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LEARNING THROUGH LANDSCAPE

*Christopher L. Salter**

You can see with your eyes. You can see with your mind's eye. You can see anew the landscapes that you have known many times before but have not seen. You can see landscapes that you have never even anticipated; and you can see daily scenes that take on new meaning because of new demands you make on your own views. All of these capacities of sight and sense are part of the human potential. All of them relate to landscape; each of them requires vision. Each of them--as is true with all other senses --can afford you learning through landscape.

The mind attempts to organize each vista it encounters. The criteria for such organization are signaled by your own sense of what the function of the view is--what is the purpose of imagining that which is before you? For example, if you are a person in flight from a rabid dog, your views of the landscape will search for certain features such as phone booths, open shops, black and white cars, or even trees. If that same landscape is encountered as you are leading a group of fifth graders to a public park, a wholly different set of responses is created by the same landscape. In this case architecture, names on the stores, even the nature of the music and language that drift out of the open windows will be the image makers.

What is critical is the act of seeing. What is vital is the acknowledging of image--not image as a passive, remote collection of static inputs, but image as the dynamic presence of landscape elements. And it is the creative act of seeing that enlivens the image. We, as geographers, are blessed with the most exciting of educational mediums when we realize how much

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*Dr. Salter is Associate Professor of Geography at University of California, Los Angeles. This paper is Dr. Salter's Presidential Address at the Long Beach Meetings, May 1, 1976.

we can learn and teach through an aggressive use of our landscape. All we have to demand of ourselves is that we can see the rich potentials for learning in the field around us.

Think for a minute of another view on seeing. Carlos Castanada in his Don Juan quartet concludes his ten-year apprenticeship by finally "stopping the world." This act of time withdrawal and self withdrawal is predicated upon one single feat--he (the apprentice) must learn to "see." In the words of Castanada, this heightened vision meant "responding to the perceptual solicitations of a world outside the description we have learned to call reality." Think of that again, "to respond to perceptual solicitations of a world outside ... reality." This was not a drug vision; it was not even a mystic vision. It was an exhortation to intensify vision through looking harder, with more energy, with more faith at the world of Don Juan. Phrased more simply in another part of the Quartet, it was a requirement to "feel with the eyes." This is seeing.

The questions that we must ask as geographers are two: What are the returns on learning to see landscape; and how shall we educate ourselves and others to gain this vision? Why shall we seek vision: How shall we gain vision?

Let me answer the question of rationale first. There are two basic components to the patterns of people and their progress. One component is the time slice which provides us with blocks of the past to study. History has traditionally used this mode for the cataloguing of man's activities, and all of us have been nurtured on such a segmenting of man's past. The other component of this learning approach is the space slice. By space, I mean the raw material of which our humanized landscapes are created. All landscapes are hosted by space; all space runs the risk of being transformed by society. Space is meant to accommodate our landscape sculptures. In the consideration of the space slice time is, in a sense, disregarded, while we examine the nature of the spatial organization of a given society. For, just as societies have had countless decisions to

make as to how to marshall their time, so too, have there been an infinite number of decisions about how to shape their environment. Geography is the discipline that is most concerned with such patterning of space. It is this facet of our learning demands with which we are most concerned in our comments this evening.

Five Geographic Themes Leading to Learning Through Landscape

Whether or not a person has had any training in geography the discipline can make available to him five fundamental themes which are helpful in the study of society. The themes are:

1. Space and its charactertstics
2. The modification of natural space
3. Changing perceptions of space utility
4. Institutions created to govern the design of space
5. The social responsibility of the geographer-educator.

To this suite of themes we need add only one question: Is the landscape that we are studying designed in the best interests of its inhabitants? Does it work for them? Will it continue to work for them? How might we as geographers--learning from that landscape--redesign it toward more effective and/or satisfactory space use?

The First Theme: Space and Its Characteristics

There is a subjective and an objective landscape. The subjective landscape relates to environmental perception. The objective landscape is the basic physical reality which a people must deal with as they play out their social, spiritual and survival roles. The conditions of soil, topography, streams, seacoasts and climate are elements of that objective scene. As the set of a stage drama is exposed to the audience for some moments before the players assume their roles, so, too, must a person interested in any specific place and people, give some

preliminary time to quiet and pensive observation of the physical elements of the landscape. This is not to say that these particular qualities force the elaboration of certain cultural patterns, but it is essential to acknowledge the kinds of constraints and benefits a people experience as they attempt to meet needs of food, shelter, clothing, water, and other minimal creature comforts within a given habitat. Just as critical, however, is the institutional matrix each new generation is faced with. It is tradition and not necessity which has us initiate our investigations with consideration of the physical setting.

However, what must be realized in this learning process from the physical environment is that even features as bold as river channels and mountain ranges may be assessed in different ways by different observers. To a nomadic and pastoral people who are compelled, for example, to move their flocks hundreds of miles each year, a river might well be perceived as a frightening component in their environment. To a farming people in the same area, however, the flow of that river might mean the difference between an abundant harvest and famine. At the outset, therefore, it is essential to discuss the landscape and its physical elements in the most objective of terms. What is the relief of the area? What is the annual rainfall, and what is its variability? How long is the growing season? What is the nature of the soils of the region? Even these questions, however, grade into the subjective: How isolated is the region? What crops can be grown there? What flood potential exists as a result of the stream modification done by human groups? How hospitable does the environment seem to be?

If these questions about the spatial characteristics of the objective landscape are considered, asked, and answered as one begins to look at the nature of society in the region, then it will be easier to understand how the people have sculpted a world for themselves in their particular habitat.

The Second Theme:
Modification of Natural Space

One of the most immediate human responses to placement in a new setting is to make a mark that is his or hew own. Whether one thinks of new curtains in a kitchen, a new arrangement of a homeroom, a new pattern in a garden, or a new logo on a publication, there is a deep-seated call to make one's own mark. On the one hand this modification decision may be described as a functional response to environmental needs, but in virtually every instance of this kind there is also latitude for personal design inputs. The assessment of these facets of individual and idiosyncratic creation is an evocative feature in the analysis of humanized space.

In a broader realm, the decisions people make in regard to settlement patterns, house types, agricultural systems, transportation networks and methods of commercial and industrial organization are all indicators of cultural preferences. It is this individuality which is so expressive of what we must call humanity; it is this same quality of individuality which gives cultural geography so much of its pathos, and it is this tandem quality of cultural uniqueness and individual design that makes the modifications in the creation of a cultural landscape the equivalent of an art form.

This view of landscape as a canvas for the artistic expression of all people is the very quintessence of geographic education. When we view the world around us not as drab acceptance of economic reality, or mute acknowledgement of cultural constraint, but study it rather as individual experiments in popular design, then we have really begun to learn through out landscape. Like the person who is amazed to find out that he has been speaking prose all his life, think of the joy our educational process could bring to a person to whom we say, "You've been creating art all your life in your apartments, your garden plants, your clothes ... and even in your choice of entrees."

We must assign the title of art to this second theme--this study of the modification of natural space.

The Third Theme:
Changing Perception of Space Utility

As noted above, a river system might be seen as an example of the objective landscape. No one can deny the existence of the channel cut or the seasonal rise and fall of the water level. However, the perception of that landscape feature can change very quickly. If, for example, that river has been a source of anxiety to the surrounding population because of traditional flooding, then it is bound to be evaluated in one way. But, if a significant modification of the stream upriver results in a stable, predictable flow, the response to it may be modified quite rapidly. Examples of features in the landscape which may be subject to rapid changes in perceived utility might include physical features such as marshes that become valuable--or lose value--because of wildlands legislation; coastal mudflats that are enhanced because of the discovery of petroleum; or desert land that suddenly appreciates in value because of zoning changes to allow airport construction.

The roles of technology, economy, and aesthetics are critical to any consideration of this process of valuing. It is the changes in these realms which serve as the catalysts for new resource appraisals. Whether speaking of a primitive people or of the most urbane populations, it is cultural systems which must change to accommodate the use of all but the most fundamental resources. Coal, for example, was long seen as a nuisance before it was accorded high resource value. Hunting and gathering groups place value on plants and earth substances which to other groups would consider using. There are even seasonal changes, or even shorter term changes we experience which have us assign a higher value to tuna and potatoes at the end of the month than at the beginning.

The critical factor to relate to in this theme of varying perception of space and landscape is the theme of change. What our burden as geographers must be is not only perceiving the nature of the change, but comprehending its rationale. What factors have stimulated it? What direction is the change taking? How effective is the change for the society in question?

The Fourth Theme:
Institutions Created to Govern
the Design of Space

There is nothing innovative about pointing out the fickle nature of man in his romance with space and place. Such an observation is in that class of verities which lead one to say, "Yes ... yes, of course. I've known that all along, although I may not have said it just that way." This theme then, is a continuation of the third theme above--the concept of changing perception. Not only do societies change their views on the value of certain space and space modifications, they create institutions to organize and direct such modifications. The shaman, for example, is exhorted to create sacred space. City councils have the power to limit new housing starts. State legislatures may cause whole cities to bloom in the desert simply because of the allowance of gambling. The examples are without limit. Each society which acknowledges its own ability to shape space creates social organizations to oversee the shaping and use of that very space.

The role of the geographer in considering this cultural phenomenon is to ask questions about who is given authority to design landscapes. What status is given to the people who have the power to assign the title of "private" to plots; to designate ceremonial foods? to give certain season to certain acts of landscape modification? In every case the geographer--the explorer of landscape--is trying to understand the morphology, the genesis, and the evolution of such patterns of space.

The final question to be asked about particular landscapes and the people who transform them is, "is this a productive use of space for this population?" If we can learn not only how space is transformed, but also how well present configurations mesh with the social needs of the population under scrutiny, then we have put geography to its best uses. And in this process we have learned that much more about the basic nature of humankind. This final theme is, then, . . .

The Fifth Theme:
The Social Responsibility of
the Geographer-Educator

It will not do for us to be satisfied with mere academic inventory-taking of this process of landscape development. The speed with which new vistas are being created requires that the body of decision-makers be enlarged. Changes are carried out on such a large scale that there is a real need to acquaint more people with the potential influence and responsibility they possess for the shape of the world around them.

Geographers--who traditionally have withdrawn from any social use of their discipline--must educate students and public alike in the process of landscape evaluation and consequent civic participation. If the web of freeway interchanges, for example, is offensive, thought must be given to analysis of the alternatives in an urban transport network. Speculation as to the probable impact of a policy of freeway elimination will illustrate what other ramifications such an act would have. Are such alternatives superior? For whom? And what are the means of influencing the policy-makers? Where does the decision-making power lie?

Or, consider the termination of the development of tract housing. What social costs are there to be paid if large scale housing developers are disallowed within or on the margins of urban areas? What will this mean for patterns of home ownership, settlement, maintenance of older communities? The

answering of these, and similar questions, should lead all of us to realize that geography is an absolute keystone in the process of liberal education at any level. While landscape may be the focus of our syllabus, we can see that the critical process of culture development and social interaction and the vehicles, the dynamic elements, of this creation of the humanized earth. It is our responsibility to make sure that our students see this just as clearly.

To conclude, therefore, reflect on these geographic themes:

... space and its characteristics
... the modification of natural space
... changing perception of space utility
... institutions created to govern the design of space
... the social responsibility of the geographer-educator

The study of these phenomena is the study of humankind. And the locus for this study is the landscape. Let us, the practitioners of the single discipline which grants the landscape the vitality it truly possesses, give energy and creativity to the act of learning through landscape.

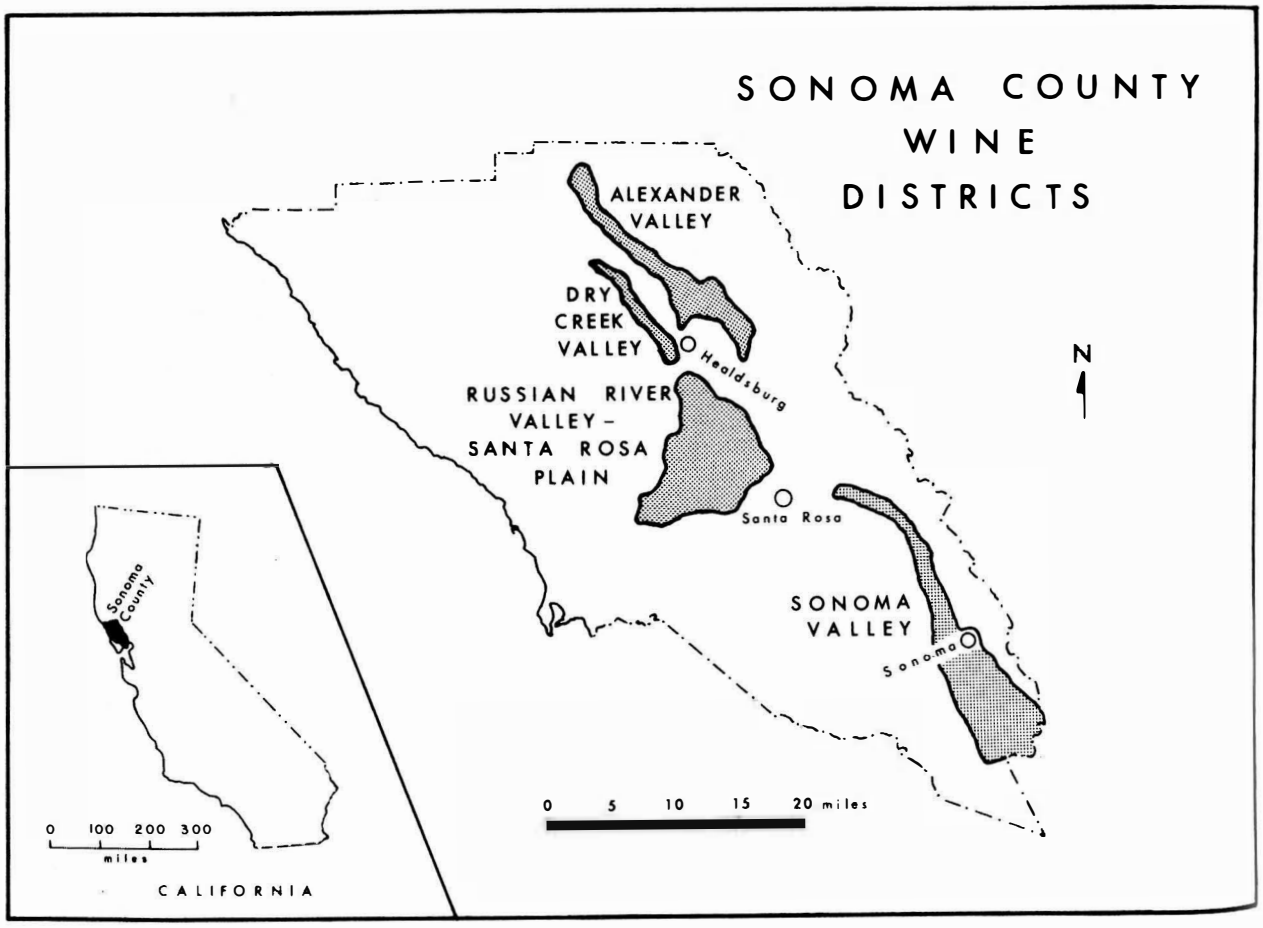

Figure 1. The California North Coast Wine Grape Region Showing Sonoma County.

GRAPES CONQUER PRUNES: VINEYARD AND WINERY EXPANSION IN SONOMA COUNTY, CALIFORNIA

*William K. Crowley**

In the late 1960's the people of the United States began to sharply augment their intake of wine.[1] From 1969 to 1972 per capita wine consumption in this country increased by an average of 12 percent per year.[2] Increased consumption obviously meant that more wine had to be produced somewhere. The bulk of the new American demand was filled by the United States, rather than foreign sources, and within the United States the demand was met, to an overwhelming extent, by California producers. Three-fourths of the wine drunk in the United States is made in California and the Golden State's response to the widening national market was immediate and spectacular. In the seven-year period from 1968 to 1975 California wineries nearly doubled their sales. During the same period acreage in winegrapes in California increased by 132 percent.[3] America's new wine thirst created "boom" conditions in the California wine industry.

The impact of the wine boom has had varied effects amongst the different winegrape growing regions of California, since each wine region has its own unique set of characteristics. Some areas have emphasized large vineyards and large wineries, others have focused on smaller operations. In all reqions, however, the latest emphasis has been on table wines. Nearly every wine district has seen table wine varieties invade valleys and hillsides never before planted to vines. Dozens of new wineries have been constructed and old ones have been generously expanded to process the added tonnage.

To illustrate the stimulus of the wine boom on a particular locale, Sonoma County has been selected as a case

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study area. This county is one of California's most vinous areas, and one where table wines were first emphasized well over 100 years ago. While possessing the usual claim to a certain degree of uniqueness, many of the trends present in Sonoma mirror state-wide operations. The purpose of the study is to demonstrate how both the vineyard and the winery have responded to recent developments.

Location and Historical Development

Sonoma County is situated north of San Francisco Bay, just west of the more widely famed Napa County (Figure 1). In contrast to Napa, where one valley and its adjacent hillsides represent the bulk of the plantings, Sonoma County has four major winegrowing districts: The Sonoma Valley, the Alexander Valley, the Dry Creek Valley, and the North Santa Rosa Plain-Russian River Valley. Each of these districts is physically distinct, but not by any means are the districts necessarily internally uniform climatically. Parts of different districts may be more similar than two ends of the same district (e.g., the southern part of the Sonoma Valley is more like the western end of the Russian River Valley growing area, than the northern end of the Sonoma Valley).

Sonoma County is deep in wine history. Viticulture in the area dates to the establishment of the San Francisco Solano Mission in the town of Sonoma in 1823. By the 1850's vineyards were being widely planted. One of the principal individuals responsible for winegrape development during the mid-nineteenth century was the so-called "Father of California Viticulture," Agoston Harazsthy. He gained his fame while in Sonoma where he imported large numbers of European vines for dispersal around the state. Both verbally and in print Harazsthy expounded upon the worthiness of the Sonoma area as a wine producer, and attracted many growers and a good deal of investment into the county.

In the 1860's Sonoma became the leading wine producing county in California, and two decades later local wines began to

receive international acclaim as gold medals were won at wine tastings in Europe and in the United States. Vineyard acreage and winery numbers showed a general increase in these years (with certain significant setbacks at times). This trend continued into the twentieth century, and by 1920 the number of registered wineries in Sonoma County was 256.[4]

The Depression arrived, however, and a mammoth slump in the wine business ensued. Sonoma County vintners lapsed into a prolonged somnolency. Vineyards were pulled out and wineries were closed. By 1933 there were only 160 wineries in all of California, compared to the figure of 700 in 1920.[5] The glum conditions endured until the late 1960's. Prices for grapes were low ($112 per acerage ton in 1967 in Sonoma County) and in Sonoma the number of wineries had dwindled to less than 25.[6] Then came a drastic, almost overnight change. Between 1968 and 1975 the county witnessed a resounding revival of vineyard development, and winemakers new and old began an attempt to regain Sonoma County's pre-Prohibition wine reputation.

The Vineyard

In 1967 Sonoma County had but 12,800 acres of winegrapes. In 1975 the total had climbed to 24,600 acres, a 92 percent increase in a mere eight years.[7] One wonders where 12,000 acres are suddenly discovered that are suitable for vineyard production. The availability of such a large amount of land was made possible in Sonoma County because the prune industry was in a tight squeeze at about the same time that winegrapes became popular. Prune orchards were ripped out and vineyards were planted. The county lost over 11,000 acres of prunes between 1965 and 1975.[8] This land use conversion suggests that the world is not all bad if humans have begun to substitute wine for prune juice. But not all vineyards occupied prune orchards. Apple and pear orchards, and also pasturelands gave way to the advance of the grape.

In Sonoma County the planters of these thousands of acres of grapes have varied backgrounds and own widely varying

amounts of land. There are many small and medium-sized holdings (10 acres to 200 acres) in vineyards in contrast to trends toward large holdings, many over 1,000 acres, in places like Monterey County on California's central coast, and in several Central Valley counties.

The largest single landholder in Sonoma County is Sonoma Vineyards with about 2,000 acres, part of which is in Mendocino County to the north. Italian Swiss Colony has 2,000 acres (only 800 of which are in vineyards). There are several other large holders with greater than 500 acres, the most famous of which include Gallo with approximately 700 Sonoma County acres, and Widmer Vineyards, a large upstate New York winery with 500 acres. Companies such as Prudential Insuance are also involved in Sonoma vineyard ownership.

In addition to these relative giants there are a myriad of lesser holdings, in the hands of retired executives, retired airline pilots, former aerospace engineers, city folk who have retreated to a hoped-for utopia in Sonoma wineland, and long-time farmers, especially of Italian heritage, who have been on the scene through boom and bust.

With such a variety of vineyardists and sizes of holdings, one might suspect great variation in the kinds of grapes they have planted. Surprisingly, although many grape varieties are involved, the response has been uniform in terms of the "class" of grapes cultivated: premium wine grapes for premium table wines. This trend represents a change for Sonoma County, and a reversion to nineteenth century conditions. The truth is that Sonoma County had become a bulk wine producer prior to the recent boom. Most wine made in the county was sold by the barrel to other wineries who then bottled the wine under their own labels. In 1967, 85 percent of the value of the grape crop was represented by commons, and only 15 percent by premiums. Contrast this figure with that of 1974, a short seven years later, when premium grapes accounted for 65 percent of the harvest value, and commons only 35 percent.[9] The premium

portion will increase even more in the next few years as newly planted vineyards begin to produce.

Further evidence of the increased importance of premium grapes is supplied by noting which varieties are the most widely planted (Table 1). In 1969 the bearing acreage (i.e., those vineyards producing a crop) was dominated by commons. Zinfandel and Carignane accounted for nearly one-half of the total, while the two most premium reds, Cabernet Sauvignon and Pinot Noir, accounted for only 5 percent of the acreage.[10] In 1974, Cabernet Sauvignon and Pinot Noir comprised more than half the total in non-bearing vines, while the two leaders in 1969 made up less than 7 percent of the new plantings.[11] By 1974, one acre in five that was planted to vineyard, both bearing and non-bearing, was planted to Cabernet Sauvignon, which became the single most important variety in Sonoma County, finally surpassing Zinfandel. This is proof positive that Sonoma once again seeks a name in the world of premium wines.

TABLE 1. Percent of Total Wine Grape Acreage in Selected Grape Varieties in Sonoma County

Variety	1969 Bearing	1974 Non-bearing	1974 Total
Zinfandel	32	6	13
Carignane	16	1	8
Cabernet Sauvignon	3	31	20
Pinot Noir	2	23	12
French Colombard	6	1	5
Chardonnay	1	17	11

Source: Sonoma County Department of Agriculture, *Agricultural Crop Report 1969* (Santa Rosa, California: County of Sonoma, 1970), pp. 10-11, and California Crop and Livestock Reporting Service, *California Grape Acreage 1974* (Sacramento: United States Department of Agriculture and California Department of Food and Agriculture, 1975), pp. 19, 20, 22, 27, 32, 35.

Although Sonoma County has gone the premium route for wine production, it has not changed the color of its wine. Nearly three-fourths of the grapes planted now, as before, are used for producing red wines. Among the whites, however, the same trend of switching from commons to premiums can be seen. Chardonnay, the supreme white wine grape, occupies more acres today than any other white grape in Sonoma County.

The rush of new plantings has brought along a new era in viticultural techniques, and an altered look to the rural landscape of the county. Some of the ideas are not necessarily new, but they have seen widespread use in Sonoma land only with the recent boom. Among the changes seen in the vineyard are wider spacing of plants, greater variability in pruning techniques, new methods of frost protection, and a greater willingness to irrigate.

Grape vines are now generally, but not universally, planted in 12 x 8 fashion, meaning a given vine is 8 feet from its neighbors in the same row and 12 feet from its neighbors in adjacent rows. Previously, closer spacings, such as 10 x 6 or 7 x 7 were used. It has been shown that more plants per acre do not necessarily yield greater production, since more plants produce greater competition. With the wider spacing presently used vineyard care, including cultivation, is made easier.

