kolonialblatt*. Berlin: Reichskolonialamt, (official publication) 1890-1921, semi-monthly. Yearly reports on the colonies appeared as *Beilage zu Deutsches Kolonialblatt*.
5. *Deutsche Kolonialzeitung*. Berlin: Organ der Deutsche Kolonialgesellschaft, 1884-1887, semi-monthly; 1888-1914, weekly; 1915-1942, monthly.
6. Kurtze, B., *Die Deutsch-Ostafrikanische Gesellschaft*. Jena: G. Fischer, 1913.
7. Samessa, P., *Die Besiedlung Deutsch-Ostafrikas*. Berlin: W. Weicher, 1909.
8. Siebenlist, Th., *Forstwirtschaft in Deutsch-Ostafrika*. Berlin: P. Parey, 1914.
9. *Der Tropenpflanzer: Zeitschrift für tropische Landwirtschaft*. Tanga: Druck und Verlag des Kommunalverbandes, 1905-1914.
10. *Usambara Post: Zeitung für die Nordbezirke Tanga, Pangani und Wilhelmstal*. (newspaper). Tanga: Kommunal Druckerei, 1901-1916. Weekly, no page numbers.

THE AREAL DISTRIBUTION OF RAILROAD ABANDONMENTS IN CALIFORNIA SINCE 1920

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THE HISTORY OF THE RAILROAD network of the United States can logically be divided into two broad periods. The first period, one of network expansion, extends from 1830 to 1916. During these years, the country's rail route mileage expanded each year without interruption until a peak of over 254,000 miles was achieved.¹ Since then the trend in railroad route mileage has been downward, and the figure today is closer to 210,000 miles.² Since some new construction took place after 1916, well over 40,000 miles have been abandoned since that date.

The history of California's rail networks shows a similar pattern of change. The peak of approximately 8,400 miles was achieved a few years after the national peak. The general contraction of the mileage since then has brought the current figure to about 7,000 route miles.³ The areal distribution of the approximately 1,500 route miles abandoned between 1920 and 1963 is the subject matter of this study. The purpose of the paper is to explain the areal variation in the rate of abandonment. It is hypothesized that this variation can be explained by differences in the characteristics of areal units in the state.

STUDY PROCEDURES AND LIMITS

At this point, explanations about the procedures and limits of the study are in order. First, data limitations dictated the temporal limits of the study. No published national data is available before 1920, and the Interstate Commerce Commission (I.C.C.) stopped publishing this information after 1963.⁴ Data for California alone is available for more recent dates, but the desire for comparability of results for California with those of the nation as a whole made 1963 a logical place to stop. More recent abandonments are briefly mentioned, however, near the end of this paper. Second, between 1920 and 1942 each abandonment case was reported in full in the I.C.C.'s *Finance Reports*, and valuable data on causes of abandonment was gleaned from this source. The areal units used in this study are Bogue and Beale's State Economic Areas, using the earliest classification available, that for 1950.⁵ These units, rather than counties, were used because they are relatively uniform areas and because they are appropriate to the scale of generalization desired. Noncommon carrier rail mileage, such as most logging lines, was not included in the study. Last, it should be noted that Interurban abandonments are also excluded from consideration. This exclusion was based on the fact that Interurbans largely had a different technology, function, and locational pattern than the so-called steam railroads, and thus should logically be studied separately.⁶

BACKGROUND TO ABANDONMENTS

One characteristic of the United States rail network at the beginning of the study period constitutes an important background to this study. The very uneven distribution of traffic densities within the rail network at this time was very striking. A 1928 study showed, for example, that 28 percent of the nation's route miles carried less than 2 percent of the freight ton-miles. About 40,000 route miles that year carried less than 100,000 ton-miles per mile of track annually.⁷ This is significant, because it was highly doubtful whether any of this mileage was being profitably operated. Thus, even during the prosperous twenties, about one-sixth of the nation's mileage was probably submarginal. These lines were obviously prime candidates for abandonment, and any further decrease in their traffic would constitute a considerable managerial incentive to work for their withdrawal from service.

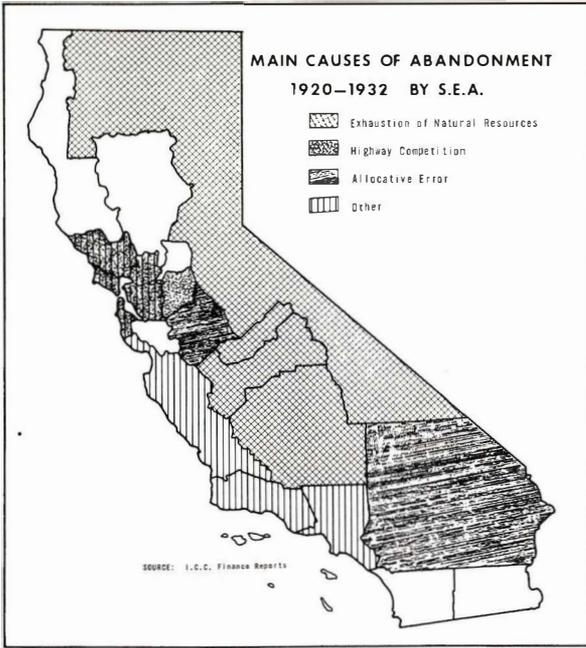


FIGURE 1

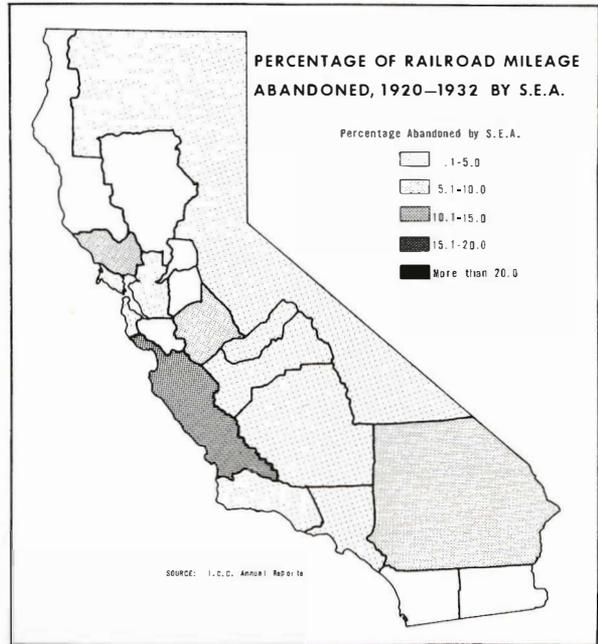


FIGURE 2

Several post-1920 developments led to traffic decreases on many of these marginal lines and thus led to their abandonment. The most important of these developments was the rise of other forms of transportation that diverted considerable rail traffic. Highway transportation was by far the most important of these modes, but pipe lines and barges also were effective in places. The truck took advantage of certain railroad weaknesses, such as slow speed, high costs for small and short shipments, and route inflexibility to divert considerable traffic, especially after about 1926. Passengers were also diverted to the highways in large numbers, primarily to private automobiles. This type of diversion, then, constituted a prime cause of abandonment for formerly marginal or submarginal lines.

The depletion of natural resources also led to a large number of abandonments. Many lines were built primarily to serve areas of lumber or mineral production, and disinvestment was often the only logical choice after the depletion of the resource. Such abandonment was a normal part of railroad network change well before 1920.

