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MACROCALIFORNIA AND THE URBAN GRADIENT

*Harold M. Elliott**

Buridan's ass is a classic example of the dilemma of indecision. In a story originating with Aristotle, but usually attributed to the late medieval French philosopher Jean Buridan, a donkey once found himself located between two bales of hay lying at identical distances to his right and to his left. Unable to decide between the equally attractive bales, the unfortunate animal starved to death.[1] In other situations like this there is a more prudent course of action. In the absence of prior information leading a person to prefer one alternative over another, the rationally justified procedure is random choice.

Indifference Lines

In geography, the problem of choice without preference finds expression in the indifference line. Such lines are used to measure the spatial reach of cities and to identify boundaries between competing market areas. When individuals plan shopping trips they often must decide between alternate destinations. If, after considering such things as time and effort, they find that they have no particular preference between two different cities, then their location between the two cities stradles what is called an indifference line. In such cases it is usually said that they have feelings of indifference toward both cities.

Indifference lines are often defined as the midpoint between two places. Buridan's ass was located on just such a line. If human beings acted like Buridan's ass we might expect to find starved bodies lying at irregular intervals along each of these indifference lines. However, people are not usually this indecisive and along each line random choices are made. Huff has considered

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such lines and sees them as 50% probability lines.[2] Right on the indifference line half the people are likely to choose one city and half will choose the other. Farther away, the probability that people will cross over the line for a trip to a market center on the other side decreases. Indifference lines have also been called lines of equilibrium, where the gravitational forces of one city are balanced by the gravitational forces of surrounding cities. Even though a given city's influence actually extends beyond these lines, into the territory of adjacent cities as it were, its influence is greatest within the lines.[3]

Larger places are often seen as having greater attraction. However, attractiveness is an elusive quality and characteristics other than size are often part of it. Where two places are of unequal attractive power the indifference line between them will be curved away from the place with the higher level of attraction.[4] In the special instance where two places are of equal attractiveness, the line between them will be straight.[5]

Indifference lines have many uses in geography and several new ones will be explored here. The first such use involves the various levels of influence California exerts outside the state and how far this influence might extend. The second involves the connections and paths of influence that exist between California cities and other cities beyond California.

Indifference Lines and Economic Functions

Market area boundaries can be drawn between competing firms, between competing cities, and even between competing states. California is usually defined by its political border. Another definition involves indifference lines and the hypothetical areas of influence they separate. Individuals, ideas, and artifacts are both attracted to and emitted from the cities of California along various well-known channels of movement. California's attractive and emissive qualities are strongest within the state's area of influence and weakest beyond it. This area of influence and its many levels of intensity can be identified by the multiple lines of indifference that separate California cities from cities farther east.

As has been established in studies of threshold, range, and economic hinterlands, higher order functions are increasingly concentrated in successively larger central places, and a greater variety of goods and services can be found in larger central places than in smaller ones.[6] Size and function

are thus positively related. If higher order functions with higher thresholds tend to be located in larger central places, then it follows that there are some functions whose thresholds are so high that they can only be met in the largest central places. There are also some functions whose thresholds are so high that their minimum ranges extend beyond individual places and include the entire nation. Such functions survive (or survive best) in a system's largest central place. In the United States most, though not all, of these highest order functions can be found in New York, the highest order central place in the country. They include such things as the diamond market, Wall Street, specialized retail facilities, rare services, and much of the nation's best talent in law, medicine, advertising, corporate management, and the arts. At the highest functional level, then, New York's hinterland stretches across the entire nation. Individuals wishing access to these highest, or first, order functions must either travel to or communicate with New York. They may also have things shipped or transmitted to them from New York.

If all economic and cultural functions in the United States were listed in rank order from highest to lowest threshold, it could be shown that all or most functions exist in the nation's primate city and that only a few of the lowest order functions exist in the nation's smallest cities. At the lower end of the scale many such lists can be found in the literature.[7] Immediately below these first order functions exising only in the primate city are the second order functions existing in both the primate city and the second largest city. Individuals wishing access to these second order functions must travel to either the primate city or the second largest city. If we assume that the attractiveness of both the largest and the second largest city is the same with respect to second order functions, then the indifference line between the two cities will be straight and will lie halfway between them.[8]

Macrocalifornia and Microcalifornia

Figure 1 shows the indifference line separating New York from Los Angeles, the nation's second largest metropolitan area. Since the 1975 population of the Los Angeles Standard Consolidated Statistical Area (SCSA) was well over 10,000,000 this can be called the 10M indifference line. Individuals wishing access to goods and servcies existing only in urban areas of 10,000,000 and above must look for them either in New York or Los Angeles. Take, for

example, the case of Dallas, which in Figure 1 is located just to the west of the New York-Los Angeles, indifference line. Residents of Dallas who wish access to second order (10M) goods and servcies (those available only in New York and Los Angeles, but not in Dallas) must seek them in one of these two larger centers. Because Los Angeles is closer (in physical distance, though not in other kinds of distance) there is a higher probability that they will be sought or obtained in Los Angeles instead of New York. Therefore, at least for second order (10M) goods and services, Dallas and other places west of the New York-Los Angeles indifference line are within the orbit of what might be called Macrocalifornia.

To the east of this line second order goods and services are more readily obtainable in the closer city of New York and individuals are more likely to seek them there than in Los Angeles. This area can thus be called Extracalifornia, since it is here that the influence of California cities becomes minimal. Most of the cities in the nation do not share an indifference line with a California city. Some do, however, and when they are brought into the calculation their presence causes the boundary of Macrocalifornia to shift westward.

Just as there are second order functions available in the largest and the second largest central places in the nation, so also are there third order functions available in the largest, second largest, and third largest central places. In the United States the third largest central place is the Chicago SCSA (over 7,600,000 in 1975). Figure 1 shows the 7.6M indifference line, separating Los Angeles and Chicago, just to the west of the 10M indifference line separating Los Angeles and New York. Between these two lines the influence of California is low, although it is higher than in Extracalifornia. Second order goods and services (available only in the 10M cities of New York and Los Angeles) will be sought in Los Angeles, while third order goods and services (available only in the 7.6M cities of New York, Los Angeles, and Chicago) will be sought in Chicago, since Chicago is nearer. All other lower order goods and services desired by individuals located within this zone will be sought in beyond-California cities like Dallas, St. Louis, and Minneapolis.

As smaller and smaller urban areas are added to the map, the accompanying indifference lines mark off the boundaries between places where successively lower and lower order functions become available. The Dallas-Los Angeles indifference line marks off the boundary between this California city and the nearest non-California city where goods and services available only in places

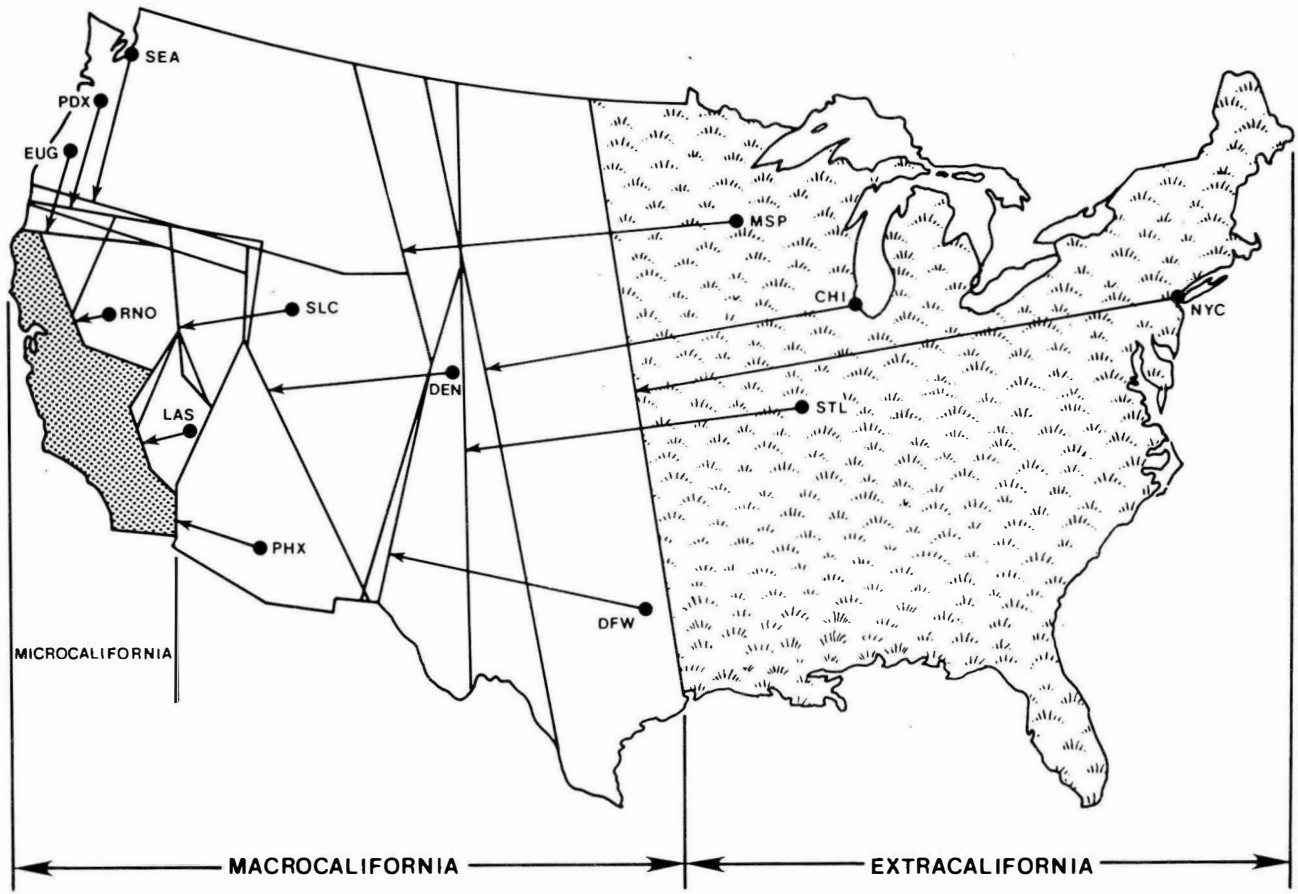

Figure 1. Macrocalifornia as Defined by Indifference Lines.

of at least 2,500,000 (the population of the Dallas-Ft. Worth SMSA in 1975) can be found. The Portland-San Francisco and the Phoenix-San Diego indifference line mark off the boundary between California cities and the nearest non-California city where things available in places of at least 1,000,000 can be found.

Eventually the indifference lines will identify a third region, Microcalifornia, by retreating west of the Sierras and south of the Siskiyous. When city sizes reach the level of approximately 100,000, all subsequent regions marked off by the indifference lines of smaller and smaller central places lie completely within California. At this point the influence of California and its central places becomes total. A listing of all the indifference lines used to delineate Macrocalifornia at its various levels of intensity appears in Figure 2. By themselves these lines are not particularly significant. However, they do lead directly to a new conception of how urban systems in the United States might be arranged.

		BEYOND STATE CITIES												
		NYC	CHI	STL	DFW	MSP	SEA	DEN	PDX	PHX	SLC	LAS	EUG	RNO
	LAX	X	X	X	X	X	X	X		X	X	X		
	SFO		X	X		X	X	X	X					
	SAN				X			X		X		X		
WITHIN	SAC							X	X	X	X		X	X
STATE	FRE										X	X		X
CITIES	BAK									X	X	X		
	SCK													X
	VIS											X		X
	CIC												X	X

Figure 2. Cities Sharing an Indifference Line with California Cities.

Christaller and the Indifference Line

Indifference lines also play a role in the Christaller System.[9] In Christaller's K=3 hierarchy lower order central places are located at indifference points between three larger centers and in the K=4 hierarchy they are located between two larger centers. In the K=7 hierarchy six lower order central places are located on one side of an indifference line separating three larger centers. In the K=3 system Christaller argues that since individuals

in lower order centers are equidistant from three higher order centers, they will gravitate with equal intensity toward all three larger centers for those higher order goods and services that are not available locally. At the same time, one of these higher order centers is larger than the other two and it is to this center that people will travel when they have a need for the highest order goods and services.

Surrounding each central place in the Christaller system there is a nested series of concentric hexagons that define that central place's field of influence.[10] Each one of these successively smaller hexagons is an indifference line. Each one also happens to coincide with the location of lower order central places. The outer hexagon defines the area within which people will travel for the highest order functions. The inner hexagon defines the area of travel for the lowest order functions.

In Figure 1 the New York-Los Angeles indifference line is the equivalent of a single outer hexagon in the Christaller system while the indifference lines delineating Microcalifornia are the equivalent of several inner hexagons. Every city in the United States is surrounded by these concentric zones of influence. However, unlike the Christaller pattern, they are not, nor are they ever likely to be, hexagonal or regular in nature. Instead, they form irregular wedges and polygons that share sides at many points in the hierarchy. A brief exercise with the Proximal Map elective in SYMAP, where cities are added one at a time (from largest through smallest) to a number of separate computer runs, will confirm this observation.

Displaying the results of such a procedure is difficult, however, and the complete picture of these nested and overlapping polygons is chaotic and virtually impossible to decipher. Fortunately, there is another way of looking at the patterns formed by indifference lines. This way is provided by the closely related nearest larger neighbor method, which follows directly from the spatial patterning of indifference lines.

The Nearest Larger Neighbor Method

Note in Figure 1 that Dallas lies to the west of the New York-Los Angeles indifference line. This means that for goods and services available only in urban areas of 10,000,000 or larger, people in Dallas will find their nearest source in Los Angeles. Note also that Dallas is to the east of the Chicago-Los Angeles indifference line. This means that for goods and services

available only in urban areas of 7,600,000 or larger, people in Dallas will find their nearest source in Chicago, There are no other cities that are larger than Dallas and nearer to Dallas than Chicago.[11] Chicago is therefore Dallas' nearest larger neighbor. Anything not available in Dallas must be sought first in Chicago (assuming that the choice to do without is not made). If the desired good or service is not available in Chicago, people in Dallas will seek it in their second nearest larger neighbor, Los Angeles. If it is not available in Los Angeles, it must be sought in New York, the highest order central place in the nation and Dallas' third nearest larger neighbor. If it is not available in New York, it doesn't exist.

A hierarchy of nearest and subsequent nearest larger neighbors can now be envisioned for every city in the nation. Just as Dallas is part of a hierarchy that includes New York, Los Angeles, and Chicago, so also is every other city part of a similar hierarchy. If things are not available locally, they must be sought in a nearest larger neighbor. The lines connecting a city with its primary, secondary and subsequent nearest larger neighbor are called nearest larger neighbor axes. Macrocalifornia can now be defined by a hierarchy of nearest larger neighbor axes. Every city west of the New York-Los Angeles indifference line has Los Angeles on one of its nearest larger neighbor axes. West of the Sierras, in Microcalifornia, all axes save the highest one extending to New York are located within the state. Beyond Macrocalifornia there is Extracalifornia, where nearest larger neighbor axes extending into California are absent.

The Urban Gradient

Figure 3 shows the primary nearest larger neighbor hierarchy in California and the eleven western states, as derived from county and metropolitan populations in the 1970 census. Since this hierarchy focuses primarily on cities it can be called the urban gradient. All cities located in counties with populations greater than 50,000 are shown on this map. Hollow circles indicate places between 50,000 and 100,000. Circles with dots indicate places between 100,000 and 500,000. Solid circles indicate places above 500,000. The county seat, or the largest central place in each county, is connected by a line with its nearest larger neighbor. Places within 10% of each other in population are considered to be the same size. This urban gradient, or capillary system, identifies all the nearest places where higher order goods and services are

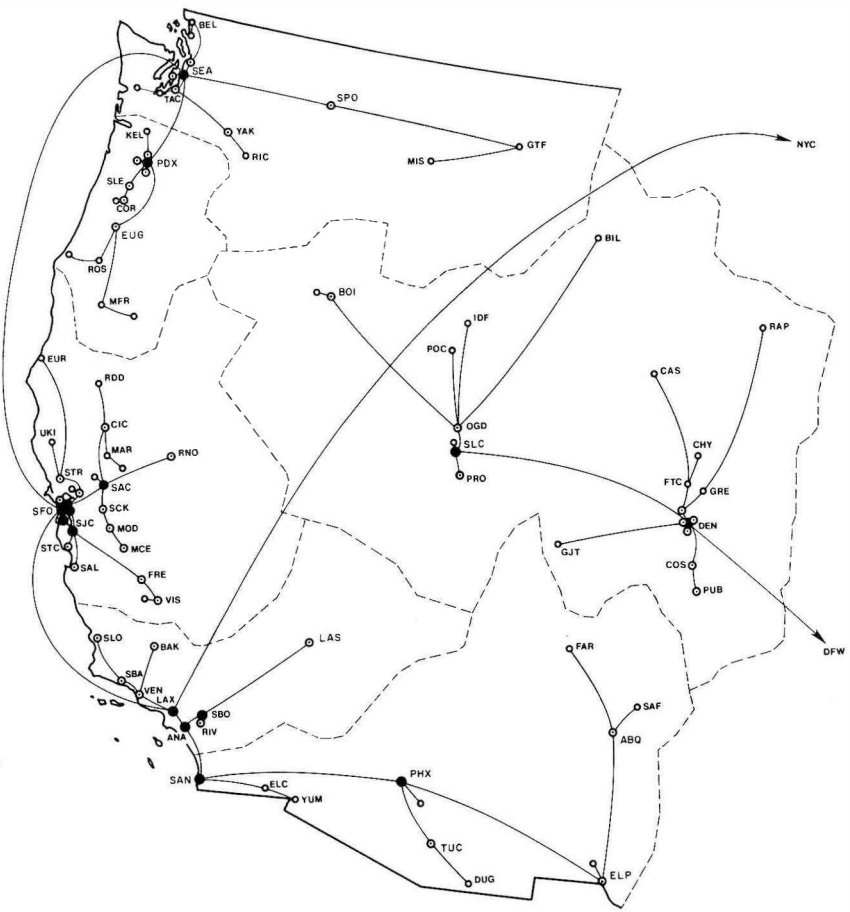

Figure 3. 1M Cantons in the Pacific Coast-Rocky Mountain Region.

likely to be available. Only the primary axes appear on this map. Axes connecting each city with its second, third, fourth, or higher nearest larger neighbor are not shown.

The logic of the indifference line requires that on the average consumers patronize the closest centers offering the goods and services they need. Although agreement is not universal,[12] many investigators support this rule.[13] It is a rule, however, that should always be stated in the probabilistic terms favored by Huff and Pred.[14] If something cannot be found in Chico, for example, a likely and reasonable strategy is to look for it first in Sacramento, not in Redding or Susanville. If it cannot be found in Sacramento, it is reasonable to look for it next in San Francisco, not in Fresno. Such a strategy is logically sound and conforms to the Principle of Least Effort, an important though not fully appreciated concept.

In Figure 3 the dashed lines, called population divides, separate adjoining regions called nearest larger neighbor cantons. On this particular map, each population divide marks the boundary of a nearest larger neighbor canton associated with an urban area having a population of greater than 1,000,000. They can thus be called 1,000,000 (or 1M) cantons. Note that in the eleven western states there are six such 1M cantons focused on Denver, Seattle, Portland, San Francisco, Los Angeles, and San Diego. All of these cantons are separated from their neighbors by 1M population divides.

As one travels up the gradient, away from the population divide, the size of each central place gets larger and larger. Eventually all such travel terminates in New York. On the west coast, all such travel terminates in Los Angeles, the highest order central place in the west. In the Great Basin-Rocky Mountain region, all such travel terminates in Denver and its nearest larger neighbor, Dallas.

Cantons are named after their highest order central places. However, each canton can exist at many different scales. For example, at the highest level of abstraction the Los Angeles canton and its nearest larger neighbor gradient covers the entire Pacific Coast and engulfs four of the five smaller cantons referred to above. At this level it can be called (in 1970) the Los Angeles 10M canton since it is associated with a central place having a population of at least 10,000,000 and has a population divide separating it from another central place with a population of at least 10,000,000. It is bounded by the 10M Great Basin-Rocky Mountain population divide, which extends from eastern Montana and central Idaho, through central Nevada and southern Utah, to eastern New Mexico and the extreme tip of west Texas.

Since the highest order central place in this 10M canton is Los Angeles, it also represents another definition of Macrocalifornia. In Figure 1, Macrocalifornia was defined by a series of indifference lines. In Figure 3 it is defined by a series of population divides. The 10M Great Basin-Rocky Mountain population divide defines Macrocalifornia at the 10M level and the 1M population divides associated with the San Francisco, Los Angeles, and San Diego cantons define it at the 1M level. At a much lower level of abstraction the Los Angeles canton shrinks even more in size. If the population divides for all central places larger than 100,000 were drawn, the Los Angeles canton would become a .1M canton

The cantons of California will now be considered. Figure 4 shows the California urban gradient and the outer boundary of the three California cantons that emerge when the Los Anglees 10M canton is divided into .9M cantons, based on 1970 SMSA populations. Here, the Phoenix, Portland, and Seattle cantons have been calved off from the larger Los Angeles 10M canton leaving the Los Angeles, San Francisco, and San Diego .9M cantons. Although they are not shown in Figure 4, the population divides separating the urban gradients of these three California cities from each other are the same as those appearing in Figure 3. In Figure 4 only the outer population divide showing the maximum reach of the California nearest larger neighbor system has been drawn. This outer population divide separates the .9M cantons of California from the Portland, Denver, and Phoenix .9M cantons. It also defines Macrocalifornia at the .9M level.