Sonoma County's vineyards were previously owned largely by Italian surnamed families who clung to head pruning as the only legitimate way to train a vine, despite suggestions from agricultural advisors that other forms of pruning were better for some grape varieties. With the influx of new blood into Sonoma County vineyards, cordon pruning and cane pruning (both of which involve trellising) are now employed, and one can differentiate old vineyards from new vineyards, not only by the thickness of vine trunks, but also by the method of pruning.

Frost protection has become one of the most costly additions to the modern vineyard in Sonoma County. Some vineyardists still have no frost protection, some still use the

older, less protective wind machine-orchard heater combination, but the most popular technique presently in use in Sonoma County is the *permanent set* system. This is a system of buried pipes connecting stems with overhead rainbird sprinklers attached. When freezing temperatures approach, the sprinkler system is turned on, and as the water freezes on newly formed buds and leaves, the heat of fusion, released by water going from the liquid to the solid state, maintains the temperature at a steady 32°F (0°C).

The permanent set system has several plusses, in addition to the fact that it is very simple to use, once implanted. It protects to lower temperatures than a wind machine-orchard heater combination; it can be used for cooling the vineyard if summer heat becomes excessive; it can be employed for spreading herbicides; and finally, it can be used for what many might have assumed was its main purpose anyway, irrigation.

Irrigation of vineyards was virtually unheard of in Sonoma County before 1960. Harazsthy had long ago pronounced irrigation as unnecessary and undesirable in this area and for 100 years everyone believed him. There is much lore about, suggesting that the best wines are made from unirrigated vineyards. However, someone finally figured out that grapevine roots cannot really tell the difference between rainwater and irrigation water, and so farmers have begun to irrigate their vines in the Sonoma area, thereby increasing their production totals.

A permanent set system is costly not only because of all the pipe and sprinkler heads, and the laying of the pipe. Water development costs are also high. A reservoir must be built, a large pump purchased, and in most cases, a well has to be dug. Total costs for a permanent set system may be upward of $1,500 per acre.

In summing up the vineyard changes in Sonoma County, the most perceptible alterations are the greatly increased expanse occupied by grapes, the switch from common to premium

varieties, and the employment of new technology. The county has not yet been purchased and consolidated by a few large corporate enterprises.

The Winery

All the changes during the boom have not been in the vineyard. Sonoma County, in November 1976, claimed 47 operating wineries (with several others in the planning stages), double the total in 1970. The heaviest concentrations of wineries occur within a few miles of the towns of Healdsburg and Sonoma. Of Sonoma County's wine growing regions, the Alexander Valley has the largest number (18), followed by the Santa Rosa Plain-Russian River Valley (14), the Sonoma Valley (10), and Dry Creek Valley (6).

The majority of the new wineries are small, family-sized operations. Production in one-third of them is less than 25,000 gallons of wine per year, which puts them in the tiny (the popular term is "boutique") category. The new wineries are predominantly family-owned or owned by a small group of friendly shareholders. For the first time a large number of wineries are operated by people without Italian surnames. That is a major change.

In addition, Sonoma County has been subject to large corporate invasions much the same as have been occurring in other wine regions of California. Heublein, Schlitz, Scottish and Newcastle, and Pillsbury have entered the arena. Some have built large, new wineries. Others have taken over old small ones. It is notable that since 1970 the wineries with the greatest announced financial difficulty have been those with large corporate influence. For example, Sonoma Vineyards, the county's second largest winery, with a capacity exceeding three million gallons, was completely reorganized financially in 1976. The winery lost nearly nine million dollars in 1975, and owed so much money to Bank of America and Wells Fargo Bank that the banks decided that they had to step in to keep the vats from

vanishing. The banks, along with a national liquor distributor, Renfield, ended up owning a percentage of the winery and a new management team was brought in to straighten out the operation.

So many new wineries has meant the purchase of new equipment. New technology is even more rampant in the winery than in the vineyard. Stainless steel tanks, inflatable bladder presses, and centrifuges are all the rage now. To detail the latest equipment and explain its operation would require a technical treatise. The general impact is that the new technology has greatly increased the financial ante for those interested in the winery end of the grape scene. The reward is that the winemaker is better able to control his processing, and in the end, to more consistently produce what he or she hopes is a high quality product.

The fierce competition resulting from so many new entries into the winemaking world has led to a greater breadth of types of wine being made available to the consumer. Two Sonoma County wineries (Grand Cru and Sebastiani) have recently produced a Nouveau wine, a red wine which is drinkable one month after harvest, and a type which is very popular in France.

A second addition to the usual lot of wines has been the production of vintages from grapes infected with *Botrytis cinerea*, known as the "noble mold." These wines are very sweet but low in alcohol and are not usually drunk with dinner. If successfully made they may command astronomical prices. At least five Sonoma County wineries (Grand Cru, Chateau St. Jean, Trentadue, Gundlach-Bundschu, and Sonoma Vineyards) have produced wines from *Botrytis*-infected grapes.

A third example of the kind of pioneering that all this competition produces is a recent announcement by the barely opened Mill Creek Vineyards that it has made a Cabernet Sauvignon Blanc!

The great number of new wineries, in addition to the new kinds of wine, has produced bafflement for the consumer. How can anyone organize, in his head, the varied products of so many

wineries? Given a list of the wineries, one might ask, "What are they all doing? How can there be so many?"

I have decided that some order might be brought to this situation, if at least the wineries are categorized (Table 2). The reader will have to sort out the numbing list of wines on his own. My classification is not a standard one, nor are the criteria separating classes consistent, but the classification does summarize some important facts about Sonoma County wineries: the recency of so many, the longtime role of the Italian community, and the arrival of the conglomerate.

The categories have little to do with size, although the new family wineries clearly tend to be the smallest. Caution must be exercised in accepting without reservation a given year for the start of a winery. In many instances an old winery is taken over by a new group, or a new winery may be built on an old winery site. In some cases a winery may be closed for several years and then reopened. Generally, wineries seek as early a founding date as is legally possible, since earlier seems to equal better (psychologically) when it comes to wine production.

The bulk category includes wineries which do not retail any of their wine, but sell it to other wineries, mainly those in the Central Valley region such as the Gallo Co. Some of the middle-sized wineries that do retail their wine also sell a good amount in bulk to Gallo. Much of this bulk action is still a hangover from pre-Boom days.

The total number of wines produced by the establishments classified is in the hundreds. Some wineries produce 20 different wines. At the other extreme, one winery, as yet unopened, has advertised that it will produce only Cabernet Sauvignon. Some wineries market their products nationwide; others (obviously very small ones) sell their entire production through mailing lists. The consumer who wishes a wine from every winery in Sonoma County faces an impossible task. Sonoma County wineries, even the largest, may be midgets compared to their Central

TABLE 2. Classification of Sonoma County Wineries

	Storage Capacity in Thousands of Gallons	Year Established
OLD FAMILY STYLE WINERIES (Founded before 1965)		
Korbel	1,000	1862
Martini and Prati	2,500	1880's
Valley of the Moon	200	1883
Foppinao	940	1896
Pedroncelli	425	1904
Sebastiani	3,000	1904
Kenwood	120	1906
Mazzoni	80	1912
Bandiera	75	1937 (reopened 1975)
Rege	150	1939
Hanzell	11	1956
NEW FAMILY STYLE WINERIES (or small corporations)		
Z-D	5	1969
Trentadue	50	1969
Swan	3	1969
Dry Creek	20	1972
Davis Bynum	90	1973
Pastori	45	1973
Grand Cru	20	1973
Vina Vista	7	1973
Sausal	125	1973
Chateau St. Jean	130	1973
Sotoyome	30	1974
Hacienda	30	1974
A. Rafanelli	10	1974
Alexander Valley	17	1975
Johnson's	12	1975
Beliz-De Loach	5	1975
Jade Mountain	4	1975
Lambert Bridge	40	1975
Preston	5	1975
Old Hop Kiln	5	1975
Gundlach-Bundschu	11	1975
Mill Creek Vineyards	?	1976
Landmark	?	1976

TABLE 2 (continued)

	Storage Capacity in Thousands of Gallons	Year Established
BULK WINERIES		
Frei Brothers	780	1880
Chris Fredson	285	1890
Seghesio	1,500	1902
Sonoma County Co-Op	750	1935
Sonoma County Cellars	300	?
		Corporation
GIANT CORPORATE INFLUENCE		
Italian Swiss Colony	9,000	Heublein
Sonoma Vineyards	3,000	Bank of America & Renfield
Geyser Peak	2,000	Schlitz
Souverain	1,400	Formerly Pillsbury, now grower owned
Simi	500	Schieffelin & So.
Cambiaso	650	Four Seas Investment
Buena Vista	75	Young Bros. Markets
Nervo	?	Schlitz

Source: Field Work, and "Directory of the Wine Industry in North America," *Wines and Vines*, Vol. 56, No. 12-A (December 1975).

Valley cousins (Gallo has three wineries with a storage capacity of 165,000,000 gallons of wine), but they do offer variety--in types of wine, in levels of technology, and in backgrounds of the owners.

Conclusion

The early 1970's boom is over from the growers' standpoint. A glut of grapes hit the market beginning in 1974. There will probably be a "surplus" until 1980, as thousands of new acres come into bearing.[12] Some vineyards are even being pulled out, with just under 1,000 acres of vineyard disappearing

in 1974-75 in Sonoma County.[13] Prices for grapes in 1976 did revive somewhat in Sonoma County, but this was a result of climatic influences rather than any dimunition in vineyard acreage.

The number of new wineries, in contrast to grape acreages, keeps increasing. In part this is a response to the present grape glut. Farmers, unable to sell their grapes, have built their own wineries. In the future, one suspects that there will have to be a "shakeout" of so many new wineries, but the number recently built does suggest that there is still room for the proverbial "little guy" in one part of the business world.

Although Sonoma County has undergone phenomenal vineyard and winery expansion in the last eight years, winegrapes as a crop still take a seat far to the rear in Sonoma County's agricultural picture. Also, although wine has displaced prune juice it is still not the county's leading beverage. Milk remains the leading source of Sonoma County agricultural income.

Finally, what has been happening in Sonoma County in terms of vineyard planting and winery foundation, has been paralleled in Napa County, where total grape acreage is nearly the same, and recent plantings are equally abundant. Monterey County, and other central coast locations, as well as Central Valley plantings, make Sonoma County's surge look like one small pebble (I might say a golden pebble) in a pile of gravel. Certainly, the ultimate outcome for Sonoma County, as a result of the expansion of the 1970's, will depend on what happens to the rest of California's vineyards, and also on how much we underwined Americans decide that we want to increase our consumption.

NOTES

[1]Portions of this paper were presented in "The Revitalization of the Wine Industry in Sonoma County," read at the 1976 Meetings of the California Council for Geographic Education.

[2]"Is Consumer Scarcity the Industry's Main Woe?" an interview with Louis Roos Gomberg, *Wines and Vines*, Vol. 57 (September 1976), p. 30.

[3]"California Grape Acreage," *Wines and Vines*, Vol. 57 (May 1976), p. 42.

[4]W. F. Heintz, "Prohibition Took Toll of California Wineries in 1920-33," *Wines and Vines*, Vol. 57 (September 1976), p. 76.

[5]Personal interview with W. F. Heintz, October 1, 1976.

[6]Sonoma County Department of Agriculture, *Agricultural Crop Report 1968* (Santa Rosa, California: County of Sonoma, 1969), p. 5.

[7]*Ibid.*, p. 10, and California Crop and Livestock Reporting Service, *California Grape Acreage 1975* (Sacramento: United States Department of Agriculture and California Department of Food and Agriculture, 1976), p. 33.

[8]Sonoma County Department of Agriculture, *Agricultural Crop Report 1965* (Santa Rosa, California: County of Sonoma, 1966), p. 10 and Sonoma County Department of Agirculture, *Agricultural Crop Report 1975* (Santa Rosa, California: County of Sonoma, 1976), p. 4.

[9]Sonoma County Department of Agriculture, *Agricultural Crop Report 1968* (Santa Rosa, California: County of Sonoma, 1969), p. 5 and Sonoma County Department of Agriculture, *Agricultural Crop Report 1974* (Santa Rosa, California: County of Sonoma, 1975), p. 5.

[10]Sonoma County Department of Agriculture, *Agricultural Crop Report 1969* (Santa Rosa, California: County of Sonoma, 1970), p. 10.

[11]California Crop and Livestock Reporting Service, *op. cit.*, pp. 19, 27, and 32. The reason for using non-bearing acreage is that this category is primarily composed of vines less than four years of age and thus indicates which varieties are dominant among recent plantings.

[12]"Kirby Moulton Reviews California's Outlook," *Wines and Vines*, Vol. 57 (August 1975), pp. 27-29.

[13]California Crop and Livestock Reporting Service, *op. cit.*, p. 37.

PARTIAL AND TOTAL DISPLACEMENT MIGRATION IN THE SAN FERNANDO VALLEY

*Christine M. Rodrigue**

Migration is a highly pervasive element in American society, as in many others. It is therefore quite understandable that many people are interested in this phenomenon and that many of them have made great efforts to study it and contribute to our understanding of it. As a result of migration's wide scholarly appeal, the literature on it is enormous, so much so that the propspective student soon finds himself buried in a veritable mountain of books and studies.

The volume of this literature is not only discouraging to researchers, however. This vast amount of information is also notoriously fragmented. Authors are scattered among practically every social science. Unfortunately, most of them tend to focus their attention on some particular facet or scale of migration and do not give their readers an overview of how their particular study relates to the understanding of migration and residential movement as a whole. Very few seem to recognize that all types of human movement entailing a permanent change of residence are basically similar and still fewer have perceived and acted on the need for a theory which could unify all these many works on such human movement.

Curtis C. Roseman is one of the few people who have responded to this need. In his "Migration as a Spatial and Temporal Process," Roseman proposed a theory which classifies residential movements according to the behavioral characteristics of individual moves.[1] According to his theory, there are only two basic types of migration: partial displacement

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migration and total displacement migration. Because these two kinds of migration are so different in terms of the information gathering and decision-making processes, Roseman suggests that they play completely different roles in the adjustment of migrants to the social situations at their destinations.

Migration is here defined as any permanent change in residence.[2] Permanence refers to a demonstrated intention to remain indefinitely in a new residence.[3] For the purposes of this study, intention to remain is demonstrated by the act of purchasing a home.

A partial displacement migration is defined as any permanent change in residence in which one or more activity nodes is retained. An activity node is a place that is visited frequently or regularly by a person or household, such as a job location, shopping center, or recreational facility.

Conversely, total displacement migration describes any permanent residential move wherein all activity nodes are, without exception, abandoned for an entirely new assemblage of nodes.

Partial displacement migration constitutes an adjustment by a household to the general area with which it is most familiar. As such, it often serves as part of the processes of social mobility and assimilation as a household makes its dwelling place congruent with its spatial and environmental needs or self-perceived social status by moving to a more appropriate neighborhood.[4] The ability to distinguish differences in the social environment declines as distance lowers the quality and quantity of information available to a household about a particular area.[5] Households move relatively long distances in response to job opportunities or to the perceived environmental attributes of distant regions and then often find that they must soon make partial displacement migrations in order to make their dwelling places suit specific needs or their socio-economic status.[7] Viewed in this way, total displacement migration does not play the same role in social mobility and

assimilation that partial displacement migration does.[8]

If Roseman's argument is viable, partial and total displacement migrants could be expected to differ in a number of respects. It is the purpose of this author, then, to examine three such variables: (1) reasons given for moving; (2) average reported annual income; and (3) the distance between origin and destination.

The first variable to be examined is the set of reasons given for moving: if partial displacement migrants are making fine adjustments in the site and situational natures of their dwelling places and total displacement migrants are moving in response to job opportunities and general environmental amenities, this difference should be reflected in the reasons given for moving.

The second variable is a comparison of the average reported annual incomes of the two groups. Those households which are able to overcome the costs of moving relatively great distances might be expected to have higher incomes than those moving shorter distances.[9]

The third variable considered is a comparison of the distances the two groups of migrants move. For any particular area, there must be some distance below which most moves are partial displacement migrations and above which most moves are total displacement migrations. That is, as distance increases, the number of activity nodes retained probably decreases until, finally, the number of nodes retained reaches zero. That point may be thought of as the distance threshold dividing the two groups of migrants.

This study focuses on migrations made into or within the San Fernando Valley. The Valley is a large area of post-World War II suburban development, located on the northwest side of Los Angeles. With a present population of approximately one and one-half million, the Valley is divided into some twenty-one towns. Due to the rapid influx of migrants since the war, these many towns have completely coalesced into a single

conurbation. It is likely that only the long-term resident can perceive the differences among all of the component communities. Many are nowadays little more than postal districts of the City of Los Angeles[10] (Figure 1).

To implement these objectives, data were gathered through a telephone questionnaire submitted to 51 recent migrants into or within the San Fernando Valley. The questionnaire included a brief introductory speech and questions relating to the reasons for moving, the distance moved, the socio-economic characteristics of the migrants and, in order to differentiate the two groups of migrants, the activity nodes retained. Seven types of activity node were selected: job location, grocery stores and supermarkets, shopping centers or department stores, children's schools, churches, friends' residences, and recreation points (Figure 2).

Names and addresses of all persons buying homes in selected San Fernando Valley tax districts during the month of September, 1974, were obtained from the Los Angeles County Tax Assessor's Office. Telephone numbers were then acquired from the telephone directory distributed in March, 1975. The map in Figure 3 indicates the locations of the tax districts chosen for this study.

The sample obtained may contain a bias favoring middle income households and it excludes all those in which Spanish is the only language spoken.

There is a major distinction in terms of the first variable, reasons given for moving, between households making partial displacement migrations and those making total displacement migrations (Table 1). Almost all of those making partial displacement migrations did so for reasons relating to the site and situational characteristics of the dwelling place. Such small-scale environmental reasons include wanting to buy one's own home, wanting a larger house, and a dislike for the old neighborhood. Only 5 percent moved for job-related reasons. On the other hand, less than a third of total displacement

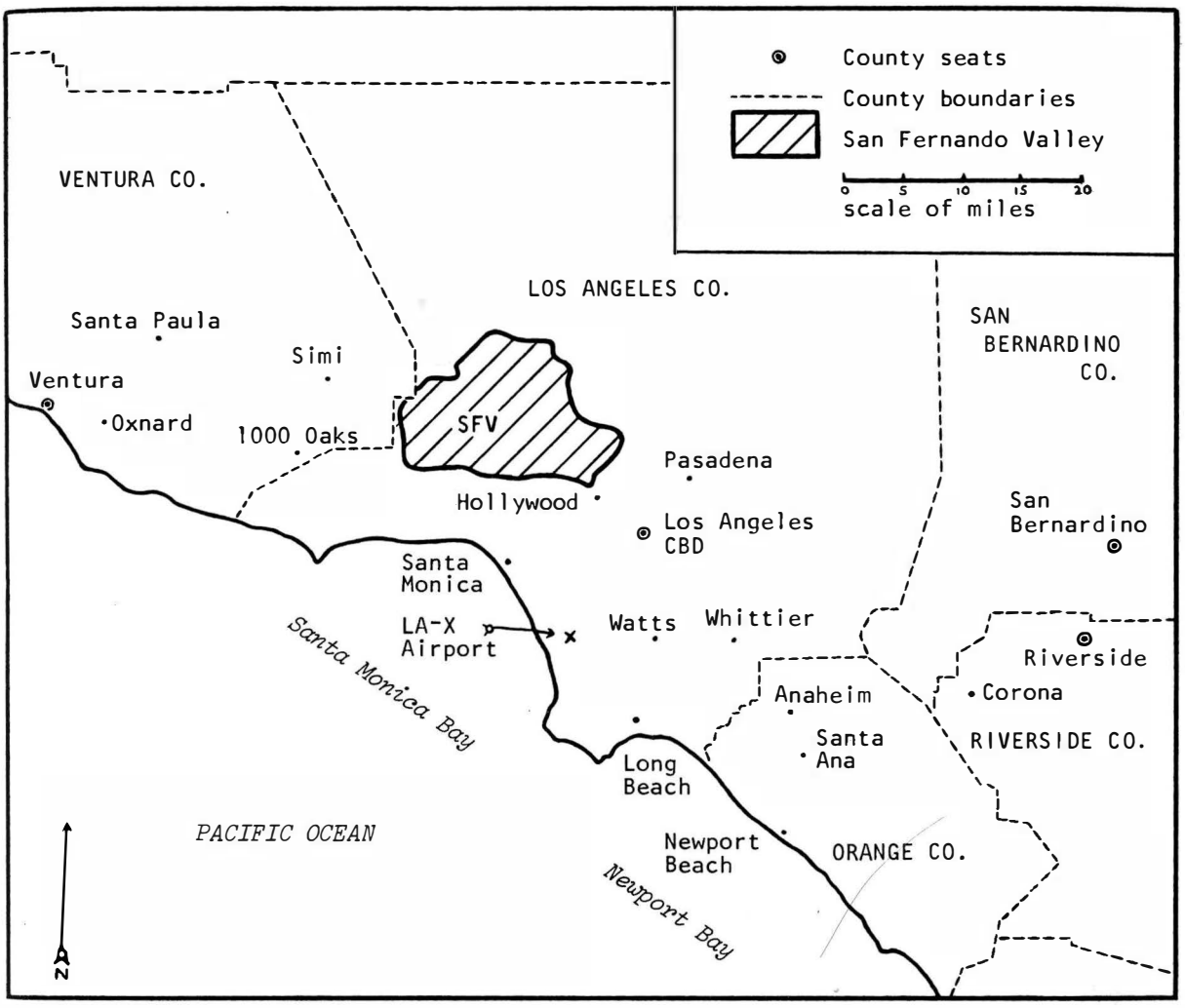

Figure 1. The San Fernando Valley in Relation to Southern California.

Introduction: "Hello, my name is Chrys Rodrigue. I'm a student at the University in Northridge and I'm doing a study for one of my classes on why people move. It would be a lot of help if you could answer a few questions for me."

1) Have you moved in the last year?

2) What were the reasons for your move?

3) a. Where did you move from?

   b. What are the nearest cross-streets to your previous address?

   c. To your present address?

4) a. Do you (or your spouse) still have the same job as you did before you moved?

   b. Do you still shop at the same grocery stores or supermarkets?

   c. Do you still shop at the same shopping center or department stores?

   d. Do you have children? Do they still go to the same schools?

   e. If you go to church regularly, do you still go to the same church?

   f. Do you still visit friends and relatives from the old neighborhood regularly? (About how often?)

   g. Do you still go to the same nightspots, restaurants, movie theaters, etc., as before?

   (Miscellaneous comments)

5) What are your ages?

6) What is your ethnic or racial background?

7) Could you state your (family) yearly income within a thousand dollars?

(Miscellaneous comments)

Figure 2. Questionnaire Employed.