Several other causes of abandonment should also be mentioned. The recognition of an error in originally constructing a line, here called an allocative error, is one. Many investors were overoptimistic about the traffic prospects of line extensions, and the resulting abandonments were common well before 1900. The abandonment of one of two essentially parallel lines, here referred to as network rationalization, often followed either mergers or agreements for joint use of a section of track. The relocation of an important shipper and increased cost of operation have also led to abandonment. It should be noted that more than one cause of abandonment was involved in many cases.

Just under 1,500 miles of railroad were abandoned in California between 1920 and 1963. This figure represents 17.8 percent of the 1920 mileage. The comparable figure for the conterminous United States was just over 15 percent. The somewhat higher figure for California can be, at least partially, attributed to the very high rate of abandonment in southeastern California and the state's relatively sparse base year (1920) network. A total of 142 segments was abandoned, with an average length of just over 10 miles. The length of individual lines abandoned varied from 169 miles for the Tonopah and Tidewater Railroad (139 miles in California) to several only a fraction of a mile long.

In order to study the changing distribution of abandonments, the study years were divided into three periods. This division was based on findings for abandonment data for the conterminous United States. The first dividing line, between 1932 and 1933, marked a change in the major cause of abandonment, from the exhaustion of natural resources to highway competition. Since causal data was not available after 1942, the second division between periods had to be made on a different basis. The division was based on a great rate of change in the national abandonment frequency curve that occurred between 1943 and 1944.

ABANDONMENTS, 1920-1932

A total of 241 miles of railroad was abandoned in California between 1920 and 1932, approximately 3 percent of the 1920 mileage. This means that only about 20 miles a year were abandoned, on the average. Such a low figure is not surprising when it is remembered that railroads constituted a virtual overland transportation monopoly during most of this period.

The distribution of the leading causes of abandonments illustrates this situation quite well (Figure 1). As was true nationally, the leading cause was the exhaustion of natural resources, which was involved in approximately 38 percent of the mileage.⁸ Almost as much mileage was abandoned upon recognition of an allocative error in originally constructing a line. These two causes of abandonment were dominant in most parts of the state. Highway competition was a cause of abandonment in only 16 percent of the mileage, and appears as a co-leader in two areas around San Francisco Bay. This illustrates both the late efficacy of intercity truck competition and the fact that it first became effective in and around urban areas. A large variety of miscellaneous causes, or cases where the cause was unclear, accounted for the rest of the abandonments.

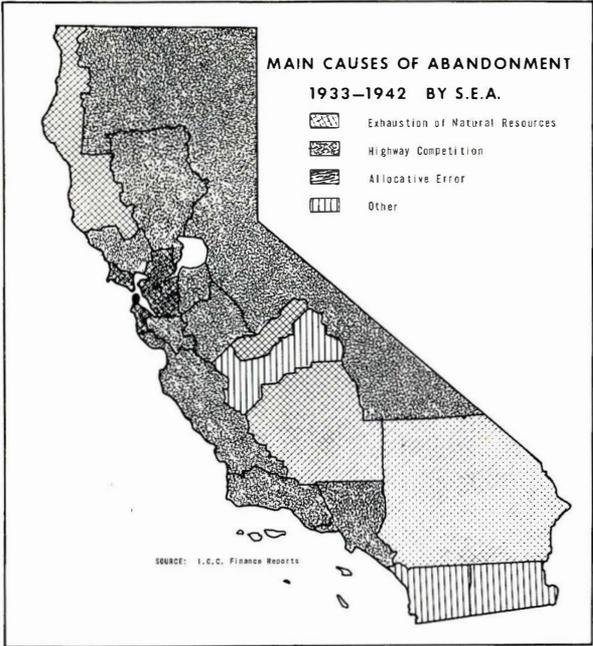


FIGURE 3

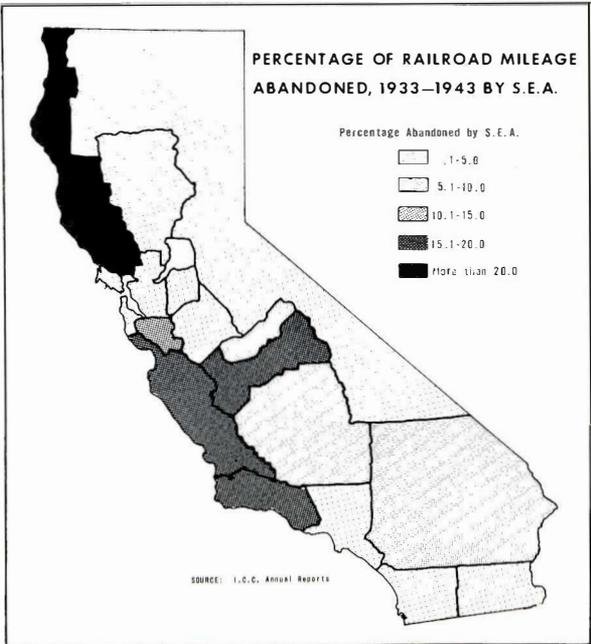


FIGURE 4

The map showing the percentage of rail mileage abandoned by State Economic Area (S.E.A.) illustrates this general lack of abandonments quite well (Figure 2). Only in the South Central California Coast Area was as much as 10 to 15 percent of the 1920 mileage abandoned. This relatively high rate is largely attributable to a single abandonment, the Pajaro Valley Consolidated Railroad, in the northern part of the area. Unfortunately, the cause of this abandonment was not clear from the record in the *Finance Reports*, one of the few cases where this was true.⁹ It appears likely, however, that an allocative error in construction was involved. The low original mileage in this largely mountainous S.E.A. is also important to the result.

Three other S.E.A.'s had between 5 and 10 percent of their mileage abandoned. Most of the abandonment in the North Central California Coast Area, some 36 miles, can be ascribed to a network rationalization program. A formerly competitive line to the Southern Pacific, the Northwestern Pacific, had become its subsidiary. Thus lines that formerly duplicated one another were "rationalized."¹⁰ It should also be mentioned that truck competition had lowered traffic levels sufficiently so that such a step became highly desirable. In the other two areas, some lengthy lines to unsuccessful mineral developments accounted for most of the mileage abandoned.

ABANDONMENTS, 1933-1943

The pace of abandonment increased greatly during the second period. Almost one-half of the 1920-1963 mileage abandoned, 715 miles, was withdrawn during these eleven years. The economic pressures of the Great Depression constituted a great incentive to cut fixed costs. In addition, truck competition became effective in all the state's S.E.A.'s. In places, trucks even replaced railroads in mining or lumbering operations. In general, highway competition changed both the rate and the distribution of abandonments.

The map of main causes of abandonments shows these changed conditions effectively (Figure 3). In those cases up to 1942 for which causal information is available, fully 56 percent of the mileage was abandoned, at least partially, because of truck competition. This cause led in many parts of the state, including the Los Angeles area, parts of the Central Valley, and in the Sierra. The exhaustion of natural resources was now the second leading cause of abandonment, contributing to one-third of the mileage. In the Northern California Coast Area and the Upper San Joaquin Valley and Tulare Basin Area, the exhaustion of timber resources led, while in the San Bernardino-Riverside Standard Metropolitan Area (S.M.A.), a long mine branch accounted for most of the mileage.