Figure 4 differs from Figure 3 in that it shows end cities. End cities are the lowest order central places in any given canton and their locations are used to define the population divide. They are usually found in remote areas and are located nearer to population divides than are higher order centers. As one travels down the gradient, from larger to smaller cities, end cities are the ones found "at the end of the line." Also in Figure 4 the outer population divide has been drawn along the county boundaries separating the end cities of the San Francisco, Los Angeles, and San Diego urban gradients from the end cities of the Portland, Denver, and Phoenix urban gradients. In Figure 3 the population gradients have been drawn along indifference lines separating the various end cities. Note closely in both figures 3 and 4 the population divide between the Los Angeles and the San Francisco

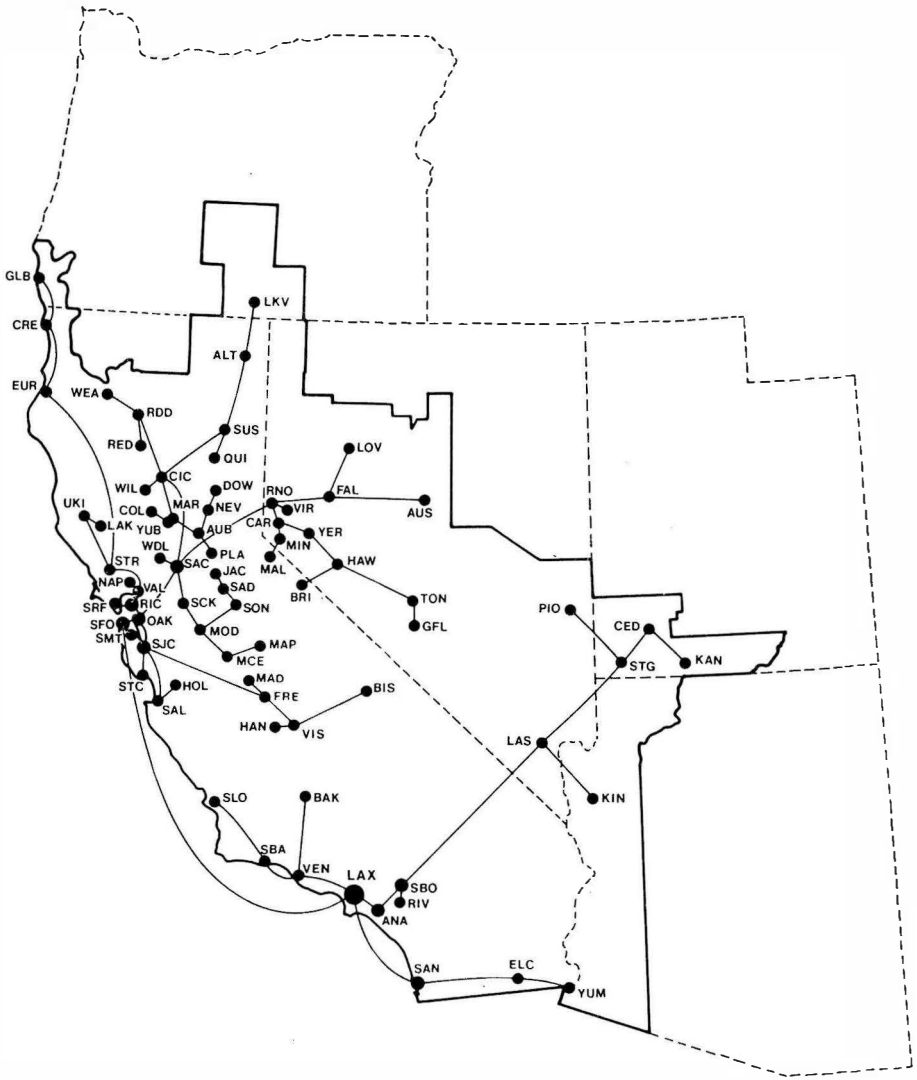

Figure 4. Macrocalifornia as Defined by .9M Cantons.

urban gradients matches the straightline, a traditional boundary between northern and southern California marked off by the northern borders of San Luis Obispo, Kern, and San Bernardino counties. Note also in both figures how clearly the San-San gap appears. This rural discontinuity in the San Francisco-San Diego megalopolis, which has been described recently in this journal coincides very nicely with both the straightline and the urban gradient.[15]

Empirical Test

What evidence is there that the nearest larger neighbor gradient, population divides, and Macrocalifornia indifference lines correspond to things in the real world? Are people within the San Francisco canton actually oriented toward that city for their higher order goods and services? To test such a hypothesis it would first be necessary to sift through mountains of data to determine the hinterland of each urban area in the nation, much as Ullman did for Mobile in 1943, Harris did for Salt Lake in 1939, and Borchert and Adams did for Minneapolis in 1963.[16] Fortunately something like this has already been done (quite independently) by Rand McNally in their Commercial Atlas and Marketing Guide, which contains a map showing fifty major trading areas in the United States.[17] Each of these regions focuses on a major center of specialized higher order activities like banking, wholesaling, advertising, and corporate decision-making. The boundaries of these major trading areas were drawn along county lines after a lengthy consideration of such factors as physiography, population, economic activities, highway facilities, newpaper circulation, railroad services, suburban transportation, and sales reports.

This Rand McNally system can be used as an empirical standard against which the nearest larger neighbor system can be judged. The agreement between the Rand McNally trade areas and the their corresponding nearest larger neighbor cantons is quite high. Of 408 counties in the eleven western states, 318 (78%) are placed within the hinterland of the same major city by both classification systems. When this pattern was compared with an even distribution, which might exist if there were only a chance relationship, a chi-square goodness of fit test indicated that the difference was significant at beyond the .001 level. Within California, 56 counties out of 58 (96%) were classified correctly by the nearest larger neighbor method, with only Modoc and Inyo counties being classified differently. In the case of Inyo county and

its largest city, Bishop, Rand McNally classified it as part of the Los Angeles trade area, while the nearest larger neighbor method placed it within the San Francisco canton. The disagreement can be attributed to the use of straight-line distances by the computer program used to generate the nearest larger neighbor axes appearing in Figures 3 and 4.[18] Within the larger area of the entire Macrocalifornia urban gradient shown in Figure 4, 69 counties out of 77 (89%) were classified correctly by the nearest larger neighbor method. There is strong evidence, then, that the nearest larger neighbor gradient and the indifference lines that define the retreating boundary of Macrocalifornia accurately describe something that exists in the urban landscape of California and its eastward extension.

Applications

There are several possible applications of the nearest larger neighbor method. The first is highly practical. The nearest larger neighbor gradient is a very efficient way of designing a marketing and wholesaling distribution network, where each smaller subsidiary location is oriented toward its nearest larger neighbor. Many such networks may in fact already be arranged in this chain of command fashion. Another application lies in transportation research. Are airline routes that follow the urban gradient more profitable than ones that connect hierarchically unrelated cities? The answer to this question might be interesting. The nearest larger neighbor gradient might also provide a more realistic criteria for delineating time zones. Perhaps the most significant application of the nearest larger neighbor method lies in historical research, where it has promising applications in central place theory. Such things as bank records, transportation schedules, shipping receipts, and newspaper subscriptions serve as the raw material against which theoretical central place geometries must ultimately be tested. However, as the investigator delves farther and farther into the past, information of this sort quickly disappears. This is a major problem faced by those who study the evolution of central place systems and it has even caused some scholars to advocate the abandonment of central place theory entirely.[19] If geographers really wish to describe and explain central place hierarchies, it will be necessary to observe how these urban systems have actually evolved through time. The nearest larger neighbor method, which owes part of its inspiration to the dilemma of Buridan's ass, provides a means for investigating their historical development.

ABQ Albuquerque, NM
ALT Alturas, CA
ANA Anaheim, CA
AUB Auburn, CA
AUS Austin, NV
BAK Bakersfirld, CA
BEL Bellingham, WA
BIS Bishop, CA
BOI Boise, ID
BRI Bridgeport, CA
CAR Carson City, NV
CAS Casper, WY
CED Cedar City, UT
CHI Chicago, IL
CHY Cheyenne, WY
CIC Chico, CA
COL Colusa, CA
COR Corvallis, OR
COS Colorado Springs, CO
CRE Crescent City, CA
DEN Denver, CO
DFW Dallas/Ft. Worth, TX
DOW Downieville, CA
DUG Douglas, AZ
ELC El Centro, CA
ELP El Paso, TX
EUG Eugene, OR
EUR Eureka, CA
FAL Fallon, NV
FAR Farmington, NM
FRE Fresno, CA
FTC Ft. Collins, CO
GFL Goldfield, NV
GJT Grand Junction, CO
GLB Gold Beach, OR
GRE Greeley, CO
GTF Great Falls, MT
HAN Hanford, CA
HAW Hawthorne, NV
HOL Hollister, CA
IDF Idaho Falls, ID
JAC Jackson, CA
KAN Kanab, UT
KEL Kelso/Longview, WA
KIN Kingman, AZ
LAK Lakeport, CA
LAS Las Vegas, NV
LAX Los Angeles, CA
LKV Lakeview, OR
MAD Madera, CA
MAL Markleeville, CA
MAP Mariposa, CA
MAR Marysville, CA
MCE Merced, CA
MFR Medford, OR
MIN Minden, NV
MIS Missoula, MT
MOD Modesto, CA
MSP Minneapolis/St. Paul, MN
NAP Napa, CA
NEV Nevada City, CA
NYC New York City, NY
OAK Oakland, CA
OGD Ogden, UT
PDX Portland, OR
PHX Phoenix, AZ
PIO Pioche, NV
PLA Placerville, CA
POC Pocatello, ID
PRO Provo, UT
PUB Pueblo, CO
QUI Quincy, CA
RAP Rapid City, SD
RIC Richland, WA
RIC Richmond, CA
RIV Riverside, CA
RNO Reno, NV
RED Red Bluff, CA
ROS Roseburg, OR
RDD Redding, CA
SAC Sacramento, CA
SAF Santa Fe, NM
SAL Salinas, CA
SBA Santa Barbara, CA
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STR Santa Rosa, CA
SUS Susanville, CA
TAC Tacoma, WA
TON Tonopah, NV
TUC Tucson, AZ
UKI Ukiah, CA
VAL Vallejo, CA
VEN Ventura, CA
VIR Virginia City, NV
VIS Visalia, CA
WDL Woodland, CA
WEA Weaverville, CA
WIL Willows, CA
YAK Yakima, WA
YER Yerington, NV
YUB Yuba City, CA
YUM Yuma, AZ

Figure 5. Three Letter City Codes.

NOTES

1. For a detailed account of this problem see Nicholas Rescher, "Choice Without Preference: A Study of the Logic and of the History of the Problem of Buridan's Ass," Kant-Studien, Vol. 21 (1959/60), pp. 142-175.

2. David L. Huff, "A Probability Analysis of Shopping Center Trading Areas," Land Economics, Vol. 39 (1963), pp. 81-90.

3. David L. Huff and James M. Lutz, "Ireland's Urban System," Economic Geography, Vol. 55 (1979), p. 200.

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Volume XXI, 1981

SUMMERTIME COASTAL AIR FLOW IN NORTHERN CALIFORNIA

*Gerald Hannes**

During the past few years, several articles have been published on ocean-air interactions and coastal air flow.[1] Many dealt with the interaction of summertime upwelling with the land-sea breeze system. The basic nature of this circulation and its resultant hodograph shape have been described by Haurwitz and by Staley.[2] The monsoonal component of the air motion along the west coast of the United States was described by Schroeder et al.[3] Other influences such as diurnal strength of the inversion and its height fluctuations on the transgressions of marine air have been outlined by Meitin and Stuart, and Simon.[4] Thus, coastal areas are zones of complex geophysical interactions.

Other research interests in the coastal environment have been concerned with explaining precipitation mechanisms or the lack of them. Bryson and Kuhn have examined the effect of coastal topography and orientation on zones of subsidence, while Azevedo and Morgan measured the amount of fog precipitation (fog drip) associated with the penetration of summer stratus in coastal forests.[5] Simon, using weather satellite photography, identified four regions of different low cloud formations off the west coast of the United States.[6] Others have described the penetration of fog in coastal areas.[7] Lastly, researchers such as Mahrer and Pielke have employed numerical models to analyze the interaction of the sea and land breezes with local topography and the mountain wind systems.[8] They have described the diurnal changes in the coastal flow brought about by the interaction of both the mountain and sea breeze circulation in a two dimensional numerical model.

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Study Area and Objectives

Northern California was chosen as the study site because of the presence of cold, upwelled water along the coast during the summer and its possible effect on the regional air flow. Furthermore, very few people have examined mesoscale surface air flow in this region of complex topography. The area around Eureka is generally quite flat while to the south several transverse ridge systems lie adjacent to the coast. This change in topography should logically modify the basic land-sea breeze system. A better understanding of the modification brought about by the topography on the air circulation would aid numerical modelers and also help researchers interpret the effect of climate on the vegetational patterns in a coastal area.

To examine the general air flow in the Cape Mendocino area, nine wind sampling locations were used to depict the characteristics of the summertime atmospheric motion from July 8 to August 17, 1970. (Figure 1) Standard wind instruments were lent by the National Center for Atmospheric Research, Boulder, Colorado. The Blunt's Reef Light Ship data was obtained from the National Climatic Data Center, Asheville, North Carolina.

The nine sampling locations were classified as low level (Navy, Ocean House, Blunt's Reef, and Trinidad Head), intermediate in elevation (Walker-George) and ridge top (Windy Nip, Mount Pierce, Bunker Hill and Mazzepa). The ensuing discussion of each station's wind characteristics will proceed in this paper according to this catergorization.

The data were extracted at hourly intervals from a continuous record to determine the characteristics of the average (vector) resultant wind field, the major objective of this paper. The mathematical basis for the calculation of a resultant wind is described by Pant.[9] The three hour weather information taken aboard the Blunt's Reef Light Ship was included in this analysis to illustrate the nature of the offshore flow.

Resultant Wind Field

Figure 2 depicts the nature of the hourly resultant wind field at the low level and intermediate locations. All stations generally display the classical afternoon vector rotation through time. For example, the vectors for Navy rotate clockwise from 1400 to 2000 PDT. The influence of the Pacific High pressure system on the surface wind is indicated by the frequency of northerly

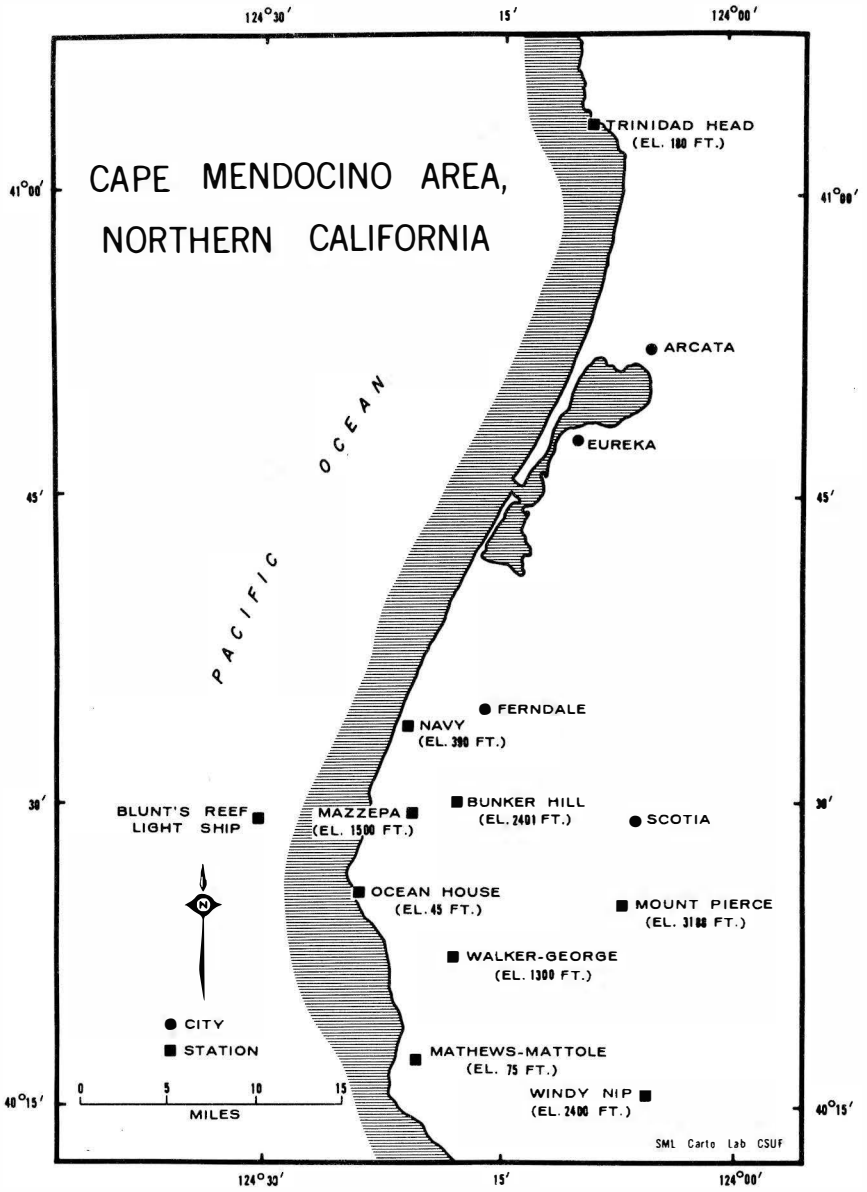

124°30′
15′
124°00′
41°00′
45′
30′
40°15′
CAPE MENDOCINO AREA,
NORTHERN CALIFORNIA
TRINIDAD HEAD
(EL. 180 FT.)
ARCATA
EUREKA
PACIFIC OCEAN
FERNDALE
NAVY
(EL. 390 FT.)
BLUNT'S REEF
LIGHT SHIP
MAZZEPA
(EL. 1500 FT.)
BUNKER HILL
(EL. 2401 FT.)
SCOTIA
OCEAN HOUSE
(EL. 45 FT.)
MOUNT PIERCE
(EL. 3188 FT.)
WALKER-GEORGE
(EL. 1300 FT.)
CITY
STATION
MATHEWS-MATTOLE
(EL. 75 FT.)
WINDY NIP
(EL. 2400 FT.)
0 5 10 15
MILES
SML Carto Lab CSUF

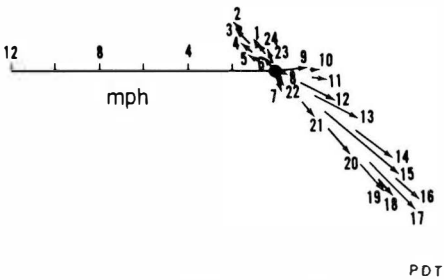
Figure 1

winds at all hours. Trinidad Head is the only site that had an offshore flow during this study period. This implies that Trinidad Head is subject to more late evening and early morning air drainage and land breeze flow than the other locations. The difference in physical characteristics between the Cape Mendocino area and the Trinidad Head location probably causes the variation in the flow structure at each site. The larger Cape headland exerts greater frictional and thermal effects on the wind field than does the smaller Trinidad headland. The Trinidad Head station occupies a more leeward location on a headland than does either Navy or Ocean House. this leeward location on a headland might be influenced by atmospheric eddy structures that would favor an offshore flow. The existence of eddy structures in this area had been borne out by observation of the local zones of stratus dissipation near Trinidad Head.