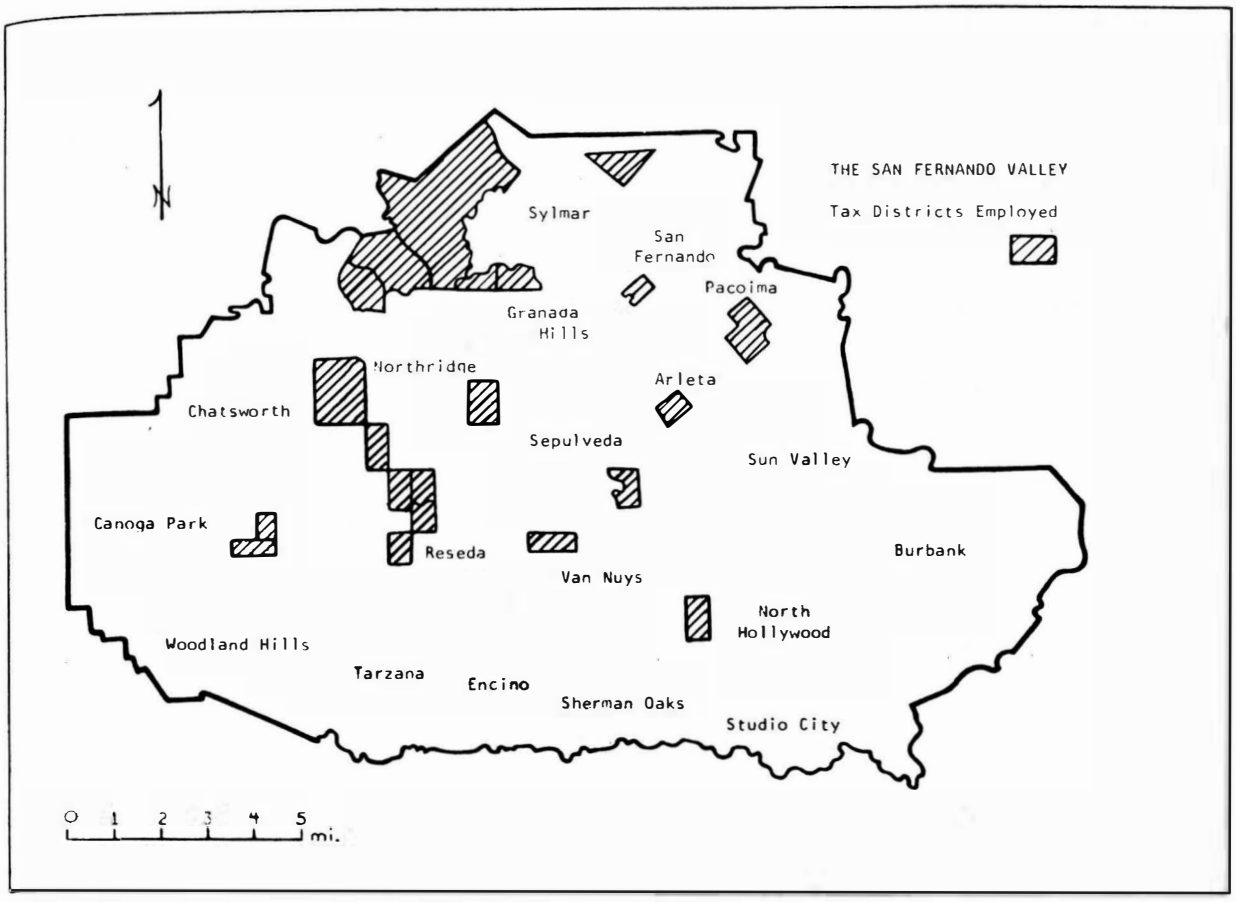

Figure 3. Location of Tax Districts Chosen.

Table I. Reasons Given for Moving.

	PD (n=37)	TD (n=14)
site and situation of dwelling place	94.59 %	28.57 %
employment/economic	5.41 %	71.43 %

migrants moved for environmental reasons. The environmental reasons were at a gross regional level, such as climate and college opportunities and, hence, are of a different nature than the highly localized reasons cited by partial displacement migrants. Some 71 percent of the total displacement migrants gave job transfers as the reason for moving.

The second variable, average reported annual income, differs significantly between the two groups of migrants. Where partial displacement migrants earned, on the average, $17,320, total displacement migrants earned $25,250. By employing the test designed to evaluate the difference between population means, the difference was found significant at the 0.01 level (Figure 4).

$$(X_2 - X_1) \pm 2.576 \left[s \left(\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \right) \right]$$

$$(25,250 - 17,320) \pm 2.576\ (4.57)$$

$$(7,930) \pm 11.77$$

$$7,918.23 \text{ to } 7,941.77$$

0 is not included; therefore, the difference is significant at the .01 level

Figure 4. Significance of the Difference Between Average Reported Annual Incomes.

The third variable considered was the distance separating partial from total displacement migrants. In the San Fernando Valley, the distance threshold separating the two was found to lie between 45 and 50 miles. The regression of activity nodes retained reached zero between 45 and 50 miles, as can be seen from the scatter diagram in Figure 5, which

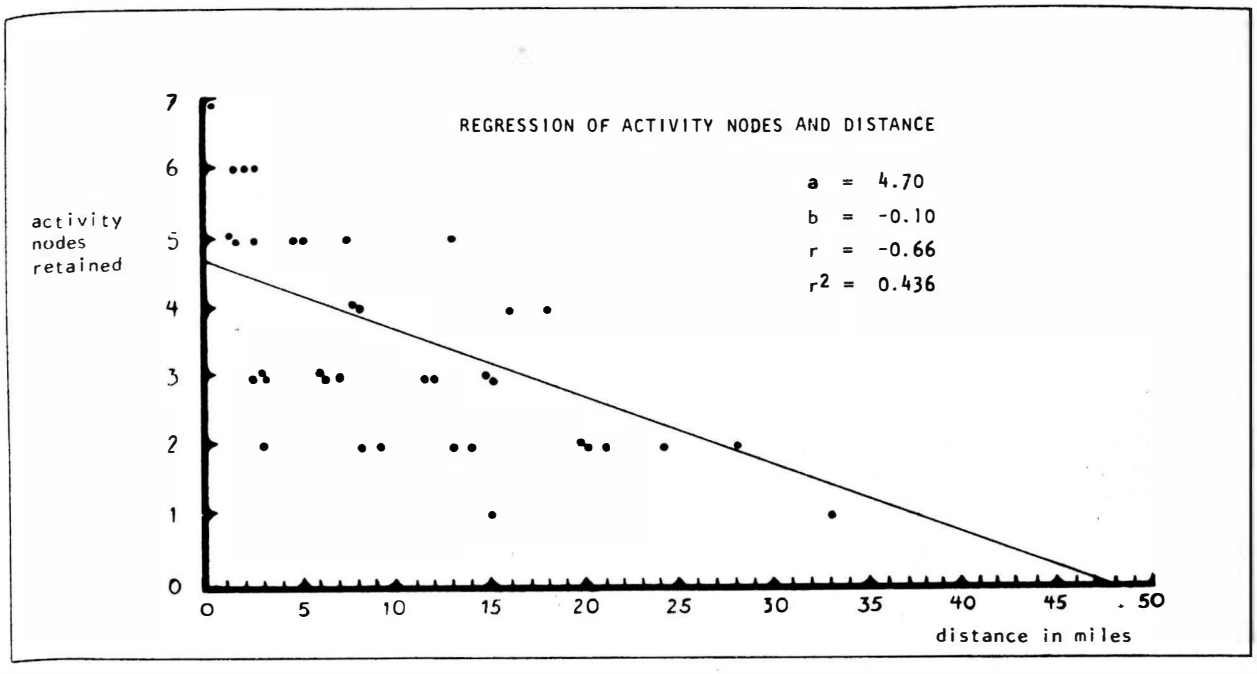

Figure 5. Regression of Activity Nodes and Distance.

plots distance of migration against the number of activity nodes retained from the previous residence.

Roseman's proposal of a dichotomy between two basic types of migration suggested that partial and total displacement migrants could be expected to differ in a number of respects. In the present paper, three characteristics that might be expected to vary significantly between the two groups were selected for investigation. It was concluded that the two groups did, indeed, differ importantly from one another in terms of the three variables considered.

This present study has demonstrated the validity of classifying migrations on the basis of activity node retention. The suggested criterion produces two distinct scales of migration which are meaningful in the context of a theory based on the behavioral processes involved in an individual act of migration.

NOTES

[1]*Annals, AAG*, Vol. 61 (1971), pp. 589-98.

[2]Mangalam noted that change of residence is the characteristic of migration most often stressed. Following his lead, all human movement entailing "permanent" change in residence is here and in Roseman termed "migration." J. J. Mangalam, *Human Migration* (Lexington: University of Kentucky Press, 1968), p. 8.

[3]Lee defines migration as any "permanent" or "semipermanent" change in residence in presenting his theory. However, he did not give criteria for distinguishing permanence from impermanence. Hence, in this study the author felt free to operationalize permanence in a fashion that would permit use of County Tax Assessor's property purchase data, all the while recognizing that the vast number of renting migrants would be excluded by the chosen definition of migration. E. S. Lee, "A Theory of Migration," *Demography*, Vol. 3 (1966), p. 49.

[4]Roseman, *op. cit.*, pp. 595-96.

[5]*Ibid.*, pp. 593-94.

[6]*Ibid.*, p. 594; G. Olsson, "Distance and Human Interaction: A Migration Study," *Geografiska Annaler*, Vol. 47B (1965), pp. 24; and E. L. Ullman, "Amenities as a Factor in Regional Growth," *The Geographical Review*, Vol. 44 (1954), pp. 119-32.

[7]Roseman, *op. cit.*, p. 593.

[8]*Ibid.*, p. 596; R. L. Morrill, "The Negro Ghetto: Problems and Alternatives," *The Geographical Review*, Vol. 55 (1965), pp. 339-61; and H. M. Rose, "The Development of an Urban Subsystem: The Case of the Negro Ghetto," *Annals, AAG*, Vol. 60 (1970), pp. 1-17.

[9]As per the "Rose hypothesis," i.e., that persons of higher socio-economic status tend to move greater distance. A. M. Rose, "Distance of Migration and Socio-Economic Status of Migrants," *American Sociological Review*, Vol. 23 (1968), pp. 420-23.

[10]Except San Frenando, Burbank, and Universal City, which are independent urban entities.

The success of this researcher in utilizing purchase data available in a county tax assessor's office suggests wider use of this resource by students of migration in other contexts.

GEOGRAPHIC EDUCATION--A NEW COURSE FOR TEACHERS IN THE LAND OF THE LONG WHITE CLOUD

*Brian Devonshire**

Geography is a major subject in the New Zealand high school curriculum and has been for many years. Even though geography has enjoyed a key position among the school subjects, geographic education as a part of teacher preparation at the university level was introduced for the first time in 1976. Geographic education was included as a part of the post-graduate Diploma in the Social Sciences developed by the Geography Department of Massey University near Palmerston North. The new course shows promise as a model for similar programs that might be developed in other parts of the world and could be af real value in upgrading geographic knowledge among California teachers.

In the New Zealand scheme of things, potential high school teachers are required to obtain a bachleor's degree in a given subject, e.g. geography, before going on to Teacher's College.[1] The teacher's colleges, and even more so the universities, offer post-graduate and undergraduate specialist programs for which a diploma is awarded. Massey University is the only New Zealand university to offer a program of external study by correspondence leading to a diploma. All other universities require on-campus enrollment. The diploma candidates at Massey are required to attend a vacation course of four days duration to bring their work together and, further, must take the same final exams as their equivalent full-time students.

Over the past few years there has been mounting pressure on teachers and upon the institutions of higher learning to

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provide a program for upgrading geographical knowledge and methodology for the inservice secondary teacher. Even though surveys indicate that geography teachers are better qualified on the whole than those in other disciplines, many critics have felt that they have lost contact with the frontiers of geography.[2] This has been particularly evident in view of the dramatic changes taking place within the discipline over the past decade.

The program designed by the Geography Department at Massey sprang from the expressed need of teachers in the field. The Diploma is open to a variety of occupational fields but for teachers the key course is geographic education. In the first year (1976) numbers were limited to thirty. Teachers attending the vacation school in August indicated that the program had considerable value for them.

Course Outline

Mr. John Renner, Vice-Principal of Palmerston North Teachers' College developed the course outline and had overall responsibility for it. The author was appointed Visiting Teaching Fellow to set up the actual study guides and to be responsible for the day to day administration of the course. The outline is wide ranging and designed to help experienced teachers gain a better appreciation of the underpinnings of teaching geography. The course is laid out to include: Quantification and the Development of Theory in Human Geography; The Changing Nature of Geography and Geographic Education; Curriculum Development and Geography; Geographic Education and Theories of Learning; Assessment and Other Forms of Evaluation; an Analysis of Teaching Strategies in Geography; and Preliminary Investigation of a Personal Teaching Problem in Geography. The first six topics formed the titles for the six major study guides. Each guide was designed as a six week work unit. Each included a general account of major themes, as well as an outline of current trends. Also included in each was an assignment

that requires the student to apply the general principles contained in the guide. There are also six or seven reprints of key articles taken from various sources which help illustrate the subjects under discussion. An attempt was made to include key articles which give either a theoretical or practical illumination to subjects studied. Reference is also made to the required texts for the course. Student reaction indicated success in using the reprints as references for future application.

The Students

The students enrolled in the inaugural course were a cross section of inservice teachers. both men and women. Their ages ranged from the early twenties fresh out of teacher's college to veterans in their fifties with over twenty years experience in the teaching profession. Some of the students are from large city schools while others are from country districts. The geographic spread is the entire country from Auckland in the north to Southland at the tip of South Island.

Preliminary Investigation

The Preliminary Investigation of a Personal Teaching Problem in Geography is a key function of the course. It gives the students an opportunity to apply their new found knowledge in practical classroom situations. Further, such an investigation has the potential of forming the basis of another course in the Diploma program titled "An Approved Research Exercise." The initial group of students was expected to submit topics for approval, and then to complete individual reports by the August vacation course. Subjects picked ranged over a wide field, and proved just as varied in presentation. A great deal of interesting and valuable research was carried out. Some topics included pupil perception of other peoples, the effectiveness of teaching strategies in the classroom, problems of teaching field work, suitability of the present school curriculum, and

pupil response to concept based geography teaching. It is intended that such investigations in the future can form the basis of a publication for teachers of geography. The major strength of such material is that it comes from the classroom teachers with a strong bias to application, sometimes a rather scarce commodity.

The Vacation Course

The Vacation Course was of four days duration and designed to supplement the regular course material. It was organized around four major themes: (1) The changing nature of geography and geographic education; (2) geographic curricula; (3) learning theory and skills; (4) strategies, skills and related assessment. Visiting lecturers were employed to assist with introduction and presentation of materials. The general format was of presentation and feedback.

Conclusion

Too few geographers have adequate training in learning and learning theory; student reacton indicated such a need. The course as presented serves to update teachers' geographical knowledge, improve the theoretical base of their skills and knowledge, and encourages them to think about the theory of their specialist subject. If this has happened, and student response points in that direction, then the course has value to both the present students and to their students in turn.

This program is a unique attempt to marry the university with experienced inservice teachers over a long period with profit to both parties and to the profession as a whole.

NOTES

[1] In Australia and New Zealand the Teachers' College is a highly specialized institution, usually apart from the university. It is similar to the institutions of the same name that preceeded the present California State College and University system.

[2] A recent survey was done for the National Grography Curriculum Committee, by Miss A. Jones. Another was carried out by Professor W.B. Johnson and presented as a paper to the Biennial Conference of the New Zealand Geographical Society in Christchurch, 1972.

FROM DAIRY VALLEY TO CHINO: AN EXAMPLE OF URBANIZATION IN SOUTHERN CALIFORNIA'S DAIRY LAND

*Carol Van Kampen**

As with most economic activities, spatial movements in California's dairy industry are constantly influenced by fluctuating cultural and economic processes. Urbanization is perhaps the most critical process affecting the industry because it involves intensifying land uses and increasing population densities. Many dairy regions which served the Los Angeles Metropolitan area in the early 1950's to mid-1960's have since experienced drastic land-use transformation. This metamorphosis involved a conversion of dairy land-use to more urban-oriented land uses, particularly residential and commercial. In the recent past, three Southern California areas, Cypress, Dairyland, and Dairy Valley, incorporated in an effort to forestall encroaching urbanization and to preserve the land for dairying. When these areas incorporated in the mid-1950's, nearly all their land uses were associated with dairying, and their importance as a major milk-producing area for the Los Angeles market was firmly established. However, by the late 1960's, much of this dairying activity, along with most other agriculture, was eliminated.

This paper is an analysis of urbanization's influence on land use patterns in the Diary Valley portion of Southern California. The urbanization process lasted little more than ten years and eliminated nearly all dairy land in the area in spite of the aforementioned effort to stop it.

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Historical Background

Most of the dairies in Southern California have been operated by Dutch and Portugese people whose ancestors came to America from Holland or the Azores during the early 1900's. Both ethnic groups have contributed significantly to the functioning of the industry in Southern California, although the Dutch still control the majority (70%) of the dairies in the area.[1] During the 1920's and 1930's, many dairies were in close proximity to Los Angeles (Figure 1). However, as that city expanded, these operations have proved vulnerable to the forces of urbanization. The long-term effect of urbanization has caused the industry, which first established in parts of the San Fernando Valley in the 1920's, to retreat in a southeasterly direction.

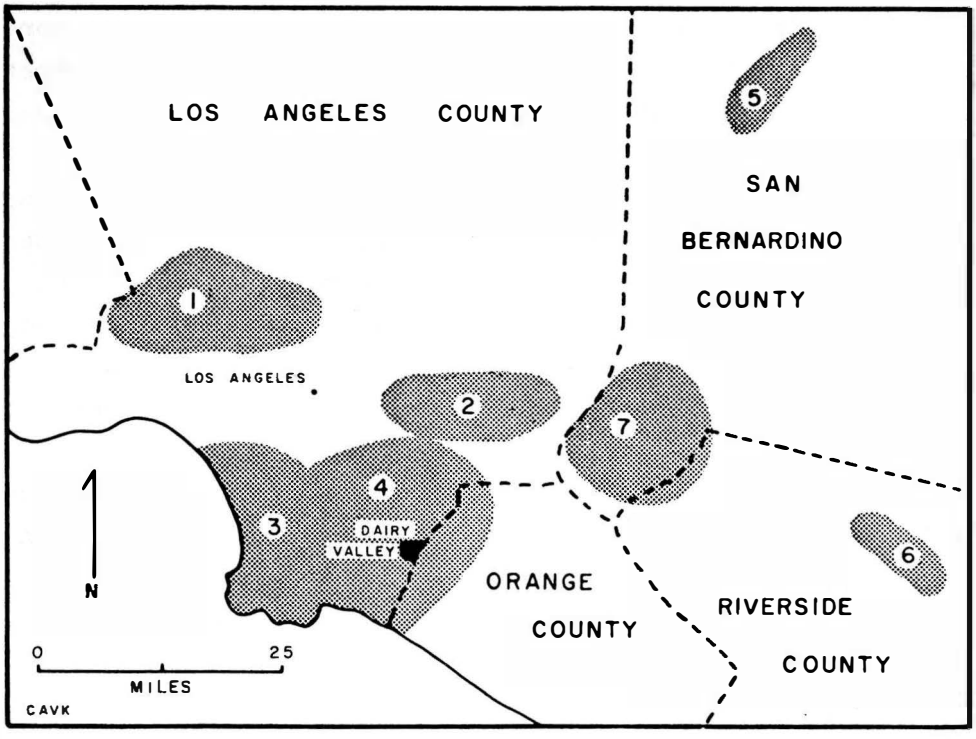

Figure 1. Past and present milk-producing districts in Southern California: (1) San Fernando Valley 1920-1950; (2) San Gabriel Valley 1930-1950; (3) Southwest 1930-1950; (4) Southeast 1930-1970; (5) Mojave River Basin 1960-present; (6) San Jacinto-Hemet 1930-present; (7) Chino Valley 1930-present. Source: L.B. Fletcher and C.O. McCorkle (1962), pp. 26-28.

In each successive stage of settlement, a complex of interrelationships developed to service the industry and the personal needs of the area's inhabitants. Economic activities related to dairying, such as grain and hay sales, equipment services, cattle sales yards, and veterinary practices specializing in the care of dairy animals, located nearby. Along with these activities, a complementary labor force evolved. Although most dairying has now moved out of Los Angeles County, remnants of the area's past dairying activity can still be seen along the busy thoroughfares of many urban communities. As examples, grain suppliers are still located in Bellflower, Paramount, and Artesia. Cultural remnants exist in areas first settled by Dutch and Portugese dairymen. Dutch Christian Reform Churches and schools remain in Bellflower, Paramount, and Artesia. Portugese Catholic Churches are located in Artesia and Paramount. A grocery store specializing in Dutch imports is located in Bellflower, and one specializing in Portugese foodstuffs is located in Artesia. Also, a unique Dutch bakery operates in Artesia.

When dairymen moved into the Dairy Valley region in the early 1950's, they realized that they must innovate a more lasting means to preserve the land for dairying and their strong community life.

Dairy Valley was, therefore, incorporated in 1956 with this one aim in mind.[2] It was a unique city with more dairy cows than people; 100,000 cows resided on 400 dairies, while the human population was 3,500.[3] Incorporation allowed the entire area to be zoned solely for agriculture, thus preventing the encroachment of any non-harmonious activity. Property taxes were kept to a minimum because land values were assessed in terms of agricultural use. Since the city was operated as a rural community, only the facilities necessary for dairying were provided. Municipal costs accordingly remained low, minimizing local taxes.[4] Commercial activities necessary for the functioning of the industry were given variances to enable

establishment in the area. Most residential structures were associated with the dairies and such lots were kept to a five-acre minimum in order to prevent subdivision of the land.[5] A pleasant, rural landscape was created where, for acre upon acre, all that could be seen were dairy farms. Dairying had indeed been preserved as a way of life for the inhabitants.

As part of the south-east milk-producing region, Dairy Valley produced nearly 80 percent of Los Angeles County's fluid milk.[6]

Basic to Dairy Valley's intensive production was the drylot technique of dairying. Introduced by the Dutch and Portuguese settlers, it entailed confining dairy animals in a corral and bringing feed to them. In this way, valuable energy is not expended and the feed can be controlled to ensure the highest possible production per cow. Also, since land is a high-cost factor in dairying, the drylot method enables dairymen to use it more intensively, as opposed to the pasture method. The results are a higher ratio of cows per acre of land, thereby increasing production, and a higher ratio of cows per person, thereby decreasing labor costs.[7]

Using the drylot method, dairymen in Los Angeles County were able to achieve higher production per cow than in any other county in the United States.[8] But total production for the county, and for Dairy Valley, declined drastically since the early 1960's. Present county production is now less than one-fifth that of 1963.[9] This decline occurred in an area whose inhabitants were dedicated to the preservation of dairying and a unique way of life which had been carefully cultivated.

Urbanization Applies Pressure

There were many reasons for Dairy Valley's decline as a milk-producing area. With Los Angeles' "urban sprawl" moving closer, the dairy land became more attractive to developers. As the land values rose, assessment procedures by the county

were revised. Land was no longer assessed by the county for its agricultural use, but rather for its potential urban use. From 1951 to 1964, assessed valuations increased nearly 450 percent. The Dairy Valley property tax per acre which averaged $20 in 1951, increased to $280 in 1964. Also, during this period, the tax rate rose almost 40 percent.[10] Increasingly, the farmers' profits could not compensate for the extra tax burden imposed by the county and other taxing districts out of their control. Even though milk production costs in southern California are less than other areas, this advantage could not justify the use of high-cost land for a basically low-income industry.[11]

Those dairymen who were farsighted (and who also might be accused of being speculators) knew it would not be long before urban development would force its way into the area. The lure of profit on high-priced land eventually became too great to resist. Dairymen increasingly realized they could sell their land for attractive profits and establish new, modern dairies elsewhere. Thus, the farmers' resolution to remain in the area was gradually diminished.

As urbanization approached the periphery of Dairy Valley, conflicts developed which increased operating costs and undermined the dairymen's pride as members of the community. Complaints from nearby residents about odors and flies were common. The complaints caused enforcement of stricter health inspection coles which, in turn, required many dairies to undertake expensive control programs. Also, as vacant land near the dairies was subdivided and developed, it could no longer be used for waste disposal from barns.

Neighborhood nuisance problems also appeared. New children, seeing the vast open fields, were tempted to play on the farmland. Occasionally, acts of malicious mischief resulted in haystacks being set afire. The possibility of such fires prevented purchase and storage of hay when the price was lowest. They were, consequently, unable to take advantage of lower hay prices and had to pay the going price for hay as it

was needed. At present, because of the 1976-77 drought, the price of hay is about $100 per ton, which is three times its cost in 1965.

Recognizing the above problems, voters modified the city ordinances in 1965 to permit subdivisions of less than five acres per residence.[12] This vote was the deciding factor in the eventual urbanization of Dairy Valley.