The percentage abandonment map reflects the higher general rate of abandonment and the change in its distribution (Figure 4). The North and North Central California Coast Areas had the highest rates. In the former, three long segments to areas of timber exploitation were abandoned, two because of resource exhaustion and one because of the diversion of traffic to trucks. The original sparse rail network of the area was basic to this high rate. In the North Central Coast Area, a continuation of the Southern Pacific-Northwestern Pacific rationalization policy and increased highway competition resulted in a high rate.

The Southern and South Central Coast Areas, along with the Fresno S.M.A., also had relatively high percentages of abandonment. The Southern Coast Area is the most interesting, as fully eleven segments were involved. Most of the mileage consisted of the piece by piece abandonment of the narrow-gauge Pacific Coast Railroad in and near the Santa Maria Valley. This line was greatly affected by truck competition, but its transfer problem was also a factor. Most of the abandonment in the South Central Coast Area constituted the northern extension of this same railroad. In Fresno County, the abandonment of the 56-mile San Joaquin and Eastern Railroad, built primarily for bringing supplies to the site of dam construction, dominated the total.¹¹

The next map summarizes the data on causes of abandonment that was available from I.C.C. sources from 1920 to 1942 (Figure 5). Highway competition was the overall leader, accounting for about 44 percent of the mileage. In general, abandonments in urban and largely agricultural parts of the state were caused by highway

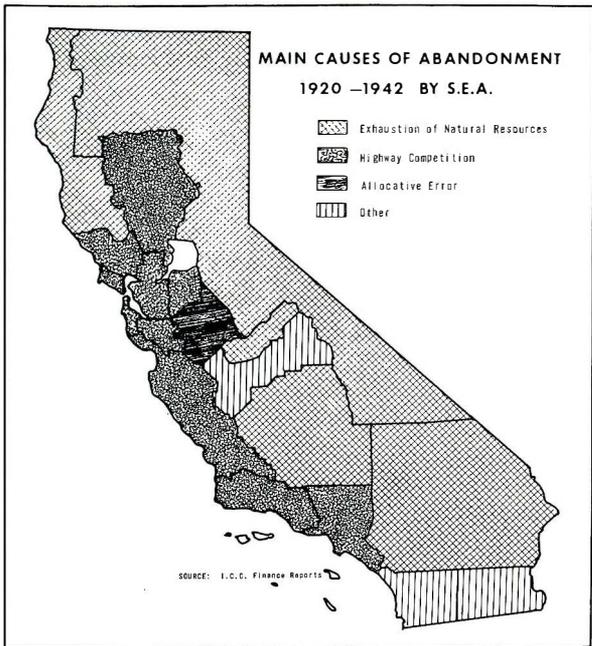


FIGURE 5

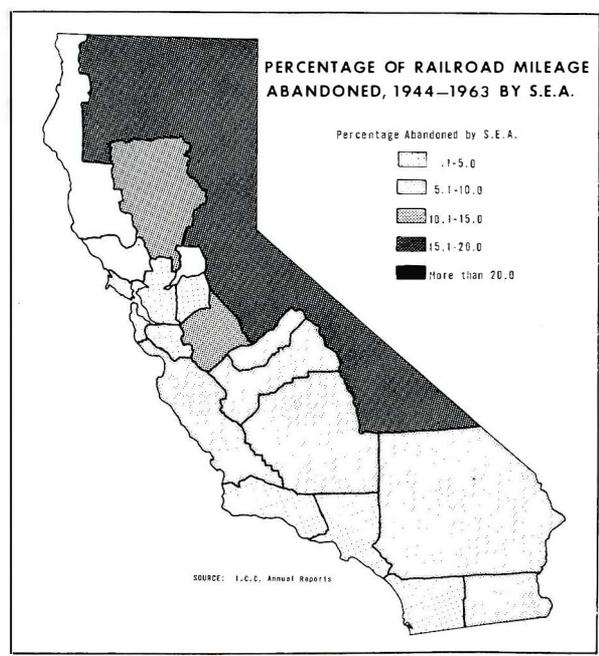


FIGURE 6

competition. In most of the rest of the state, where resource exploitation is an important part of the economy, the exhaustion of these resources was the leading cause. The seeming exception in the southern San Joaquin Valley is misleading, as most of the abandonments here took place in the Sierra portion of these areas.

ABANDONMENTS, 1944-1963

Some 535 miles of line were abandoned in California during the last period. Three outstandingly long cases accounted for fully 55 percent of this total. These three were the 78-mile Yosemite Valley Railway in Mariposa and Merced counties, the 139 miles of the Tonopah and Tidewater in Inyo and San Bernardino counties, and 75 miles of narrow-gauge Southern Pacific track in Inyo County. Fortunately, causal information on these three lines is available, something that is not true of the other abandonments of the period. In general, it is safe to assume that truck competition was still very important in abandonment, as was resource exhaustion. In addition, rapidly rising rail costs added a new reason for rail abandonment.

The East and North California Mountain and Valley Area had the highest rate of abandonment during the third period (Figure 6). Five long abandonments here had a combined total of 256 miles. Inyo County alone had 130 miles because of the Tonopah and Tidewater and Southern Pacific narrow-gauge abandonments. In both these cases, the decrease in mineral production was the basic cause, with a large supplemental role for highway competition.¹² The 52 abandoned miles of Yosemite Valley Railroad in this S.E.A. can largely be ascribed to a decline in lumbering activity.¹³ Two other long abandonments in the north of this S.E.A. were also most probably brought about by timber depletion. Spatially, then, a high rate of abandonment was associated with a decline in the main economic activity in parts of the area.

The Sacramento Valley and Lower San Joaquin Valley Areas were also quite prominent. In the former, most of the mileage withdrawn consisted of Southern Pacific branch lines in agricultural zones. It appears that this company undertook a systematic program here to eliminate many parts of a dense rural rail network more appropriate to horse and wagon days. The majority of the mileage abandoned in the San Joaquin Area consisted of a part of the Yosemite Valley line, and, as previously mentioned, was largely attributable to the depletion of timber.

SUMMARY MAP, 1920-1963

The summary map (page 34) shows the distribution of abandonments during the whole 44-year study period. Few areas in the state had less than a 10 percent rate, and very high rates were also rare. Only the North Central Coast Area had one exceeding 40 percent; this high rate was brought about by the simultaneous operation of resource depletion, a rationalization program, and effective highway competition. The South Central Coast Area had a somewhat lower rate. Areally, abandonments here were associated with a sparse original network in a largely mountainous S.E.A. and high rates in two agricultural valleys as a result of highway competition and (probably) an allocative error.

It is interesting to note that most of the Central Valley experienced a lower rate of abandonment than adjoining areas. Even Fresno County had a high rate only in its Sierra portion. In general, these areas had a higher original route density than nearby S.E.A.'s and abandonment here was largely associated with highway competition. Highway traffic diversion, because of its nature in progressively diverting a larger range of commodities over time, usually takes much longer to lead to abandonment than resource depletion. Logically, then, much higher rates can be expected here in the future. In addition, the leading urban areas also had low rates. These areas were, of course, appropriating an ever increasing share of the state's economic activity during the period, and the incentive to abandon was thus often missing. With the exception of the San Diego S.M.A., these areas also had a high 1920 rail density.