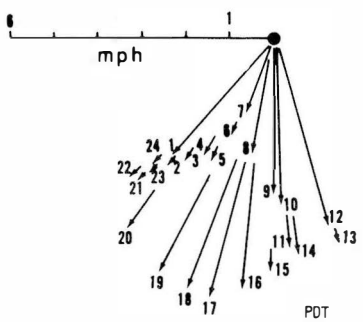
Another factor that would likely influence the general lack of offshore flow in the Cape Mendocino area is the effect of atmospheric wave activity and subsidence in this locale. Subsiding air or dense marine air could "scour out" any nighttime down-valley flow. Dense marine air flowing down the leeward slope in the late evening hours, observed, could logically be expected to modify the offshore flow. Mountain ridges at right angles to the general northerly flow could induce formation of atmospheric waves and under proper conditions could eliminate or strongly modify through subsidence the offshore motion. The existence of waves activity in this area is mentioned by Marotz, Hannes, and Lahey.[10]

If hodographs were constructed for each site shown in Figure 2, each would be different. As mentioned by Staley, the shape of a hodograph is related to the local effects of friction, pressure gradient force, and Coriolis force.[11] Furthermore, the stagnation points of vector rotation represent equilibrium points where some type of balance is achieved among the forces involved in producing the flow field. For example at Navy, stagnation periods occur between 1200 and 1300 PDT, and between 2100 and 2300 PDT. Ocean House, south of Navy, has a much more elongated hodograph shape than Navy. Elongation, according to Staley, generally indicates topographical constraints.[12] Moreover, the difference between the two hodograph shapes could also be caused by diurnal pressure variations due to location. Ocean House occupies a leeward location, while Navy has a windward position with respect ot the wind field. Myers has described local variations of the wind field along mountains with stable airflow, which may be similar in part to conditions occurring at these two Cape stations.[13]

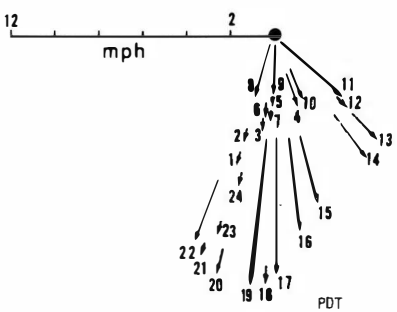
RESULTANT WINDS: July 8 to Aug 17 1970



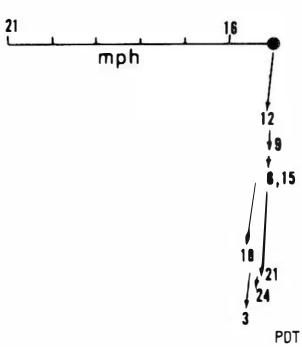
Trinidad Head



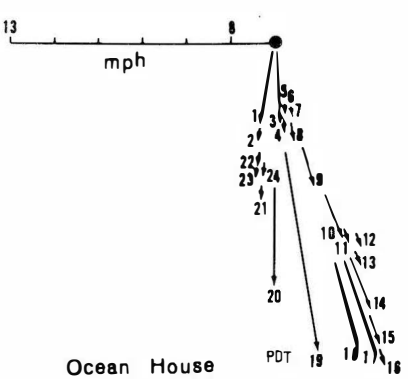
Navy



Walker-George



Blunt's Reef



Ocean House

Figure 2

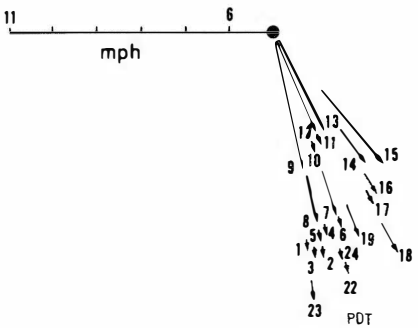
The hourly resultant winds for the ridge top locations are displayed in Figure 3. Mazzepa, Bunker Hill, and Mount Pierce are located at different elevations on the Bear River Ridge system. Windy Nip is south of the Bear River Ridge in general produces a shear zone between Mazzepa and Mount Pierce. For example, at 1800 and 1900 PDT the winds at Mazzepa are from the northeast and at Mount Pierce from the northwest. Bunker Hill, on the other hand, has an air flow from the north, intermediate to the other two stations. The shearing is likely caused by the land-water contrasts and the frictional effects of the ridge system. As mentioned by Bryson and Kuhn, a zone of horizontal divergence should occur if the land is towards the low pressure system.[14] This seems to be the case in the summertime off the west coast of the United States, for the Pacific High is well developed offshore, while a thermal low is found in the Central Valley of California. This shear zone also extends south of the Bear River complex. The winds for this time interval (1800-1900) are northeasterly at Walker-George, northwesterly at Windy Nip.

Hodograph shapes of the low level sites are not as elongated as the upper level sites. (Figures 2 and 3) Again, elongation of shape usually implies some form of constraint on the ideal wind flow.

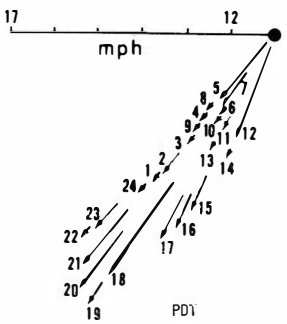
Diurnal Wind Variation

The diurnal wind velocity is quite variable spatially at the locations examined in this study. (Figure 4) However, the stations do exhibit certain similarities in the general nature of the summertime velocity distribution. The maximum resultant wind velocity at the ridge stations (Bunker Hill, Mazzepa, Mount Pierce and Windy Nip) comes during the late evening (1800 to 2100), while the minimum velocity generally occurs between 1000 and 1200 PDT (exceipt at Mazzepa). In contrast to the ridge top sites, the low level sites (Ocean House, Navy, and Trinidad Head) all record maximum velocity at or before 1800 PDT, while the minimum value occurs at or before 0800 PDT. These local speed variations are in part related to the daily heating and cooling cycle of the Cape area. Hannes has described the diurnal temperature similarities that occur between the stations in this study area.[15] Diurnally, all the sites do not heat and cool at the same rate; thus, each station's wind profile should vary throughout the day.

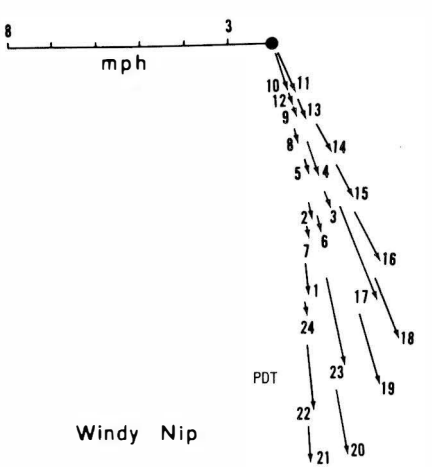
RESULTANT WINDS: July 8 to Aug 17 1970



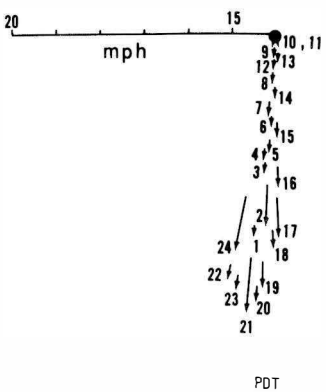
Mount Pierce



Mazzepa



Windy Nip



Bunker Hill

Figure 3

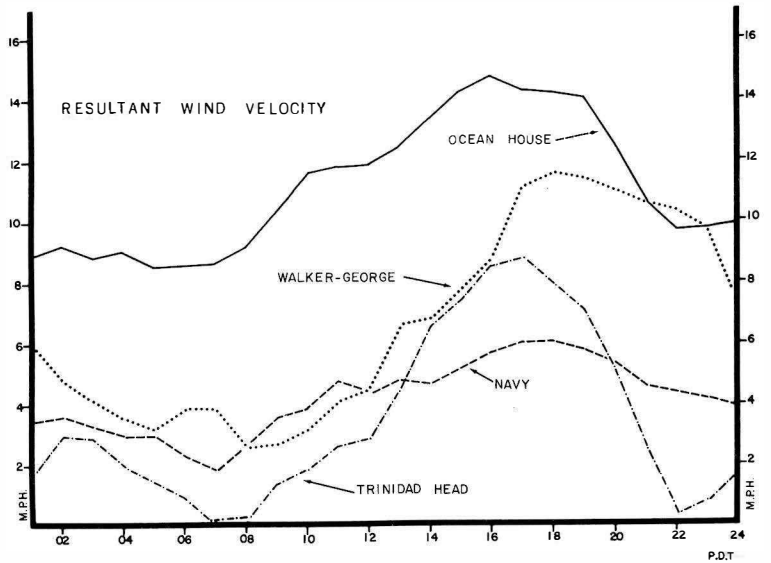
The cause of the late evening maximum velocity, as opposed to the early morning minimum velocity, is probably related to a series of local factors modifying the classical sea breeze system. One such factor causing the morning minimum velocity (e.g., between 1000 and 12000 at Bunker Hill) is the effect of thermal turbulence. Turbulence could disrupt the morning horizontal flow field, while in the late evening hours a lack of vertical rising currents could enhance the horizontal flow over the ridges.

A second environmental factor that could modify the diurnal wind field is related to the changes in elevation of the inversion base. With late evening cooling of land or water, the inversion base could be lower, and thus cause the wind speeds to increase the Bernoulli effect. As described by Simon, the height of the inversion base varies along the California coast.[16] This variation in height, coupled with the local topographic variations, would likely produce the strong winds at Bunker Hill and Mazzepa. No continuous or daily upper air soundings were taken during this study, but discontinuous soundings at Arcata, California by a United States Navy research team indicated an inversion base below 1200 meters in the early morning.

Hannes has described the breakdown of a low level wind maximum, a jet-like feature, over the Arcata area during the early morning.[17] This velocity maximum is probably related to variations in the height of the inversion base and the frictional discontinuity between land and water.[18] As described by Blackadar, the nocturnal inversion is often associated with wind shear at low levels.[19] Furthermore, the diurnal wind diagram for Navy and Walker-George resemble the ideal shape of a hodograph influenced either by a low level wind maximum as described by Barad or an inertial oscillation as mentioned by Hoecker.[20] The relationship between the inversion base and local wind maxima along the ridges can only be ascertained by further study of the diurnal nature of the upper level wind field.

Summary

In conclusion, this paper has described the general nature of the wind field in an area of complex terrain. The wind field at Trinidad Head, north of Cape Mendocino, exhibits the classical land-sea breeze flow, while the flow field over the Cape records a dominant northerly flow. Also, the lack of either a dominant nighttime land breeze or downvalley flow throughout the Cape area is thought to be related to modifying effects of subsiding air produced by the favorable onshore


RESULTANT WIND VELOCITY
OCEAN HOUSE
WALKER-GEORGE
NAVY
TRINIDAD HEAD
M.P.H.
P.D.T

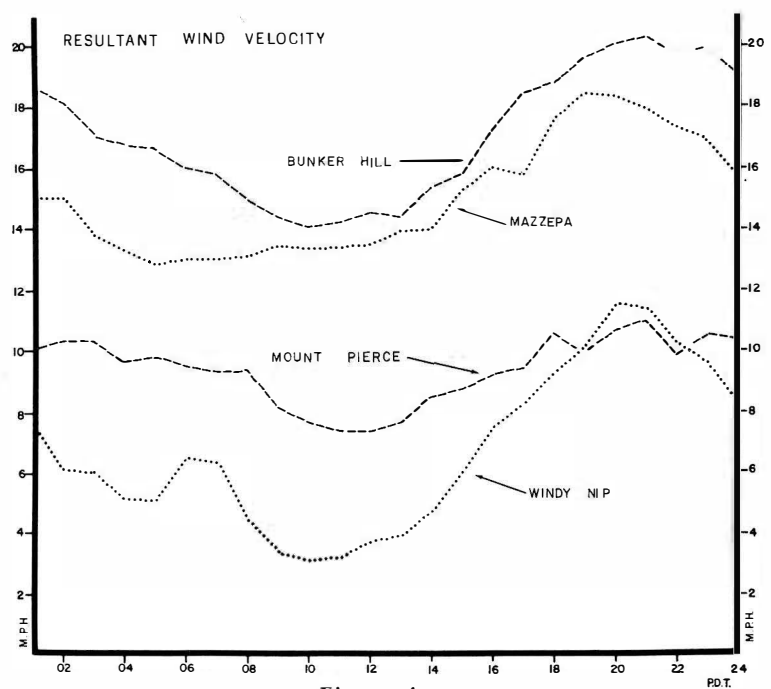
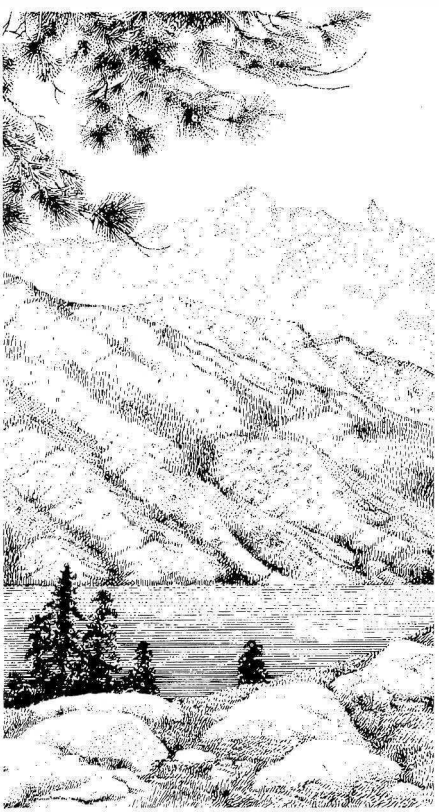

RESULTANT WIND VELOCITY
BUNKER HILL
MAZZEPA
MOUNT PIERCE
WINDY NIP
M.P.H.
P.D.T.

Figure 4

pressure gradient between the Pacific High and an interior thermal low. As suggested in this article, the frictional and thermal effects of the Cape land mass cause many of these local variations in velocity and general hodograph shape. The shear zone that occurs along Bear River Ridge is thought to be related to frictional effects. The diurnal variations in velocity are a result of the changes in magnitude of the forces involved. As suggested by Lahey, the wind field is responding to temperature and pressure gradients produced by variations in the rate of upwelling along the coast.[21] Further study in this area is needed to ascertain the exact nature of ocean-air interactions.



NOTES

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6. Simon, op. cit. (Footnote 4), pp. 1310-1314.

7. G. Marotz A preliminary examination of the effect of synoptic regime changes and topography on circulation regimes over Cape Mendocino, California, Ph.D. dissertation, University of Illinois (1971), 298pp.; M. A. Fosbert and M. J. Schroeder "Marine air penetration in central California," Journal of Applied Meteorology Volume 5 (1966), pp. 573-589.

8. Y. Mahrer and R. A. Peilke "The effects of topography on sea and land breezes in a two dimensional numerical model." Monthly Weather Review Volume 9 (1977) pp. 1151-1162.

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11. Staley, 1959, op. cit. (Footnote 2), pp. 364-370.

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Volume XXI, 1981

VERTICAL AERIAL PHOTOGRAPHY OF THE LOS ANGELES AREA: A HISTORICAL PERSPECTIVE

*Clement Padick**

As a result of recent technological advances in imaging hardware systems and the availability of various space platforms a large and impressive package of images of the Los Angeles area has been produced. Imagery from both the visible and non-visible portions of the electromagnetic spectrum has become commonplace and accessible, beginning with the Gemini, Apollo, and Skylab slide series, and continuing with sequential Landsat images, NASA high altitude color and color infra-red photographs, all complemented with thermal infra-red and radar images. The spectacular Landsat color views of the Los angeles area have received world-wide attention. Not only are Seasat radar images of the basin available, but additional higher resolution coverage from aircraft side-looking radar systems is available to users. Disregarding the newness and often stunning visual effect, much of this imagery originates in digital form, thus facilitating computer enhancement and rapid non-visual interpretation, a major advantage when dealing with immense quantities of data.

The availability of these forms of imagery has tended to obscure to many users the significance and usefulness of existing vertical black and white aerial photography. Such photography has been available for decades and undoubtedly will represent valuable archival materials for years to come. This imagery is generally inexpensive and easy to obtain, available for assorted dates and at variable scale, can be enlarged to any needed scale, is reasonably accurate planimetrically, and can be handled by users with a minimum amount of training. A conventional continuous tone panchromatic 9" x 9" photograph contains millions of bits of information, unfortunately poorly suited to automated interpretation but recording almost everything present in a landscape at the time of exposure.

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Consequently sequential vertical aerial photography of the same scene through time provides an unequalled base for monitoring quantitative and qualitative aspects of landuse change. Should topographic maps be available for the approximate dates of exposure, as is generally the case, usability of the imagery would be enhanced.

This claim for the merits of vertical aerial photography should not be construed as a critique or rejection of oblique aerial photography in landuse study. To many the oblique view is the normal and preferred view and can be most useful in a qualitative sense. Commentary on oblique imagery is beyond the purview of this study. However mention must be made of the extensive Spence collection of oblique aerials of the Los Angeles area covering the period 1922 to 1972. This collection, as well as a number of early Fairchild obliques, is housed in the Geography Department of the University of California at Los Angeles. Further inquiry should be directed to that institution.

Existing aerial photography certainly has been used extensively by many professional groups, i.e., planners, real estate developers, mapmakers, governmental agencies, and these applications will continue. However, the use of aerial photography, either directly or in slide form, generally has been minimal in educational systems, even in university level instruction and research. In part this neglect occurs as the result of the general lack of information in summary form on the sources and availability of imagery. The task of maintaining up-to-date information from a variety of sources is very time consuming, and the acquisition of indexes to facilitate identification and ordering of specific scenes can be very expensive. The primary thrust of this review is not to plead the case for vertical aerial photography nor to detail the dynamics of landuse change in the Los Angeles area through the past four decades. Even newcomers to the Southland are well aware of these phenomena. Should any doubts linger the reader is invited to review Table 1, a listing of representative population changes from 1940 to 1980, generally for areas included in the subsequent index of comparative aerial photography. The population of the county increased approximately 270% during this period accelerating the loss of national agricultural status from the number one county of the 1950's to the obscurity of 1980. Rather, the intent is to identify sources of photography, provide an index listing of representative landuse change sequences, and extend an invitation to potential interested users to request more detailed information from the writer.

	1940	1950	1960	1970	1980
Los Angeles County	2,785,643	4,151,687	6,042,686	7,041,980	7,477,657
Los Angeles City	1,504,277	1,970,358	2,481,595	2,816,061	2,966,763
Beverly Hills	26,823	29,032	30,817	33,416	32,281
Vernon	850	432	229	261	89
Alhambra	38,935	51,359	54,807	62,125	64,764
Monterey Park	8,531	20,395	37,821	49,166	54,298
Cerritos	-----	Inc. 1956	3,508	15,856	52,591
Carson			Inc. 1968	71,150	84,963
Culver City	8,976	19,720	32,163	34,451	38,378
Burbank	34,337	78,577	90,155	88,871	83,781

Table 1

LOS ANGELES AREA: REPRESENTATIVE POPULATION CHANGE
(based on data from the Los Angeles County Regional Planning and the Los Angeles Times , January 19, 1981)

Sources of Imagery - Governmental

A large number of federal governmental agencies have obtained aerial photography for in-house use in completing job responsibilities on a routine but periodic basis. In order to obtain information on costs and availability of such imagery outside users in the past have been required to contact each agency separately, a very time consuming practice. Recent developments have greatly facilitated quick access to necessary infromation. The National Cartographic Information Center (NCIC) is the information branch of the U.S. Geological Survey's National Mapping Program. In order to organize and distribute information about U.S. aerial photography coverage and to promote elimination of aerial mapping duplication by isolating individual aerial projects, both governmental and private, the agency developed and now publishes the Aerial Photography Summary Record System (APSRS).[1] The principal products of the System are State-Base Graphics (SBG), a series of maps that delineate coverage of conventional aerial photography projects for each state in the U.S.

The graphics are grouped by state location into 34 booklets. Each contains 23 graphics that show coverage by date of flight (not annual but by year blocks) and by scale, range and agency. Two reference systems are used, county boundaries and a latitude-longitude grid. Each sixteenth of a grid area represents a 7.5' quad area and contains either a single character code, a two character code, or is blank if no information is available. A single character code identifies the agency holding the most recent imagery for each area with a specific scale or time range. For those few agencies holding nationwide holdings the graphics have two characters in each quad listing indicating both the scale range and date of that agency's most recent imagery. A directory of contributor agencies containing addresses and names of contacts is also available from NCIC. Each booklet is issued twice a year. In addition NCIC can provide microfiched listings with more detailed coverage information for each SBG area.

In addition to NCIC another source of detailed information has become available to users in recent years. The EROS Data Center is operated by the EROS Program to provide access primarily to Landsat multispectral imagery of the earth provided by NASA, aerial photographs acquired by NASA from research aircraft and skylab, Apollo, and Gemini spacecraft. The primary functions of the Data Center arestorage and reproduction and user assistance and training. The Center's computerized data storage and retrieval system is based on a geographic system of latitude and longitude. User inquires on availability of imagery may be

AIR PHOTO COVERAGE - L. A. BASIN - U.S. GOVERNMENT SOURCES

U.S. GEOLOGICAL SURVEY[1]

Year	Index	Scale	Area Covered
1948	GS-HD	1/20,000	L.A. Basin
1952	GS-VP	1/23,600	L.A. Basin
1963	GS-VASK	1/24,000	Redondo, Downey, Anaheim San Pedro, Las Bolsas, Santa Ana 15' Quads
1964	GS-VAWW	1/24,000	Central & Northern L.A. Basin
1972	GS-VCYY	1/24,000	L.A. Basin & W. Orange County
		U.S. Dept. of Agriculture[2]	
1938[3]	AXJ	1/20,000	L.A. Basin, excluding South Bay & Harbor areas[4]
1952-54	AXJ	1/20,000	Entire L.A. County
1959	AXJ	1/20,000	Malibu area & west San Fernando Valley only
1965	AXJ	1/20,000	East San Gabriel Valley only

1. Available from U.S.G.S., Menlo Park, Ca.
2. Available from U.S.D.A., Salt Lake City, Utah.
3. Available from National Archives Service, Washington, D.C.
4. Harbor area negatives were destroyed at the outbreak of World War II (December, 1941).

Table 2

centered on a geographic point location or a rectangular area designated by latitude and longitude. A computer search based upon a specific request will produce a print-out of available imagery.[2]

Acquisition of aerial photography from governmental sources has a number of advantages. The prints are relatively cheap, negatives may be purchased and reproduced in private photo laboratories, and the imagery is not copyrighted. Additionally, imagery is available on a historical basis, generally beginning in the middle 1930's for large area coverage and earlier for some spot coverage. For example the Santa Monica, California 15' quadrangle, appearing in 1921, carries the notation that revision was by means of the Bagley Aerial Camera, photography by Second Lieutenants W. K. Wook and T. J. Giboney, Engineers, in January of 1919.

A summary of governmental sources of aerial photography is provided in Table 2. A number of other agencies, i.e., Forest Service, Soil Conservation Service, etc., have obtained imagery in Los Angeles County but not of the urbanized Los Angeles Basin. The U.S. Geological Survey[3] obtains photography primarily for the production and revision of topographic quadrangles. Its photo indexes are uncontrolled mosaics matching topographic maps. Various subdivisions of the U.S. Department of Agriculture[4] have contracted for aerial photography since 1935. Coverage is on a county basis, either entirely or partial depending upon the extent of agricultural landuse. As of this date the agency has photography of all major croplands in the country amounting to more than 80% of the total land area in the U.S. A recent entrant in the airphoto field is the National Ocean Survey of the National Oceanic and Atmospheric Administration.[5] This agency uses aerial photography in connection with nautical and aeronautical charting programs. The available imagery concentrates on coastal areas but also includes most civil airfields. in all cases with governmental agencies, the sale of photography is secondary to the prime responsibilities of that agency. No prints are routinely stocked, and delivery time is determined by agency priorities.