Land-Use Transition and Urban Growth

From 1960 to 1976, a dramatic change in land-use occurred. In 1960, agricultural land-use was predominant, covering approximately 70 percent of the total area, whereas urban uses occupied only 7 percent (Figure 2).[13] At this time, there were nearly 4,000 inhabitants in Dairy Valley. Between 1966 and 1973, almost 200 new residential tracts were built in the city.[14] Each new tract ate away at land devoted to dairying, until, by 1970, agricultural land-use was reduced to approximately 34 percent. Urban uses occupied 30 percent of the total and the remaining land became largely vacant (Figure 2).[15] By 1970 the city had been renamed Cerritos, and its population was 15,800.[16] The population has now reached 43,000 and urban land-use covers approximately 75 percent of the total area, while only 8 percent remains in agriculture (Figure 2).[17] Only 14 dairies remain in Dairy Valley and the chance of their continuing existence is uncertain, for the 1973 Cerritos Master Plan calls for the elimination of all agriculture by 1980.[18]

Outmigration of Dairies

The major period of outmigration occurred between 1965 and 1970. During 1965 and 1966, nearly 100 dairies moved out of Dairy Valley.[19] In the early phase of the outmigration, dairymen had no problem selling their land. After 1967, the Master Plan was approved, thereby determining all land-use development within the city and providing for an orderly transition from an agricultural community to a suburban community.[20]

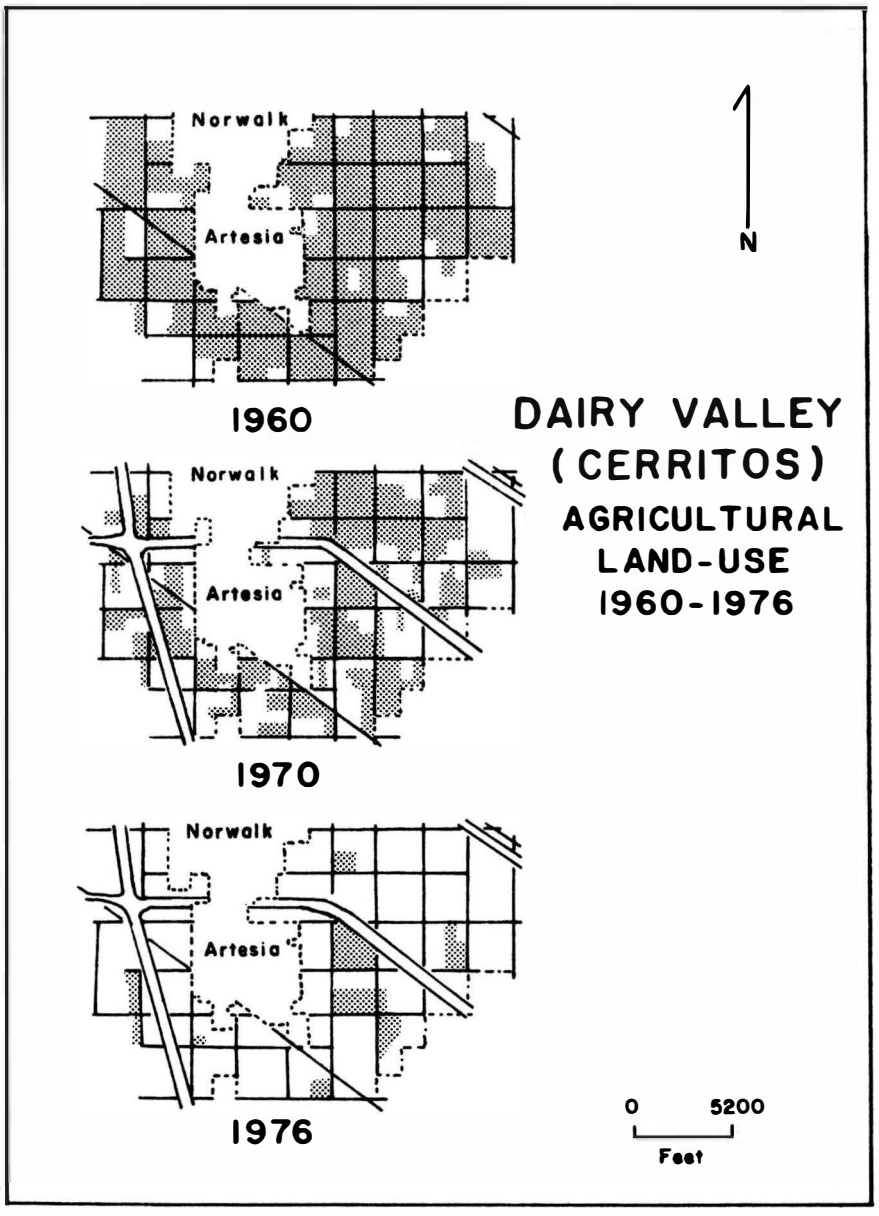

Figure 2. Dairy Valley (Cerritos) Agricultural Land-Use 1960-1976. Source: City of Cerritos, Analysis of Land-Use Activities, Dept. of Environmental Affairs Report, Sept. 1, 1973.

Due to very specific zoning conditions set forth by this Master Plan, some dairymen experienced difficulty selling their land.

To better evaluate the effects of Dairy Valley's urbanization on its former rural inhabitants, questionnaires were sent to dairymen who relocated from Dairy Valley to the Chino valley region, the most frequent relocation destination.[21] The results reveal that no single factor influenced the decision to relocate.

Seventeen percent chose to move solely because of the early opportunity to realize a large profit, since land was selling at $25,000 per acre in 1965. Fourteen percent of the respondents indicated that their move was prompted by the desire to update their facilities. This group, burdened by outdated equipment, viewed the land sale as a means to finance the establishment of a more modern dairy farm.

The balance of the respondents indicated that various negative pressures compelled them to relocate. Twenty-seven percent stated that as farm renters in Dairy Valley, they were forced to move subsequent to the sale of their rented farms. Since other rental farms were not available at this time in Dairy Valley, relocation became necessary. The remaining respondents were almost equally divided between mounting property taxes and growing urban harrassment as reasons for abandoning Dairy Valley.

Relocation of the Industry

Since Dairy Valley was the last concentrated dairy region in Los Angeles County, the outmigration of these dairies has practically stripped the county of its milk producers. Once the leading milk-producing county in California, Los Angeles has relinquished its dairy production to areas farther from the market.

Chino Valley, located in parts of San Bernardino and Riverside counties, is the last extensive area in southern California capable of producing for the large Los Angeles milk

market. About 100 dairies from Dairy Valley were relocated in Chino Valley.[23] When questioned about the advantages of moving to Chino, dairymen cited large amounts of inexpensive land and low taxes as principal reasons. Also, the milk haul from Chino Valley to the Los Angeles metropolitan area is much shorter and less expensive than from the San Joaquin valley, California's other extensive dairy region. The moderate climate was also considered an advantage over San Joaquin, even though the average temperatures are more extreme than in Dairy Valley.

Chino Valley is now the most productive dairy region in southern California; however, many dairymen feel it is only a matter of time before the dairies must again migrate. An overwhelming 70 percent of the Chino Valley respondents felt urbanization would eventually force them out of their area.

Conclusion

Dairy farming as a way of life has been preserved in southern California by generations of Dutch and Portugese people at the cost of continued relocation. Because the perishability of milk necessitates locating close to market and because large amounts of land are needed for operation, dairying usually develops on the urban fringe of its market area. Since the urban fringe is dynamic, any land-use patterns not compatible with urban expansion are forced farther from the population center, as evidenced by the southern California dairy industry.

NOTES

[1]G. J. Fielding, "Dairying in Cities Designed to Keep People Out," *The Professional Geographer*, Vol. XIV, no. 1 (Jan. 1962), p. 15.

[2]Incorporation was possible through the California Government Code, Section 34,302.

[3]S. Fidman, *The Cerritos Factbook* (published by the City of Cerritos, date uncertain), p. 5.

[4]Fielding, p. 16.

[5]N. Irving and Associates, *Comprehensive General Plan* (published by the City of Cerritos, 1966), p. 2.

[6]This percentage was obtained by taking the number of milk cows in both L. A. County and Dairy Valley, and multiplying each figure by the average annual milk production per cow in California for 1960 as listed by the California Crop and Livestock Reporting Service.

[7]B. L. Anderson and E. Boersma, "Changing Location Factors in the Los Angeles Milkshed," *The California Geographer* (1962), p. 50.

[8]California Crop and Livestock Reporting Service, *Manufactured Dairy Products, Milk Production, Utilization, and Prices* (California State Deaprtment of Agriculture, Dairy Industry Statistics), 1956-1960.

[9]Ibid., 1960-1974.

[10]Irving, p. 2.

[11]L. B. Fletcher and C. O. McCorkle, *Growth and Adjustment of the Los Angeles Milkshed, A Study in the Economics of Location*, Bulletin 787 (University of California, Agricultural Experiment Station, Berkeley, 1962), p. 45.

[12]Fidman, p. 5.

[13]City of Cerritos Planning Commission, *Analysis of Land-Use Activities* (Dept. of Environmental Affairs Report, Sept. 1, 1973), p. 16.

[14]Ibid., p. 46.

[15]Ibid., p. 16.

[16]Ibid., p. 1.

[17]Information obtained from the Planning Department of the City of Cerritos.

[18]City of Cerritos Planning Commission, *Cerritos General Plan, 1973.*

[19]County of Los Angeles Health Department, *L.A. County Producer Mailing List*, 1965 and 1976.

[20]City of Cerritos, 1973.

[21]There was a 42 percent response from 75 questionnaires sent to Chino Valley dairymen who had relocated from Dairy Valley.

[22]County of L.A. Health Department, *Riverside and San Bernardino Producer Mailing List*, 1976.

SLOPE AS A DETERMINANT OF THE BOUNDARY BETWEEN THE CASCADES AND SIERRA NEVADA

*A. Lynn Scheel**

Geographers have ascribed significance to the Cascades and Sierra Nevada as discrete, natural provinces, but heretofore descriptions of the boundary between these two ranges have been vague. For example, Fenneman states, "A distinct change in the character of the Sierra-Cascade province is seen near the 40th parallel."[1] Loomis says, "The Sierra Nevada extends from the Feather River south to the Mohave Desert...."[2]

The purpose of this research is to attempt to systematically and objectively establish a slope boundary between the Cascades and Sierra Nevada. The hypothesis tested was:

Due to geologic stage and process, slopes of the Sierra Nevada will be steeper than those of the Cascades in the area where the two ranges meet.

Constructional volcanism has been occurring intermittently in the Cascades for millions of years, continuing until recent times, as witnessed by the eruptions of Lassen Paak between 1914 and 1917. Compared with the Sierra Nevada, the processes of erosion have not had a sufficient span of uninterrupted time to maturely dissect much of the region. Intermittent volcanism has thwarted the progress of erosion since mid-Tertiary and, furthermore, Cascadian streams have not had the impetus of periodic uplift to rejuvenate themselves.

In contrast, volcanism in the northern Sierra has not been extensive, and has not occurred since the Pliocene. Uplift of the Sierra Nevada continues today, as evidenced by the earthquake of 1872, and by recent faulting along the eastern scarp. Thus, the agents of erosion have been given an advantage of time in carving Sierran topography that they have not had in the Cascades.

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Study Area Delimitation

Selection of sample areas of equal size on either side of the irregular geologic boundary was awkward without a point of reference. To facilitate selection of study units, an axis was drawn approximately bisecting the zone of geologic change. This axis provided a reference line from which to measure the northwest and southeast limits of the study area. The northeast boundary was established just west of Lake Almanor. The area northeast of Lake Almanor is part of the Modoc Plateau, a volcanic upland geologically similar to the Cascades, but in general, flatter. The southwestern confines of the study area lie at the base of the foothills. The total area encompasses approximately 1,519 square miles (Figure 1).

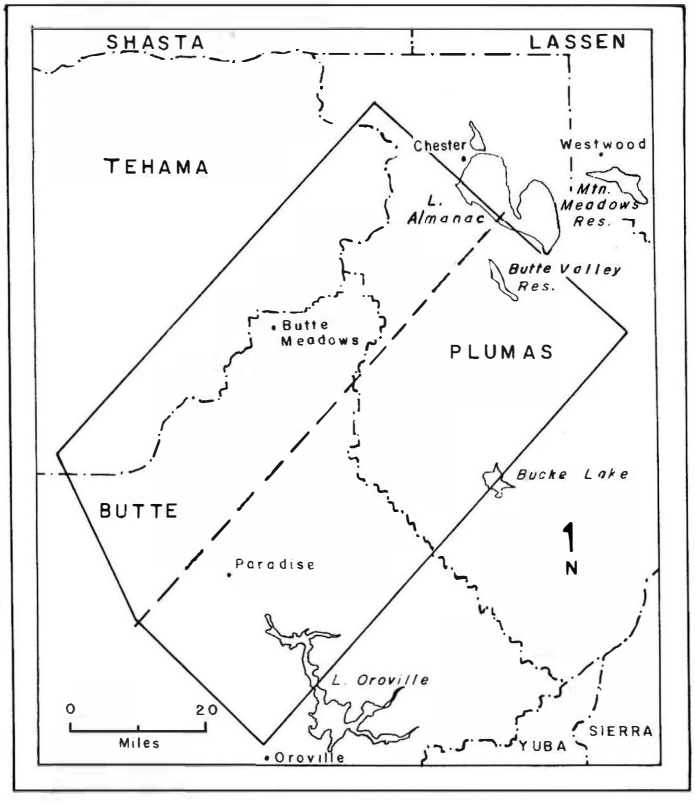


Figure 1. Study Area Boundaries and Reference Axis

A modification of Van Horn's plastic slope template and Thrower and Cooke's slope indicator technique was used to analyze the maps for slope.[3] Seven categories of percent of slope were established: (1) 0-15 percent, (2) 16-30 percent, (3) 31-45 percent, (4) 46-60 percent, (5) 61-75 percent, (6) 76-90 percent, and (7) over 90 percent. Fifteen percent increments were chosen because a range of greater than 15 percent for each category would have decreased experimental sensitivity, whereas a range of less than 15 percent would have entailed too many categories to be workable.

Template construction. For each map contour interval involved, a clear, plastic template was constructed with corresponding contour lines drawn on it for each percent slope category. To determine the spacing of lines for each percent of slope for each contour interval, the formula for determining percent of slope must be recalled. It is

$$S = \frac{v}{h} (100\%)$$

where v is the amount of rise or vertical distance, and h is the run, or horizontal distance. Since the map scale is 1:62,500, one inch on the map represents approximately one mile on the ground. If the topographic map indicates that a unit of terrain rises 5,280 feet in 5,280 feet of horizontal distance, the values in the formula would be

$$\frac{5,280}{5,280} (100\%),$$

resulting in a 100 percent slope, an angle of 45°. If the contour interval is, say, 80 feet, then 5,280 divided by 80 gives the number of lines into which one inch must be divided to represent 100 percent slope. To determine the spacing for 75 percent slope on a map with a contour interval of 80 feet, for example, we compute 75 percent of 5,280 = 3,960; 3,960 divided by 80 is 49.5, the number of lines into which one inch must be divided to represent 75 percent slope. Identical

computations were made for each contour interval used and for each percent of slope category. Since the task of dividing one inch into so many contour lines was very cumbersome, the template segment was lengthened to two inches (or three or four inches), the same number of lines drawn approximately 1/50 inch apart, and the segment reduced photographically by 1/2 (or 1/3 or 1/4). Templates were also made for each *index* contour interval involved (see Figure 2).

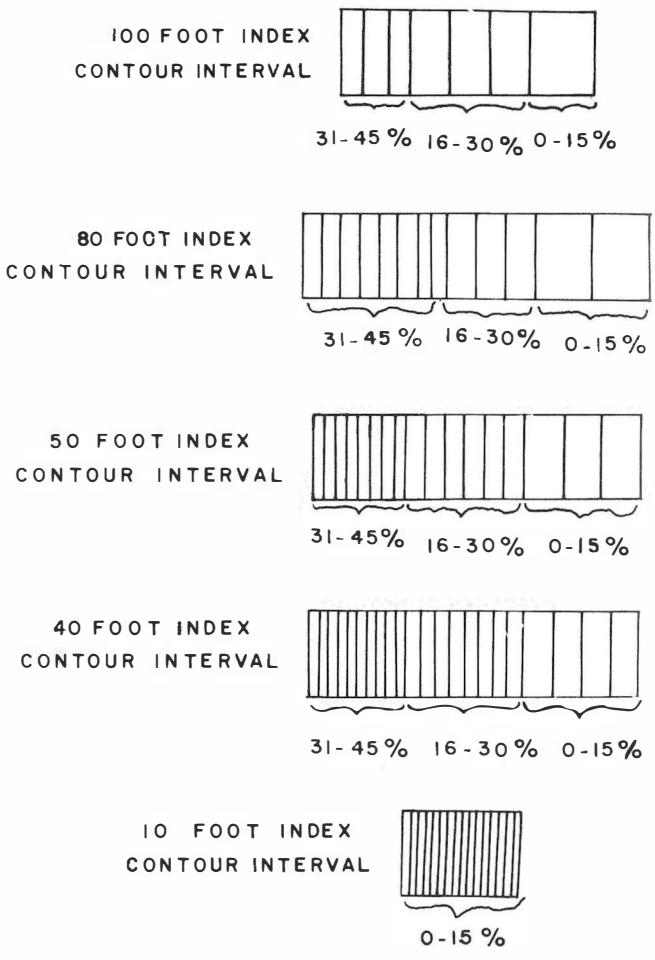


Figure 2. Sample Segments of Index Contour Interval Templates.

Map analysis. With the plastic templates prepared, actual examination of the topographic maps began. Each map was overlaid with tracing paper, and a colored pencil was selected to represent each category of percent of slope. The appropriate template was slowly moved inch by inch over each map, matching contour lines to those on the template. Beginning with 0-15 percent, all map areas where the contour spacing was the same or greater than that on the template were colored one color. The same was done with each template for each category of slope. Because of the great variability of the contour line spacing, analysis with the regular contour line templates was extremely difficult. Therefore most of the work was completed with the index contour templates, speeding the work considerably. All maps were analyzed

in this manner for the entire study area. The assembled tracing paper resulted in a large slope map of the study area with each category of slope represented by a different color. The geologic boundary as shown on the California Division of Mines and Geology geologic map sheets of Chico and Westwood, and the reference axis were then superimposed on the map.

Data Preparation

To facilitate analysis of the colored tracing paper map, the colors were converted to numerical data. Each color was assigned a value as follows:

Number	Color	Percent Category
1	Yellow	0-15
2	Light green	16-30
3	Purple	31-45
4	Orange	46-60
5	Dark green	61-75
6	Red	76-90
7	Dark blue	over 90

With each integer representing the mid-point of a category, the following values were assigned to the following percentages of slope:

Value	Percent of Slope
1.0	7.5
1.5	15.0
2.0	22.5
2.5	30.0
3.0	37.5
3.5	45.0
4.0	52.5
4.5	60.0
5.0	67.5
5.5	75.0
6.0	82.5
6.5	90.0
over 6.5	over 90.0

The entire map was overlain by a tracing paper grid of four-inch cells. On a separate piece of frosted plastic film, a single cell 4 inches square was further subdivided into cells 4 inches square. Every other 0.2 inch cell was carefully cut

out with scissors. This 4-inch square guide was placed on the larger grid of 4-inch squares, one square at a time, instantly converting each into a 4-inch cell of 400, 0.2-inch cells. Since every other cell had been cut out, the underlying slope map was exposed through half, or 200, of the small cells.

The predominant color exposed through each of these cells was determined, and the correct number for the percent of slope represented was written in pencil through each cell on the tracing paper beneath. The 4-inch grid was then rotated one quarter of a turn and the remaining 200 cells marked in the same way. When all the large cells had been marked, the entire area had been assigned one number for every 0.2-inch cell. Thus, the values could be aggregated for any size area desired, as amall as 0.2 inch square, or as large as the entire study area.

A working grid of one inch cells (approximately one square mile) was used in the actual analysis. A coordinate system of letters and numbers was established to designate rows and columns of one inch cells. The 32 rows were assigned letters from left to right, A through Z, and AA through FF. The 50 columns were assigned numbers from 1 to 50. Because of the dimensions and shape of the study area, some marginal cells were smaller than one square inch. Except for these, and a few cells which overlaid small areas not included in analysis (parts of lakes, rivers, etc.) each cell contained 25 numbers.

An average value for each cell was found. The numbers in each cell were summed and divided by the number of values within the cell, resulting in an average slope value for each cell. Next, average slope values for each column were computed by summing the cell averages and dividing by the number of cells in the column.

Testing the Hypothesis

When all column averages had been found, a comparison of slope values could be made from one side of the axis to the

other. The Cascade side of the axis included columns A through P (excluding small patches of Quaternary alluvium), and the Sierra side, columns Q through FF. The average slope value for each side was computed by summing the column averages and dividing by the number of columns.

A more precise analysis was then made by comparing average values from one side of the geologic boundary to the other. All values for each column, partial column, whole cells, and parts of cells covering Cascadian rock were summed and averaged. The same was done for the Sierra Nevada. This supplied the basic information to support or reject the hypothesis that slopes of the Sierra are steeper than those of the Cascades in the boundary region.

To establish a slope boundary a row-by-row analysis was done. A table of average cell values for each row was prepared so that each row from left to right could be studied for significant changes in slope values. Each row was analyzed for significant breaks or changes in percent of slope, and for slope trends, using the following operational definitions:

1. Significant change - The slope value of a cell differs by at least one point (15%) from the value of the cell immediately preceding and following it in a row.

2. Trend - Each 3-cell segment immediately preceding or following a significant change is uninterrupted by another significant change (the values do not vary by one point, 15%, or more).

Every significant change and the difference in slope values was noted in each row. Every slope trend and its average slope value was indicated also.

Intuitive boundary. Without refernnce to or consideration of the geologic boundary, an "intuitive" boundary (or boundaries) was established as suggested by the data. Only significant changes accompanied by slope trends were considered. Each significant change and trend, represented by a dot, was plotted on a map of the study area which did not show the

geologic interface between the Cascades and Sierra Nevada. Straight lines were drawn to connect the dots from row to row where they appeared close together or were in some way obviously aligned in a NE-SW direction, roughly paralleling the trend of the geologic boundary. Some dots appeared to fit into a boundary but were not connected because of the distance between them. A boundary was not interpolated between significant changes of more than approximately two or three miles perpendicular in either direction. Because many rows contained more than one significant change accompanied by a trend, more than one intuitive boundary emerged. A Plus (+) or a minus (-) sign on either side of the intuitive boundaries indicates whether the slope trend is steeper or less steep.

Findings and Conclusions: Regarding the Problem

The problem or purpose of the research was to attempt to establish a slope boundary between the Cascades and Sierra Nevada. Figure 3 shows the results. The solid, black lines connecting the dots represent intuitive boundaries. Rather than finding one continuous boundary, the data indicated several short slope boundaries, or boundary segments. The longest segments, between rows 7 through 17, columns Q through V (Boundary A), and rows 18 through 30, columns W through Y (Boundary B) are approximately 15 miles long and 12-1/2 miles long respectively. Shorter segments appear between rows 15 through 22, columns Y through BB (Boundary C); rows 25 through 31, columns AA through CC (Boundary D); and rows 11 through 17, columns C through D (Boundary E). Three very short segments connect only three dots each. These occur at rows 19 through 21, columns A through B; rows 15 through 17, column E; and rows 30 through 32, column N. Eight segments connect only two dots, and the remaining dots are unconnected.