CONCLUSIONS

It appears, then, that spatial variations in the rate of abandonment can be associated with differences in areal characteristics. In particular, the nature of the dominant

economic activity of an area and its fortunes, the effectiveness of truck competition, the rate of growth, and the nature of the 1920 rail network are important variables in this explanation.

I would like to close with some observations on the likely future course of abandonments. Abandonment since 1963 has proceeded at a very moderate rate, with a total of about 100 miles withdrawn from service. I expect, and indeed hope, that this rate will greatly increase in the future. The railroads of the nation are burdened with too many unprofitable lines that are no longer needed. A vigorous abandonment policy should be followed so that they can restrict themselves to the function they perform so well, the line haul. If this policy is followed, the future pattern of abandonments will be very much like that of the network of today. Eventually the state should have perhaps 2,000 miles of railroad. The result of this great disinvestment will be, I believe, an economically sound railroad network. California and the nation will be better off for it.

REFERENCES

¹ United States Department of Commerce, Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1957* (Washington, D.C.: U.S. Government Printing Office, 1960), p. 429. Note that throughout this paper mileages refer to route miles, not total miles of track.

² Association of American Railroads, *Yearbook of Railroad Facts* (Washington, D.C.: Association of American Railroads, 1969), p. 60.

³ For data on state mileages, see for example the Association of American Railroads' "A Chronology of American Railroads" (n.d.).

⁴ This material was published in the appendices of the I.C.C.'s *Annual Reports*.

⁵ Donald J. Bogue and Calvin L. Beale, *Economic Areas of the United States* (New York: The Free Press of Glencoe, Inc., 1961). Note that the term Standard Metropolitan Area rather than Standard Metropolitan Statistical Area applied in 1950.

⁶ The problem of which railroads to classify as Interurbans was solved by accepting the listing of such lines found in George W. Hilton and John F. Due, *The Electric Interurban Railways of America* (Stanford, Calif.: Stanford University Press, 1960). The considerable mileage of Pacific Electric and Sacramento Northern trackage abandoned since 1920 is not, therefore, included in this study.

⁷ Harold G. Moulton and Associates, *The American Transportation Problem* (Washington, D.C.: The Brookings Institution, 1933), p. 159.

⁸ Multiple causes of abandonments were common. In these cases, the mileages involved were placed in more than one category. Thus the percentage figures for the different causes of abandonment do not add up to 100.

⁹ See *Abandonment of Operation by Pajaro Valley Consolidated Railroad Company*, 145 I.C.C. 511.

¹⁰ For example, see two cases, both entitled *Northwestern Pacific Railroad Company Abandonment*, 158 I.C.C. 736 and 193 I.C.C. 416.

¹¹ *San Joaquin and Eastern Railroad Company Abandonment*, 193 I.C.C. 217.

¹² David F. Myrick, *Railroads of Nevada and Eastern California* (Berkeley, Calif.: Howell-North Books, 1962), 2 vols., pp. 209-210 and 589-593. The T & T was authorized for abandonment in 1946, but had not been in operation for several years. The date of I.C.C. authorization for abandonment is used as a basis for temporal classification throughout this paper.

¹³ H. Johnston, *Railroads of the Yosemite Valley* (Long Beach: Johnston-Howe Publications, 1963), p. 72.

THE AUTOMOBILE AND THE ROADS OF YOSEMITE VALLEY*

ALLAN K. FITZSIMMONS

ON APRIL 30, 1913, in a "Memorandum to the Press," Secretary of the Interior Franklin K. Lane proclaimed, "I have decided to allow automobiles to enter the Yosemite Valley."¹

The results of that decision are evident in the landscape of Yosemite Valley; changes have occurred that require analysis if similar decisions are to be made intelligently in the future. This paper inquires into modifications to the roads in the Valley during the period 1913-1966 in an attempt to ascertain the impact of the automobile on one aspect of the cultural landscape.

Vacation travel based upon private automobile transportation has become an established recreational activity, with the vacationing citizen utilizing non-urban recreational resources in ever-increasing numbers (see Tables 1 and 2).² Visitor increase to the outdoor recreational areas has received impetus from many sources. There have been increases in leisure time and in the emphasis upon leisure-time activities as our society has become more highly mechanized. More money has become available for private travel. Our population has steadily increased.

A most significant factor, however, in greater use of the recreational resources is the greater accessibility of the areas to the population as a whole. Such accessibility is made possible by privately owned automobiles and the highways upon which they travel. Each year more automobiles are registered throughout the nation. California alone had almost 9,000,000 autos registered in 1966 compared to 4,000,000 in 1950 and 120,000 in 1914.³ Moreover, the autos travel on a constantly improving system of multilane high-speed highways that greatly reduce time and effort in traveling from urban to scenic areas. The automobile is one of the most important factors which has brought about increased utilization of recreational lands.⁴

THE AUTOMOBILE AND YOSEMITE VALLEY

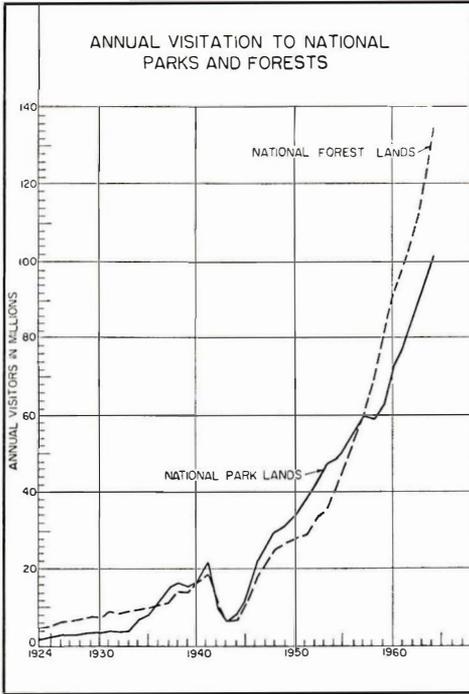
Prior to the automobile era, Yosemite Valley could only be reached by horseback or stage. The stage routes (via Wawona, Big Oak Flat, or up the Merced Canyon) were generally rough, dusty, and long. With the opening of the railroad to El Portal in 1907, a good deal of suffering was removed from a trip to the park, although a 12-mile stage ride was still necessary to reach the Valley from El Portal. The Wawona and Big Oak Flat routes remained jarring and dust-covered. These methods of travel brought slightly less than 11,000 visitors in 1912.

By 1915, two years after the auto had been admitted to the Valley, over 31,000 tourists visited the park.⁵ Visitations steadily increased so that by 1925 they had reached some 180,000 (see Table 3). On July 31, 1926, the all-year highway up the Merced Canyon was dedicated; two years later 340,000 people came to Yosemite Valley.⁶ From 1927 onward, the automobile has annually provided transportation for more than 90 percent of the park visitors.

The tourists required increasingly more facilities to match their increasing numbers. Needed were more accommodations, more restaurants, greater volume capabilities in retail food and dry goods sales, and generally more services of all types. The expanded facilities required expanded employee numbers, more service and support areas, and finally, the employees needed housing and certain "community services."