Sources of Imagery: Non-Governmental

A number of private concerns have produced aerial photography of the Los Angeles area. Procurement of imagery from such companies has several advantages. Being local they are quick to respond to inquiries, have multiple year coverage of the same areas, have short delivery times, and can deliver customized orders. However, since selling imagery is their business, these concerns have a higher price schedule than governmental sources, especially for small orders, and they copyright all imagery.

SELECTED AIR PHOTO COVERAGE - TELEDYNE GEOTRONICS[1]

Year	Job Number	Scale	Coverage
1927	C 113	1/18,000	L.A. Basin
1928	C 300	1/18,000	Entire County
1947	C 11351	1/24,000	South L.A. Basin
1953	C 19400	1/63,360	L.A. Basin
1956	C 22555	1/14,000	L.A. Basin
1958	C 23023	1/36,000	L.A. Basin
1960	C 23870	1/14,400	L.A. Basin
1963	C 24223	1/63,360	Entire County
1964	C 24801	1/14,400	L.A. City Limits
1965[2]	C 25019	1/24,000	L.A. Basin
1968	2400	1/28,800	L.A. Basin
1971	2755	1/10,440	Entire City Limits
1973	7300	1/24,000	L.A. Basin & Newhall-Saugus
1976	7600	1/24,000	L.A. Basin - Newhall-Saugus
1979	3800-001,2	1/24,000	West L.A. Basin
1981	3800-003	1/24,000	East L.A. Basin

1. Imagery available from Geotronics, Long Beach CA. Information supplied by Ms. Q. Boyer.
2. Imagery between 1927 and 1965 was flown by Fairchild Aerial Survey. Negatives are now controlled by Geotronics.

Table 3

Teledyne - Geotronics[6] controls the most extensive historical collection of vertical photography of the Basin. Table 3 provides a representative but selected listing of its holdings. Of special interest is the availability of broad coverage for the late 1920's.

Metrex Management Corporation[7] offers contact photography at any desired scale as well as zoning and aerial photo atlases of the entire L.A. Basin plus the Newhall - Saugus area and a portion of the Antelope Valley. Reproductions are available for the years 1981, 1979, 1977, 1975, 1972, and 1970. Each photo is centered on the same location for each flight, and future flights are planned for alternate years. Similar products are available from Aerial Map Industries.[8] The company can provide annual coverage since 1963 with imagery tied to the Thomas Brothers Atlas.

Several volumes of large format printed photography of the Los Angeles area were published by Landis - Fairchild Aeromaps, Inc. in 1970 using imagery flown in 1969. The large folio pages at a scale of 1/12,000 are accompanied by a red line plastic overlay of the corresponding U.S.G.S. topographic map and a zoning map of the area portrayed. Aerial Photomaps, Inc., then in Fullerton, published a four volume Aerial Photomap Book of the non-mountainous sections of Los Angeles County using 1964 imagery. The large format page at a scale of 1/5,000 is keyed to the Thomas Brothers maps. The distributor is no longer operational.

Representative Air Photo Listing

The index listing of representative Los Angeles area vertical aerial photography (Table 4) includes samples of either significant or radical change since World War II days. Usually each set of four photos emphasizes a particular aspect of change, i.e., growth in the central business district, transportation, development of industry or warehousing, or conversion of open or agricultural land to urban functions. As might be expected in an area of almost complete modification, each set includes many aspects of landuse change through a forty year period.

The core area of the city of Los Angeles has been greatly altered in recent decades. The initial entry in the listing clearly illustrates two major changes - the impact of freeway development on access to the inner city and the shift in building form and profile from the monotony of the 40's and 50's to the development of a high rise skyline on Bunker Hill and its southwest aerial extension. The 13 story height limit on buildings was rescinded in 1958. An exception was issued

VERTICAL AERIAL PHOTOGRAPHY OF THE LOS ANGELES AREA: A REPRESENTATIVE HISTORICAL SAMPLING

Area	Index#, 1938[1]	Index#, 1952-4[2]	Index#, 1964[3]	Index#, 1979[4]
L.A. Central Business District	AXJ-26-13	AXJ-7K-87	GS-VAWW 1-216	3800-001 17-35
Dodger Stadium & Environs	" 26-32	" 7K-88	" 1-190	7600 11-29[5]
U.C.L.A. Westwood Area	" 26-18	" 4K-79	" 1-198	3800-01 13-16
Beverly Hills, Century City	" 26-20	" 14K-62	" 1-196	" 14-31
Los Angeles International Airport	" 58-64	" 14K-71	GS VASK 1-30	" 14-31
L.A. Harbor area	N/A[6]	" 7K-140	" 2-70	" 17-7
Marina Del Rey & Environs	" 27-68	" 4K-72	" 1-25	" 13-10
Dominguez Dome-S. L.A. River Flood-plain	" 73-8	" 13K-219	" 1-89	7600 5-15[5]
Vernon & Environs	" 64-60	" 7K-20	VAWW 2-22	" 9-25[5]
Cal. State Univ., L.A., Alhambra, Monterey Park	" 45-25	" 14K-17	" 1-186	" 11-25[5]
Baldwin Hills area	" 26-101	" 4K-142	" 2-28	3800-001 15-31
N. Hollywood-Studio City	" 24-68	" 4K-152	" 1-91	" 14-39
Sherman Oaks-Ventura Blvd. at San Diego Freeway	" 24-74	" 3K-138	" 1-87	" 12-22
Woodland Hills-Calabasas-S.W. San Fernando Valley	" 64-78	" 2K-104	2400-1-109[7]	" 9-12
Van Norman Lakes-Sylmar-N. SanFernando Valley	" 23-87	" 3K-147	GS-VAWW 3-21	" 12-36

Table 4

for the Los Angeles City Hall opened in 1927. The northern portion of the C.B.D. and the steep hills just north of the city are features of the second set. The Chavez Ravine area, once a rural retreat within minutes of the city center, has been totally transformed and now contains the impressive Dodger Stadium complex. The U.C.L.A. Westwood campus opened in 1929 in a relatively open and almost rural setting. The campus has been greatly expanded, and Westwood is now a major commercial, financial, and entertainment center.

For a city of its modest population Beverly Hills has developed one of the largest commercial districts in the United States. This expansion through the years and the development of Century City from motion picture lot to high-rise commercial center is well chronicled in the Beverly Hills photo sequence. Los Angeles International Airport is the third busiest in the United States after Chicago and Atlanta. Its development from the insignificant Mines Field near the intersection of Lincoln and Sepulveda in 1938 to its present expanse and influence on surrounding landuse is well documented in the airport sequence. Los Angeles Harbor is one of the busiest on the west coast, and its development into a major import-export facility has played a major role in the economic development of Southern California. Unfortunately the 1938 negatives of the Palos Verdes Hills and harbor areas were destroyed at the outbreak of World War II. Ballona Creek, an alternate mouth of the Los Angeles River (its course switched south to its present channel in 1825) flowed in its artificial channel through an empty marsh area in 1938. Vestiges of the Venice Canal scheme of Kinney can also be seen. Today the site has been converted into the massive Marina del Rey, one of the largest on the west coast and scheduled for further development eastward. The Dominguez Dome, a recently developed anticline directly within the Newport-Inglewood fault zone, and the adjacent floodplain of the lower Los Angeles River were formerly open agricultural and oilfield islands surrounded by urban development. Today, owing in part to the proximity of the area to the harbor district and easy freeway access, the area has been almost completely transformed into a manufacturing and warehousing complex. Only isolated small agricultural plots are still present.

The city of Vernon incorporated in 1905, partly to provide services proscribed by Sunday blue laws in neighboring Los Angeles but primarily to preserve land close-in to downtown Los Angeles for industrial purposes. Its conversion from mixed agricultural-industrial use to the densest concentration of industrial enterprises in the Los Angeles area is clearly demonstrated in this photo sequence. Its

resident population has steadily diminished to fewer than one hundred, a stark contrast to its daytime workforce of many tens of thousands. Growth and change in the west San Gabriel Valley has not been as dramatic as that in the San Fernando Valley but still significant. This set of photos concentrates on development in the Alhambra - Monterey Park area. Most notable is the growth of the campus of California State University at Los Angeles and the urbanization of the Monterey Hills. The Baldwin Hills, like its geomorphic relative to the south, the Dominguez Dome, is an anticline in the active Newport - Inglewood fault zone. The Hills in the 30's were a very apparent island of openness with landuse concentrated on petroleum extraction and small scale dry farming. Urban expansion, primarily residential, has gradually enveloped the area, with little open land remaining. The Baldwin Hills reservoir, which failed in 1963 with large property loss but small loss of life owing to early detection and evacuation, remains empty and the site unused to this date.

The last 4 sequences in the photo sample monitor changes in the San Fernando Valley, an area in the Los Angeles basin that has undergone the most radical overall change since World War II. In 1940 the total population approximated 100,000 mostly in the eastern portion, from Glendale to San Fernando. Today over a million people are resident in the Valley, and numerous commercial and industrial cores have developed. The initial sequence, focusing on the Studio City - North Hollywood area, emphasizes 3 themes: flood control measures on the Los Angeles River and branches of Big Tujunga Creek (the area was severely inundated in the 1938 flooding), freeway development, and residential growth, especially in the hills on the southern margin of the valley.

The second sequence focuses on the environs of the intersection of Sepulveda and Ventura Boulevards in the mid-Valley. Significant changes include commercial development along Ventura Boulevard, freeway construction, impressive residential development especially in the Santa Monica Mountains to the south, and the conversion of agricultural land into the Sepulveda Dam flood control basin on the upper Los Angeles River. One of the best illustrations of the conversion of agricultural land and unused hillslopes to dense residential use is provided in the Woodland Hills - Calabasas sequence. Few residences can be detected in 1938; little unused acreage is visible in 1979. The last sequence covers the Van Norman Lakes - Sylmar area of the north central Valley. The lakes, the initial storage area in Los Angeles for water introduced from the Owens Valley, were completely surrounded by open and agricultural land in 1938

and 1952. Urban encroachment is very apparent in 1964. The area was severely affected by the 1971 Sylmar quake, including extensive damage to the earthen dam on the large lower reservoir. The 1979 photo features the completely rebuilt lake and the restored adjacent freeway complexes.

Summary

The writer has taught photo interpretation for a number of years and has used vertical photography in several other geography classes with great effectiveness. Used directly photos are indispensible in field courses, and in slide form are valuable media in courses on California and Metropolitan Los Angeles. The use of sequential slides can save much time and many words. This paper has attempted to remove a major barrier to more extensive use of aerial photography in geographic instruction - namely, to provide a succinct summary of sources of imagery and to identify specific place photography. Some sources and some coverage may have been missed, but most significant coverage has been discussed.

Through time the Geography Department at California State University at Los Angeles has acquired an extensive collection of air photos and photo indexes, the base for this paper. This accumulation has been expensive and time consuming, and the continued maintenance of a contemporary collection will be more expensive in the future. With a vested interest in the improvement of geographic education at all levels, the Department is prepared to provide access to and information about aerial photography, especially of the Los Angeles area. It is hoped that this paper will serve as a catalyst for more effective use of this valuable resource.[9]

Figure 1

Los Angeles - the Inner City (U.S.D.A. photo, 5/22/38) Access to the Central Business District is strictly by regular surface streets. Only the City Hall, upper right, rises above the monotonously flat skyline. (AXJ-26-63)

Figure 2

Los Angeles -the Inner City (Geotronics photo, 5/10/76) The city core is surrounded by freeways, and the focus of business has shifted dramatically to the northwest. (7600-10-27)

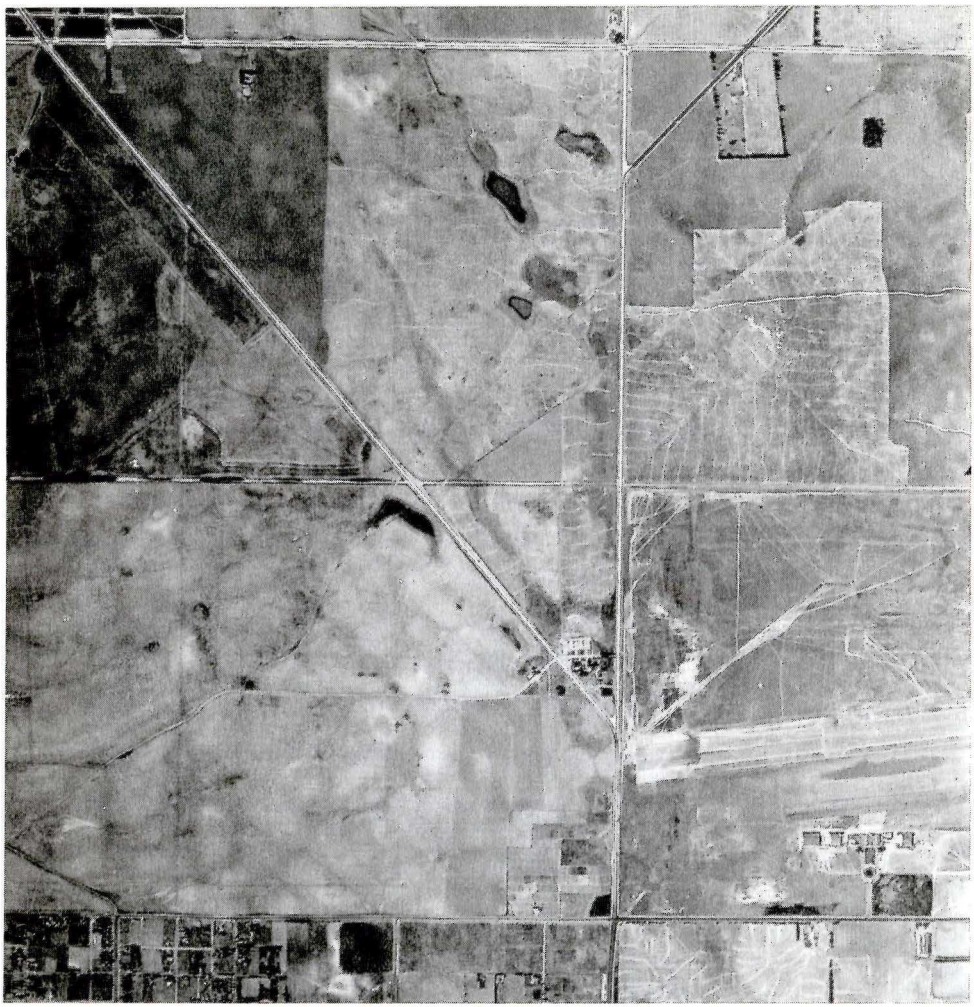

Figure 3

Los Angeles Airport Site (U.S.D.A. photo, 7/2/38) Mines Field, the embryonic LAX, is situated at the intersection of Lincoln and Sepulveda Boulevards, in the midst of open space. (AXJ-58-64)

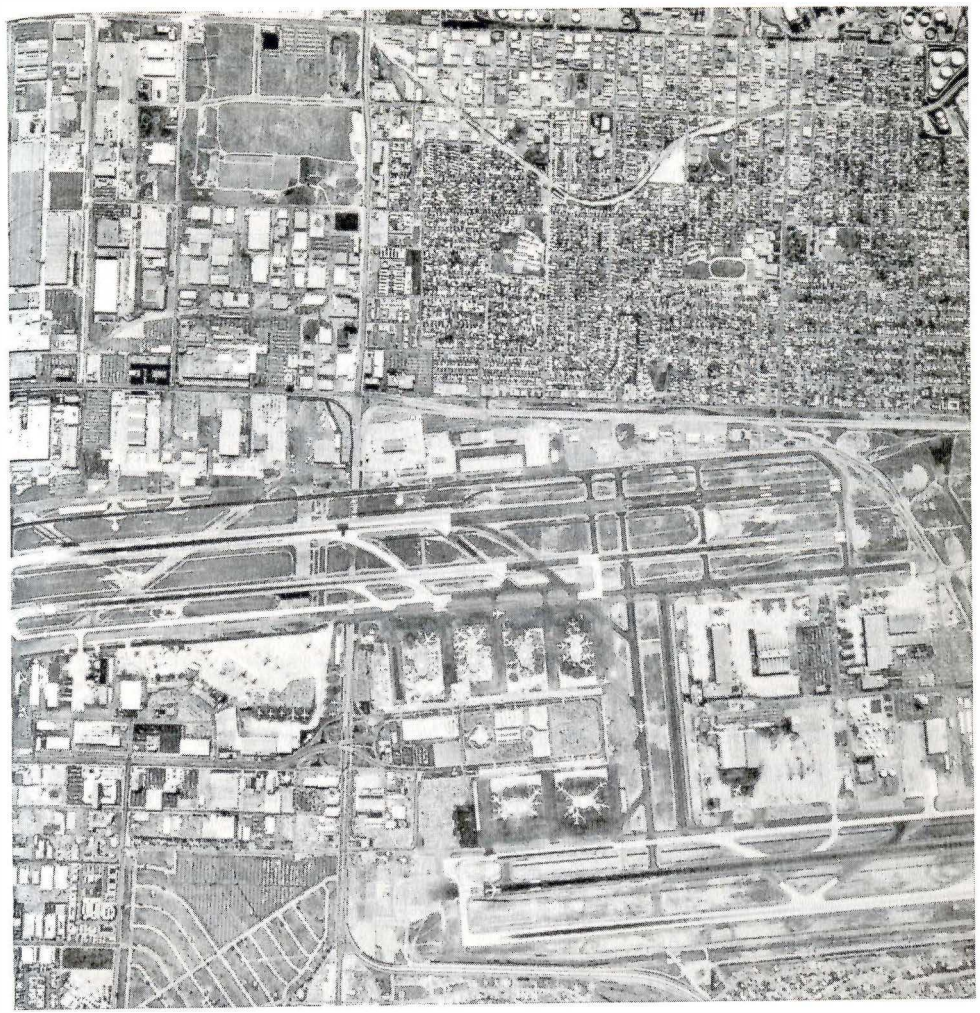

Figure 4

Los Angeles International Airport (Geotronics photo, 3/22/76) The development of this complex represents one of the most dramatic land use changes in the entire Los Angeles Basin. (7600-7-29)

NOTES

1. Available from NCIC, 345 Middlefield Road, Menlo Park, CA 94025; request the Southern California booklet.
2. For additional information contact the EROS Data Center, U.S.G.S., Sioux Falls, SD 57198.
3. Additional information is available from the U.S. Geological Survey, Western Mapping Center, 345 Middlefield Road, Menlo Park, CA 94025.
4. Additional information, including a status of photography booklet, is available from the U.S.D.A., Agricultural Stabilization and Conservation Service, 2222 West, 2300 South, Box 30010, Salt Lake City, Utah 84125. Imagery obtained before 1941 is available from the National Archives and Records Service, Cartographic Archives Division, General Services Administration, Washington, D.C., 20408.
5. For further information contact the Coastal Mapping Division, C 3415, National Ocean Survey, NOAA, Rockville, Maryland 20852.
6. Details may be obtained from Teledyne-Geotronics, 725 East Third Street, Long Beach, CA 90801.
7. Additional information available from Metrex Management Corporation, 131 North San Gabriel Blvd., Pasadena, CA 91107.
8. Contact Aerial Map Industries, 2014 South Main Street, Santa Ana, CA 92797.
9. A sequence of historical slides based on 1938 and 1970's photography of the L.A. Basin has been prepared by the writer and used at recent meetings of the California Council for Geographic Education. Further information is available from the writer.

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DOING BATTLE WITH FEELINGS OF URBAN IMPOTENCE

*Christopher L. Salter**

A paradox that is most frustrating to a person committed to instructing people in ways of surviving in city space is the paradox of urban impotence. This is the sensation of being unable as an individual to exert appreciable influence in the flows of change and development in a city. It is paradoxical for the simple reason that the city is the most artificial (non natural) of all environments. It is the zenith of human capacity to transform a natural setting into a cultural environment. To look at such a scene and feel unable to play a significant role in that process of human transformation can be intensely frustrating.

It is just such a frustration that led to the creation of the UCLA Urban Environmental Education Project and an experiment in experiential education that has attempted to demonstrate a method for diminishing the anxieties of perceived urban impotence. At the same time, this Project has created avenues of continuing interaction between the university--one of the most likely forces in the design of future city space--and the inner city school populations--one of the most likely inhabitant groups of that city space. This article is given over to a commentary on the specific goals, the effectiveness, the institutionalization of the UCLA Project, while then addressing itself to the broader implications for the real-world outcomes of this curriculum innovation in other cities.[1]

I. *The Goals of the UCLA Urban Environmental Education Project*

In the briefest form, the Project was focused upon a single goal: prove that UCLA could create an educational experience demonstrating university faculty, university undergraduates, Los Angeles school teachers and Los Angeles primary and secondary school students can still play a productive

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role in the design and creation of their urban setting. In short, use the city as a laboratory for learning and make the lessons practical as well as theoretical.

The need for such an effort has probably been sensed by most of the readers of this journal as you have experienced the pessimism of colleagues and students alike who claim that they can have no impact on their city; that they are "simply cogs in an inhuman machine." This is a particularly distressing attitude to hear from undergraduates who see no point of entry into the decision-making process that builds the environment around them. Such beliefs have the danger of becoming self-fulfilling prophesies as students lapse into constricting indifference toward control and modification of the urban setting.