All of the boundary segments except for three "2-dot" segments trend in a northeast-southwest direction, approximately

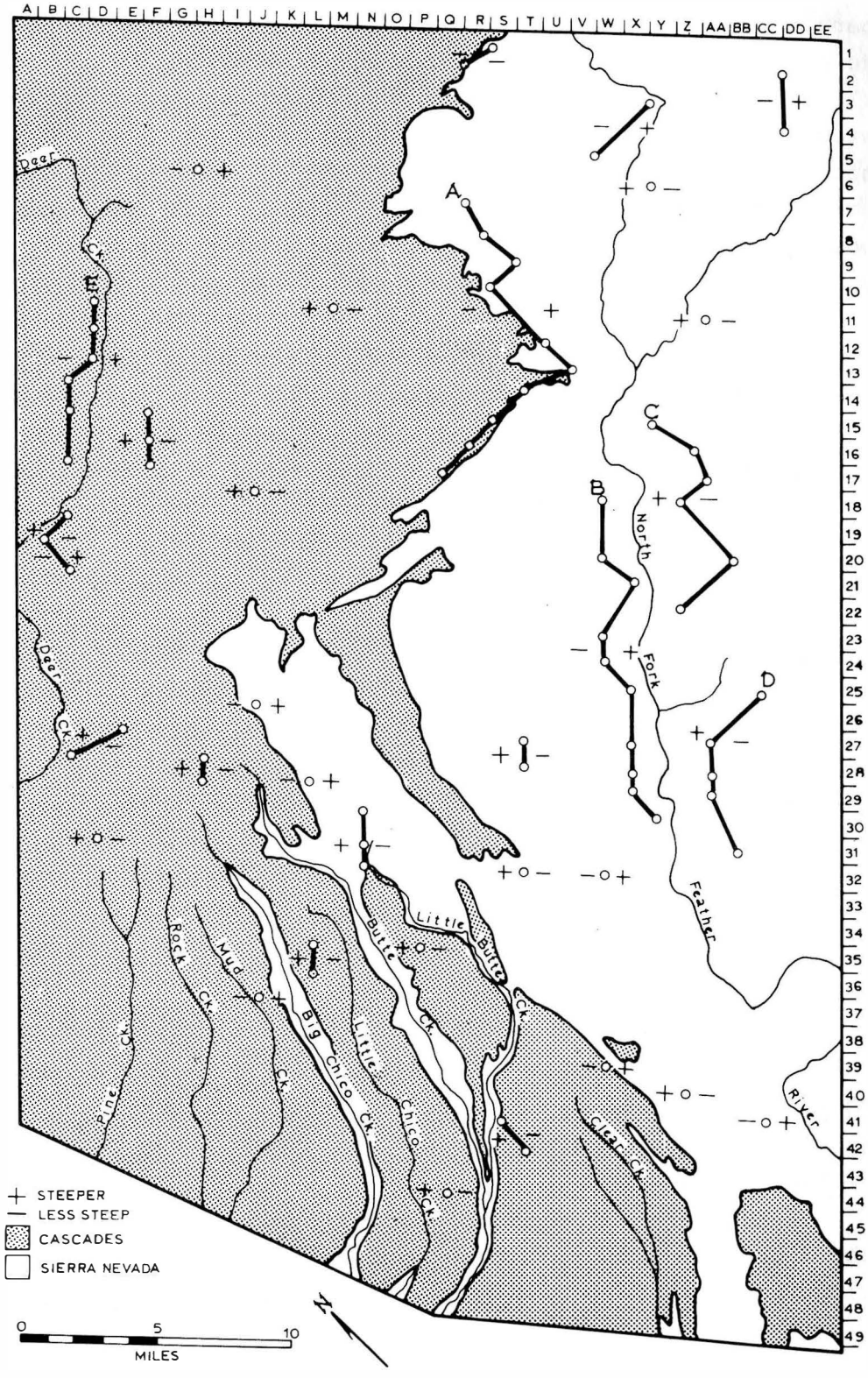


Figure 3. Drainage, Geologic Interface, and Intuitive Slope Boundaries in Study Area.

paralleling the geologic interface. The 16 unconnected dots do not seem to fit into any boundary scheme.

None of these intuitive boundaries is long enough to stand by itself as a salient slope boundary distinguishing one mountain province from the other, and the existence of other boundary segments seemingly scattered throughout the study area would tend to invalidate any preference for one boundary over another.

A more continuous boundary might have emerged by using some value of less than one point (15%) to represent a significant change in slope. For example, if all changes of, say, 0.8 or greater had been recorded, a satisfactory boundary might have been achieved. However, such a statistical maneuver would undoubtedly compound the problem of too many boundary segments, making justification of any one difficult.

Some attention should be given to the possibility that differences in slope characteristics may be attributable to factors other than broad geologic differences. Certainly other factors influence slope development. Exposure, differential resistance of rock to weathering, vegetation, and climate, for example, can have a substantial effect on slope form and steepness. However, these are usually locally manifested. Exposure may be the principal reason for a steep slope on a particular hill or ridge, but it is unlikely that conditions of exposure would be uniform throughout the entire Sierra or Cascade part of the study area and, additionally, contrast significantly with the other side.

Rock composition and rock type vary greatly within both the Sierra Nevada and the Cascades. Differential weathering of rocks of different types could be found at many places within each part of the study area, and would not likely account for overall differences.

Climate and vegetation are relatively uniform throughout the Sierra Nevada and Cascades. Peculiar micro-climatic conditions could definitely affect degree of slope, but again, this

would be localized within the region. Vegetation changes with elevation, but is *broadly* similar in both ranges, and would not likely account for a difference in slope from one range to the other.

We also need not reject the possibility that the change from one lithic unit to another influenced the change in slope characteristics, but the other slope boundaries must also be accounted for. A partial explanation can be seen on Figure 3. It is clear that the Feather River has exerted a great influence on slope steepness. Slope boundaries B, C, and D parallel the course of the North Fork of the Feather River. The slopes trend (left to right) from less steep (-), to steep (+), to steep (+), to less steep (-), indication clearly the steep, plunging canyon walls. The same effect, although less dramatic, can be seen in the northwest corner along Deer Creek (Boundary E). The existence of these river canyons has "pulled" the intuitive slope boundary away from the influence of the geologic interface. Interestingly, foothill streams such as Pine Creek, Rock Creek, Mud Creek, Big and Little Chico Creeks, Butte Creek, and Clear Creek have not demonstrated the same control on slope development except for points along row 37 and 39 where the transition from less steep to steep lies almost precisely upon the line separating Cascadian from Sierran rock. Various other points of slope change which are unaccounted for must be explained by some other phenomena, perhaps exposure, vegetation, etc., as mentioned before.

Findings and Conclusions:
Regarding the Methodology

As a technique that can be employed by an individual, slope analysis by the present method is rigorous and thorough, particularly when the entire study area is analyzed rather than samples. However, there are instances of generalization in the methodology which should be mentioned.

The construction of contour line templates is tedious and difficult. It involves drawing many equally spaced lines by hand in a space of one to three inches. The actual width of each line varies when drawn by hand so that complete uniformity of line spacing and width is impossible to achieve. This may result in a slight margin of error, the degree of which is not known, but which is assumed to be negligible.

Also, since the topographic maps were analyzed mainly by templates corresponding to the index contour spacing, some generalization of percent of slope unavoidably occurred within the index contour lines.

In converting the color data to numerical data, a value was assigned according to the color mode within each 0.2 inch square cell. This, too, was a generalization, but only to an area 0.2 inch square, which is very small datum unit for a study area of approximately 1,500 square miles.

Recommendations

With regard to the hypothesis that slopes of the Sierra are steeper than those of the Cascades, it would be useful and informative to compare slopes from sample areas other than boundary segments to determine if slope characteristics in the boundary region persist throughout the two ranges.

The idea of slope as a boundary between geologically dissimilar ranges need not be discarded. We have seen that at least a partial slope boundary coincides with the geologic boundary (Boundary A, Fig. 3). Another similar experimental situation might well produce the expected results. For example, the same problem is applicable to the Klamath and Cascade Mountains. The geologic history of the Klamath Mountains is basically that of the Sierra. the same technique of slope analysis could be applied in an attempt to establish a slope boundary there.

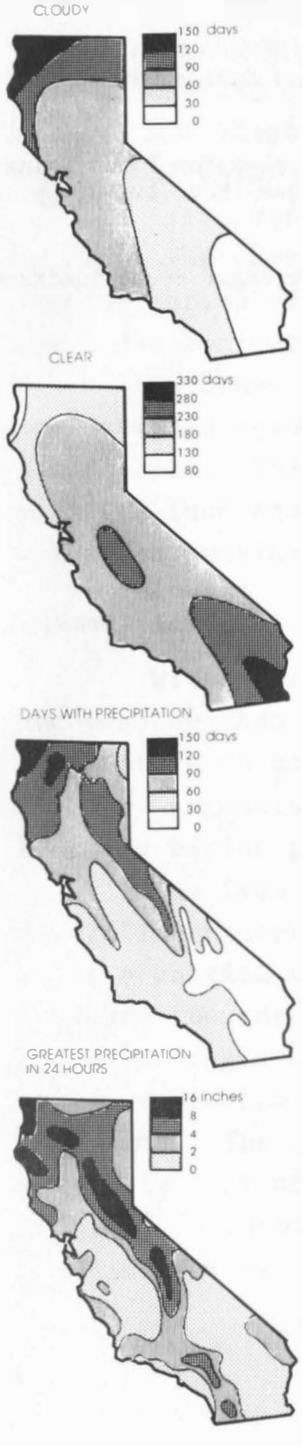
NOTES

[1]Fenneman, Nevin M., *Physiography of Western United States*, McGraw-Hill Company, Inc. (1971), p. 417.

[2]Loomis, Frederic B., *Physiography of the United States*, New York: Doubleday, Doran and Company, Inc. (1938), p. 312.

[3]Thrower, Norman J. W. and Ronald U. Cooks, "Scales for Determining Slope from Topographic Maps," *The Professional Geographer* (May, 1968), pp. 181-86.

See Also: Van Horn, Richard, "Slope Map of the Sugar House Quadrangle, Salt Lake County, Utah" (1972), U.S.G.S. Map 1-766-C.



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THE KAWEAH CO-OPERATIVE COLONY: A GEOGRAPHICAL APPRAISAL OF NINETEENTH CENTURY SOCIALISM IN THE MOUNTAINS

*William Kaiser**

Most studies of utopian ventures are political histories and rarely deal with the geographical aspects of the settlements. This is a geographical appraisal of the Kaweah Co-operative, a socialist colony which was located 40 miles east of Visalia, California, in what is now Sequoia National Park.[1] The Kaweah Colony was founded in 1885 by a group of San Francisco radicals led by Burnette Haskell in an attempt to demonstrate the superiority of socialist co-operation over capitalism. They settled the remote area along the Kaweah River, near the Giant Forest (Figure 1) for its lumbering potential. Their plan was to undersell their capitalist lumbering competition and equally distribute profits among members.

The major accomplishment of the Colony, in the six years of its existence, was the building of a road from the Kaweah River to the edge of the Giant Forest, a distance of 18 miles over steep mountainous terrain. Little actual lumbering was done. The Kaweah Colony was never self-sufficient; it relied heavily on the financial support of non-resident members. The demise of the Kaweah Co-operative Colony came in 1891 with the formation of Sequoia National Park and the rejection of their prior claims to the land.

This analysis deals with the socialist background of the Kaweah Colony, land utilization in the Colony, the Colonists' perception of nature, and the failure of the

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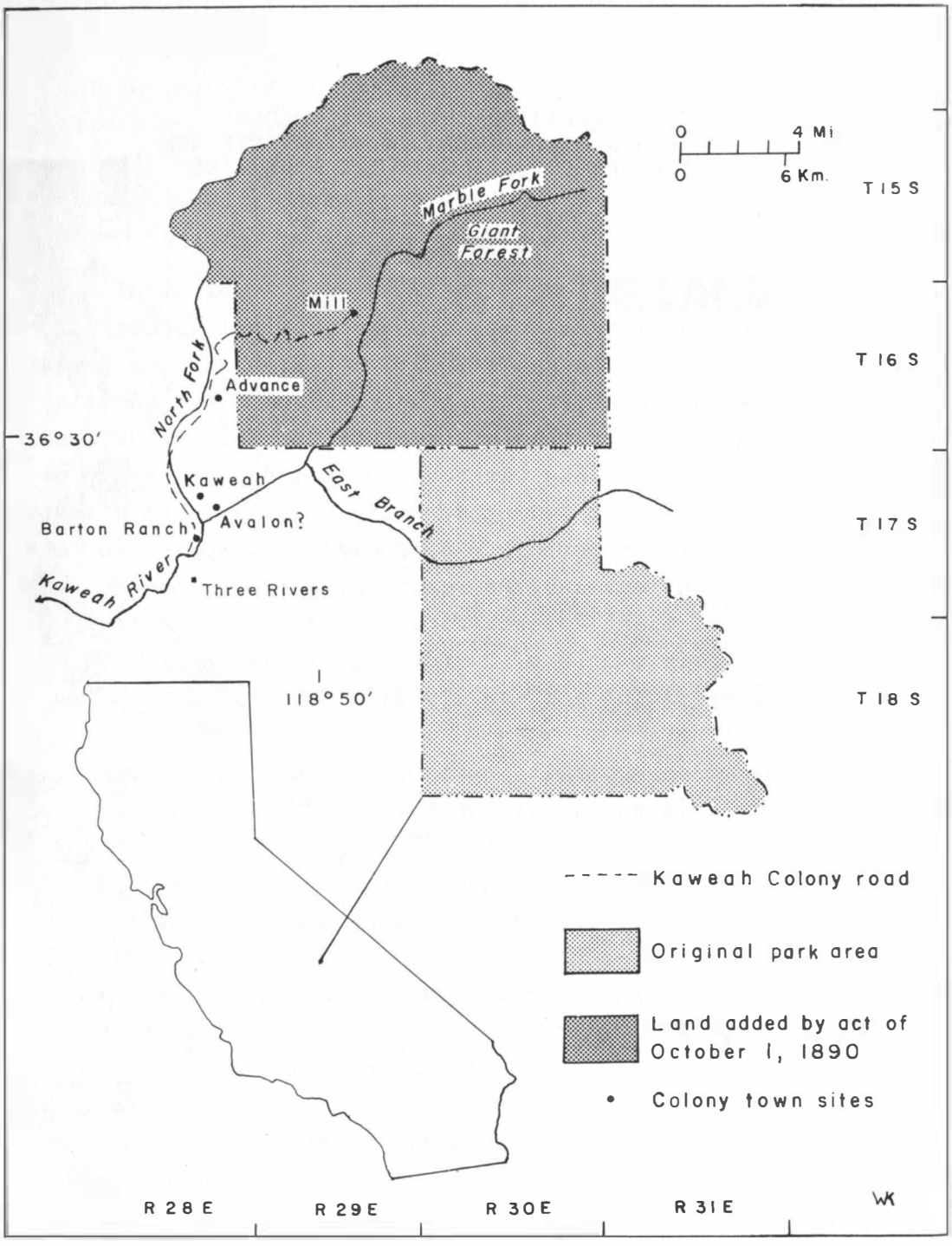

Figure 1. Sequoia National Park boundaries, 1890 (after Berland and U.S.G.S., 1915), and Kaweah Colony town sites. The Colony claimed the Giant Forest as well as townships along the road.

Colony upon the formation of Sequoia National Park.[2]

The Colony was an outgrowth of the International Workingmen's Association (IWA), organized by Burnette Haskell in the early 1880's in San Francisco. Haskell and other members quickly tired of violent confrontational Marxism and turned toward utopian socialism.[3]

The evolutionary approach to change expressed itself in the IWA's intention to form a series of co-operative industrial settlements from the Mexican to the Canadian borders, based on the exploitation of abundant natural resources.[4] A member informed Haskell that magnificent forest land, 40 miles east of Visalia, was open for land claims. Further inspection ofthe site confirmed the possibility of lumber development, and the IWA decided to concentrate its efforts on the Kaweah site.[5]

In early October, 1885, members of the IWA entered the Visalia Land Office and filed individually for adjacent quarter sections of land in the Giant Forest and Kaweah Canyon, under the Timberlands Act of 1878.[6] Local land officers had been ordered to report any suspicious land claims to Washington in order to prevent lumbering interests from acquiring large tracts of public land. In response to this order, the Visalia Land Office reported the 55 claims made in the Kaweah-Giant Forest area, fearing that the claimants were lumbering industey proxies. The Commissioner of the General Land Office then blocked the colonists' timber filings.[7]

This action, however, did not dismay the colonists. They believed it would allow them time to raise enough money to purchase the land under the Timberlands Act. Moreover, the suspicion that they were proxies for the lumber industry would be dispelled by their efforts to improve the land.[8] Members decided to squat on the land and never did have legal title to the land they claimed.

The Colony originally intended to build a railroad to the Giant Forest and ship the lumber to San Francisco, where

it would be shipped to international markets. They also planned to establish their own international trade network to compete with the capitalist system.[9]

Limited financial resources forced the Colony to base its economy on agriculture, as well as lumbering. Instead of a railroad, the colonists decided to build a wagon road and transport the lumber to the San Joaquin Valley. They intended to undersell the current lumber market there by half the existing price.[10] They assumed that the lumber demand in the San Joaquin Valley would assure the survival of the Colony.

The Colony's official newspaper, The Commonwealth, painted a bright picture of the agricultural potential of the Colony land:

> The soil is capable of producing in the utmost perfection, olives, oranges, grapes, apples, peaches, pears, plums, cherries, nuts, and every kind of fruit, vegetable or grain indigenous to the temperate and semi-tropic zones.[11]

In a later article the newspaper quoted the Russian geographer, Peter Kropotkin, about the unlimited agricultural potential of the soil surrounding Paris, France. By some strange logic, this indicated to the newspaper that the soil around the Kaweah Colony also had unlimited agricultural potential.[12]

In fact, little of the Kaweah Colony land was suited for agriculture. The land is rugged mountainous terrain ranging in elevation from 2,000 to 8,000 feet. Soils that could support such crops are only developed along the Kaweah River and its branches in alluvial fans and terraces. Orchards can only survive at lower elevations near Barton Ranch, Kaweah and Avalon (Figure 1) where the number of frost-free days would allow such cultivation.[13] The climate of the area is the typical California variation of the Mediterranean climate, summer dry and winter wet. There is, however, a significant variation in precipitation between the higher and lower elevations because of the orographic effect. Any agricultural venture would necessarily depend on irrigation during summer.

Indeed, one agricultural scheme involved the diversion of water from the Kaweah River to their orchards. The medicinal nature of olive oil was described in the Commonwealth when the Colony decided to grow olive trees.[14] Later, olive growing regions of France and Italy were compared physically and climatically to the Colony lands.[15] Non-resident members sent Kaweah peaches, figs, strawberries, date palms, apricots, loquats, and raisin grapes, as well as olives, for the orchards.[16]

The Colony claimed to have cleared 300 acres for wheat and barley, and there is written evidence of the introduction of rye grass from Germany. Members supposedly pastured cattle. There is even a roundup mentioned in the newspaper.[17]

The colonists intended to mine limestone, marble, gypsum, gold, silver, and iron ore. The presence of these minerals was shown by reprinting excerpts of geological reports on the whole Sierra Nevada. It was assumed, without investigation, that all these minerals would be present on their land.[18]

The population of the Colony varied between 75 and 300 people in its brief history.[19] There were five town sites in 1890, Barton Ranch, Kaweah, Advance, Avalon, and Mill Site (Figure 1). Each town had a specialized function and was no more than a day's travelling time from another. Advance was the site of the administrative center, the general store, post office, and school.[20]

Despite meager attempts at agriculture, the Kaweah colonists were always dependent on outside support for their survival. The situation was plain in 1890, when Haskell wrote, "... even now we hope our friends upon the outside will not forget that their monthly dues are what we are presently depending upon...."[21] The Vislia Delta later reported that "no meat, milk, butter, or eggs was supplied to the Colony for weeks or even months at a time."[22] Tents and cabins were the main form of housing.

The lasting accomplishment of the Kaweah Co-operative Colony is the 18-mile road, built by members from the Kaweah River to the edge of the Giant Forest (Figure 1). "Persons accustomed to mountain road building had deemed it next to impossible to construct a suitable road" through that stretch of rugged country.[23] It was accomplished, according to the colonists, because of "socialist co-operation." It is ironic that the road the Kaweah colonists built for lumbering was the only road to the Giant Forest until the 1930's. It still can be travelled on foot today, with the permission of the National Park Service.

The Kaweah Co-operative Colony attempted to compete with the outside world on capitalist terms. They viewed the mountains and their timber in economic terms. Other groups, at this same time, believed that the Kaweah River-Giant Forest region was worthy of preservation for future generations. These differing views of the potential value of the same region are good examples of the idea that resources are, in fact, cultural appraisals.

Individual members of the Colony were not oblivious to the beauty surrounding them. The site was often described in rapturous terms, where "lofty giant trees whose tops seem to touch the sky is a sight to be seen nowhere else ... [and] is worthy of a special journey around the world to witness."[24] One woman wrote "that every bird of the air and fish of Kaweah River is more than a bird or fish, in fact is sacred...."[25]

Despite individual attitudes expressing appreciation of nature, the Colony's primary purpose was lumbering. The description of the timber on their land in the Commonwealth left little doubt as to their intentions.

> This wonderful belt of timber, the most valuable portions of which are already in the possession of the Colony, has a reputation of being the finest body of timber in California. Here the crop of a thousand years, which by actual measurement and cold Blooded calculation amounts to several millions of dollars in value awaits the application of industry.[26]

The newspaper claimed that there "is enough timber in the Giant Forest to last over a hundred years without touching the mammoth growths."[27] Contrary to what most histories of the Colony say, it is clear that they did not intend to lumber the Sequoia gigantea of the Giant Forest. They said it "would be nothing short of vandalism to indiscriminately destroy these sentinels of past centuries...."[28] The colonists, however, were ignorant of the potential ecological damage they would cause by logging in the vicinity of the Giant Forest.

By 1890, there was considerable agitation for a national park in the Kaweah region. John Muir had named the Giant Forest in 1875 and lumbering had taken place at an even earlier date.[29] There had been proposals for park reservations in the Kaweah area since 1880. Local conservationists succeeded in having four sections surrounding the General Grant Grove north of the Giant Forest withdrawn from public sale in 1890.[30] Agitation for a national park in the area was ignored by the Colony newspaper.

The sale of several townships in the Kaweah River area, to the south of the Colony, to what was believed to be big lumbering interests precipitated the formation of Sequoia National Park on September 25, 1890.

The colonists were relieved to learn that the land they claimed, including the Giant Forest, was not included in this original bill (Figure 1). Haskell welcomed the establishment of the park because he thought it would benefit the Colony.

> ... its tourists, its hunters will have to buy their food and supplies from us. The location of this National Park is one of the greatest boons that could have been conferred upon us....[31]

Much to their surprise, Sequoia National Park was expanded to more than double its original size by the same bill which created Yosemite National Park. This new bill was signed into law on October 1, 1890, six days after the original.[32] The new parkland included not only the Giant Forest, but all of the townships around it (Figure 1).

The Kaweah colonists' initial reaction was guarded optimism. Haskell wrote that the "bill properly excluded all claims, settlements, and entries previously taken up, thus protecting our already acquired lands."[33] However, Haskell did a disservice to the other members by assuring them "These townships have been for nearly four years legally and absolutely ours...."[34]

The Kaweah Colony disintegrated in much bitterness soon after the Secretary of the Interior ruled that their land claims were not truly bona fide. The Federal Government did not even reimburse the colonists for their road, which was appropriated along with their lands.

Why were the boundaries of Sequoia National Park extended to include the colonists' land after only six days? Oscer Berland, in an outstanding piece of historical scholarship, points the finger at one of the greatest landscape modifiers in California, the Southern Pacific Railroad. Southern Pacific's reasons for wanting an extension of the park boundaries are actually logical. Parks built around natural curiosities like the Giant Forest attracted tourists and stimulated passenger traffic. The Southern Pacific was also concerned with watershed protection for its vast tracts of land in the Central Valley. Furthermore, the railroad held an important position in the lumbering industry, and felt threatened by any sort of competition, especially socialist.