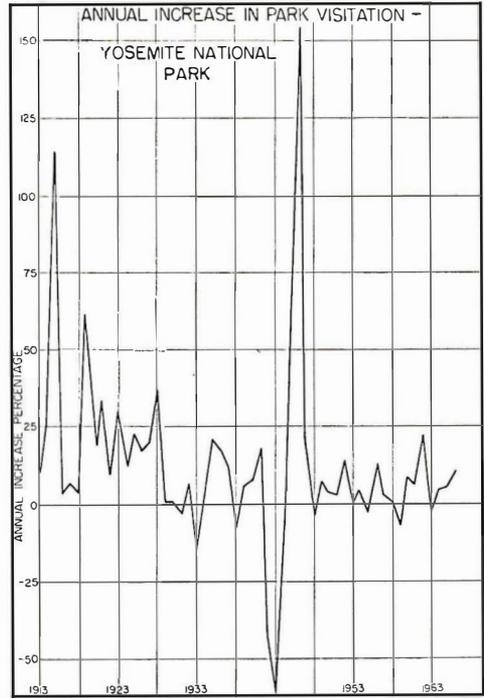
* This study summarizes parts of Mr. Fitzsimmons' master's thesis, *The Auto and the Cultural Landscape of the Yosemite Valley* (Northridge: San Fernando Valley State College, 1969). Mr. Fitzsimmons is currently a graduate student at UCLA.

TABLE 1



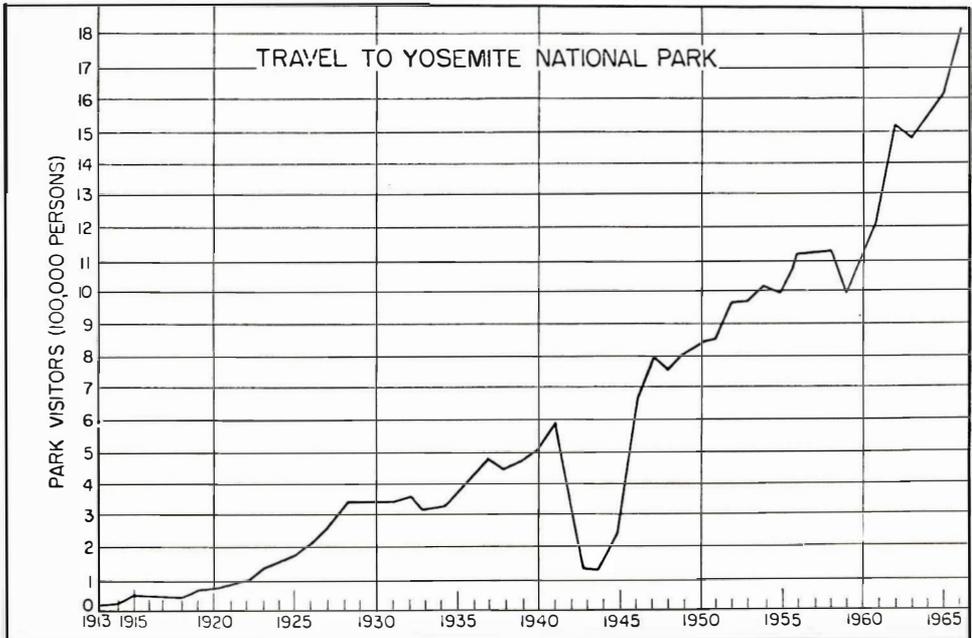
Source: Federal Lands Since 1956—M. Clawson

TABLE 2



Source: National Park Service Travel Summaries

TABLE 3



Source: National Park Service Travel Summaries

The increasing numbers of tourists and the continuing modifications to the landscape have created problems in maintaining the Valley in any semblance of a "natural" state. During the peak tourist season—June, July, and August—problems similar to those in many urban areas are common. Traffic congestion, overcrowding of public facilities, air pollution, and various unlawful activities are all typical summertime occurrences in Yosemite Valley.

CHANGING ROAD PATTERNS

The roads in the Yosemite Valley in 1913 were poor, not only by current standards but by the criteria of that day as well. The network of roads had evolved over a long period of time. The choices that man had made in selecting the early routes were made in the light of expediency: what was the quickest route to travel and which path offered the fewest obstacles to construction? The first report of the acting superintendent of the Valley, H. C. Benson, brought attention to the poorly designed road network. It called for planning and establishing a road system with an eye for aesthetic values.⁷

Benson was not the first to criticize the roads: similar comments appeared in *Century Magazine* in 1890.⁸ William Colby, writing about an 1894 visit to the Valley, regarded the roadways as random and excessive in terms of mileage.⁹ Figure 1 indicates that there were a number of unnecessary roads in the Upper Valley—no less than three routes led from the Old Village to Kennyville, a distance of about a mile. In addition, there were three routes between Camp Curry and the Indian Caves, with only a quarter mile difference in length between the longest and shortest paths. Further examination shows that there was a fairly direct route between each of the habitated sites in the eastern portion of the Valley. The roads were traveled by freight wagons, stages, horses, pedestrians, and occasional bicycles. They were subject to snow and rain in winter, sun and traffic in summer. Initially, the surfaces were composed of whatever substances underlaid the chosen routes. With the onset of the dry season and the accompanying period of heavy traffic, the roads annually turned to ribbons of dust.

Initial efforts to improve the road surfaces consisted of spreading gravel from the Merced River on the roadways. This work commenced in 1909 with a three-mile section of the South Road between El Capitan bridge and the Sentinel Hotel.¹⁰ The process continued until some 19 miles of road were covered with gravel by 1918.¹¹ Although gravel was an improvement, it was quickly broken down under the weight of heavy traffic, indicating that still further improvements in road surfaces were necessary.

In addition to inadequate surfaces, the roads of the Valley were narrow with abrupt turns. These conditions were such that in 1913, when autos were first admitted, only the North Road could be used by private automobiles and only for ingress and egress.¹² The roads were not considered suitable for private auto traffic,¹³ and all automobiles had to be parked for the duration of their visit to Yosemite Valley.¹⁴ Thus, when automobiles were admitted to the Valley in 1913, their owners found a poorly planned and overly extended network of dusty, gravel-covered roads extending over narrow and twisting routes.

VALLEY ROADS SINCE 1913

The roads of the Valley underwent varying degrees of modification in the years after regular automobile use began. Through time the new vehicles increased in number, weight, and speed and, as they did so, new pressures were applied to the road network—pressure that led to resurfacing, realigning, and construction of new roads.

Prior to the 1920's, work on the primary roads was heavily oriented toward repair, maintenance, and minor improvements of existing routes.† Each spring, repairs were necessary to put the roads into passable condition. The road surfaces needed renovating, ruts needed to be filled, and washed-out portions required reconstruction—this spring repair rite was annually performed until the roads were paved in the late 1920's. During the tourist season constant maintenance work was required to preserve

† The primary roads represent the principal means of through travel in the Valley. They provide routes extending the length of the Valley and link the camps, hotels and various sites of occupation and interest.