The need for a program to dispute such impressions of urban impotence seemed particularly critical for me, as a practitioner of cultural geography, a discipline that is broadly dedicated to the concept that environments are largely society-made and humanly organized. To have the students' primary setting be, at once, both the most artificial of all settings AND one that they felt incapable of influencing appeared to be an academic and psychological contradiction that deserved to be challenged. It was in the context of such a challenge that the UCLA Urban Environmental Education Project (the Project) was conceived in 1976 and introduced into our curriculum in the summer of 1977. The components of the Project are shown in Figure 1.

The resources tapped to dispell this perceived state of environmental urban impotence included the following:

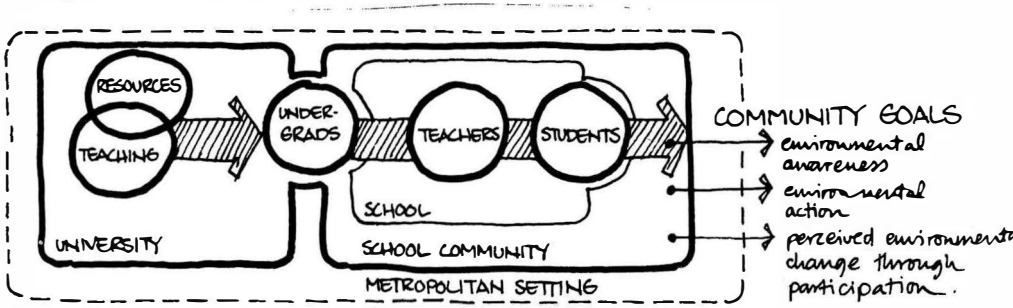


Figure 1 - The Components of the Project

1. The university faculty as a source of environmental knowledge, research and teaching capacity;

2. University undergraduates who were to benefit from the lessons of environmental modification;

3. Los Angeles public school teachers and students who were to provide an academic and community setting for the lessons from and about the landscape;

4. The Los Angeles environment as a superb setting for the observation and analysis of the human processes of landscape creation.

To link these components into a productive unit, the Project brought together secondary school teachers from the Los Angeles inner-city schools and UCLA undergraduates for a Summer Institute in Urban Environmental Education in 1977. The Inner-city focus was determined by the terms of a supportive grant the Project obtained from the Office of Education. We felt that bringing lessons of environmental and community awareness to southcentral Los Angeles and other low-income communities would not only be consonant with the Project's goals of teaching methods of environmental change, but such a setting would also involve UCLA in areas of the city in which our university has been little present. It also seemed appropriate to devise ways in which inner-city settings could be studied in order to tap the human resources that were there, both for the improvement of local environments and for enhancement of community pride.

The Summer Institute. The Summer Institute was a six-week course taught in the Department of Geography that concerned itself with: instruction in the major elements of urban ecosystems and; manifestations of those elements in Los Angeles and its specific communities. If, for example, we had a morning lecture, it would focus upon aspects of drainage, flooding, local water sources and public attitudes toward water in specific locales in Los Angeles. Such phenomena became particularly significant as we lectured on the components of the built environment such as housing, transportation, and commercial networks.

Since a major ambition in our engineering of the Project was to involve UCLA undergraduates in use of the city as a laboratory, extensive use was made of the field for study of the week's lecture components. This was done in part by the scheduling of regular Thursday full-day field trips that were designed to illustrate the ways in which theories from the classroom at UCLA had immediate and significant relationship to the local settings of Los Angeles.[2]

These field explorations also were instrumental in engendering a supportive working relationship between the UCLA undergraduate and the inner-city teachers. This meant that we had at least linked three of the four target components into a working force: UCLA faculty, undergraduates and Los Angeles city school teachers. That initial rapport was essential if we were to involve the fourth

component, and make this experiment something more than just another classroom excursion into possibilities, but not student-experienced realities. Moving this experience from environmental knowing into the realm of so-called "hands on" environmental modification required three follow-through steps. These took place during the academic year 1977-78.

The Follow-Through Year

Mini-courses. With the Project participants armed with a new knowledge of environmental theory and experience of field practice, we came to the school year with three goals. The UCLA undergraduates were to observe in classrooms in the eighteen secondary schools that had participated in the Summer Institute.

After ten weeks (one quarter) of observation--designed to involve some 4-6 hours a week in the classroom--each undergraduate was to present a mini-course in environmental education. The goal of the mini-course was to give the UCLA participant ten hours in front of a class, and to force the undergraduate to bring ecosystem theory to an immediate and understandable level. Themes of the short courses were to reflect local environmental realities as much as possible. At Westchester High School just north of the Los Angeles International Airport, for example, a Black student taught a mini-course on "Noise Pollution and Black Communities." This curriculum design took on an immediacy that made it good education and good preparation for civic involvement in the modification of an environmental ill. Another student prepared a water study for a school in the arid Santa Monica Mountains. Still another did a transportation unit for San Fernando High School in the east end of the San Fernando Valley, and she commuted the twelve miles between her classroom and UCLA by bicycle, perhaps not a necessarily practical pattern, but one that gave her particular credibility as she organized a bike-path project for her school community.

A benefit that quickly became apparent was the effectiveness the UCLA students had as role models for the high school populations. Since a third of our undergraduate participants were minority, we were able to bring a peer example of environmental concern, community awareness and undergraduate success to a number of schools by sending graduates back to their own high schools, or back to their own communities.

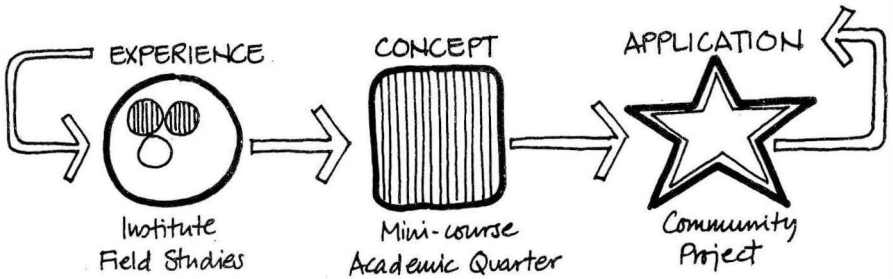


Figure 2 Linkages in the Project

UCLA "Themes in Urban Environmental Education." The structure for these mini-courses and effective interaction in the classrooms was given in part by a three-quarter follow-up course given in the UCLA Department of Geography. This course, "Themes in Urban Environmental Education," brought the UCLA participants together once a week. This gave us a forum for continued reading and discussion in the nature of the urban environment. It also provided a critical opportunity to talk about classroom and city experiences. Inasmuch as the goal of utilizing local landscape and community human resources was underscored in all facets of the Project, these sessions became charged with the responses of UCLA undergraduates to the city of Los Angeles. Students who had never experienced southcentral Los Angeles gained a new and vital sense of that part of the city and its population. Minority students at UCLA who had been outsiders to so many university groups suddenly began to speak as authorities when Anglos from Canoga Park or Woodland Hills asked questions about the minority communities of Audubon Junior High School or South Gate, California. A great deal of energetic learning went on during those sessions--and they provided a provocative discomfort to students and faculty alike who had previously confined their college education to the classroom.

Community Projects. The end goal of the Project was to have the UCLA undergraduate, in conjunction with the Summer Institute teacher and his or her Urban Ecology Class, become jointly involved in some tangible landscape modification project. If some places in the inner-city could be changed in a positive manner through this particular union, then the message of power over at least some dimension of the Los Angeles landscape would be evident to all of the people who had been touched by this experiment in Geography. This would help to diminish the paradox of urban impotence. Some of the changes included the undertaking

of a bi-lingual Human Resources Directory, causing local Hispanic and Anglo students of Highland Park to explore the community around their school as they had not done before. In the very core of downtown Los Angeles, an Anglo student who had been president of a fraternity and had never really seen the inner-city before led a Hispanic class in the design and completion of an urban mural project that covered an end of their bungalow classroom. At Lincoln High School, a slide-tape presentation on the history of the now-Hispanic community of north Broadway was engineered, designed, written and narrated by the urban environmental geography class through the cooperative efforts of the Summer Institute teacher and his two UCLA students. The UCLA undergraduates had been born in Holland and Costa Rica; the teacher was a native Angeleno, and the class was nearly totally Hispanic. The slide-tape presentation that was created from this environmental effort so pleased the high school that it was featured at Open House and was later taken by the Principal to a district superintendants' meeting to illustrate the value of promoting community pride through class activities focused on the school neighborhood, geography and history.

Not all projects were successful. One UCLA student spent months attempting to organize a one-day campaign on environmental helath and innoculation in Compton, near Watts. Seventeen children came for the free shots. But this student, working with the Compton High School Urban Ecology class developed a unique sense of understanding about school neighborhoods and lines of communication between parents and the public schools.

In another case, a trio of undergraduates worked for the full school year to establish a vest pocket park in the Foshay Junior High School Area, just west of downtown Los Angeles. The effort took the three Anglo students through numerous interviews, community meetings, sidewalk surveys, classroom discussions and finally a meeting high in the Arco Towers, attempting to sell the Atlantic Richfield Oil Company on the concept of buying the land and helping to create the park. The school year ran out on the trio and its project, but considerable environmental learning had taken place at all junctures of this effort. At least positive encounters between UCLA undergraduate students, Foshay students and teachers, and residents of the school community had been stimulated by this effort at environmental change. Even the frustration that emerged from the project's ultimate discontinuance had a positive aspect in that the Foshay community realized how well-organized community support for a park has to

before land can be secured and vacant space can be transformed into recreational space. At least the experience highlighted the essential--and manageable--processes that must be engineered before such a landscape change could come about.

The reason that so much detail has been given here to the elaboration of the components and isolated experiences in this first section is that the Project's

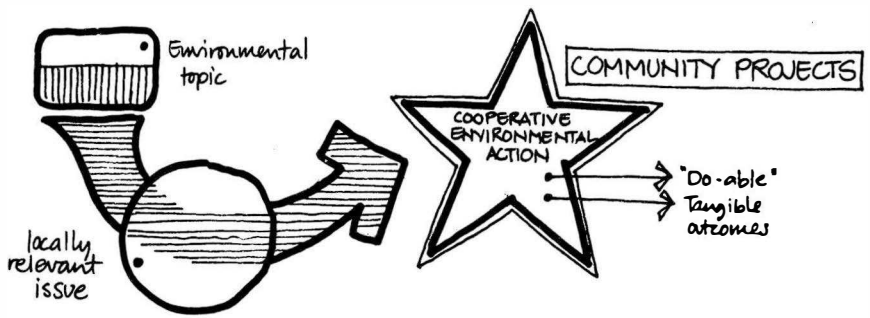


Figure 3 The Role of the Community Projects

venue was broad. In attempting to link research and teaching components of the university with the public school personnel and their local communities, common strands of civic and environmental interest were realized and stimulated where none had been before. Faculty and professionals, for example, were called in by the Los Angeles Unified School District to offer a model for urban environmental education and community research in support of new integration efforts. In sending students off campus to experience and evaluate environmental realities of communities that had existed before only in the vaguest of terms for many of our undergraduates, learning situations were created that were both exciting and alarming. The need to establish understanding of that potential for opportunity as well as the possibility for frustration is critical as we proceeded to our consideration of the effectiveness of this experiment.

II. *The Effectiveness of the Project*

Has there been a reduction in the students' fear of failing in the city?

To know that, it is necessary to recall the specific goals that we defined for ourselves at the outset of this effort at innovation in experiential education. They were:

a. Provide an experimental academic program that would stimulate cooperation between UCLA faculty, students, and Los Angeles teachers and students;

b. Expand concepts of the urban ecosystem and environmental education beyond the university classroom and into the learning field of the city itself;

c. Demonstrate the capacity that interested citizens of virtually any age possess for having impact on the shaping of the urban environment; and

d. Promote modification of the urban environment through the attainment of a, b, and c above.

In addition, there was an implicit interest in using the Project to illustrate the ways in which the city of Los Angeles could be effectively utilized as an academic laboratory for classes in the Geography and Social Sciences curriculum. It was hoped that success in this component would stimulate our colleagues in other social science disciplines to forge additional creative and cooperative links between our university and the community that we are mandated to serve.

Let us deal with each of those goals and their attainment in turn.

The Cooperative Link Between UCLA and the Los Angeles Community

There were both practical and philosophical reasons for the wish to link UCLA more actively with its metropolitan surroundings. Inasmuch as most of our student majors seek employment in this area, there are obvious benefits in providing them with more intimate exposure to the diversity and opportunity that Los Angeles as a city represents. Although the Project has included majors from more than a dozen departments, we wanted to have Geography play some institutional role in the establishment of a greater collaboration between campus and civic arenas. Because the field concept is so integral to our discipline, movement out into the community and educational frameworks of all parts of the metropolitan area came as a logical component in our design. The map (Figure 4) shows the locations of the schools from which we have gotten our teachers for training in the summer Institutes, and to which we sent our undergraduates after completion of their summer training.

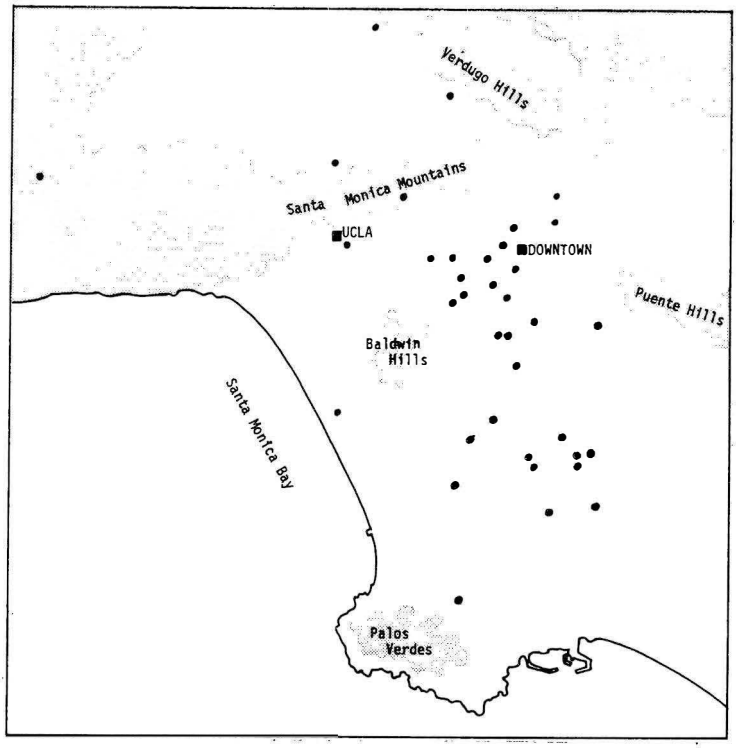


Figure 4 Sketch map of Participating Los Angeles City Schools, 1977-1980

The success of this union may be shown in part by excerpts from letters written by teachers and students who were involved in the UCLA Urban Environmental Education Project. Ms. Jane Hite, a fourth grade teacher from Graham Elementary School in southcentral Los Angeles, comments below on one of the outcomes of working with the Project and three UCLA undergraduates.

> The fourth graders have mastered, utilized, and illustrated the meanings of 16 environmental terms. They have drawn beautiful illustrations of these terms, mapped their "beats," enlarged a community map and located their homes, created a collage of the meaning of "vegetation" and written poems about trees. The previously studied terminology came alive when the children went out on community expeditions to investigate the industrial and commercial areas of Graham community, trashy, overgrown vacant lots, graffiti on walls, and the architectural styles of single resident housing in the area. The students gathered and charted population census data, and held a mock city council election, dividing their community into four districts, and then wrote a General Plan for Graham community.[3]

These "expeditions" were led by UCLA undergraduates who had familiarized themselves with the Graham landscape on field trips as part of our summer training institute, and through their own wish to understand the neighborhood that they were going to be teaching in and learning from for their year-long involvement with the Project. The outcome of this undergraduate commitment in conjunction with Ms. Hite's own good teaching and class participation led to a linkage that was ideal in terms of the goals of our Project. Going on from Ms. Hite's letter

> As a result of student enthusiasm and interest, a group of parents have joined the efforts of the students and their respective teachers to form a corporation called Cultural and Urban Environmental Studies, Incorporated Cues, Inc.). Our purpose in forming a nonprofit group is to actively involve more parents each year in carrying out community projects and activities, and to provide field study tours for the children who are recipients of our services.
>
> The goals of the corporation are: 1. Study of urban land use: 2. study of natural, built and political environments, which will include travel; 3. to broaden awareness of one's ability to affect the environment; 4. to develop appreciation of other natural, built and social environments; and 5. to enrich the classroom social studies curriculum.[4]

CUES, Inc., was so effective in the marshaling of community interest and support that Ms. Hite's class, its UCLA undergraduates and local people were able to raise a fund large enough to take the class and some parents to Sacramento, California so that the students could talk with legislators about environmental legislation. In this particular experience, then, several of our undergraduates who had never been to southcentral Los Angeles before the Project were able to develop a mini-course on political processes and associated environmental impacts, educate a classroom of minority fourth graders in some of the phenomena that relate to the process of civic involvement, and then create an experience that saw teachers, parents, and legislators all interact around the theme of community awareness and environmental education. The impact of this particular success reached all the way to the state legislature.

Additional examples of effective linkages being established between our campus and the broader urban setting include the sixth grade city planning commission roleplaying in which students had to state and defend specific development strategies for their community in Sunland in the San Fernando Valley; the establishment of an Ecology Club in Fremont High School in which a Fremont graduate--now at UCLA--was able to return to her own school as an effective role model, instructing

the student members not only in the basics of environmental literacy, but in the importance of learning discipline in order to be able to stand a chance to succeed at UCLA or other demanding schools; and the organization of a class project at Audubon Junior High School that saw a class take the first steps in the design and production of a booklet promoting the benefits of being included in--responsive to--the 1980 census process.

This was initiated after a field trip to the Census Office and interaction with local, community census materials prepared by the Project.

In the thirty-seven schools that have participated in the Project, all have had some experiences that have made them and their students more aware of the social involvement UCLA does feel with Los Angeles. At the same time, each of the eighty-four undergraduates who had enrolled in the Summer Institutes and the classes in the Department of Geography that are part of the Project has explored new landscapes and new social situations in our metropolitan area.

The essence of this interaction is suggested by this excerpt from a UCLA undergraduate's journal of his experience in the Project. He had grown up in a wealthy area of west Los Angeles.

> This has been an experience that has been well worth my time. My perceptions of Southcentral Los Angeles have changed completely. That is due to the fact that at one point I was looking at the area from an ignorant standpoint and now I look at it with a sense of familiarity. It is unfortunate that other people can't experience the other communities in their city. It is something that I believe is important, for the survival of mankind...I would just like to repeat that this has been a tremendous experience for me.[5]

Expand Environmental Education Beyond the Campus and into the City Itself

Learning from the landscape is fundamental to geography. One of the requisite skills in the discipline is the skill of observation. What are the components of the scene that you find in a walk to a theater; a drive to the Social Security Office in the Federal Building; in a stroll from school to the neighborhood Ma and Pa store? If the morphology of these mundane and local vistas can be comprehended, then two ends are served: The observer better understands the forces that shape his or her own environment, and, in so doing, personal environmental preferences and perceptions are appreciated. In a glib sense, the concept of "Know Thy Landscape; Know Thyself" was operative in the design of the UCLA Environmental Education Project. If we could take students (at any age) out into the urban scene and have them view it as a setting for the study of natural

built and social environments, then we could promote more interested learning in our classrooms. As this readership especially knows, discussions of, for example, a Central Business District (CBD) take on new and productive vitality after a class has walked near Skid Row or open market in any urban downtown.

In pursuit of our Project's goal of knowing Los Angeles, the Summer Institutes had one quarter of their time given over to field study. Each of the schools that we worked with promoted additional community walks with associated interviewing, survey taking, landscape analysis, sketch mapping, and exploration. Classes in some schools went up into the Santa Monica Mountains to study the contrasts between natural vegetation and the plants that were present in their school community. Others went into the local neighborhoods and did surveys of vacant lots, searching for clues to the past history of land use in these areas now abandoned.

One UCLA undergraduate's letter recalling a project done by Audubon Junior High School in the clearing of a vacant lot next to the historic old Dunbar Hotel--the first Black hotel in Los Angeles--on Central Avenue points out another use of the primary experiences gained only in the field and not in the classroom.

> When the Environmental Education Project first began I had some reservations about being a participant. I gave the program a chance and I was thoroughly impressed by the faculty and students' skills and deep motivation.
>
> I remember a warm day on Central Avenue in the Los Angeles inner-city. My UCLA professor was with a group of students holding a shovel, somewhat drenched with perspiration and hoeing weeds.[6]

That energy and optimism derived in part from working with the reality of people in their own landscape. While the messages in that experience were far from unanimous in their positive nature, the participants in the Project found again and again that when genuine interest was shown in understanding how a neighborhood functioned; how it was built, changed, rebuilt and lived in, people became responsive to the process of analysis. We found "teachers" in our fourth graders who knew secret histories of empty houses or vacant lots; in senior citizens who had witnessed wholesale change of their neighborhood in just two decades; and in store owners who generally welcomed interviews from high schoolers, UCLA undergraduates, and school children alike if they were asked in reference to the owner's store and its relationship to the local community.

All of the theory of these lessons from the urban setting of Los Angeles is already contained in the texts of the students. Learning from the primary experience, however, seems to have given these elements of cultural geography a greater significance. One student, upon completion of a community walk, made this observation on the productive effects of field study with his students.