It is ironic that the Southern Pacific Railroad was involved in the reservation of the Giant Forest, an act which the Visalia Delta and local officials opposed. The conspiratorial view of the role played by the Southern Pacific should not be overemphasized, however. The Kaweah colonists' claims could easily have been ruled invalid and the Giant Forest preserved at a later time.

The Kaweah Co-operative Colony was an outgrowth of nineteenth century socialism in San Francisco. Members of the Colony were imbued with the belief in unlimited material

progress, an idea, however, which was not peculiar to socialism. This belief in progress contributed to the Colony's failure to deal rationally with geographic reality. The Colony, therefore, had unreal expectations concerning their viability in the future.

The conflict between economic exploitation of the resources of a given region, whether "capitalist" or "socialist," and the efforts of conservationists to preserve the aesthetic, as well as economic resources, is even more important at the present time, with the advent of widespread application of technological methods of exploitation of these resources. The story of the Kaweah Colony, with its many ironies, is an early and significant chapter in this ongoing conflict.

NOTES

[1]Histories of the Kaweah Colony can be found in Robert Hine, *California's Utopian Colonies* (New Haven and London: Yale University Press, 1966); Ruth R. Lewis, "Kaweah: An Experiment in Co-operative Colonization," *Pacific Historical Review,* Vol. 17 (November 1948), 429-41; and Paul Kagan, *New World Utopias: A Photographic Search for Community* (New York: Penguin, 1975).

[2]One major problem encountered in this geographical study of the Kaweah Colony is that there never was a permanent record or original map showing the exact location of the Colony.

[3]*Commonwealth,* San Francisco, November 24, 1888. This was the official newspaper of the Kaweah Co-operative Colony. It was published in San Francisco from 1885 to 1890, whereupon it moved to Kaweah and became the *Kaweah Commonwealth.*

[4]Dane Kennedy, *The Kaweah Colony* (unpublished MS, Bancroft Library, 1973), p. 12.

[5]Ibid., p. 13.

[6]Hine, p. 79.

[7]Oscar Berland, "Giant Forest's Reservation: The Legend and the Mystery," *Sierra Club Bulletin,* Vol. 47, No. 9 (December 1962), p. 71.

[8]Ibid.

[9]Hine, p. 83.

[10]*Commonwealth,* April 24, 1889.

[11]Ibid.

[12]*Commonwealth,* August 1, 1889.

[13]U.S. Department of Agriculture, *Soils Survey: Visalia Area, California.* Series 1935, No. 16 (Washington, D.C.: U.S. Government Printing Office, 1940).

[14]*Commonwealth,* April 3, 1888.

[15]*Commonwealth,* April 31, 1888.

[16]*Kaweah Commonwealth,* February 22, 1890.

[17]*Kaweah Commonwealth,* January 28, 1890.

[18]*Commonwealth,* April, 1889.

[19]*Visalia Delta,* December 10, 1891.

[20]*Kaweah Commonwealth,* September 13, 1890.

[21]*Kaweah Commonwealth,* July 5, 1890.

[22]*Visalia Delta*, November 19, 1891.

[23]*Visalia Delta,* December 17, 1891.

[24]*Commonwealth,* April 24, 1889.

[25]*Kaweah Commonwealth,* January 18, 1890.

[26]*Commonwealth,* April 24, 1889.

[27]*Commonwealth,* April 10, 1889.

[28]*Commonwealth,* April 24, 1889.

[29]Francis P. Farquhar, *Exploration of the Sierra Nevada* (San Francisco: California Historical Society, 1925), p. 15. See also Douglas Strong, "The History of Sequoia National Park, 1876-1926, Part I: The Move to Establish a Park," *Southern California Quarterly,* Vol. 48, No. 2 (June 1966).

[30]Berland, p. 72.

[31]*Kaweah Commonwealth,* September 6, 1890.

[32]Berland, p. 74.

[33]*Kaweah Commonwealth,* November 1, 1890.

[34]Ibid.

COMMUNITY IN CALIFORNIA

*Bonnie Loyd**

Every community, or social group, must adapt to the urban environment. In order to survive, each community develops strategies to construct and maintain mutual support systems and safe places. When the community is dispersed throughout an urban area the need for effective channels of communication emerges as an especially critical problem.[1]

Participant observation at a switchobard in San Francisco confirmed that community switchboards succeed in helping groups deal with the centrifugal forces of urban life. Switchboards for feminists, homosexual men, single parents, and hippies link the scattered members of their communities and direct them to shared spaces.

Communities and Territory

In our sprawling cities and mobile society, communities no longer find it necessary to establish a common residential territory. Although traditional ethnic groups with distinct neighborhoods, such as Chinatowns, survive, in the emerging urban social pattern members of a community live in scattered places throughout the city. University professors, artists, and members of radical political groups may share a common outlook but not a common residential area. These dispersed individuals form a community when they develop a feeling of identification with the group, express similar interests and goals, and participate in mutual cooperation.[2]

The loosening pattern of a community's residential territory requires two separate definitions of community. The first and older definition relates a group to a specific

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residential territory, and the second definition emphasizes the common outlook of the group. This dualism in the concept of community is explored by Palm.[3] The second type of dispersed community Melvin Webber has dubbed "community without propinquity."[4] A dispersed community no longer is defined by one piece of home turf but by a flow of communication among its members. The territory shared by a scattered community may consist of a collection of preferred places for social, commercial, and service activities, such as meeting halls, clinics, bars, workshops, specialty shops, and offices. Rallies, newspapers, posters, and switchboards sustain the ties between members and inform them of community spaces.

Strategies for Adapting

Geographers such as Rengert have shown how individuals adapt to a stressful environment.[5] Lee draws on environmental psychology to explore how individuals respond to stress in the physical environment.[6] Buttimer points out that such investigations of individual behavior generally ignore the sociological dimension of human life.[7] Although individuals do cope with their physical, economic, and social surroundings alone, their strategies are often mediated by their social groups or community. The community works together to provide human services and to establish safe spaces. Even though individual personality traits may influence the choice of response, the choice usually is affected by values and practices of the group. The individualistic view of humans as single organisms responding to their environment neglects the rich dimension of social interaction.

What strategies do communities adopt to cope with the urban environment? In the traditional ethnic neighborhood community needs are met by a system of face-to-face communication with the local territory. As ethnic communities grow and expand to other parts of the city, newspapers supplement personal contact. Robert Park described how immigrants used the community press to adapt to urban life in America:

> One reason why the immigrant peoples read more in America than they do at home is because there is more going on they need to know. There is more novelty and more news. News is a kind of urgent information that men use in making adjustments to a new environment, in changing old habits and in forming new opinions.[8]

When the community is scattered throughout a metropolitan area new communication strategies are required. The vast quantity of information exchanged and the large number of potential social contacts make the city complex. Each social group must sift through these opportunities and select the information and contacts most useful to its own survival. Goldmark describes cities as "information-processing systems."[9] Deutsch suggests that the efficiency of cities be measured by the range of communications contacts they offer, but he also believes that communication overload is a disease of contemporary cities.[10]

Within this web of urban communication the telephone has become the most commonly used device for personal contact.[11] The telephone system is best suited to private conversation between two people. The network defies the friction of distance within the city, because it can instantly connect any two points. Almost everyone has access to a telephone; more than 90 percent of American homes have at least one. When widely separated members of a community seek information the telephone is the most convenient tool.

Development of Switchboards

Community switchboards emerged in the past few years as an effective means to link dispersed communities. Switchboards evolved from telephone information services called "hot lines." The first hot lines provided specialized information on drugs, sex, or venereal disease. They filled a gap in public services unnoticed by formal institutions. Hot lines have been especially popular with teenagers because this group generally does not have the resources to use public services without the assistance of an

adult. Hot lines fill their needs because the caller can seek information without revealing his or her identity, paying a fee, traveling to an office, or making an appointment.

Hot lines share several basic characteristics: First, they provide information not readily available from public agencies or friends. Second, callers need not reveal their identity. Third, hot lines require little money to operate, and the service is free to users. Finally, the service is as close as the telephone and requires no trips, appointments, or waiting.

Telephone counseling services grew out of the early information hot lines. These switchboards organized to handle suicide prevention, drug problems, child abuse, rape, and abortion counseling. They offer a combination of psychological, legal, and medical services. Again, the vital ingredients in the formula are reliable information, anonymity, low cost, and immediacy.

But these telephone services still do not constitute a true community switchboard. They provide information and counseling to isolated individuals who guard their anonymity. If the switchboard staff is effective in providing complete information, referrals, and advice, the clients may never call again. These services also limit themselves to a specific category of assistance. The hot lines that arose in the 1960's still field questions but do not link communities.

In San Francisco the first community switchboard was labeled the Haight-Ashbury Switchboard. It began to answer a wide range of requests within the "hippie" community of the late 1960's. Although many members of the community lived within the Haight-Ashbury neighborhood, few established permanent residences. Households were fluid; some people lived in vans; others floated in and out of San Francisco. Street people with no fixed address became more and more common. Due to the mobility of community members, the Haight-Ashbury Switchboard became a central community service. The Switchboard staff continues to answer requests for housing, jobs, health care,

and legal aid. They advise callers on how to cope with the welfare system, where to join a yoga group, or when concerts are scheduled. Camaraderie took the place of anonymity in the formula for success.

At about the same time the Haight-Ashbury Switchboard became well established two switchboards for homosexual men organized--one in San Francisco and one in the East Bay. The switchboard as a strategy for adapting to the urban environment suited this group because other means of community communication have been limited. Radio advertisements, posters, or city newspaper coverage of events, businesses, or services in the "gay" community have not been acceptable to other social groups. The switchboard is also appropriate because many homosexual men prefer to maintain partial privacy about their identity. The confidentiality of a community switchboard is ideal. Switchboards for homosexual men have been organized in most major American cities, so that gay men who are new in town routinely call the switchboard to find out about bars, baths, housing, and community activities. It is their point of access into the community. Although gays are accepted more openly in San Francisco every year, and gay newspapers, posters, advertisements and radio spots abound, the switchboards still are firmly established as a community service.

One offshoot of the community switchboard is the FM radio station switchboard. When FM stations first blossomed as free-wheeling alternative media, their call-in services coordinated everything from car pools to Thanksgiving dinners for the listeners. More recently, as the stations have become more commercial, their audiences have broadened and they have lost much of their intimate contact with the community.

The Case of the Women's Switchboard

The feminist community has perhaps the largest potential membership and is the most scattered community in the Bay Area. The San Francisco Women's Switchboard provides cohesion for this

group. A year of participant observation as a staff volunteer and as a caller yielded an inside view of how a switchboard functions. The operation of this switchboard typifies most. It functionally resembles the Haight-Ashbury Switchboard, the two switchboards for gay men, and a nearby women's switchboard in Berkeley. The Women's Switchboard began in 1972. During its first months of operation several women borrowed space in a garrett, installed a telephone, and began a card file of information. Today the Women's Switchboard has two telephones in a small office in the San Francisco Women's Center. The calls are answered by a staff of about forty volunteers. The Women's Switchboard is advertised widely and is available to all women. Callers vary in age, income, and ethnicity. During peak periods staff members may answer as many as ten calls per hour. Up to two thousand calls a month have appeared in the log.

The card files of information lie at the heart of the operation. The main file contains more than 300 listings in categories spanning abortion, adoption, advertising, alcoholism, writers, yoga, youth, and the Y.W.C.A. An analysis of 3,000 calls shows that requests for help in housing and medical care are the most common (Table 1).[12] This fact confirms the belief that the switchboard is a strategy for providing basic community needs. Calls for information on entertainment make up only 3.7 percent of the total.

The ingredients for an effective community switchboard differ slightly from those for a hot line. Low cost and immediacy are crucial for both, but a wide range of community information must be provided. The most striking difference is that community camaraderie replaces the anonymous exchange of information.

Measuring Effectiveness

For social scientists measuring the effectiveness of community switchboards several measures are possible.[13] Some evaluate calls and others examine the information resources.

TABLE 1. Analysis of Calls to the San Francisco Women's Switchboard

Information Sought	Percent
Housing	22.5
Medical Care	15.3
Crafts and Skills	11.7
Mental Health	9.6
Special Interest Groups	7.9
Legal Aid	6.1
Rides	4.9
Mothers and Children	4.2
Entertainment	3.7
Other	14.1
Total	100.0 = 3,000

Source: Marcia Settel, *Newsletter*, San Francisco Women's Center, August 1975.

The simplest measure is tabulating the number of people who use the switchboard during a given time period. For the Women's Switchboard the mean number of callers per operating hour is seven. This number has more meaning if it can be compared to the total number of people in the community. However, in dispersed communities population estimates are usually difficult if not impossible to estimate.

A second, more meaningful measure totals the number of people actually helped by a switchboard. This number is usually far less than the number of calls. Sometimes needed information is not available; often a caller is referred to another source. Information about classes, doctors, or apartments may be inaccurate, out-of-date, or inappropriate. At the Women's Switchboard the number of people helped compared with the total number of calls is between 50 and 75 percent.

A third measure emphasizes the number of repeat callers. The repeat callers propably are satisfied with the service and are maintaining ties with the community. Repeat callers make up nearly 50 percent of the calls that are answered at the Women's Switchboard.

Other measures of effectiveness apply to the files of information kept at the switchboard. The most straightforward measure is the total number of listings. At the Women's Switchboard they total over 4,000. Inexperienced staff members may not be able to make full use of all the files, but others may add their personal store of information to supplement the listings. At least twenty items a day are updated.

Conclusion

Community switchboards are a successful strategy for helping social groups adapt to the urban environment. They fulfill two basic functions that allow the communities to maintain their cohesiveness. The first is to supply a network of social contacts for mutual support. The second is to direct callers to shared community spaces throughout the city. These spaces range from coffee houses to free clinics. Like the community members themselves, the community spaces are dispersed and shift frequently. Constant communication is required to notify community members of changes. When communities scatter throughout the city and face-to-face communication diminishes, switchboards can be an effective alternative.

NOTES

[1]Parts of this paper were presented at the 1976 annual meeting of the Association of American Geographers.

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PREHISTORIC LAND USE PATTERNS IN THE MORRO BAY WATERSHED, SAN LUIS OBISPO COUNTY, CALIFORNIA[1]

*Robert L. Hoover**

Cultural, social, and ecological factors interact in ways that are extremely complex, even in the simplest of societies. In an archaeological study of settlement patterns, prehistoric sites should be viewed as survivals of portions of the original settlement pattern. The complete analytical reconstruction of this pattern will never be completely possible, as it is not possible to identify or classify all traces of past settlement, even if such component parts were entirely preserved. One must, therefore, use a synthetic approach, utilizing whatever information is available from pertinent archaeological and other sources to reconstruct a picture of these patterns of settlement. This is attempted in the following study.

Procedures

Intensive site surveys of the Chorro Valley, San Luis Obispo County, California, by Mr. Jay C. von Werlhof's Cuesta College archaeology classes in 1969 were designed to locate and identify as many sites as possible from visible surface features. One can assume that the majority, but not necessarily all, of the prehistoric sites in Chorro Valley have been recorded. Evidence of chert flaking, shells, ashy soil, and other unusual occurrences were frequent identifiers of sites.

Using Trigger's approach to the study of settlement patterns as a complex relationship between the natural

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environment, the aboriginal technology, and the subsistence economy, three levels of analysis are utilized.[2] At the simplest level, individual structures are described as to size and form, method of construction, internal division, and activities occurring in or around the structure. The residential settlement layout as the primary locus of activity is analyzed at a secondary level. Some of the aspects of this level include the location of structures, the total number and density of inhabitants per dwelling, internal village organization and its spatial relationships, external demarcation of the settlement, and activities in and around the village. At the third level of analysis the distribution of settlements within the study area and the spatial relationships on a zonal scale are examined. The relationships among ecology, natural resources, and ease of communications to site locations were compared. The overall density and distribution of settlements, and the distribution of specialized loci--quarries, temporary camps, cemeteries, and food processing stations--are other factors which were analyzed. Other aspects of this level of analysis include population movement among loci on a seasonal or non-seasonal basis, the exchange of commodities between settlements by means of long or short term trade and between similar or complementary economies, the social and political relationships between settlements, and the differential exploitation of gross ecological zones.

Individual Structures

Numerous historic accounts of priests, soldiers, and travelers agree on the generally hemispheric shape of Chumash houses. These structures ranged in size from 15 to 60 feet in diameter, depending upon the size of the occupant family and on whether they were commoners, the family of a lineage headman, or the polygynous household of a chief. The best description of one of the larger houses comes from the original journals of Fr. Jan Crespi:

> Some of these houses, round like half oranges, are extremely large; we entered for curiosity's sake within some of them and were struck with wonder at their size, for no doubt at all they must be able to lodge sixty people and more without hindrance.[3]

Each village had at least one sweathouse. One type was a large semi-subterranean structure which was entered through the roof. Another type was smaller and had a side entrance. Men normally slept together in the larger sweathouses and used them as religious clubhouses.[4]

Information on construction methods can be derived partly from archaeological data and partly from historical accounts. The only structure excavated in the Morro Bay region was a dwelling with a floor diameter of about thirty feet.[5] The floor of transported earth was constructed in a shallow depression that had been prepared beforehand. It was roughly circular in shape and had acquired a saucer shape due to the compacting of the soil by heavy human traffic around the center of the dwelling. The outer raised edges of the floor reached a maximum thickness of two inches and had a characteristically rolled or rounded shape that sharply defined the floor from the exterior ground surface.

Such dwellings were made of poles, usually of peeled willow (*Salix spp.*), which were set into the ground around the edge of the circular floor to a depth of six inches.[6]

Tule was probably the favored material in the Chorro Valley, as it grows abundantly around the shores of Morro Bay and several nearby lakes. Student experiments in the reconstruction of such structures in 1971 and 1974 indicate that bundles of tules can be folded in half and rested over the horizontal pole, with both ends of the bundle being secured o n the external side of the house by another layer of willow poles lashed to the frame. The thatching process would have to begin on the lowest course of horizontal poles and continue upward in overlapping layers. The resulting shingled effect sheds water very well.

The hearth, normally located in the center of the house, was the focus of household life. Smoke from this hearth escaped through an opening in the roof. The fire itself was utilized for heating the structure and for cooking. The interior of the houses, at least the larger examples, had internal compartmentation.[7]

Location of Structures and Density of Inhabitants

The Chumash residential settlement was the primary locus of activity in the prehistoric period. It is clear from excavations throughout the Chumash area that the various activities of the population were performed in discrete parts of the village set aside for specific purposes. There was little overlapping use of these areas. The residential area contained dwelling structures arranged relatively close to one another.

Brown utilizes baptismal records and statistical techniques to estimate an average of five to seven persons per each of the smaller houses. These would be the single-family dwellings of monogamous commoners, including husband, wife, children, and perhaps an older dependent relative. Heizer has shown that the canoe owners of the Santa Barbara Channel also occupied the larger houses containing several related monogamous families.[8] These men were heads of important lineages. Chiefs lived in even larger houses with even more relatives, multiple wives, and perhaps some retainers. This would tend to raise the average number of people per household and give a distorted view of intervillage population density. We might expect fewer chiefs and lineage heads as far north as the Morro Bay area, so that six or seven people to a dwelling structure would be an accurate estimate.

External Demarcation

Resources collected from the land surrounding each village were communally owned. Thus, there was a zone around each village which was used by all village residents in common for hunting, fishing, and plant collecting activities. Mussel rocks, oak trees, and areas of *chia* sage were exploited in this way.

The boundaries of such villages were not clearly demarcated, as several neighboring villages might be subject to the authority of a single chief and share a common resource base. It was the chief's duty to provide for all his needy subjects out of the communal food stores, regardless of their village origin.

Activities Around Settlements

Each village, including residential, mortuary, and manufacturing areas, may be seen as a nucleus of local activities. Around each of these centers was a roughly circular area which was intensively exploited by the villagers as a resource base and containing a number of special purpose sites--acorn grinding and leaching areas, hunting camps, quarries, and pictographs. The complex, perhaps a couple of miles in diameter, formed a complete settlement. The exact area, size, and shape of the complex was dependent on topography, the abundance of local resources, and the size of the human population it supported.

Women might travel out from the village during the day, collecting and processing acorns at sites like that on Pennington Creek. An area of exposed bedrock provided a place for bedrock mortars, while the nearby creek supplied water for the leaching process. Other plant resources--edible bulbs, islay, and chia--were available elsewhere. The optimal distance from the village which could be practically traveled each day for resource exploitation has been found to be about four miles.

Men probably traveled greater distances on hunting expeditions, establishing temporary camps, but would not be gone for more than two or three days at a time and would bring most of the wild game back to share with their families.

Site Distributions

The distribution of prehistoric sites in the Morro Bay watershed (Figure 1) is certainly not random or evenly spaced. There are relationships to sources of fresh water, food resources, routes of travel, and even the presence or absence of certain kinds of dangerous animals. Settlement patterns in the study area can best be interpreted by examining the sub-areas individually. At first glance, it is clear that the coast and valleys were the selected areas for settlement, while mountain ridges were generally ignored as habitation sites.

The Chorro Valley contained a series of moderately small permanent villages, each two miles apart, along the banks of Chorro Creek. These villages were normally on the south bank of the creek and often near its confluence with subsidiary streams. Small special purpose satellite sites for gathering, quarrying, hunting, or ritual activities were clustered around the permanent villages. Such sites are also found along the northeastern shore of Morro Bay. SLO-569, near the confluence of Dairy and Chorro Creeks, was larger than average, perhaps representing a local political center or stopping point along a trade route connecting the Chorro Valley with the Salinan Indians northeast of the Santa Lucia Range. Dairy and Pennington Creeks were apparently routes used for this purpose, as the contain several temporary camp-sites. Perhaps, the Salinans were allowed to pass over the mountains to collect shellfish near Morro Bay, a practice found in other areas of California.