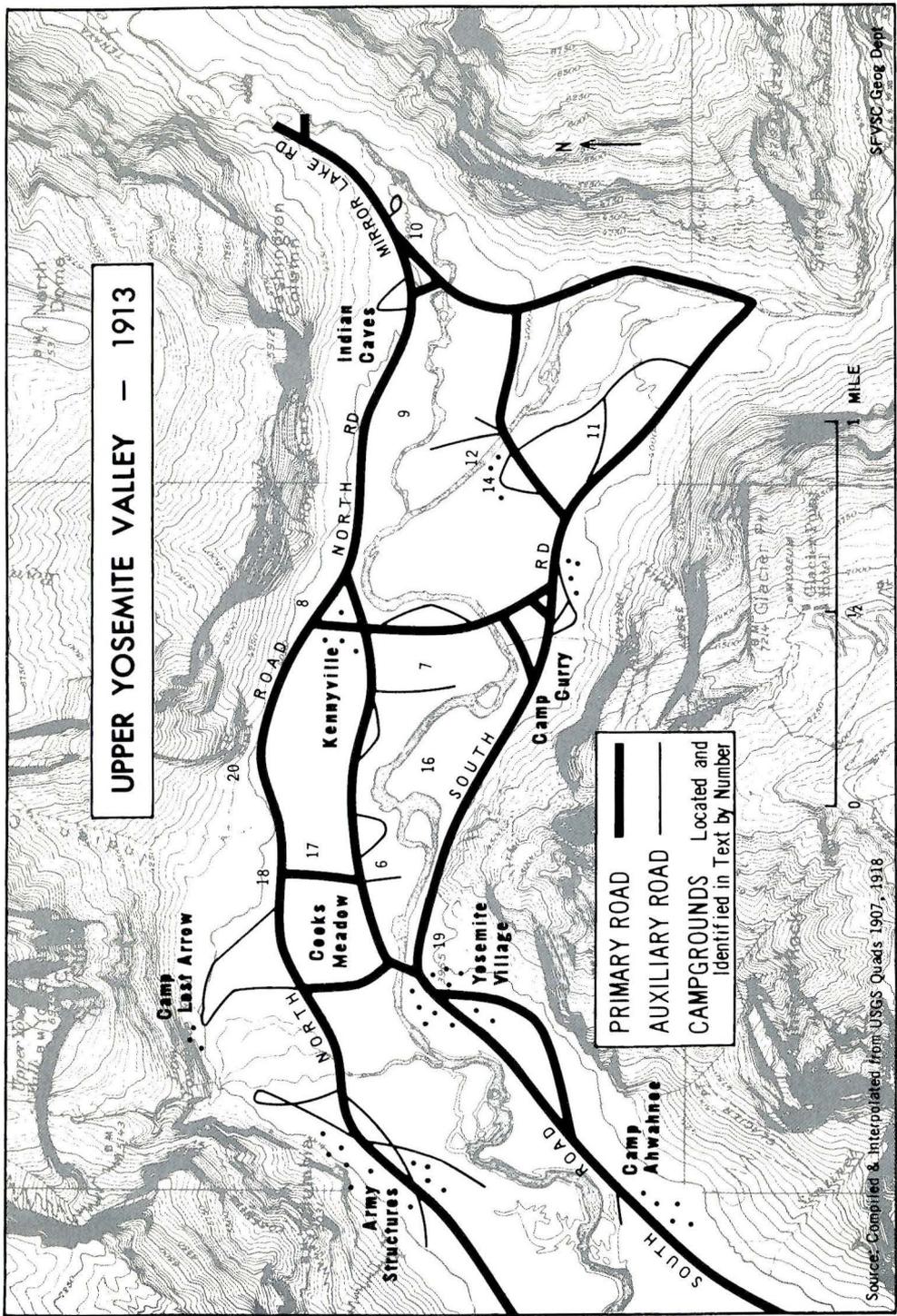


FIGURE 1

the roads in a passable condition, since the gravel surface quickly broke down under the heavy summer usage. Road crews, with horse teams and hand tools, worked throughout the summer and into the fall spreading gravel, sprinkling the roads, and effecting general repairs. These tasks increased in difficulty as more and more vehicles appeared in the Valley.

A flurry of activity took place in the 1920's and early 1930's; roads were widened, realigned, and paved. Beginning with the Mirror Lake Road in 1919, several of the roads were realigned.¹⁵ The Mirror Lake Road was relocated only a few yards from its previous route, but was wider and straighter. A new road was constructed through Camp 7 in 1921; with the eastern portion of the now dissected camp designated as Camp 15. The road across Cook's Meadow was built in 1924.¹⁶ The construction of the New Yosemite Village, dedicated in 1924, and the opening of the Ahwahnee Hotel in 1926 caused a realignment of routes in their immediate vicinity. The road to Kennyville via Camp 20 was truncated by the Ahwahnee Hotel, which was built on the former Kennyville site. The North Road was relocated southward, while a new road connecting Ahwahnee and North Roads was built in 1925.¹⁷ This period of activity also saw the completion of the Camp Curry bypass road and the relocation of the El Capitan Bridge and accompanying approaches about one-half mile eastward. Taken together, these modifications constitute the most significant change in the primary road pattern in all of the years since 1913.

While new roads were being constructed, the remainder of the system was also improved. *Construction Reports* consistently refer to work done in continued widening, the spreading of more and more gravel, and the improvement of bridge approaches. However, the foremost achievement was the paving of the Valley roads. The Bureau of Public Roads commenced paving operations in 1927 and continued work into the early 1930's. In the early fifties, the road across the Valley floor at the Old Village was eliminated and a realignment effected to provide a cross-Valley route just east of the old road. In 1956, a bypass road was constructed north of Yosemite Lodge. Nonetheless, from the mid-thirties until 1966, the close of this study, the primary roads underwent little change; the pattern and mileage of the roads remained nearly constant, as shown in Figure 2.

AUXILIARY ROADS

When the automobile entered Yosemite Valley in 1913, some five miles of auxiliary roads were to be found.‡ With the greatest efforts being expended upon improving the primary roadways, the auxiliary tracks received little attention prior to 1920. However, during the twenties the construction of the New Yosemite Village necessitated the building of access roads to and among that growing complex of structures; campgrounds also received new or extended roadways at that time. As new facilities were constructed, the auxiliary network expanded to provide access to the newly habited areas.

The early and mid-thirties was an active period in the development of access and service routes. While some new auxiliary road construction occurred in the western portion of the Yosemite Valley, most of the work was accomplished in the eastern half of the Valley within the campgrounds, primarily Camps 11, 12, and 14. Little additional work, save maintenance, was done until the fifties when expansion of Yosemite Village, its adjacent maintenance and residential area, and Yosemite Lodge necessitated substantial extension of the auxiliary roadways.

SUMMARY

The pattern of the primary roads has remained remarkably constant through time, especially when the vast increase in the number of visitors is considered.¹⁸ There are, to be sure, differences between the 1913 and 1966 patterns: the El Capitan bridge has been moved, some relocation of mid-Upper Valley roads has occurred, and two bypass roads are now evident. However, these changes represent only minor modifications of

‡ The auxiliary roads consist of camp roads, roads in concessionaire and residential areas, roads to service facilities and the like.