> I went home this day with a good feeling, of satisfaction. The students had learned more about their environment, even better, they are using their community as a tool for understanding the environment. They realize that there are problems in the community and many have ideas of how they could alleviate those problems...I think that a sense of place was experienced by many students today.[7]

Demonstrate the Capacity for Urbanites to Shape Environment

This is one of the most difficult components of the Project to assess. It would be very satisfying to be able to list block after block of modified landscape in association with smiling civic groups. But it would be somewhat inaccurate. Murals did get painted; Ecology Clubs did get formed and did organize campus clean-up campaigns; trees did get planted; vacant lots did get cleaned up...and in conjunction with all of these realizations of this particular goal, additional plans and stratagems were set in motion.

The real change in local landscapes, however, has proved to be tied in to a longer process than the one-year life of each UCLA undergraduate's involvement with the Project. For example, a UCLA student placed in Westchester High School spent most of her year attempting to gain access to land adjacent to the Los Angeles International airport for a class garden. Even with numerous interviews at LAX, at City Hall and with parents of her school students, she was not able to clear away restrictions before her year ran out and she had to leave for a summer abroad. Even with the park unrealized, however, we cannot say that there was not environmental learning. Everyone involved felt more optimistic about the possibilities of the environmental reality of such a garden.

In another project, our student at South Gate High School spent a full year attempting to gain adequate permits for access to a Department of Water and Power right-or-way so that his class of students could do an environmental analysis of the land under the power lines, and plant a garden. In the final stages, it became apparent that the school district was going to disallow the plan because of potential liability responsibilities. There was, then no garden

but there was greatly enhanced understanding of the path to authority and, consequently, to change. Frustration was also found on this path, but there is a lesson in that as well. Although the Project would have preferred simple success, it did add an instructive realism to the experience.

The strength of these efforts and their learning and civic benefit is shown in the excerpt from a letter by one of the Project undergraduates working at Loren Miller Elementary School in inner-city Los Angeles.

> The Project provides a mechanism by which UCLA can extend its arms into the community, potentially impacting positively in its community relations. Increased awareness of the environment, how it impacts on people and how people impact on it, is attained. To achieve this level of understanding and then share it further through teaching, for example, is very important to the future of our cities, if they are to remain habitable.[8]

The Promotion of Urban Environmental Modification Through the Combined Aspects of the Project: Changes in Landscape and Attitudes.

A writer for the Los Angeles Times, Art Seidenbaum, saw the Project and its associated activities as "real digs in the real field." In this excerpt from his "New Roots at Manual Arts" he illustrates the scope of environmental education as he perceived it.

> The underside of inner-city, down where the bedrock problems are, sprouts new stems and buds and hopes. There's a heap of earth renewal happening at Manual Arts High School, working on the hard groung in this city...Mrs. Barrie Gyllenswan was talking about the big bed of osteospermum (African daisies) to be planted at the southern border of the campus for the big spring fair April 29. Mrs. Gyllenswan leads an urban environmental education class that combines downtown tours, Los Angeles problems research and real digs in the real field. She and UCLA student Barbara Azeka combined forces at Manual after teaming in an environmental program at the Westwood campus last summer, a program designed by Chris Salter and William Lloyd to help teachers reroot inner city awareness.[9]

Another journalist, in the San Fernando Valley News, saw the Project as bringing together forces to "fight community blight."

> UCLA has declared war on community blight, enlisting the aid of hundreds of junior and high school students from throughout the Greater Los Angeles area and San Fernando Valley. More properly known as the UCLA Urban Environmental Education Project, the program is designed to enable students to observe problems first hand. Classroom study will be supplemented with the actual planning and carrying out of improvements in their own neighborhoods.[10]

In our own assessment, we feel that we initiated civic awareness and pointed out the process of environmental change in all of our schools, while the actual modifications vary widely from school to school and community to community. Attitudes, however, were changed and charting that process was one of the positive aspects of the Project. One of the most difficult aspects of a teaching life is the determination of what impact a specific class, experience, or professor has had on a student or a class. We can determine overall class response by comparative examinations across time, but that tells us little about individual students and whether or not they benefitted from the situations we have created for them on campus. In one sense, we have to wait a decade and hope that one out of five hundred returns to say something about successful role modeling or provocative lines of thought, or creative assignments. The wait is long indeed, and the fruits of such a wait are never without ambiguity.

As we have attempted to chronicle this Project--not for purposes of just this article, but because of our own needs to know if the time commitment made has been justified academically and experientally--we have come up with formal and informal instruments of assessment. We have been tapping these resources in the writing of I and II above, and will include the materials in our records. The one comment we are inclined to introduce into the paper proper came from radio reporter Christopher Ames of KNX-FM, a popular CBS affiliate in Los Angeles. At the outset of a half-hour interview Ames gave me on "Inside Out," he opened with the comment:

> As unlikely as it may seem, my guest tonight is a professor of geography at UCLA who believes that some teaching should be done in the city as well as the classroom. What we are going to try to find out is why a professor or a student would leave the security of the campus to try to right environmental wrongs in the city of Los Angeles...

The fact that the Project can look back on the reality of 84 undergraduates, 47 teachers, 37 schools and nearly 2,000 school children engaging in urban exploration and education, guided by UCLA in its concern for demanding education and a role in the development of Los Angeles is refreshing evidence that potentially effective experiential education has been launched in this experiment.

III. *The Institutionalization of the Project into the University Curriculum: Is There Life After the Pioneering Effort?*

The combination of external grants, broad community support, and energetic undergraduate response all led to a sensation of easy initiation of the Project in

its first years. Since that point, however, the grants have terminated, the expansion of the number of students involved has made administration of the Project a significant chore, and the elaboration of friendships and responsibilities in each of the school situations had forced a decision to be made about the permanent nature of this outreach effort at urban environmental and experiential education. In the Fall of 1979, it was decided that there would not be any further institutes, nor would additional schools be brought into the network of primary and secondary school sites that UCLA was servicing in the Project. The schools that had been the most supportive of the placement and the community analysis mini-courses of the university undergraduates were made part of an established community of concern between the campus and the public school system.

In our curriculum at the university level, I have introduced a new course in cultural geography, "Reading the Cultural Landscape." This highly visual course is an effort to give method to the way in which mudane and pedestrian landscapes can be observed and analyzed. One component of the course requirements is the reading of a landscape of some Los Angeles community both through the field analysis of its natural, built and social environment, and through research on its community development as obtained from primary sources on campus and in the community itself. This study in what I call "intimate sensing" has now institutionalized a considerable portion of the field work, study in local sources and interaction with street people and civic leaders. There is a lesson in such an approach for both the university student and the non-university personnel who have too long felt that our students lacked adequate concern for the city that surrounds their university campus in its splendid isolation and insulation.

From this class, it is easy to select undergraduates who might benefit from and welcome the opportunity to formalize such community analysis by working in one of our Project network schools. Teachers are still very interested in such students and the training in the Reading the Cultural Landscape class gives them adequate preparation for observation and class participation in accommodating schools. Such a mechanism has scaled down the size of the experiment so that it can be dealt with as part of a regular academic class and that, in all probability, is the key to appropriate institutionalization of this effort to increase a university student's sense of creative participation in the process of seeing and shaping the nature of city space.

IV. *Conclusions and the Transferability of this Project to Other Schools and Other Cities*

The UCLA Environmental Education Project began with a simple goal:

> Create an academic program that would bond environmental theory with environmental practice and have this education occur in our city as well as on our campus.

Toward that end, the Department of Geography, in conjunction with the Office of Experimental Educational Programs of UCLA has devised a program that ran three years, creating a vehicle for instruction in environmental concepts on campus and experience in making such concepts relate to community awareness and analysis in inner-city Los Angeles. Undergraduates from more than a dozen majors linked with teachers and students from fourth to twelfth grade in the city's public schools to promote the essential urban process of environmental knowing and doing.

Outcomes range from flashy murals to quiet concern; from newly found pride in community to newly expressed anger at student indifference to community; from UCLA undergraduates lauding the variety of Los Angeles landscapes, to the same undergraduates bemoaning the fact that they lived twenty years in our city before seeing the downtown in any knowledgeable way. We like to think of the impact from such a varied experiment to be positive and provocative. These two quotes that seem ot reflect such an assessment of the Project by people who have participated in it. The first is from a teacher in the Project; the second from a UCLA undergraduate.

> As a result of the UCLA Urban Environmental Education Project, the students in my class and their parents developed a really positive feeling about the worth of group effort in the community--the local school community, the university community, and the city.[11]

The second quote comes from a student who has lived his last six years in south-central Los Angeles.

> Today I truly appreciate the environment in which I live. The ghettos are no longer the disgusting places which I previously tried to avoid and ignore. I now have a more analytical attitude toward them. I channel my energies and ideas into discovering the possible causes of such degradation and what I can do to help revitalize these areas.[12]

In outcomes such as these, the gist of the response does not derive from a particularly Los Angeles reference. The learning has not been city-specific. The experiences that have led to these reactions (and we have accumulated

many like them as participants have commented on their involvement during the Project's three years) are the products of two necessary conditions:

1. There must be an intellectual commitment to the belief that lessons can be learned from the landscape in any setting. The mosaic of the natural, built and social environment is visible for all to observe whether from atop a 60 story building or on the stoop of a Ma and Pa store. Observation, process speculation, and field analysis operate at all scales.[16]

2. There must be willingness on the partof at least one faculty member to forsake the haven of the university campus in order to create initial linkages between community and college. This can take shape through cooperation between public or private schools, service organizations, governmental agencies or private firms, but it does require faculty commitment to the union between these various sources of urban design, urban utility and urban frustration. The beauty in playing this role is that the signals you get from all sides largely welcome the articulation of university interest in the environment and the community in which its campus is nested.

The lessons, then, that can be derived from this experiment in the amelioration of student anxiety over urban impotence are several. To the students can come a sense of understanding of the landscape and the dynamic forces that shape it in their local community. To the school and community populations who are witness to an "entrepreneural" role of the university undergraduate who is attempting to spark community awareness, there comes a sign of immediate university concern for pre-collegiate school populations and their environment.

And to the faculty who undertake the creation of this network of varied peoples with diverse perspectives and personal goals, there comes the realization that cities grow and change, prosper and suffer because of the skills, power and ideas of just such diverse populations. Such understanding can add significant dimensions of reality to any instruction in the nature of the design, creation, maintenance and utility of cultural landscape. It is experiential education in its most useful and stimulating form.

Acknowledgements

I wish to thank David Alpaugh, Lucy Blackmar, Melinda Meade, William Lloyd, Mark Lipschutz and Chloe Riggs for generous and creative assistance during the life of the UCLA Urban Environmental Education Project. Without their participation and insight, this three year experiment would never have gotten past the initial field trip and coffee at the cafe in Southcentral Los Angeles. Also, a special thanks to David Alpaugh for the graphics in the article.

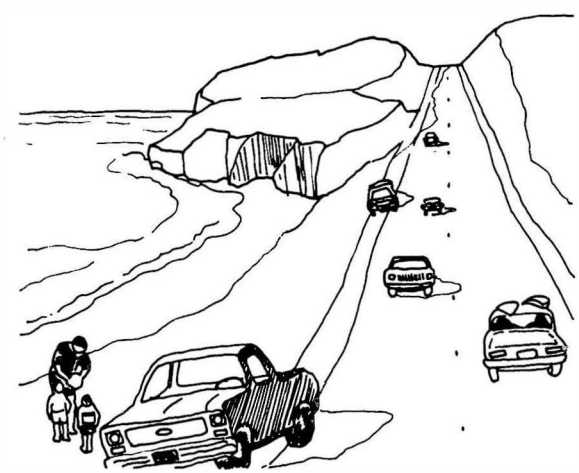
NOTES

1. The initial goal of the Project was to design a program that would speak both to Los Angeles and to additional urban centers. As the Institute and curricular materials took shape, however, it was seen that there was merit in first creating a mechanism that had a strong chance of success in our home city. The first two items below are focused on Los Angeles, while the subsequent references are to useful efforts by other authors that deal with cities in general. Salter, Christopher et al, Scoring Los Angeles Landscapes: Environmental Education in an Urban Setting, (Los Angeles, U.C.L.A. Urban Environmental Education Project, 1978). Salter, Christopher L., "New Views of Space: The Los Angeleno Use of Landscape as Therapy," South Dakota Review, Volume 18, No. 1-2 (Spring/Summer, 1981), pp. 68-81. Alanen, Arnold R., "Form, Function, and the Vernacular Landscape: A Geographic Perspective," CELA Forum, Volume 1, No. 1 (Spring 1980), pp. 2-7; Clay, Grady, Close-up: How to Read the American City. (New York: Praeger, 1973); Knep, Edward C., "Theoretical Perspectives on Community Process and Form," The Social Science Journal, Volume 13, No. 2 (April, 1976) pp. 103-118.

2. A useful guidebook for the blending of theory and field practice is Farbstein, Jay and Min Kantrowitz, People in Places: Experiencing, Using and Changing the Built Environment, (Englewood Cliffs, New Jersey, Prentice-Hall, 1978). A text dealing with the same problem of having the city serve as classroom is George, Carl J. and Daniel McKinley, Urban Ecology, In Search of an Asphalt Rose, (New York: McGraw-Hill, 1974).

3. All of the quotations are taken from the Final Report, UCLA Urban Environmental Education Project, Department of Geography, UCLA, Fall 1979. The Hite quote is in Final Report, Appendix B, p. 25.

4. Final Report, Appendix B., pp. 25-26.
5. Op. Cit., pp. 27-78.
6. Op. Cit., p. 19.
7. Final Report, Appendix C., p. 5.
8. Final Report, Appendix B., p. 21.
9. Seidenbaum, Art, "New Roots at Manual Arts," Los Angeles Times, April 21, 1978, p. 14.
10. "UCLA Fights Community Blight," Valley News, August 4, 1977, p. 18.
11. Final Report, Appendix B., p. 25.
12. Op. Cit., p. 3.



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BICENTENNIAL LOS ANGELES: COMMENTS ON THE METROPOLIS AND PERTINENT LITERATURE

*David W. Lantis**

On September 4, 1981 Los Angeles, the nation's third largest city, celebrated its 200th birthday. In the past several years a considerable volume of literature about the city and its environs has been published.

Background

When I began teaching a California course in 1950, geographically-related materials about Los Angeles and the surrounding area were somewhat limited.[1] Anton Wagner's Los Angeles, an early-1930's German dissertation had been published but there was no English translation.[2] The volume on Los Angeles in the American Guide Series, especially Part III, a series of seven tours, was helpful.[3] Popular works, such as those of McWilliams[4] and Robinson,[5] plus the efforts of such historians as Dumke[6] and Cleland[7] and planner Mel Scott[8] were useful. A few geographers, principally Clifford Zierer, Ruth Baugh and Hallock Raup, had written professional articles about the Los Angeles area. Yet much of the material on Los Angeles in my class resulted from field reconnaissance, involving many field trips with students (usually World War II veterans knowledgeable about their own communities), scores of interviews,[9] considerable walking and some thousands of miles driving different routes. Finally, after three years, I had gained sufficient confidence to address an audience of peers.[10] That paper was followed subsequently by a booklet,[11] and then a Focus article.[12]

Beginning in the 1940's a series of master's theses in geography were prepared at U.C.L.A. and some years later at some of the regional universities, particularly California State Universities, Northridge and Los Angeles. Too often these were neither published nor abstracted as papers at meetings. Thus

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the only way they could be used was through campus library perusal or interlibrary loan. An occasional dissertation was written on the area; one that I found helpful early dealt with the San Fernando Valley.[13]

As the number of professional geographers in metropolitan Los Angeles increased, additional work was undertaken on the conurbation. Especially appreciated was the work of Richard D. Preston between 1964 and 1972 and that of Robert Durrenberger over a longer period of time.[15] Their relocation in other states represented a real loss.

Mostly Popular Literature--Chiefly Historical

Most of the recent books about the metropolis take a historic approach. It is appropriate that part of the Los Angeles bicentennial literature should be Art Seidenbaum's pictorial extravaganza, authored by the book editor of the Los Angeles Times.[16] Each of the city's 200 years is represented by an eye-catching photograph by John Malmin with an accompanying commentary. For 1980 there is a picture of the sun setting into a smogbank; the prose poses a series of questions, such as "When and where will the next major earthquake shake?" (p. 320). Less sensuous photographically but more valuable to the geographer is a volume of aerial photographs by Cameron; it is already a collector's item.[17]

A work by David Lavender is one of a series entitled The American Portrait Series (other include books about San Diego and San Jose) which are subsidized by local merchants and industrialists.[18] When I first skimmed the book I was disappointed. Yet the volume has much to recommend it, including a well-selected consultant list (without a single geographer). The photographic coverage, both black and white and color, it commendable. Numerous boxed-in topics concern such diverse things as The Harbor, The Plaza and Rancho San Pedro. There are many photographs with captions about individuals. The final chapter, "Ferment" (pp. 141-165) is lengthier and covers a broader range of contemporary thoughts than do most of the history-oriented volumes. I was interested in the vignettes about the 50 sponsoring organizations (pp. 175-231). While there is no bibliography, this is not too serious an omission, since there are bibliographies in other works.

Henstell's history too is less showy than the Seidenbuam volume.[19] For example most of the photographs are in black and white rather than color. The

author considers Los Angeles by periods rather than individual years. In essence his book is a series of well-chosen photographs with lengthy comments. Like the Seidenbaum opus it is disappointing as regards the contemporary city. The final chapter, "Modern Mecca" (pp. 207-216) is well illustrated but weak on analysis of the metropolis today. The bibliography cites better-known popular works.

The latest contribution by Jack Smith, much-enjoyed Los Angeles Times essayist, is an assemblage of 65 of his newspaper columns.[20] Each selection covers a different topic, including people (such as author Norman Mailer, muralist Leo Politi and actress Joan Crawford), buildings (including the Biltmore, Rosslyn and Baltimore hotels), places (including Catalina Island, the central district and Hollywood Cemetery) and events. Obviously Smith, like this reviewer, loves Los Angeles. The book provides a feel for the city that one does not find elsewhere.

Geographers will find the bicentennial volume of California History one of the more worthwhile volumes on the city.[21] Compiled by the former editor of Westways magazine, its principal authors include John Caughey, Leonard Pitt, John D. Weaver and Richard Lillard. There are vignettes by such well-known historians as T. H. Watkins and W. H. Hutchinson. Almost every page includes a marginal quotation from prominent writers from Fray Crespi to Carey McWilliams and Neil Morgan. While much of the material represents reworking of familiar history, it is well presented. Probably most valuable to geographers is the contemporary scene as described by native son Richard Lillard. This section could qualify as an additional chapter in his widely-praised Eden in Jeopardy (Knopf, 1966). Lillard writes well (he is a professor of English!) and with long-time knowledge of the subject. (Many will recall that Lillard was the luncheon speaker when CCGE met at Los Angeles City College, May 6, 1967.)

Weaver has reworked his 1973 history of Los Angeles,[22] with a new final chapter and another title.[23] He has had much experience with popular writing and uses words cleverly, reflected in the opening sentence, "Angelinos, as all the world knows, are conceived on freeway off-ramps..." (p. 9). While the book affords impressions of the highlights of the past two hundred years, it certainly is not a very complete history. For recent decades the author relied considerably upon ideas in widely-read sources, especially the Los Angeles Times. And the reader who seeks a comprehensive view of Los Angeles today will not find it in the final chapter, "Present Indicative, 1970-1980" (pp. 177-199).

Unlike a reviewer for New West I was unable to obtain an advance copy of a volume on Los Angeles freeways. From the published critique it is assumedly a worthy addition to the literature about a much-discussed Los Angeles phenomenon.[24]

Popular Magazines

A sampling of articles listed in the Readers Guide, 1979 to 1981, provides clues to transitions in metropolitan Los Angeles. For example, evidence of "Mexicanization" of Los Angeles is reported in signs, foods and films, U.S. News and World Report, Jan. 29, 1977. Even in Anglo majority areas supermarkets now sell corn husks and other tamale ingredients. The article predicted that half of California's people may be Hispanic by 1990.

In a lengthy article in Audubon, Sept. 1980 Peter Steinhart discussed the declining level of Mono Lake and urged Angelenos to reduce their export of Mono water. This topic has appeared in a variety of magazines in the past few years.[25]

Newsweek, Sept. 24, 1979, observed that Los Angeles had suffered its worst smog attack in 24 years. The topic of smog appears again and again, of course.

Richard Reese, in the New Yorker, Dec. 24, 1979, discussed inflated house prices in metropolitan Los Angeles and noted that adding a Beverly Hills postbox will inflate the price of a house as much as $100,000. He adds that the housing spiral is a statewide problem. More recently Ben Stein in New West, Sept. 1981, optimistically proclaimed that the real estate "bubble has burst" in western Los Angeles.

R. W. Dellinger, Human Behavior, May 1979, quotes a physicist at University of California, Los Angeles, as claiming that jet noise near Los Angeles International Airport causes some strokes, as well as excessive drinking and nervous troubles. Aviation Week, March 31, 1980, hints at consideration of a new "oceanic" (i.e., offshore) airport.

Relative to downtown Los Angeles Architectural Record, Sept. 1980, noted plans for the California Center on Bunker Hill, construction of which will take eight years. It will include offices, residences and a hotel. Meanwhile Business Week, Sept. 17, 1979, indicated progress on a "people mover" in the central district and observed that there is only one (in Morgantown, W.V.) currently

in the United States. Black Enterprise, Feb. 1979, cited the difficulties of a black group in trying to acquire downtown business blocks. The same journal (and author, Faith Christmas) reported (March 1980) progress on a black-owned shopping center in Watts.