Los Osos Valley contained only a single known site in its upper portion. When the Spanish arrived in 1769, the

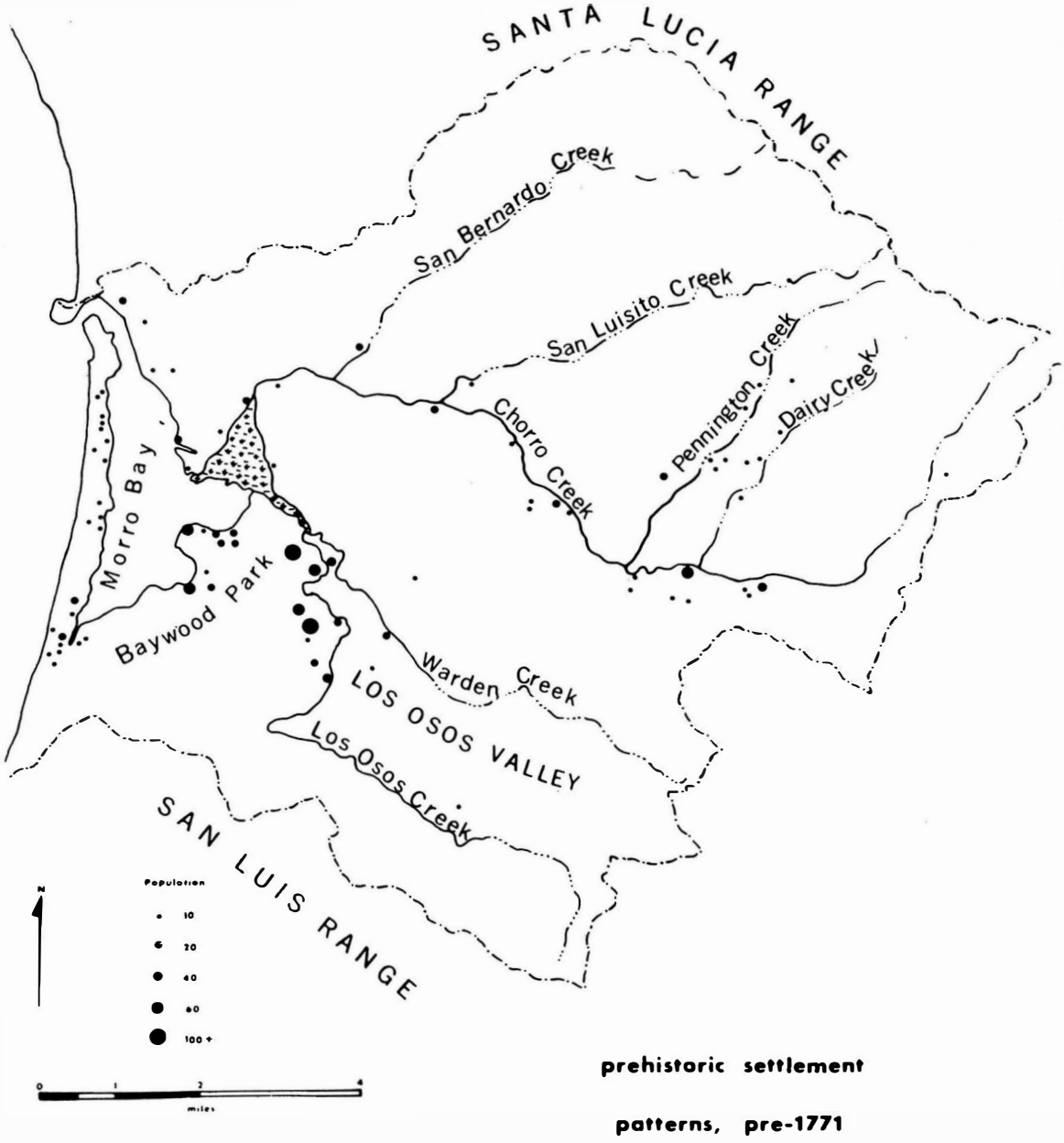

Figure 1. Study area and vicinity.

valley was the grassland habitat of numerous grizzly bears which the Indians feared and avoided. The presence of grizzlies in the area must have certainly made the area unsuitable for settlement. Not far away, the Los Osos-Baywood Park area contained the densest concentration of permanent prehistoric settlements in the entire study area. Most of these sites also were of large or medium size. Such sites were clustered around the lower portions of Los Osos Creek and the southeastern shore of Morro Bay. One of these, SLO-214, represents the largest archaeological site in San Luis Obispo County, though it is only of moderate depth. SLO-14, along the south shore of Morro Bay, is a smaller site but extends to a considerable depth and has a cemetery, indications of lengthy and intensive occupation. Many of these sites are concentrated around the present 40-foot contour level. This phenomenon can be explained if one assumes that Morro Bay was once much more extensive than today. It probably extended eastward as far as Warden Lake and included an area which is still flooded during local rainy years. The 40-foot contour may represent the old shoreline of the bay, which is still in the process of shrinking due to the deposition of silt from its tributary streams.

The sandspit of Morro Bay is the final sub-area examined. It contains numerous small shallow shell middens. These sites were all temporary camps without sources of fresh water or cemeteries. They were probably occupied only during certain seasons of the year, by Chumash from interior villages and perhaps by more distant groups of Indians for shellfish collecting purposes. Chert flakes used to pry open bivalve shells and thermal fractured rock which may have formed part of clam steaming ovens are additional features of these sites.

Relationships to the Environment

Fresh water and abundant plant resources were found in the lowland area. Anadromous fish filled the streams during the winter near the creekside villages. Smaller animals were

also available locally, but deer were probably hunted in the nearby mountains. Morro Bay was a rich source for rocky and sandy bottom shellfish, and the mountains of the San Luis range were sources of chert for flaked stone tools.

The Chumash combined hunting, fishing, and wild plant gathering techniques in their diverse and rich environment. The gathering of plants was a task primarily for women, while hunting and fishing was done mainly by men. Elaborate tools and processes were developed to obtain plant and animal foods and to make them edible or to preserve them.[9]

In spring, large pelagic fish entered the coastal waters of the Chumash. These were harpooned, hooked, or netted from remarkably constructed plank canoes outside the kelp beds. Seed and root plants began to appear. The agave, yucca, manzanita, goosefoot and chia sage were primary sources of plant food in the late spring.

Summer was the time of great abundance for the Chumash. Pelagic fish and plant resources reached their peak at that time. Sea mammals came ashore for breeding and could be harpooned on the beaches. Deer wandered down to lower altitudes in search of water and could be hunted more easily. Plants such as the tuna, chia, datil, goosefoot, islay, and other berries and seeds were available in great abundance in chaparral and grassland areas.

During the autumn, availability of food resources gradually tapered off. The large ocean fish and sea mammals migrated southward and plant resources died back. Stored seeds and dried fish were utilized as food. Pine nuts and acorns were harvested on the mountain slopes and were stored for the winter.

Winter was the leanest season for food resources. The population lived mainly on stored acorns and dried fish. Some river fishing provided a source of fresh protein.

There is a great deal of evidence that most California Indians practiced controlled burning to create more of the

desired vegetative communities.[10] Grassland and chapparal in the study area was probably burned in October to control the advance of brushy vegetation and to increase and concentrate the kinds of seed and bulb plants which served the Chumash economy.

Distribution of Specialized Loci

Special purpose sites tended to cluster around the village of those who utilized them in the Chorro Valley. Most of these sites were used for food processing activities, such as SLO-544. Cemeteries were not found at these locations but only at the permanent residential villages. The Morro Bay sandspit contains only special shell collecting sites without any residential villages nearby. Perhaps, the users of these sites lived in the large villages on the eastern shore of the bay.

Chert quarry sites, where the stone was broken off and roughly flaked, were found in the hills above the alluvial valleys. One of these exists on the south side of Bishop's Peak. Several Chumash sites in areas of less resource variability have been identified as specialty manufacturing centers for chert blades, shell beads and serpentine bowls, though these have not yet been noted in the Morro Bay watershed.

Promontories and peaks were traditionally used by the Chumash as religious shrines. SLO-212, a huge volcanic outcrop near the Tomasini Ranch in Chorro Valley, is a very noticeable example of such a site which contains numerous red pictographs that are now barely visible. The sites along Pennington and Dairy creeks may also represent specialized loci connected with trade and travel.

Population Movement Among Loci

Population movement among the prehistoric Chumash of the study area can best be distinguished as seasonal and non-seasonal. There was a great deal of short range seasonal

movement associated with various subsistence activities. There is evidence of population concentrations during the winter along the major streams, where large quantities of anadromous fish (steelhead, chinook and cojo salmon, etc.) were speared and trapped.[11] Pelagic fish were utilized primarily in the summer months. Both kinds of fish were dried for use in off-season periods. The Portola expedition of 1769 noted prosperous coastal villages along the Santa Barbara Channel during the warmer months while the pelagic fish and shellfish were being used. On his return trip during the following winter, many of the coastal villages were largely abandoned, as the bulk of the population had relocated along the Santa Ynez River to take advantage of anadromous fish resources.

Late summer was the optimal time for men to form deer hunting parties, as the animals were attracted to the lower elevations where water was available. This was also the time when goosefoot, chia, and other berries, seeds, and bulbs were available for collecting by the women in the valley and slopes around each village. In autumn, acorns were available on the lower slopes, while pinon pines produced nuts on the higher interior mountains. Such unequal distribution of food resources geographically and seasonally necessitated a great deal of movement on the part of the food collecting population. The residential village seems to have formed a permanent base for these kinds of activities, where elderly persons and small children remained throughout the year.

Economic Exchange Between Settlements

Trade develops because resources are unequally distributed, sometimes even within limited areas. This was certainly true of the diverse Chumash region. Chumash coastal communities were able to obtain surpluses of such items as fish bone, shell, and coral beads, baskets, dried fish, and sea otter pelts. These were exchanged with interior

communities for river fish, game, seeds and fruits, skin and fiber blankets, furs, and bows and arrows.

The Chumash cultural system was a self-maintaining unit, drawing its energy from the resources of the environment. By exchanging goods between different areas, the Chua Chumash shared resources more effectively. Specialist occupations reduced the total energy required by the Chumash to obtain resources, reduced wastage of energy to competition, and increased the chances of Chumash survival against competing tribes.

NOTES

[1]I wish to express my thanks to Mr. J. von Werlhof, Dr. Charles E. Dills, Dr. Calvin E. Wilvert, and others who provided information on sources for the following data. I am also grateful to my wife, Christine, for her proofreading and encouragement.

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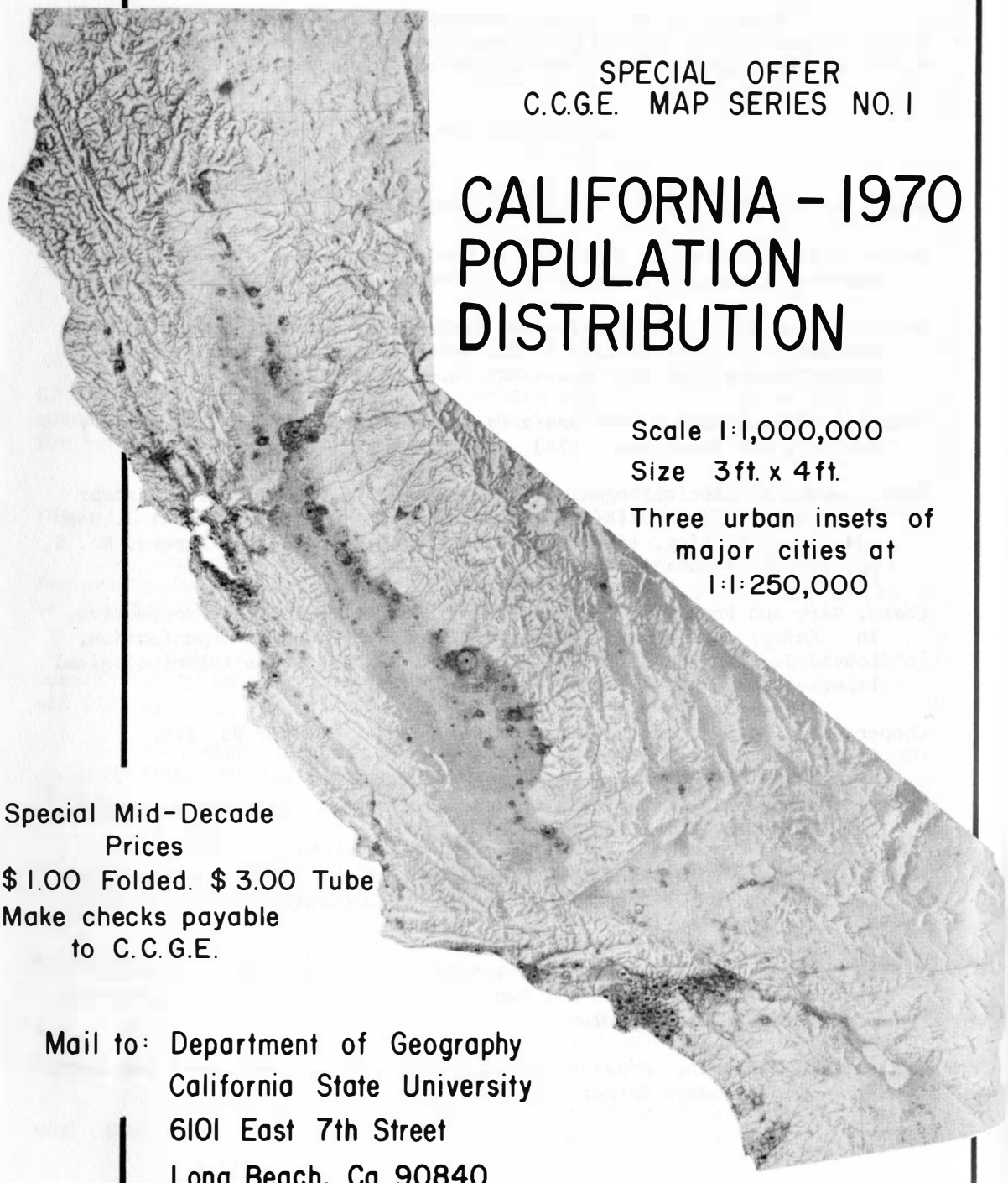

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HOUSE ORIENTATION AND SPACE HEATING CONSERVATION

*John W. Munro**

A significant result of the 1973 energy crisis has been the consideration of solar energy for space heating. The need for future energy sources will again be re-evaluated this year as a result of the devastating storms which swept the interior and eastern seaboard during January , 1977. The increasing need for savings is becoming especially acute as decision makers learn that space heating accounts for 18 percent of the nation's total fossile fuel demand.[1] Likewise, the heating demand for the average residential household is between 55 and 60 percent of the total energy used (see Figure 1).[2]

Widely heralded solar heating potential is based largely around the possibility of capturing the sun's rays by various forms of solar collecting devices. The effectiveness of these devices is a function of size and optimal placing of the device relative to sun angle and direction.

Since optimal orientation to the sun is prescribed in the installation of solar collectors on houses, it follows that any house which faces the sun absorbs a certain amount of natural solar radiation. It further follows that, especially in the winter months with low sun angles, if the daytime activity areas (living room, family room, and kitchen) were to face south they would be warmed enough by natural radiation to permit a reduction in the demand for space heating. A common situation in a post WWII subdivision housing tract is for these daytime activity areas to be on one side of the house, usually the street side, with picture windows facing opposing windows

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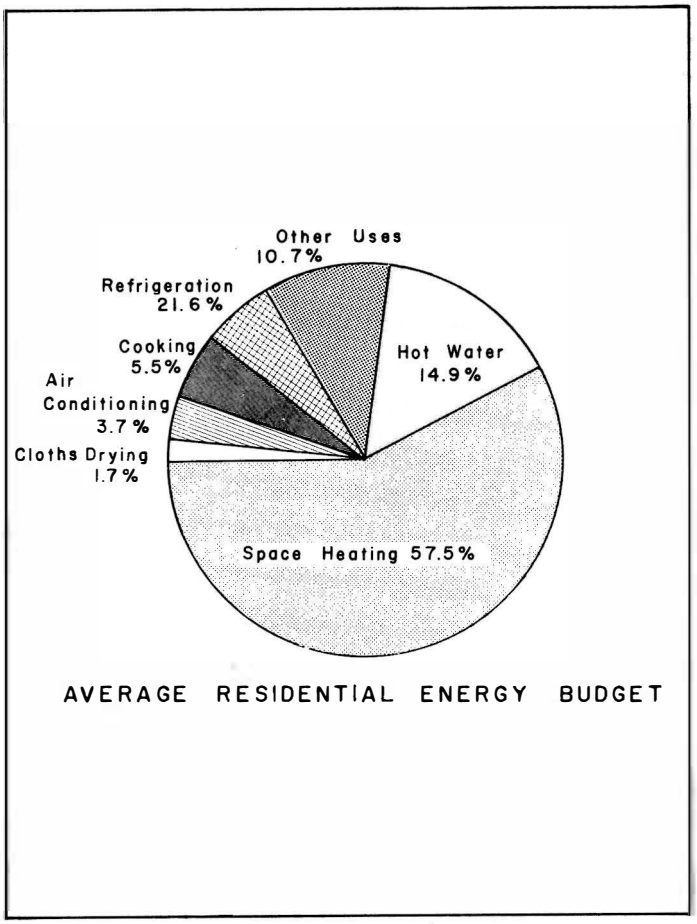

Figure 1. Residential Energy Budget (after, Stanford Research Institute).

across the street. The question may then be posed: on east-west trending streets where the daytime activity areas face either north or south, do the south-facing houses naturally consume less heating fuel than the north-facing houses? It was the purpose of this investigation to measure fuel consumption data for south-facing versus north-facing houses on opposite sides of the same street to determine whether a savings in fuel consumption exists. Measurements were made for a test site in San Jose, California during the winter of 1974-75.

Site Climate

Radiation intensity is the foremost consideration in determining a site's potential for tapping solar energy. Studies in the late 1950's and 1960's found and delimited three world regions where a good potential for harnessing solar energy exists (see Figure 2).[3] The test site, San Jose, California, at 37°N, is located in the extreme southern portion of the region classified as "good." While this region, unlike the other two, is generally hampered by problems of seasonality causing major variations in the amount of radiation received on a day to day basis ome of the benefits that can be ascribed to the region defined as "highest potential" can be found to exist in the San Jose area due to the locational proximity (37°N vs. 35°N) to the northern boundary of the "highest" region. These benefits that overlap into the "good" region are high sun angles, long cloud-free days, and a considerable amount of solar radiation.

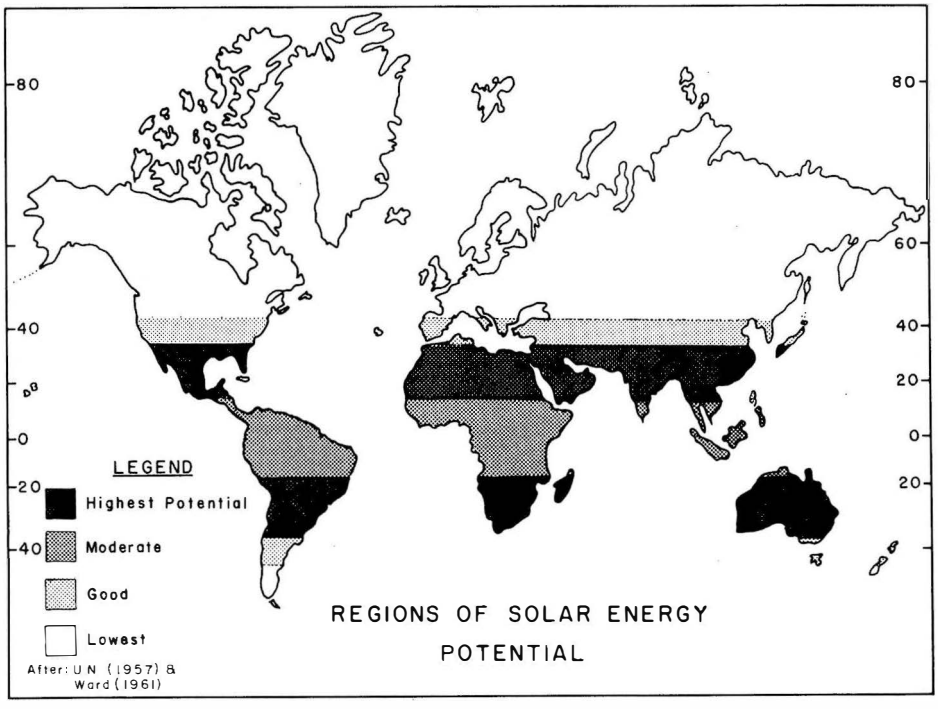

Figure 2. Regions of Solar Energy Potential (after, United Nations & T.G. Ward).

San Jose receives on the average 216 lys/day* of incoming solar radiation during the winter months.[4] The sky is unobstructed from 50 to 60 percent of the time and the sun angles vary from 29.6 degrees to 42.4 degrees above the horizon during the same period.

The climatic conditions which occurred during the test period of November 1974 to February 1975 were within normal ranges. These data, summarized in Table 1, were obtained from the Meteorological Observatory at San Jose State University and the U.S. Naval Weather Observatory at Moffett Field, Naval Air Station California. Wind and temperature were not considered in this study because the winter temperatures were not significantly low enough to cause a wind chill factor.

TABLE 1

CLIMATIC CONDITIONS, SAN JOSE, CALIFORNIA
NOVEMBER 1974 TO FEBRUARY 1975

	Incoming Radiation	Sun Hours	< Broken Conditions	> Broken Conditions	Days of Precip.
November	185 lys	330 hrs	299 hrs	103 hrs	2
December	138	341	238	152	5
January	168	341	276	104	3
February	211	308	219	168	10
Totals	702 lys	1330 hrs	1032 hrs	516 hrs	20
Averages	174		256	129	
Percentages			77%	23%	

*Lys - Langles. One langley is equivalent to one calory of radiation or the amount of heat needed to heat one square centimeter one degree centigrade. 1 ly = 1 cal/cm^2/min.

Site Description

The test site is in the extreme southern part of San Jose, located on the flat alluvial plain of the Northern Santa Clara Valley. The test area is surrounded on three sides by mountain ranges (reaching elevation of a few thousand feet) but the houses in the test site are well away from the shading and cooling effects of the mountains.

Uniformity of the test houses was a major factor in selection of the streets and residences to be measured. Houses were selected which were: (1) typical of San Francisco Bay Region housing, (2) not insulated by overgrown vegetation, and (3) old enough not to have construction deficiencies uncorrected. With these considerations in mind, 1000 houses from seven different subdivision tracts, with ages ranging from 5-7 years, were selected from City Planning Department Maps and large scale (1" = 200') air photographs. All of the selected houses were located on east-west trending streets (Figure 3).

The orientation of daytime activity areas was determined by interpretation of air photographs (1:24,000) and confirmed, in questionable instances, by visual on-site inspection. The air photo interpretation keys were: chimneys, as indicators to lcoation of living or family rooms, and patios, assuming that access is normally from the family room. If the fireplace and the patio are in close proximity to each other then the determination of the daytime activity area could be inferred with some accuracy. This technique proved to be successful in 60 percent of all the houses where the indicated parameters were visible. The remainder of the houses not visually discernible by the air photo inspection and the remaining 40 percent of unconfirmed housing were visually inspected to verify the location of the daytime activity area. Following the final on-site inspection, 834 units (of the original 1000) were selected for further study.

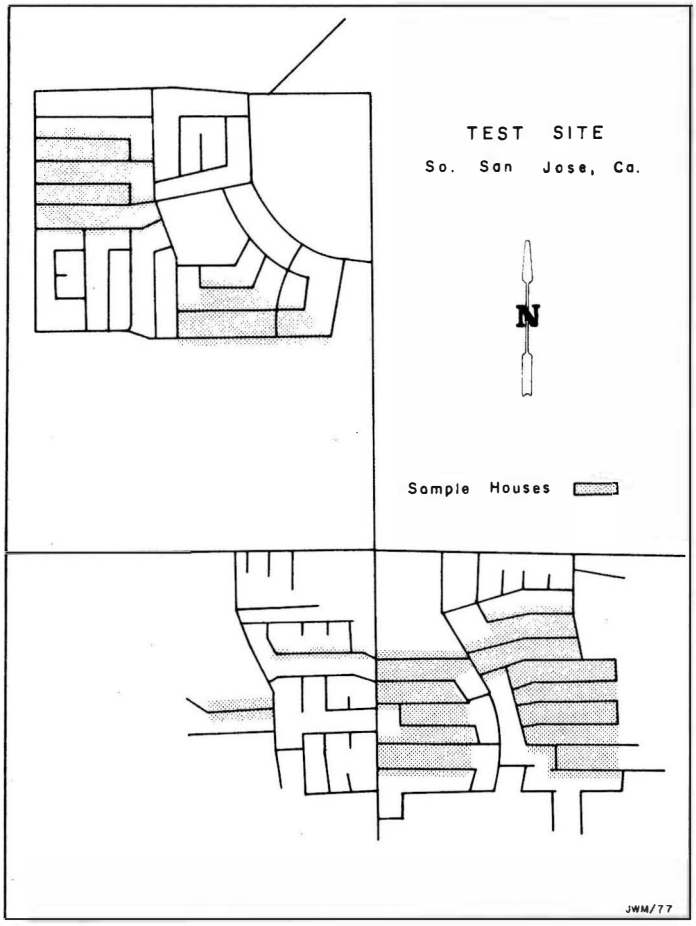

Figure 3. Test Site, South San Jose.

The Data

Data on natural gas consumption, the nearly universal heating fuel in San Jose, were provided by Pacific Gas and Electric Company with the provision that fuel usage by individual houses would not be revealed. Since the data had to be aggregated by north/south street sides anyway, the imposition of disclosure rules presented no problems.

In Table 2, a summary of the natural gas consumption figures for houses in the test site, data are aggregated by equal numbers of north and south facing houses. Gas consumption rates are in cubic feet per month.