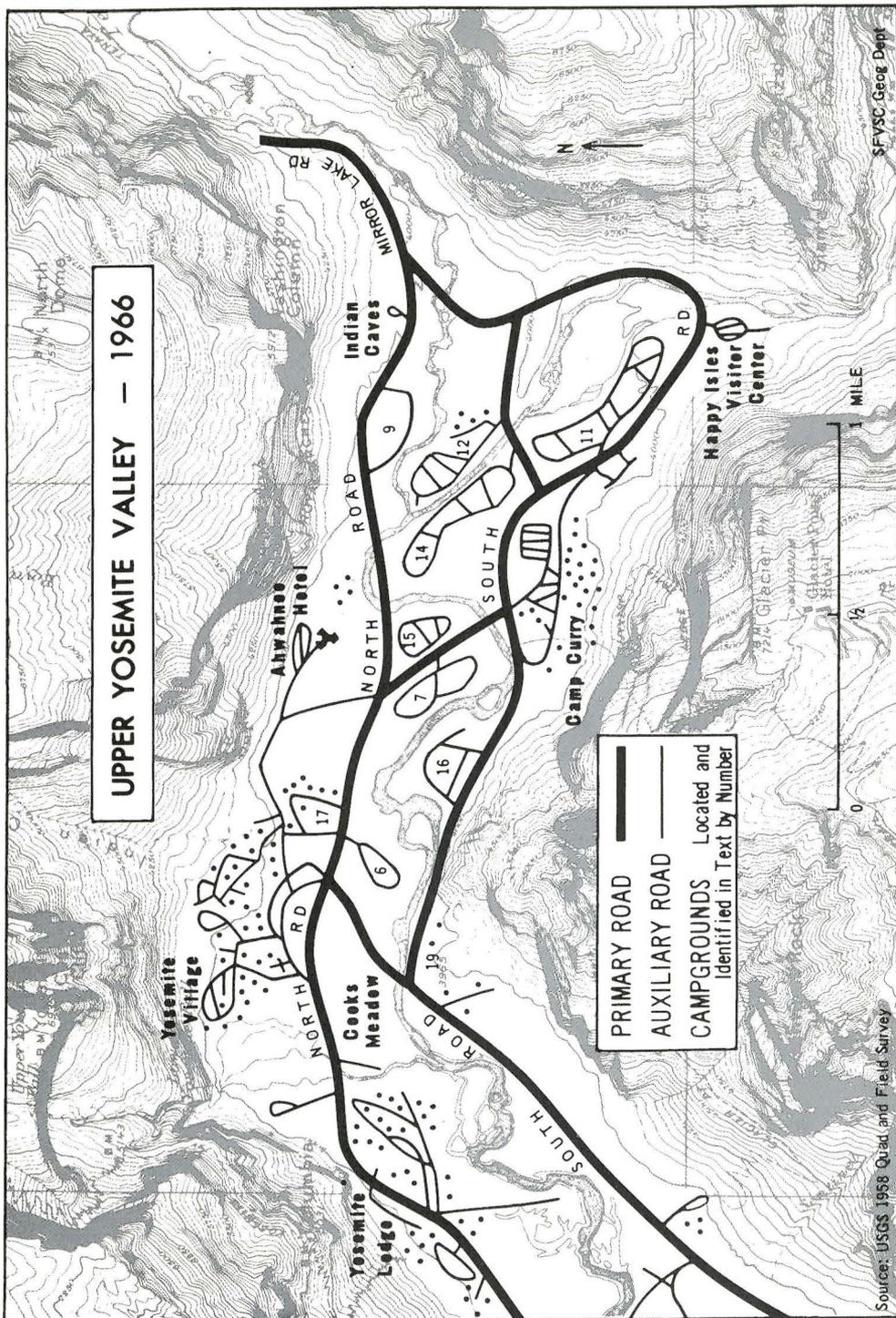


FIGURE 2

the overall network. There are still three routes from the Old Village site to the Kenneyville site and there remain three ways to go from Camp Curry to the Indian Caves just as there were in 1913. The mileage of the primary system has remained essentially constant; there were approximately 19 miles of road in 1913 and 18 miles of road in 1966. However, the roadways of 1966 are wider and straighter, are paved, and have a much greater carrying capacity than did their 1913 predecessors.

Modification of the auxiliary road network was accomplished by expansion into areas previously lacking such roads, and by intensification of the existing pattern. The most notable changes occurred in the area north of the New Village. These changes represented an expansion into a previously undeveloped area and were made to provide access to the growing service and residential complex located there. All the facilities constructed in the Valley to provide warehousing, maintenance, and support for the tourist centers required access routes. Thus, the auxiliary system increased from five to 15 miles in length, while the primary system remained nearly static.

CONCLUSION

The substantial lack of change to either the length or pattern of the primary roads since the admission of the automobile may be accounted for by several phenomena. First, the limited size of the Valley, some 2,400 acres, and its long, narrow, often-constricted shape restrict possible route changes. Additionally, the periodically flooded Merced River and the limited, permanent ingress-egress points inhibit practical choices for wholesale pattern modification. Finally, the extended nature of the pre-1913 network made substantial changes of pattern and length unnecessary. While no marked change to the pattern or length of the primary road network was caused by the auto, paving of the roads was primarily a response to the continued and lasting presence of the auto in Yosemite Valley.

The extension of the auxiliary network was made necessary by the influx of auto-borne visitors over the years. And, visitors' needs expanded with their numbers. These constantly increasing needs were fulfilled by the construction of more and more facilities within Yosemite Valley, each requiring access and connecting roads.

In general, changes to the roads of Yosemite Valley since 1913 have made a less significant impact on the Valley scene than changes made to other elements of the cultural landscape. Modifications to residential patterns, tourist accommodations, maintenance and service facilities are all quite visible in the Valley scene. The change in meadow usage from providing feed for the substantial pre-auto animal population to providing scenic attractions for auto-borne tourists is another post-auto landscape modification.

There is room for a great deal of improvement in the movement of people about the Valley. Traffic problems are serious and harmful to both the park and the park-experience of the visitors. Several methods of alleviating transportation difficulties are being studied and some are being implemented.¹⁹ Additional possibilities include restricting the use of automobiles in the park with local transportation handling all travel in Yosemite Valley. Reconstructing the road network to optimize traffic flow and simultaneously reduce the impact on the natural scene is another approach.

The ultimate solution involves prohibiting the use of automobiles in the Valley. But whether such a solution could be implemented, is a real question. Society must accept the fact that more stringent regulations on the use of resources are needed to cope with the increasing population pressures on the land.

REFERENCES

¹ From a "Memorandum to the Press" as quoted by Richard Lillard, "The Siege and Conquest of a National Park," *American West*, V (Jan., 1968), p. 69.

² Clifford Zierer, "Tourism and Recreation in the West," *Geographical Review*, XXXXII (March, 1952), p. 463.

³ From a statistical abstract received in a personal communication with the California Department of Motor Vehicles.

⁴ Zierer, *op. cit.*, p. 476 and C. Frank Brockman, *Recreational Use of Wild Lands*, (New York: McGraw-Hill, 1959), p. 19.

⁵ From a National Park Service statistical abstract received in a personal communication with John Krisko II, Valley District Naturalist, Yosemite National Park.

⁶ *Yosemite National Park Travel Survey of 1953*, p. 12.

⁷ H. C. Benson, *Report of the Acting Superintendent of the Yosemite National Park*, 1907, p. 9.

⁸ Lucius P. Deming, "Destructive Tendencies in Yosemite Valley," *Century Magazine*, XXXIX (Jan. 1890) p. 477, and George MacKenzie, "Destructive Tendencies in Yosemite Valley," *Century Magazine*, XXXIX (Jan. 1890), p. 476, and "The Care of the Yosemite Valley," *Century Magazine*, XXXIX (Jan. 1890) an editorial, p. 474.