Magazines seem less likely than newspapers to discuss social problems such as crime. Yet Time, Aug. 24, 1981, identifies hundreds of teen-age gangs in Los Angeles County, responsible for nearly two-thirds of the "violent street crime." The article emphasizes troubles associated with Saturday night "cruising."

Geographers' Contributions

Steiner has provided us with the first book-length geography of Los Angeles since Anton Wagner.[26] A native Angeleno and former journal editor, Steiner is respected for his scholarship. Like many other treatises on the city, his work concerns the geographic rather than the political city. While his writing style is less glamourous than that of some historians and others, it is quite readable. The first half of the study is topical and coverage is quite satisfactory. Steiner considers successively location, physical environment (with problems), urban evolution, housing and people, employment and circulation (transit). As expected in a geographer's study, the maps are praiseworthy. I made a mental note to "steal" some, especially the one of neighborhood affluence (or lack of it) on page 52. Photographic coverage is good; unfortunately the publisher's paper dulls some of the pictures.

The reviewer has assumed for some years that Steiner is not a regional geographer. yet he anticipated more extensive regional discussion and description.[27] I was puzzled a bit by inclusion of the Oxnard Plain and exclusion fo the San Jacinto Basin. More detail, too, regarding larger communities was expected. Too many are merely named. I know how complex metropolitan Los Angeles is and admire Steiner's achievement.

Field Trip Guide 1981, fittingly edited by Logan for the national meeting in April 1981[28] is not restricted to the Los Angeles conurbation; places as distant as San Francisco and Flagstaff are included. Only nine of the 19 field trips relate directly to metropolitan Los Angeles. My favorite trip in the Logan opus is probably the self-guided tour of downtown Los Angeles (pre trip 1), partly a reflection of admiration for Salter, as well as fondness for an area I have walked around, through and across many times in the past 32

years. This readable tour gives a good "feel" for the central district. Plaudits are in order also for the little sketches. Logan allowed individual authors freedom yet one wishes that either Carthew or O'Leary (trips 6 and 13) had given more attention to the cultural geography of the Santa Monica Mountains (the physical environment is covered well). While it probably was not germain to the intent of the guidebook, I would have appreciated personally more information about the recently-created Santa Monica Mountains National Recreation Area. I became fascinated with house types of the Los Angeles area early in my residence there and sometimes thought of preparing an article on this subject. Thus I had personal interest in Brown's description of Greene and Greene houses in Pasadena (trip 15) and reminded myself to explore this locale again in the future.

This reviewer enjoyed the other Logan-edited tours too. In the 1950's I witnessed agriculture decline in many parts of the Los Angeles Lowlands. Thus I had particular interest in Reith's "Agricultural Responses to Urban Pressures in Southern California (trip 11). Beaton's "Tour of the Hollywood District" (trip 14) updates "what happened then" to the motion picture industry and cognate activities. I personally would have welcomed more insight into the total Hollywood District but doubtless Beaton satisfied the interests of visiting geographers. Falick's "The Twin Ports: Los Angeles and Long Beach" (trip 17) is quite brief yet provided visiting geographers an image of the waterfront. He shows the variation in development and contemporary activity of the twin ports. This would make a worthy topic for a monograph. Orme's "The Ventura Coast" (trip 10) and "Central Transverse Ranges and San Andreas Fault System" (trip 16) marginally relate to the conurbation but are well done. The latter tour especially is most helpful in terms of background setting.

This reviewer would encourage two authors in the Logan guidebook especially to expand their brief tours into longer works. McIntire's "L.A. by Freeway" (trip 7) could become a booklet that would complement the Los Angeles Geographical Society's Day Tours. Dagodag's "Ethnic-Racial Communities in Los Angeles" (trip 9) is a concise commentary of Little Tokyo, Boyle Heights and Watts. I would be delighted to see him expand this to an ethnic geography of metropolitan Los Angeles--including Little Saigon, of course.[29] In conclusion the geographers of the Los Angeles Lowlands provided a worthy tour guidebook. It could have been improved a bit if each trip had contained a map (eight of the 19 did) and bibliographic listings (five of the 19 trips did).

The second edition of Day Tours, like the first edition published in 1964, is a valuable source of geographic information about metropolitan Los Angeles.[30] Introductory sections of varying length and relevance set the stage for each of the 14 "journeys." The authors were chosen well; they are long-time residents of metropolitan Los Angeles, long familiar with the conurbation and its changing aspects. Spencer warrants praise for his editorial expertise. For a non-local geographer who has the time to take each of the trips, Day Tours provides a means of acquiring a good knowledge of the area in less than a week. A salute to Los Angeles Geographical Society for its achievement!

Perhaps no geographer has studied Los Angeles more diligently since 1950 than Howard Nelson. Thus it is fitting that he and a colleague at University of California, Los Angeles, W.A.V. Clark, should have written the article on Los Angeles in Contemporary Metropolitan America.[31] The two begin by identifying Los Angeles as the urban focus of a traditional 11-county southern California; subsequent discussion deals with the accepted Los Angeles Basin (or Lowlands). Although content is well selected there is an absence of areal correlation between various maps.

Nelson and Clark succinctly provide a good systematic review of Los Angeles. The introduction is enlivened by several humorous quotes. The physical setting summarizes the problems (water, floods, winds and fire, earth movements and earthquakes, sun and smog). In discussing the city and its satellites, concern is shown for community interrelations (including perception and quality), minorities (Hispanic, Black, Japanese and Jews). Economic opportunities (including finance, government, manufacturing and transport) are considered. In the conclusion the authors suggest that dissatisfaction with Los Angeles may result from differing physical and cultural environments, as contrasted with the eastern United States megalopolis.

The study just described differs considerably from Nelson's The Los Angeles Metropolis,[32] a good collection of readings with the author's comments. It deserves to be better known than it has been beyond the Los Angeles area.

Lamentably I did not see all of the available literature on Los Angeles.[33] For example I have not seen a study by an Italian which reviewer Zelinsky places with Reyner Banham's Los Angeles: The Architecture of Four Ecologies (The Penguin Press, 1971).[34]

Cultural Change

Recent influx from Latin American and Asia, coupled with a large black community, is creating a new cultural milieu rather unique among American cities

(although approximated with lesser numbers in San Francisco). This transition outdates some views expressed by Gastil.[35] Perhaps unknowingly Zelinsky in 1973 anticipated this with his statement, "The cultural personality of Southern California is decreasingly defined by its nineteenth century infancy; instead, there is a constant redefinition with the arrival of more strangers and formulation of new attitudes and cultural amenities . . ."[36]

One wonders how many United States geographers, assembled in Los Angeles in April 1981, were aware of what is happening ethnically to Los Angeles. Doubtless it will be some years before American geographers generally recognize the alteration. For example, Birdsall and Florin, in their regional geography of Anglo-America (1981), are mesmerized by earthquakes and water problems, but completely ignore the new ethnic patterns.[37]

Lantis, Steiner and Karinen, in a revision of their California text,[38] recognized ethnic changes in the San Gabriel Valley, Inland Valley and San Jacinto Basin (through field work in 1980) but elected to await the final 1980 census data and publication of the 1982 County and City Data Book before making modifications relative to the more complex Los Angeles Coastal Plain (anticipated fourth edition, 1984).

Increasingly the southern half of the political city, south of Wilshire Boulevard, is becoming a Hispanic-black-east Asian city, surrounded sometimes by more affluent Anglo areas.[39] Meanwhile the San Fernando Valley, traditionally Anglo and suburban, is becoming more of an ethnic hodgepodge.[40] Ethnic transitions, revealed so well in the 1980 census, have only become recognizable in the past few years.

Desbarets recently examined the small Thai community in Los Angeles.[41] She gives only limited space (pp. 314-318) to her title topic. Since there is no documentation of the Thais in Los Angeles, it is presumed (but not stated) that her information is based upon field research. Her article amplifies the richness of the topic (i.e., Asian residence in metropolitan Los Angeles) for additional investigations.

Allen, in his well documented article on the Filipinos in the United States,[42] indicates that the largest concentration is found in Los Angeles, on the western side of the central district. With the knowledge acquired from this study it is hoped that the author is making a more detailed study of this group in Los Angeles.

Griswold Del Castillo's study of the beginnings of the Los Angeles barrio[43] provides good background but the work scarcely touches on the Spanish-speaking

concentration in East Los Angeles. The author merely notes in "Conclusion" that it evolved after 1900. Essentially the book concerns the transition of the original pueblo site around the Plaza into a late 19th century barrio. One hopes that Del Castillo, a member of the Mexican-American Studies faculty at San Diego State University, will collaborate with one of Southern California's able geographers and update his investigation into the 1980's.

Conclusions

The literature concerning metropolitan Los Angeles has been much expanded over the past quarter century. Despite the plethora of recent books and the continuing publication of articles in popular magazines, a tremendous opportunity for geographic analysis remains within the Los Angeles conurbation. No other metropolitan center in United States has a comparable quantity of professional geographers available to investigate the local scene. This reviewer appreciates their past efforts[44] and anticipates the published research of his many colleagues in the Los Angeles area, plus their students, many of whom do not yet realize they will be studying Los Angeles and environs. The primary needs seem to be in human (especially cultural and economic, including industrial) geography. It is anticipated that eventually there will be separate regional studies, too, of Long Beach and other cities, Orange County, the San Fernando Valley, the San Gabriel Valley, the Inland Valley and the San Jacinto Basin. It is hoped they will be written in a sufficiently folksy style to have broad appeal to lay Angelenos and others--we geographers tend to write too much for ourselves. Fortunately the geographers of metropolitan Los Angeles have a newspaper of the caliber of the Los Angeles Times to help alert them to the changing landscape.

NOTES

1. There was no published geography of California. Initially I used California (New York: Hastings House, 1939), one of the American Guide Series, and then Aubrey Drury, California, An Intimate Guide (New York: Harper, 1947) as a "text." Helpful supplements included D. E. Willard, Adventures in Scenery, (Lancaster, PA: Cattell Press, 1942) and "Economic Survey of California and its Counties," 1950, from the California Blue Book, pp. 753-1064; plus the syllabi of Ruth Baugh and John Kesseli, used in their California classes at the University of California, Los Angeles and Berkeley, respectively. Then in 1957 P.F. Griffin and R. N. Young published California, The New Empire State, A Regional Geography, (San Francisco: Fearon).

2. Bibliographies Instit. Ag., Leipzig. Segments in English translation were available at the U.C.L.A. geography department. I have yet to see J. Garth, A Geographical Study of the Los Angeles Region of Southern California, doctoral dissertation, University of Edinburgh, 1931.

3. n.a.: Los Angeles [American Guide Series], (New York: Hastings House)

4. Carey McWilliams, Southern California Country, (New York: Duell, Sloan, and Pearce, 1946).

5. W. W. Robinson, Ranchos Become Cities, (Pasadena: San Pasqual, 1939). Robinson also wrote a series of booklets dealing with portions of the Los Angeles Lowlands.

6. G. Dumke, The Boom of the Eighties in Southern California, (San Marino: Huntington Library, 1944).

7. R. G. Cleland, The Cattle on a Thousand Hills, (San Marino: Huntington Library, 1951).

8. Mel Scott, Metropolitan Los Angeles: One Community, (Los Angeles, Haynes Foundation, 1949).

9. On one occasion, after spending the day at the Los Angeles Harbor, I had a late afternoon appointment with the Harbormaster, a retired admiral. I was still relatively young, attired for field work. I had difficulty at first convincing him that I was a university professor.

10. "Los Angeles Lowlands of California: Rurban Oasis in Transition," (abstract), Annals, Association of American Geographers, vol. 43, 1953, pp. 180-181.

11. Los Angeles American Geographical Society "Know Your America Program," (New York: Doubleday, 1960).

12. D. W. Lantis and J. W. Reith, "Los Angeles," Focus, vol. XII, no. 9, May 1962.

13. G. R. Pappas, "The San Fernando Valley: A Socio-Geographic Study of a Modern Fringe Area," unpublished Ph.D. dissertation, University of Maryland, 1952.

14. Preston published six articles in The California Geographer (see the cumulative index to volumes I-XVII, edited by D. G. Holtgrieve and D. S. Peetz. See also his "Recent Changes in the Size and Form of the Southern California Metropolis," pp. 83-144 in D. W. Lantis, editor, California: 1970, Problems and Prospects, opening session papers, annual meeting, Association of American Geographers, San Francisco, 1970.

15. Much of Durrenberger's work applied to California generally. Recognized particularly have been his California: Patterns on the Land, 5th Ed., (Palo Alto: Mayfield, 1976) jointly edited with R. B. Johnson, and California: Its People, Its Problems, Its Prospects, (Palo Alto: National Books, 1971), a repring of 20 articles edited by Durrenberger.

16. Art Seidenbaum and John Malmin, Los Angeles 200, (New York: Abrams, 1980).

17. Robert Cameron, Above Los Angeles, (San Francisco: Cameron, 1976).

18. David Lavender, Los Angeles 200, (Tulsa: Continental Heritage, 1980).

19. Bruce Henstell, Los Angeles--An Illustrated History, (New York: Knopf, 1980).

20. Jack Smith, Jack Smith's L.A., (New York: McGraw-Hill, 1980).

21. L. L. Meyer (editor), Los Angeles, 1781-1981, special issue of California History, vol. LX, no. 1, spring 1981.

22. John D. Weaver, El Pueblo Grande, (Los Angeles: Ward Ritchie Press, 1973).

23. John D. Weaver, Los Angeles--The Enormous Village, 1781-1981, (Santa Barbara: Capra, 1980).

24. David Brodsly, L.A. Freeway: An Appreciative Essay, (Berkeley: University of California Press, 1981), reviewed by Jon Carroll in New West, vol. 6, no. 9, Sept. 1981, pp. 122-123.

25. A recent book, not seen by this reviewer, is A. Hoffman, Vision or Villainy: Origins of the Owens Valley-Los Angeles Water Controversey, (College Station: Texas A & M Univ. Press, 1981). See also Gordon Young, "The Troubled Waters of Mono Lake," National Geographic, Oct. 1981, pp. 504-525.

26. Rodney Steiner. Los Angeles, the Centrifugal City, (Dubuque, IA.: Kendall/Hunt, 1981).

27. Hopefully there will be a second edition. Steiner is urged to seek as collaborators some of the younger "experts" now active in metropolitan Los Angeles.

28. Richard D. Logan (Editor), Association of American Geographers Field Trip Guide 1981, Washington, D.C., 1981, 120pp.

29. Diane Swanbrow, "The Quiet Americans," California, Oct. 1981, vol. 6, no. 10, p. 118.

30. J. E. Spencer (Editor), Day Tours in and Around Los Angeles," (Palo Alto: Pacific Books, 1979).

31. H. J. Nelson and W.A.V. Clark, "The Los Angeles Metropolitan Experience," chapter 5, pp. 229-295 in J.S. Adams (Editor), Contemporary Metropolitan America, vol. 4, Twentieth Century Cities, (Cambridge, Mass: Ballinger, 1976).

32. H. J. Nelson, The Los Angeles Metropolis, Associated Students, University of California, Los Angeles, 5th edition, 1979, 293 pp. (mimeographed).

33. Editor Lockmann provided the reviewer with an article by Gloria Lothrop, a history professor at California State Polytechnic University, Pomona, and a member of the Los Angeles 200 executive committee, published in the Los Angeles Times , Sept. 6, 1981, which lists 65 books about Los Angeles! Not all of these are new. Unfortunately the submission date for this article had already passed and it would have taken additional weeks to months, in

the California backlands of Chico, to obtain some of these works. I particularly would have liked to have seen the following works: Brian Berger, Los Angeles 200 Years: Official Commcrative Book, Beautiful America Publishing Co.; D. L. Clark, Los Angeles: A City Apart: An Illustrated History, (Los Angeles: Windsor Publications, 1981); Bill Bradley: Commercial Los Angeles: 1925-47, (Los Angeles: Interurban Press, 1981); Brendan Gill and Derry Moore, The Dream Come True: Great Houses of Los Angeles, (New York: Lippincott and Crowell, 1980); Andrew Rolle, Jr., Los Angeles, (San Francisco: Boyd and Frazer Publishing Co., 1981); N. B. Stern (Editor), The Jews of Los Angeles: Urban Pioneers, (Los Angeles: Southern California Jewish Historical Society, 1980).

34. W. Zelinsky, review of La Citta Capitalista: Los Angeles, by G. Brino, Edizioni Medicea, Firenze, 1978, in The Professional Geographer, vol. 32, no. 2, May, 1980, pp. 261-262.

35. R. D. Castil, Cultural Regions of the United States, (Seattle: Univ. of Washington Press, 1975), pp. 258-261.

36. W. Zelinsky, The Cultural Geography of the United States, (New York: Prentice Hall, 1973), p. 135.

37. S. Birdsall and J. Florin, Regional Landscapes of the United States and Canada, 2nd Ed. (New York: Wiley, 1981), pp. 367-389.

38. Lantis et al., California, Land of Contrast, (Dubuque, IA: Kendall/Hunt Publishing Co., revised 3rd Ed., 1981), footnote, p. 112 and pp. 137-151.

39. L. Dembard, "L.A. Most Ghettoized in Southern California," Los Angeles Times, June 14, 1981.

40. Telephone conversation with Professor William Bowen of California State University, Northridge, April 6, 1981.

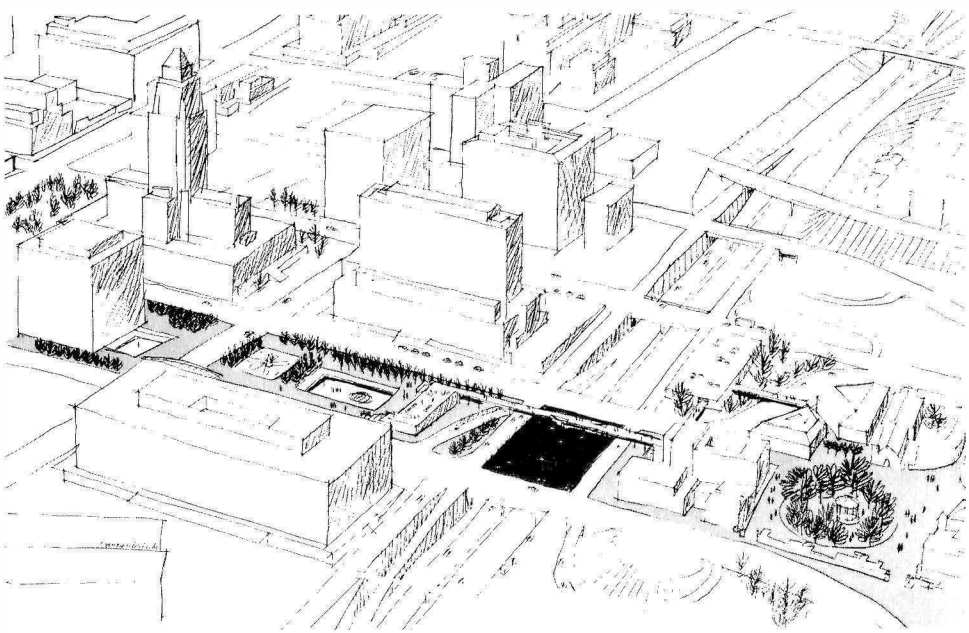
41. J. Desbarets, "Thai Migration to Los Angeles," Geographical Review, vol. 69, no. 3, July 1979, pp. 302-318.

42. J. P. Allen, "Recent Immigration from the Philippines and Filipino Communities in the United States," Geographical Review, vol. 67, no. April 1977, pp. 195-208.

43. R. Griswold del Castill, Los Angeles Barrio, 1950-1890, (Berkeley: Univ. of California Press, 1979)

44. Besides those previously noted, professional geographers in metropolitan Los Angeles who have recently or are currently doing research on the conurbation include Warren Blan, David Hornbeck, Crane Miller, Barbara Weightman, Richard Outwater, Gary Peters, Clem Padick, Richard Raskoff, and Ron Lockmann. There are probably a number of others whose activities are unfamiliar to me.

This invited paper is his first article in this publication. The author acknowledges editorial review by his colleagues, professors Bruce Bechtol and Arthur Karinen and by his wife Helen.



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WILLIAM P. BLAKE'S DESERT OF THE COLORADO RIVER

*Anna J. Lang**

Landscape transformation is almost synonymous with California. Although images of urban sprawl in the coastal basins spring to mind readily, changes in such areas as the Colorado Desert have been equally dramatic. Eighteenth and nineteenth century descriptions of this region leave vivid impressions of an arid and desolate land. During the twentieth century the desert wastes have yielded to irrigated commercial agriculture and urbanization. Many of you can attest to changes in this region now known as the Coachella and Imperial valleys. However, the intent of this paper is not a compilation of specific changes, but rather an examination of the prediction of this landscape transformation by an astute observer, William Phipps Blake.