TABLE 2

NATURAL GAS CONSUMPTION RATES, SAN JOSE TEST SITE
WINTER 1974-75

	November	December	January	February	Total
All North-facing	33082	59812	92244	73234	259373
All South-facing	30678	54153	84585	69980	239405
Percent of North greater than South*	7.23	9.41	8.30	5.73	7.69

*To obtain the monthly difference between the respective directions, the following formula was utilized:

$$\frac{(\Sigma N - \Sigma S)}{\Sigma N} \times 100 = \% \text{ of } N/S$$

ΣN = Sum of all north facing
ΣS = Sum of all south facing
N/S = Percentage the north is greater than the south facing

Results

Heating fueld consumption rates (Table 2 and Figure 4) for the south-facing test houses are significantly lower than those for north-facing houses. The monthly differences range from a low of 5.73 percent for February to a high of 9.46 percent for December with an arithmetic average for the test period of 7.69 percent.

Examination of the per-street data on a month to month basis revealed that, for the months of November and February, some of the south-facing blocks of houses used more rather than less natural gas than their north-facing counterparts. Also, for these same months the differences between the blocks were inconsistent rather than clustering around a norm. These anomalies probably resulted from the striking weather variations encountered in November and February, at both ends of the short winter weather season common to the San Francisco Bay Region. In November, for instance, when the first of

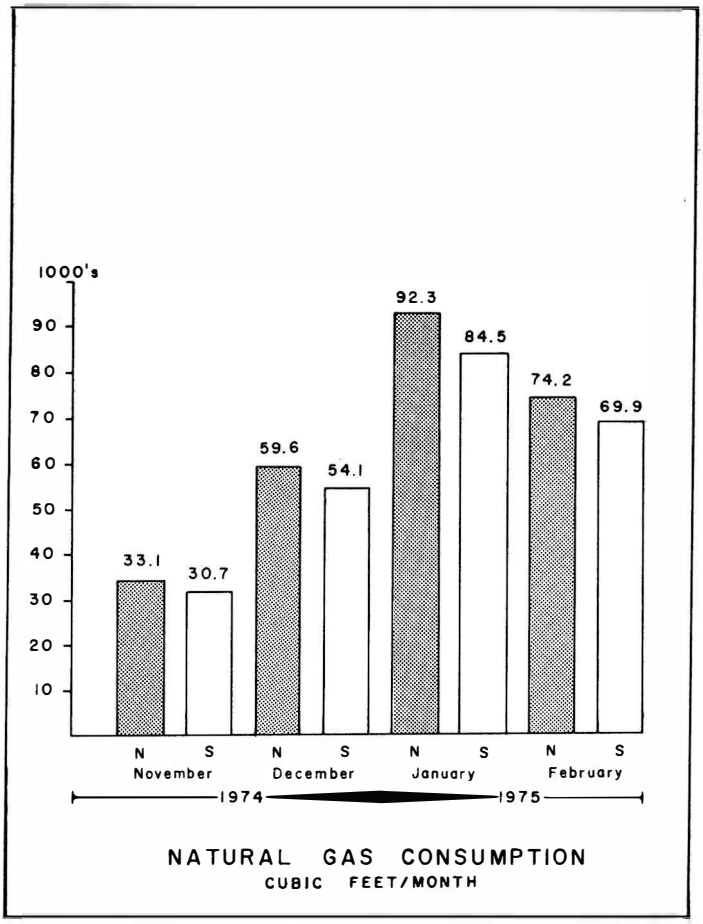

Figure 4. Heating Fuel Consumption Rates.

winter's rainstorms arrive, there are still numerous clear, warm days. February conditions, when the winter rains abate, are also quite variable. Accordingly, space heating for these months vary from hour to hour, day to day, and from person to person. The difference between sensible temperatures and absolute temperatures is surely important. Another factor explaining fuel consumption irregularity is the varied personal reaction to the changes in the length of day in November with its slow rate of change as the winter solstice approaches, and February with its rapid lengthening of the days as spring progresses.

These calculated monthly differences (Table 2) in fuel use can be converted to terms familiar to the average consumer by applying them to a non-north or south facing house (this conversion is demonstrated in Table 3).

TABLE 3

FUEL SAVING SCHEDULE

	Monthly Bill for Non-North or South Unit	Conversion Index (from Table 2)	Monthly Savings
November	$ 8.33	0.0723	$0.602
December	13.79	0.0946	1.305
January	13.70	0.0830	1.127
February	11.36	0.0573	0.651
Total	$47.18		$3.695

From this table it may be seen that if a house were to be oriented in a southerly direction the owner could expect to save at least three to four dollars per season in heating costs. While the savings on the individual house is small, optimal orientation of houses throughout an entire city could reduce the natural gas demands by close to 10 percent.

Recommendations

The results of this study lend themselves to some recommendations. First, further studies should be made to see if the findings of this study replicate elsewhere. Control parameters in further studies should be increased and standardized. In addition to direction, vegetation, and a minimum of size control used in this study, consideration should be given to employing such factors as volume, floor size, insulation, and number of floors since they all affect the demands

placed upon the heating systems of the modern houses.[5]

If the positive results of proper daytime orientation are seen to replicate it may be suggested that thought be given by local controlling agencies that, prior to house plan approval, the new residential developments should either orient conventionally planned houses on the lots so that the daytime living space faces the optimal direction for utilization of the sun for its natural heating benefits, or develop new internal house designs to make the maximum use of solar benefits. And, finally, reserve the expensive and not universally proven solar collectors and other gadgets for those areas and conditions where simple orientation would not be sufficient.

NOTES

[1]Science and Public Policy Program, University of Oklahoma, *Energy Alternatives: A Comparative Study* (Washington, D.C.: Government Printing Office, 1975), pp. 13-16.

[2]Stanford Research Institute, *Patterns of Energy Consumption in the United States* (Washington, D.C.: Government Printing Office, 1972), p. 33.

[3]United Nations Department of Economic and Social Affairs, *New Resources of Energy and Economic Development* (New York: United Nations Press, 1957), p. 21; T. G. Ward, *Possibilities for the Utilization of Solar Energy in Underdeveloped Rural Areas* (Rome: World Food and Agriculture Organization, 1961), p. 20.

[4]Stephen S. Visher, *Climatic Atlas of the United States* (Cambridge, Mass.: Harvard University Press, 1954), pp. 96-106; U.S. Department of Commerce, Weather Bureau, *Climatic Atlas of the United States* (Washington, D.C.: Government Printing Office, 1968).

[5]T. J. Chandler, "Urban Climates," *Meteorology as Related to the Human Environment: Special Report #7* (Geneva: World Meteorological Society, 1971), pp. 81-84; H. Landsburg, "Climates and Urban Planning," *Urban Climates: Technical Note #108* (Geneva: World Meteorological Society, 1970), pp. 365-68; H. Ryd, "Building Climatology," *Meteorology as Related to the Human Environment: Special Report #7* (Geneva: World Meteorological Society, 1971), pp. 89-92.

THE POTENTIAL ROLE OF GEOGRAPHY IN THE PRE-COLLEGIATE CURRICULUM

*Richard F. Logan**

Geography can and should play an important role in the education of children throughout their pre-collegiate years. It can help them to better appreciate the world in which they live: the endless, fascinating changes in its weather, and the climatic contrasts from one area to another; the native vegetation and the plants introduced from elsewhere; the mountains and the coastlines, their histories and the processes which formed them; cities, their parts, their functions, their *raisons d'etre*; foods, their places of origin, cultural implications and their ingredients; and the totalities, migrations, and adaptations of cultures. Similarly, it can help to make them better future citizens: they will have a better basis for understanding local issues, such as public transit, air pollution, water supply, ethnic and racial problems; national issues, as wide-ranging as the energy crisis, pollution, endangered species, environmental sensitivity, and the need for comprehensive regional planning; and foreign affairs--to appreciate, for example, that Russia's interest in southern Africa is far more concerned with the seizure of control of such critical items as the Cape oil route from the Middle East to western Europe and the sources of chrome, copper, gold and diamonds than the altruistic "liberation" of "oppressed" blacks, or to understand the fundamentals underlying the economic development of mainland China or the position of Israel in the Middle East.

Two characteristics should be stressed in the handling of geography throughout the pre-collegiate curriculum. The

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study should be solid, basic and organized. It should be grounded in scientific principles; it should include such fundamentals, drawn from all disciplines, as are necessary to present the full picture; and it should be logically and firmly organized. At the same time, it should be presented in an intriguing, imaginative manner, designed to interest the student and to kindle in him the desire to know more, to apply what he has learned to the daily situations in the Real World.

Such an approach can, of course, be upon a systematic basis: the group can study geomorphology alone and in its own right, followed by a unit on climate, etc., etc., much as is done in the ordinary introductory textbook for collegiage geography. But it is probably easier to capture the interest of students through a regional approach, for that is where things happen and where it all comes together. While it is necesaary to compartmentalize knowledge and teaching to some extent, it is in the region that all the compartments inter-relate and integrate, producing the complex of interactions that characterize the area. Each region is composed of landforms, climate, soils, vegetation, animals, farms, cities, transportation means and routes, industries, and above all, people. The people interact with each other and with all the elements of the environment--and it is these interactions which make news, which is of interest to students, and therefore what gives purpose and meaning to any study.

There is a great temptation to begin geographic study with a faraway, exotic and totally "different" region: to select Japan or Nigeria or India for the first unit of study the child will encounter. The student is intrigued and excited by the romantic, novel and sometimes bizarre situations, and thus becomes deeply involved.

But to start the fledgling student off on a study of geography in such unfamiliar surroundings is almost as illogical as it would be to begin the study of mathematics by plunging the uninitiate into long division before learning addition, subtraction and multiplication.

It is much more logical, and it can be just as interesting, to start with the known, the local, the nearby, and then to move on outwards into stranger lands. Starting with the local means starting with places and situations to which kids can relate, to which they can go, which they can see, hear, smell, touch, experience. And this is a fine place to begin observation and thought training: to teach the students to look, to see, to observe, to retain, to record, to relate, to interrelate. Here the beginning student can be introduced to cause-effect relationships, to orderly regimentation of thought.

At the local level, the systematic approach can be realistically combined with the regional: things are on a scale large enough for the student to grasp them concretely, and to understand them fully; and examples can be real and alive, not merely theoretical, imagined, or ethereal.

Geography can start in the first grade with a study of the school neighborhood. The determination of the directions of the streets leads naturally to earth-sun relations in their simpler forms, and to the compass and magnetism. Urban schools can usually obtain large-scale vertical air photos from the City Engineer or the Planning Department, and can have them reproduced cheaply in quantity by blue-print methods. In rural areas, the Soil Conservation Service, the local Farm Advisor, Irrigation District or County Planning Department are likely sources. On such photos (or on overlays over them), children can plan walks, and record observations such as the outlines of commercial districts, single family and multiple unit residential areas, industrial units, or crops and orchards and pastures. In so doing, they learn simultaneously to orient themselves, to transfer from ground to map, to work at various scales; and to divide human activity into some of its basic components--in short, to logically classify in an orderly fashion.

The physical base can be described and discussed. The local geology is a good starting point, even if only alluvium underlies the entire area, for alluvium can lead to a discussion

of fluvial processes, floods, and vagaries of climate. Clouds and rain lead to air masses, to orographic, frontal and convectional precipitation; sunny days can result in discussions of isolation, transfers of energy, relative rates of heating and cooling of different types of surfaces; the sea breeze can lead to temperature inversion and smog discussions. When explained simply and directly, many of these concepts can be grasped by even the first-grader, and when the student is properly intrigued even mouth-filling polysyllabic terms can be mastered. Many things can be tied together to illustatte interesting points: Where did the local Indians locate their villages? Why? (relation to water, food--oak trees along the streams, shellfish on the beach, etc.). What did they eat? Wear? How has the local vegetation been altered since human beings first came into the area (selective gathering, fire, construction, competition from imported weeds, irrigation, destruction of wild animals, overgrazing, introduction of ornamentals and crop plants). This can lead to studies of man's influence upon the envirnnment, cultural transfers, cultural infusion.

In the months and years that follow, the area involved can be gradually expanded: the neighborhood will give way to the community, and that to the region. Such a program can well involve the social studies allotment of time for the first two years of school.

Early in the third year, emphasis might well be shifted from the geographical to the historical perspective, in the form of a study of the sequence of cultures that have occupied, adapted to, utilized and transformed the region: in southern California, this would include the Indians, the Spanish Missions, the Mexican Ranchos, the early Anglo developments, and the present day.

In the first case, the Indians should be considered from the viewpoint of their adaptation to the environment: their economy (subsistence hunting, fishing, gathering), their trade and commerce (virtually none), their shelters and the materials

used in their construction, the population density and distribution, their seasonal round, their social and political organization. The Spanish Mission should be considered in regard to its contrast with and alteration of the Indian, their sedentary agrarian way of life, their introduced crops and animals, their structures, the relations with Spain and Mexico, and the lack of trade, and their long term effect upon the environment. Similar approaches can be developed for the later periods, culminating in the study of the present scene: agriculture, water supply, industry, ethnic and racial groups, density and distribution, and major problems.

Then, abruptly, the scene should be shifted--to a physically similar but culturally dissimilar land. Were the school in Kansas, we might select the Ukraine; were it in western Texas, perhaps the South African high veld or the Australian outback would be appropriate. For southern California, Greece makes an excellent companion study.

The two countries have an almost identical physical base: the climate--moist winters and arid summers, mild in the lowlands, snow on the mountains; the landforms--rugged mountains and valleys floored with alluvium; the vegetation--xerophytic shrubs; and the natural agricultural potential--modest yields of plants adjusted to the winter rainfall regime (grapes, olives, walnuts, almonds, grains).

Yet, culturally, the two lands are worlds apart. Greece has had five millenia of high cultural attainments; California was totally uncivilized until two centuries ago, when a totally alien culture (Spanish) was suddenly and forcibly superimposed upon a primitive prople. The reason for the difference lies in the contrasting vicinal situations and in the configurations of the coastlines and the resultant early transport development or lack thereof.

Greece lies at the meeting point of three continents: Europe, Asia and Africa, each with a melange of fairly progressive culture groups dating back to the dawn of history. It also

lies on the shores of the Aegean and Mediterranean Seas, seas dotted with islands and with extremely irregular shorelines. There people took to boats very early, and were able to sail from place to place with relative safety, even in the frail craft of ancient times. Thus there came to be an exchange of goods, of personnel, and of ideas abeween the different groups, and the resultant cross-fertilization produced a rapid rise in the level of culture of all the groups involved.

In California, on the other hand, isolation and non-mobility were the rule from the advent of the first peoples until the arrival of the Spanish. The coast is straight and harborless (almost all of our present harbors are artificial and less than a century old), and inland the sparsely settled and inhospitable desert precluded cultural exchanges. So there were few interchanges of ideas, no cross-fertilization, and virtually no advance.

But in recent times, with changes in technology, in the relative importance of resources, and in the role of the national state, the positions of the two areas have reversed themselves. Modern national economies and national power are based upon the possession or control of highly developed industry and the resources (coal, oil, ores, atomic fuels, etc.) for it, and of large populations occupying large and fertile land areas. All of these are lacking in Greece, but they are present in southern California and in the United States of which southern California is a part. If all Europe were a single political and economic entity, then Greece might prosper, but in its present situation, it is relegated to the position of a third-rate power.

Gradually expanding the theater of operation--shifting progressively to the other parts of California, to the rest of the United States, to North America--will allow the presentation of new basic principles, developing gradually the full systematic approach to geography. This will lead, eventually, to the study of world patterns, and of the faraway parts of the earth.

But this should not be rushed. These broader concepts can well be left for the more advanced years, for the upper grades.

Rather than to rush forward too quickly, it is better to view the local area (southern California) and the parallel region (Greece) closely, leisurely, in detail, to capture the full flavor of each, to understand the environment, the culture, the color and the personality of each, and to use them as the basis for all the rest of the studies.

Above all, geography in the schools should be made stimulating and interesting. Geography itself is interesting, and the Real World is fascinating. As Robert Louis Stevenson wrote in his "Child's Garden of Verse": "The world is so full of a number of things, I think we should all be as happy as kings". It should be our mission to impart such feelings to our students, at whatever level they may be.

THIRTIETH ANNUAL MEETING, CCGE

California State University, Long Beach

April 30-May 2, 1976

The Long Beach meeting as hosted by the Geography Department at C.S.U. Long Beach was impressive in the variety of presentations, exhibits and activities planned into the program. Friday was devoted to talks and workshops dealing with the state of geography in the public schools, a wine and cheese mixer, a picnic and executive board and department chairpersons meetings. Saturday was filled with a full program including paper sessions, exhibits, luncheon, an annual business meeting, cocktail party and banquet. Local field trips rounded out the program on Sunday.

The luncheon speaker was Dr. Richard Logan, Professor of Geography at U.C.L.A. and recipient of the ARCO award for special service to geographic education. His topic was "The Potential Role of Geography of the Pre-Collegiate Curriculum." The banquet featured President Christopher Salter's address, "Learning Through Landscape."

PAPERS AND PRESENTATIONS

John Spring, *Ocean View School District*, "Geographic Education in the K-12 Curriculum."

Robert Kiskadden, Chairman; and Joan Downey, William Leary and Raymond Lopez, Discussants; *Los Angeles Unified School District*, "The State of Geography in the City."

Arthur Nichols, *California State University, Northridge*, "Geography for Primary-Grade Pupils: Using the K-3 State-adopted Social Science Textbooks."

John Archbold, *San Diego City Schools*, "Simulating Globes and Measuring With Maps: A New Twist to Map and Globe Skills."

Gary Wexler, *Orange Unified School District*, "Simulating and Gaming Experiences for Motivating Students to Study Geography: Resources and Activities."

William Holder and Steven Slakey, *La Puente High School*, "Ideas in Cultural Geography for High School."

Dennis Flaherty, *Denoyer-Geppert*, "Maps and Globes: Highlighting the Traditional and Accenting the New."

Thomas Best, *California State University, Los Angeles*, "Media: Why Not Try It?"

Robert Brown, *Rio Hondo College, Whittier*; Chairperson. "Methods and Techniques."

A. William Dakan, *University of Louisville, Kentucky*, "Less is More: A New Method of Computer-Assisted Instruction."

Wayne R. Irwin, *Merced College*, "The Flying Field Trip: An Instructor's Reserach Method."

Alan Henninger, *Oak Grove High School, San Jose*, "Experience the World: Using Individual Experience as a Superior Tool for High School Geographic Instruction."

Robert Winters, *California State College, Sonoma*, "Teaching Geography Through Inquiry."

Raymond Stanley, *San Jose State University*, "Reselling Old Geographic Pedagogy: A Tried-and-True Technique."

Gary Peters, *California State University, Long Beach*; Chairperson. "Economic and Environmental Geography."

John Passerello, *State Department of Fish and Game, Sacramento*, "California's Wild and Scenic Rivers Program."

Jean Paden, *California State University, Los Angeles*, "Where Have All the Beaches Gone?"

John W. Munro, *San Jose State University*, "Relationships Between House Orientation and Energy Consumption."

Martin J. Pasqualetti, *University of California, Riverside*, "Geography and Geothermal Development in the Imperial Valley of California."

Gary L. Peters, *California State University, Long Beach*, "Recent Trends in the Coal Industry in the United States."

Thomas Best, *California State University, Los Angeles*, Special Session: "Perspectives on Presentations."

Arthur Nichols, *California State University, Northridge*, Special Session: "Geographic Education in the K-3 Curriculum."

Imre Quastler, *San Diego State University*; Chairperson. "Cultural Geography."

Nelvin S. Carpenter, *Mesa College*, and Imre E. Quastler, *San Diego State University*, "San Diegans' Perception of the Spatial Impact of Railroads, 1851-1873."

Donn C. Jewell, *San Jose State University*, "Perception of the Santa Clara Valley by 14 to 17-Year Olds."

Barbara E. Fredrich, *San Diego State University*, "Mapping Migrational History: A Bi-Centennial Project in Introductory Cultural Geography."

Bruce E. Bechtol and Jerry R. Williams, *California State University, Chico*, "The Origins and Dispersal of the Ubiquitous Beer Container in California."

Clement Padick, *California State University, Los Angeles*, "Social, Economic and Ecological Impact of Hunting Practices in Northern Germany."

Jean Wheeler, *California State University, Long Beach*; Chairperson. Special Session: "Motivating Secondary Students Toward Geography."

Thomas Essex, *North High School, Torrance*, "Motivation Through Media."

Randall Kroha, *Huntington Beach High School*, "Backpacking for Geography in High School."

William Pinneo, *York Junior High School, Orange*, "Uses of the Hubbard System in Large Urban Classes."

Arthur Nichols, *California State University, Northridge*, and Christopher Salter, *University of California, Los Angeles*. Special Session: "The Role of Geography in the 'Man: A Course of Study' Program."

John Cauffman, *A. J. Nystron & Company*, Special Session: "Geographic Education: Developing Geographic Skills."

James Switzer, *Southwestern College, Chula Vista*; Chairperson. "Regional Geography."

John Passerello, *State Department of Fish and Game, Sacramento*, "The Chorti Agricultural Resettlement Project: From Jocotan to El Florido, Guatemala."

Gordon R. Lewthwaite, *California State University, Northridge*, "American Samoa: Source Region for California Immigrants."

James Switzer, *Southwestern College, Chula Vista*, "Nelson, New Zealand: Regional Center for the Glasshouse Tomato Industry."

Timothy and Glenda Wilhelm, *San Juan Capistrano*, "Four Across America."

Donald Holtgrieve, *California State University, Hayward*; Chairperson. Special Session: "Geography of the California Wine Country."

Panel: William Crowley, *California State College, Sonoma*; Robert Lamb, *California State University, Northridge*;

Gary Peters, *California State University, Long Beach*;
Donald Holtgrieve, *California State University, Hayward*.

Carol Austin, *St. Anselm Indo-Chinese Refugee Community Center*; Chairperson. Special Session: "Careers in Geography."
Panel: James Cradduck, *Geo-Science Corp., Long Beach*;
Brian Edwards, *Cartographer, Auto Club of Southern California*;
Darrell Opp, *Information Service Specialist, Garden Grove Unified School District*;
David Robson, *Land Use Division, Department of Planning, City of Garden Grove*;
Linda Whiteside, *Travel Department, Auto Club of Southern California*;
Timothy and Glenda Wilhelm, *Writers, Lecturers, Photographers, San Juan Capistrano*.
[All members of this panel are *CSULB* Alumni.]

Todd Berens, *Lexington Junior High School*. Special Session: "Geographic Education in the 7-8 Curriculum."

Gerald Tyner, *University of Southern California*; Chairperson. "Geography of California."

Tibor Szalay, *California State University, Los Angeles*, "Fort Ross: The Russians in California."

Carol A. Van Kampen, *California State University, Long Beach*, "Human Factors in the Outmigration of the Dairy Industry from Dairy Valley."

David W. Lantis, *California State University, Chico*, "The Changing Face of California."

Frederick Scantling, *California State University, Long Beach*; Chairperson. "Geo-Collage."

Harvey E. Heiges, *San Diego State University*, "The Maturity of a Student Internship Program in Geography: The Experience at San Diego State University."

Thomas Best, *California State University, Los Angeles*, "Place, Position, Policy: Critical Variables in Areal Development."

Claude R. Minard, *Sonoma State College*, "Revisited Coastlines Revisited: An Unsystematic View of Geomorphic Systems."

Joseph W. Frasca, *California State College, Sonoma*, "False Color Infrared Image: A Cost Effective 35 mm Photocopy Procedure."

Bruce E. Davis, *University of California, Los Angeles*, "Extra-Terrestrial Geography: A Valid Frontier?"

Harold Robertson, *Los Angeles Unified School District*. Special Session: "Environmental and Ecological Education."

One of the advantages of an annual journal is that the editorial staff has only one deadline rather than four or twelve. However, one of the disadvantages is that contributing authors have to wait several months or even years to see their work in print. To those long patient authors of articles in this volume I offer my apologies.

I hope the reader will find the variety of items in this issue useful in teaching and learning about geographic education, research methodology, and the geography of California. You might note that a majority of the articles in this issue are by women and many are by competent and very promising graduate students. The continued health and vigor of geography in California seems assured.

The Editor