⁹ William Colby, "Yosemite Then and Now," *Yosemite Nature Notes*, XXXII (March, 1953), p. 29.

¹⁰ William Forsyth, *Report of the Acting Superintendent of the Yosemite National Park*, 1909, p. 8.

¹¹ Stephen T. Mather, *Report of the Director of the National Park Service*, 1918, p. 133.

¹² Ruth Wood, *The Tourist's California*, (New York: Dodd, Mead and Co., 1914), p. 194-195.

¹³ George V. Bell, *Report of the Acting Superintendent of the Yosemite National Park*, 1915, p. 14.

¹⁴ William T. Littebrant, *Report of the Acting Superintendent of the Yosemite National Park*, 1913, p. 37.

¹⁵ Gabriel Sovulewski, *Construction Reports of Gabriel Sovulewski 1916-1927*, Nov. 1919.

¹⁶ *Ibid.*, Oct., 1921 and Dec. 1924.

¹⁷ *Ibid.*, Aug., 1925 and Dec. 1925.

¹⁸ Some 12,000 visitors in 1913 compared with 1,800,000 in 1966.

¹⁹ The use of inter-Valley shuttle buses and the conversion of several Valley routes to one-way roads are examples.

RECENT PUBLICATIONS—THE AMERICAN SOUTHWEST

R. W. DURRENBERGER

Water Development and Water Planning in the Southwestern United States, Johannes Humlum, Kulturgeografisk Institut, Aarhus Universitet, Denmark, 1969. 240 pp. \$23.50. Distributed by Humanities Press, New York.

The fruits of long and diligent research into problems of water resource development in the American Southwest are apparent in Professor Humlum's excellent monograph. He has drawn on firsthand observations derived from four field excursions into the area—the first of which occurred in 1939. His bibliography includes most of the basic sources needed to complete such a difficult and extensive task. The book contains chapters on the Central Valley Project, the California State Water Project, water development in Arizona, inter-regional water transfers, and recreational use of water. In addition, the author has made effective use of a series of quotations from various sources (but principally from two conferences on water problems held in California in 1957 and 1961) to present various viewpoints on significant water development problems. Professor Humlum has included enough maps and photographs to satisfy even the most critical geographer. Although one might quarrel with some of Humlum's statements and conclusions, he must be commended for completing an awesome task which represents a significant contribution to the literature of geography.

The Call to California, The Epic Journey of the Portola-Serra Expedition in 1769. Richard F. Pourade, Union-Tribune Publishing Company, San Diego, 1968. 194 pp. \$9.50. Distributed by the Ward Ritchie Press, Los Angeles.

James S. Copley, Chairman of the Corporation, The Copley Press, Inc., is to be commended for publishing the fine series of books on California which included *The Explorers*, *Time of the Bells*, *The Silver Dons*, *The Glory Years*, *Gold in the Sun*, and *The Rising Tide*. *The Call to California* is a representative example of the high quality of the books in this series which form the basis for understanding the sequent occupancy of California. The author, formerly editor of the *San Diego Union*, skillfully interweaves excerpts from the diaries of Costanso and Crespi and others in a picture-text journey along the Portola-Serra route from Loreto in Baja California to San Francisco Bay. Black and white and colored photographs of sites along the route were taken at approximately the same time of the year that members of the expedition observed them.

In three areas which have been altered by the march of civilization, paintings have been used to re-create the landscape. Other than retracing the route yourself, there is no better way to understand the problems and joys that these first explorers experienced.

Sunset Travel Guide to Arizona, Lane Books, Menlo Park, 1967. Third printing, 1969. 96 pp. \$1.95.

Southwest Indian Country, Lane Books, Menlo Park, 1970. 80 pp. \$1.95.

Geographers exploring the American Southwest should always include in their packs copies of the Sunset travel guides for the regions they are visiting. The Arizona guide is typical of the series which has been used for years by Californians in their recreational forays both in and out of the state within Sunset territory. *Southwest Indian Country* is divided into four sections which provide the traveler with information about the following groups: (1) the Navajo, Hopi, Hualapai, and Havasupi of Northern Arizona; (2) the Pueblo villages of New Mexico and the Ute reservations of

southern Colorado; (3) the Apache tribes of Arizona and New Mexico; (4) the Pima, Papago, and "river people" of southern Arizona. Both books are illustrated with superb black and white photos and maps of the areas involved. *Southwest Indian Country* also contains a brief bibliography of readily available books which should be consulted by individuals planning to explore the Southwest Indian country.

The American West: Frontier and Region. Interpretations by John Walton Caughey, edited and with an introduction by Norris Hundley, Jr., and John A. Schutz. The Ward Ritchie Press, Los Angeles, 1969. 287 pp. \$10.00.

The American West: Frontier and Region is not only the title of this book but also the lead selection in this collection of John Caughey's writings put together by two of his former students. Their laudatory foreword is essential reading for those who have used Caughey's texts or read any of his other works. The chronological bibliography of Caughey's publications should be consulted by all who are not familiar with his works.

Of greatest interest to geographers are the selections in Part I which deal with regionalism and regional characteristics of the West. "California in Third Dimension," in *Part III—California*, is an excellent discussion of the literary resources available to the student of California history. The collection belongs on the shelf of every scholar concerned with the historical development of the state.

The California Coast, edited by Donald C. Cutter, University of Oklahoma Press, Norman, 1969. 278 pp. \$7.50.

Originally translated, edited, and annotated by George Butler Griffin, the nineteen Spanish documents from the Sutro Collection constitute one of the important sources on early exploration and settlement of California. First printed in the *Publications of the Historical Society of Southern California* in 1891, the documents have been re-edited by Don Cutter of the University of New Mexico, one of the leading Southwestern historians. The documents consist principally of letters written by the dominant historical figures of Early California: Vizcaino, Peña, Serra, Crespi, and the Viceroy of New Spain. Peña's and Crespi's diaries, in particular, contain many observations of the land and the people of California.

The California Revolution, edited by Carey McWilliams, Grossman Publishers, New York, 1968. 240 pp. \$6.50.

Carey McWilliams is known to most Californians because of the books that he has written about the state. However, it was as an editor of *The Nation* that he brought together this magnificent collection of essays about the state of California. Although only two of the essays are by geographers, all seventeen of the articles would be useful collateral reading for geography students. In particular, Dan Luten's "The Dynamics of Repulsion," Howard Gregor's "Water and the California Paradox," and Dick Lillard's "The Soil Beneath the Blacktop" are recommended.

California: Two Centuries of Man, Land, and Growth in the Golden State, W. H. Hutchinson, American West Publishing Company, Palo Alto, 1969. 351 pp. \$10.00.

The title of W. H. Hutchinson's book is an intriguing one and one that promises much. However, to a professional geographer the book is somewhat disappointing. There is little statistical analysis of economic or population data and the only graphic material consists of reproductions of a few maps. However, it serves the purpose for which it was written well. It is a popular picture history of the state and is well worth its price because of the photographic record of changing landscapes and life styles which it presents. One should not expect definitive statements on such topics as urbanization or the impact of water on the land. It remains for some geographer to create a good historical geography of the state.

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