In 1853 Lieutenant R. S. Williamson was ordered to explore for routes along which rail service could be extended from the Mississippi River to the southern California coast.[1] The geologist-mineralogist attached to Williamson's Pacific Railroad Survey team was twenty-seven year old, Yale-educated William P. Blake. Blake's servey observations, including maps, profiles, sketches, and water color plates, are collected in a hefty volume, which was published originally by the War Department as a part of the expedition's report and reprinted subsequently by a private publisher.[2]

The Role of the Colorado River as a Geomorphic Agent

Although the survey party spent less than a month (from mid-November to early December) trekking the uncharted wilderness that lay beyond San Gorgonio Pass, Blake was able to comprehend the essential features of the region's physical geography, including the dynamic role that the Colorado River played in shaping the landscape of the desert basin. Blake's observations and topographic

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measurements led him to the following conclusions.[3] In structural terms this desert region is the northern extremity of the Gulf of California and it was submerged during the late Tertiary period. The agent primarily responsible for blocking marine waters from this area was the Colorado River. The sediments discharged by the Colorado into the water-filled trough created a delta that grew southwestward from the vicinity of the present-day Yuma, Arizona. Upon reaching the Cocopah Mountains, the delta formed a barrier of sufficient elevation to cut off the the gulf from the region north of it. As the sea water evaporated the area became an arid lowland. The influence of the Colorado River on the desert, however, did not cease. On occasion floods or gradational instability in the delta diverted the Colorado from its gulfward course and sent its waters flowing into the desert basin. Each of these innundations created a lake that persisted until after the river again changed its course. The ultimate demise of these lakes accounts for the widespread occurence of fertile sediments that can provide the basis for large-scale agricultural development of the desert.

Lakes in the Desert Basin

It should be pointed out that blake formulated his ideas about these physiographic relationships in the absence of such twentieth century landscape clues as the Salton Sea. His first inkling of the region's dynamic physical history came three days after the wagon train entered the desert. At a site near present-day Indian Wells, Blake penned the following remarkable passage: (Fig. 1)

> The broad plain of the Desert was before us, reaching to the horizon. On the right, it was bounded by the high mountains which extended down to the plain in successive ridges, one beyond another, until blue outline could hardly be discerned in the distance.
>
> On turning around the point, I saw a discoloration of the rocks extending for a long distance on a horizontal line on the side of the mountains. On appraoching this, it was found that the white color was produced by a calcareous incrustation, extending over the whole surface, and into every cavity and crevice. This crust had evidently been deposited under water, and when seen at a distance of a few yards, its upper margin appeared to form a distinct line, which indicated the former level of the water undershich it was deposited. This water line...could be traced along the mountain sides following all the angles and sinuosities of the ridges for many miles--always preserving its horizontality--sometimes being high up above the plain, and again intersecting long and high slopes of gravel and sand; on such places a beach line could be traced. The evidences of of a former submergence were so vivid and conclusive that it became evident to everyone in the train that we were travelling in the dry bed of a former and extended sheet of water, probably an Ancient Lake or an extensive bay.[4]

Blake dubbed the ancient water body represented by the beachlines and travertine deposits Lake Cahuilla, after the native inhabitants.

That evening, when the survey party camped at a Cahuilla village, Blake inquired among the Indians and discovered that they possessed traditional knowledge of the ancient lake. Blake reported:[5]

> When questioned about the shore-line and water marks of the ancient lake, the chief gave an account of a tradition they have of great water (agua grande) which covered the whole valley and was filled with fine fish. There was also plenty of geese and ducks. Their fathers lived in the mountains and used to come down to the lake to fish and hunt. The water gradually subsided 'poco,' 'poco,' (little by little) and their villages were moved down from the mountains, into the valley it had left. They also said that the waters once returned very suddenly and overwhelmed many of their people and drove the rest back into the mountains.

In addition, the Cahuillas believed that the waters would return again.[6]

The observations Blake made and the data he compiled led him to conclude that the Cahuilla legend was credible. The barometric readings revealed the below sea level, basin-like character of the region, and he had seen water in New River, one of the Colorado's distributaries in the basin. Since flows from the Colorado could enter the basin via such distributary channels, Blake acknowledged that "the sudden floods of which they speak undoubtedly took place."[7] He also understood that once the inflow from the Colorado ceased the lake in the desert basin would evaporate in the face of "violent arid winds, pouring in from the surrounding deserts and over the mountains from the sea."[8] Blake felt that this was consistent with the Chauillas' contention that the lake waters receded little by little.

Evidence derived from recent archaeological excavations also lends some credence to the Cahuilla legend.[9] Sites around the shores of the ancient lake have yielded abundant remains of a variety of fish and waterfowl species. The lake's drying seems to have influenced population distribution as well as resource avaiability. Settlements shifted from the lake shore to the mountains and back again to the desert valley after mesquite groves became established on the former lakebed.

In addition, the notion that the waters could return suddenly has been borne out by subsequent events. At various times during the nineteenth century there were reports of water appearing abruptly in the desert basin.[10]

One of the more spectacular of these incidents occured in June, 1891.[11] On this occasion, water flowed steadily into the desert lowland from the southeast and created a salty lake some thirty to forty miles long, ten miles wide, and four to six feet deep. The sudden appearance of this lake in such close proximity to the Souhern Pacific Railroad tracks created quite a stir. Wild rumors circulated about the origin of the salty water. Prime among these was that sea water from the Gulf of California was seeping into the desert from some underground source. All of the rumors were dispelled, however, when a number of investigating parties navigated small boats from the flood-swollen Colorado River to the lake in the desert basin. The high salt content of the lake was not really a mystery. Salt from the basin's salina had dissolved in the river water.

This salina was not observed directly by Blake during the survey but

Figure 1
Travertine encrustation marks the high water line of ancient Lake Cahuilla on a spur of the Santa Rosa Mountains, Colorado Desert.

he noted that, "The Indians are accustomed to resort to it for salt, which they say is found in large quantities."[12] This feature apparently attracted distant users as well. Guinn reported that between 1815 and 1830 an annual "journada para sal" (journey for salt) was conducted from the pueblo of Los Angeles and nearby missions to this desert salt bed.[13] Blake tried to locate the dry salt lake "as nearly as possible" on his 1853 map entitled "Geological Map of the Country Between San Diego and the Colorado River California"[14] (Figure 2). It was on this map that Blake also christened the region the "Colorado Desert."

The Misunderstood "Colorado Desert"

Since its inception, the term "Colorado Desert" has suffered misunderstanding and misapplication. In his later years Blake sought to right this situation by explaining:[15]

> The name 'Colorado Desert' was given to this region by the writer in 1853. This was before the State of Colorado received its name. It was deemed most appropriate to connect the name of the Colorado River with the region, inasmuch as the desert owes its origin to the river by the deposition of alluvions and the displacement of sea-water.
> . . .The appelation may properly be confined to the regions reached by the deposition of the silt of the Colorado, whether in the form of deltas or at the bottom of ancient lakes. It should also include the bordering detrital slopes from the contiguous mountains. So restricted, the area is practically conterminous with the ancient beachlines and terraces of the lakes which occupied the valley.

Despite Blake's efforts at clarification, the designation "Colorado Desert" has continued to be misinterpreted even by exceedingly knowledgeable California geographers. For example, in a 1968 discussion Richard Logan wrote of the Sonoran Desert:[16]

> The California section is sometimes set off as a distinctive portion, to which the name "Colorado Desert' has unfortunately been affixed--unfortunately, in this writer's mind, since it has no relationship to the state of that name and the river of the same name merely skirts its eastern boundary.

Perhaps clarity and Blake's original intent could both be served if the term "Desert of the Colorado" were employed. Blake occasionally used this designation, as did LeConte in an article dated 1855 and Sykes on a 1907

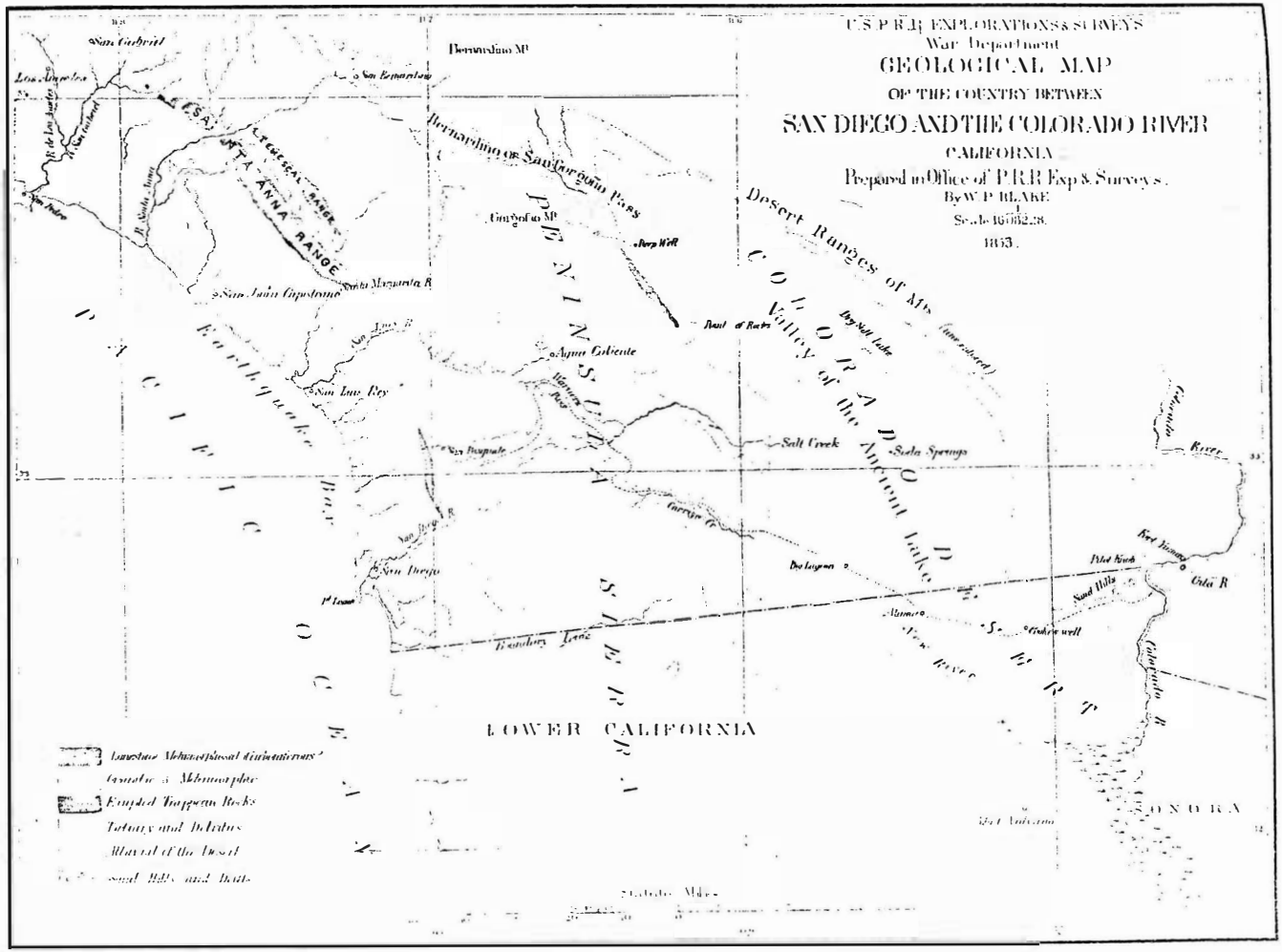

Figure 2. Blake's geological map christened the region the "Colorado Desert".

map of the newly formed Salton Sea.[17]

Notion of the Desert's Agricultural Potential

Blake's understanding of the role the Colorado River played in the evolution and dynamics of this desert region had implications that extended beyond place name identification. Blake used his insight to call attention to the region's agricultural potential. Afterall, few nineteenth century desert travelers would have shared Blake's vision that, "If a supply of water could be obtained for irrigation, it is probable that the greater part of the desert could be made to yield crops of almost any kind."[18]

Blake based his contention on the high quality of desert soil that derived from Colorado River alluvium, the luxuriance of the native vegetation on sites where adequate moisture was avaiable, and his knowledge and observations of the productivity of Indian agriculture along the Colorado River and in the desert basin.[19] In the latter instance, Blake reported that the desert Cahuillas produced fairly abundant crops of maize, beans, squash, barley, and melons from small irrigated patches of land.[20] An even earlier written account of these small gardens appears in a diary kept by Jose Maria Estudillo, a member of the Romero Expedition in the winter of 1823-24.[21] Estudillo noted that the Cahuillas had planted small patches of maize, pumpkins, melons, and watermelons. Although the Cahuillas employed a variety of techniques to exploit water from springs, wells, and intermittent washes, the scarcity of this resource imposed severe restrictions on the scale of their agricultural endeavors.[22]

Predicted Sources of Irrigation Water

In order to sustain large-scale agricultural development of the desert, irrigation water had to be avaiable in abundance. Blake believed that large quantities of water could be obtained from two sources. First, his assessment of the nature and tilt of the region's strata led him to conclude that artesian waters lay beneath the desert surface, and that "a copius supply" could be tapped by digging or boring.[23] Before the turn of the century this prediction had become a reality. The development of artesian waters initiated and sustained commercial agriculture in the Coachella Valley, which did not receive irrigation water from the Colorado River until the

Coachella Branch of the All America Canal was completed in 1948.[24]

The second source of irrigation water that Blake proposed was the Colorado River. He suggested that the delta's slope and distributary channels could form the basis of a gravity-flow system to send water into the basin. Blake wrote, "By deepening the channel of New River, or cutting a canal so low that the water of the Colorado would enter at all seasons of the year, a constant supply could be furnished to the interior portions of the Desert."[25] Blake was aware, however, of the danger inherent in such a diversion scheme. He noted, "It is, indeed, a serious question whether a canal would cause the overflow of a vast surface, and refill, to a certain extent, the dry valley of the Ancient Lake."[26] A half century later (1905-07) this prophecy was fulfilled dramatically when faulty irrigation works resulted in an accidental inundation of the desert creating the Salton Sea.[27]

Conclusion

William P. Blake's study of the Colorado Desert constitutes one of the earliest scientific records of this regions. He was a keen landscape observer, the likes of which any of us could envy.[28] His basic portrayal of the complex and dynamic relationships between the Colorado River and the desert region bearing its name has withstood the test of time.[29] Likewise, his assessment of the desert basin's agricultural potential has been borne out. According to Kennan, "only a bold and original mind could have entertained the idea of getting crops out of such a 'Death Valley' as the Salton Sink was then."[30] If Blake saw his desert today it is unlikely that he would be surprised. Yet he would probably caution that this desert turned garden still depends on the Colorado, whose waters are becoming an increasingly scarce resource.[31] In the end, the Desert of the Colorado remains inextricably bound to the river that created it.

NOTES

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3. Blake, op. cit., note 2, pp. 232-50 and Sections 12 and 13 on Sheet VIII.

4. Blake, op. cit., note 2, p. 97 and opposite plate. The "extended sheet of water" that Blake found evidence of was a high level filling of the desert basin that created a lake one hundred miles long, thirty-five miles wide, and three hundred feet deep. It stretched from just north of present-day Indio in the southern Coachella Valley to Cerro Prieto, an extinct volcano located east of the Cocopah Mountains near the delta's divide.

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6. Blake, op. cit., note 2, p. 436.

7. Blake, op. cit., note 2, p. 238.

8. Ibid.,

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of the Coachella Valley," Ballena Press Anthropological Papers, no. 3(1975), pp. 9-43; Philip J. Wilke, Thomas F. King and Stephen Hammond, "Aboriginal Occupation at Tahquitz Canyon: Ethnohistory and Archaeology," Ballena Press Anthropological Papers, no. 3 (1975), pp. 45-73; Philip J. Wilke, "Ethnography," in Irwin P. Ting and Bill Jennings, eds. Deep Canyon, a Desert Wilderness for Science (Palm Desert: Philip L Boyd Deep Canyon Desert Research Center, U. C. Riverside, 1976), pp. 97-105.

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12. Blake, op. cit., note 2, p. 245.

13. J. M. Guinn, "Las Salinas," Historical Society of Southern California Annual Publications, Vol. 7 (1907-1908), p. 19.
14. Blake, op. cit., note 2, p. 246 and map opposite p, 228.
15. Blake, op. cit., note 11, p. 6.
16. Richard F. Logan, "Causes, Climates, and the Distribution of Deserts," in G. W. Brown, ed., Desert Biology, Vol I (New York: Academic Press, 1968), p. 36.
17. Blake, op. cit., note 11, p. 1; John L. LeConte, "Account of Some Volcanic Springs in the Desert of the Colorado, in Southern California," American Journal of Science and Art, Vol. 19, 2nd Ser.(1855), pp. 1-6; Sykes, op. cit., note 11, map facing p. 6.
18. Blake, op. cit., note 2, p. 249.
19. Blake, op. cit., note 2, pp. 98-99, 109-11 and 248-250.
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22. Blake, loc. cit.; H. W. Lawton and L. J. Bean, "A Preliminary Reconstruction of Aboriginal Agricultural Technology Among the Cahuilla," The Indian Historian, Vol. 1 (1968), pp. 18-24, 29; Wilke and Lawton, op. cit., note 9, pp. 28-32; Wilke, King and Hammond, op. cit., note 9, pp. 51-54.
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28. Blake had a long and illustrious career which included: travel; teaching; publishing; and public service. In 1864 he was appointed Professor of Mineralogy and Geology at the College of California (later the University of California) and Mineralogist for the State Board of Agriculture. At the age of seventy he was appointed Professor of Geology and Mining and Director of the University of Arizona's School of Mines. Blake was accorded a variety of honors, including honorary degrees from Dartmouth, the Universities of Pennsylvania and California. It was after an arduous journey to attend the latter ceremony at Berkeley in 1910 that Blake contracted pneumonia and died. Additional bio-bibliographic

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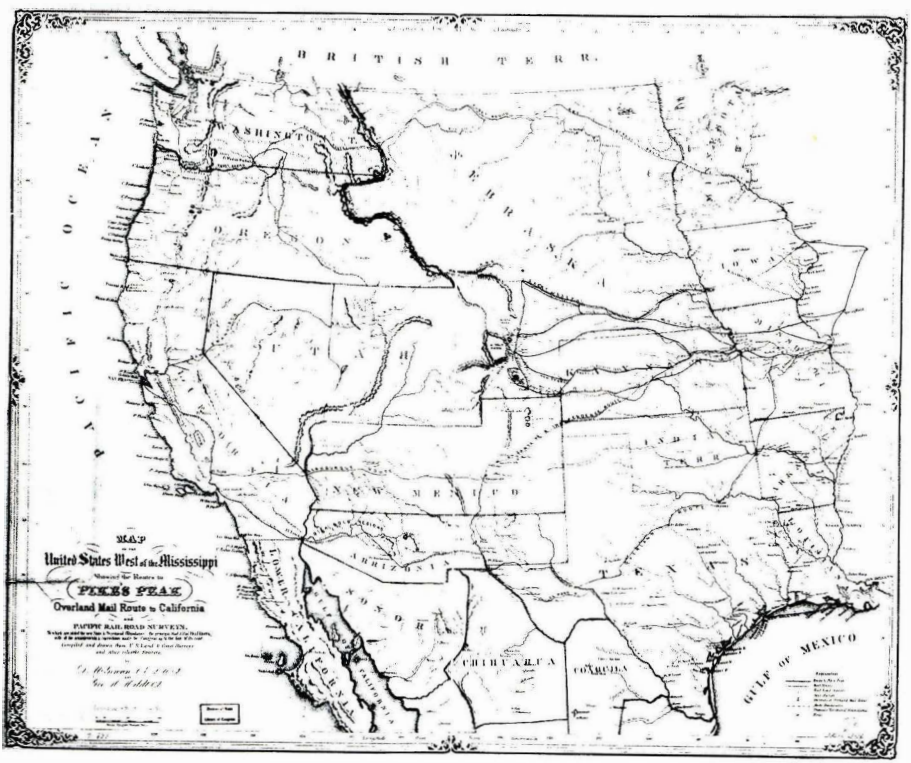

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ADVICE TO THE STILL-BORN: THE PROSPECTS FOR GEOGRAPHY AT MONT EAGLE UNIVERSITY IN 1871

*G. S. Dunbar**

In 1870 an eccentric millionaire, Horace Hawes, proposed to leave the bulk of his estate, almost thirty million dollars, for the establishment of a new university, to be known as Mont (or Mount) Eagle, near Redwood City, California, on the peninsula just south of San Francisco.[1] With the help of an American emigré scholar residing in Germany, Edward Payson Evans, Hawes solicited ideas for the development of this university. Unfortunately, Hawes, who was described by Hubert Howe Bancroft as "a self-made man, a shrewd lawyer, a man of powerful mind, original in his views and methods, but full of conceit, suspicious by nature, always unpopular, and eccentric to the verge of insanity," died in 1871 at the age of 58, and his family "succeeded in breaking the will on the ground of the testator's insanity, and thus defeated his plans for the public good and his own permanent fame."[2] If he had not died before launching the university, or if the will had not been broken, there might be a Mont Eagle University today, perhaps in the niche that Stanford University, founded in 1885, now occupies. It is conceivable that Mont Eagle would have preempted the place for a large well-endowed private university in the Bay Area and that Leland Stanford's monument might have taken a different form.

In late 1870 E. P. Evans wrote to George Perkins Marsh, American Minister to Italy, and Henry P. Tappan, former President of the University of Michigan, for their views on the ideal construction of Mont Eagle University. Especially interesting to geographers is Marsh's letter of 15 December 1870 (unfortunately not preserved), in which he made some specific suggestions of a geographical nature. The following passages are from Evans' reply, dated 20 January 1871:

> I thank you heartily for the valuable suggestions contained in your letter of Dec. 15 in reference to the organization of the recently endowed university in California, and shall be grateful

**Dr. Dunbar is Professor of Geography at U.C.L.A. and is President of the Association of Pacific Coast Geographers.*

for any thought which may occur to you after further reflection and which you may be willing to favor me with.

Your suggestion that the University should inaugurate as soon as possible a series of observations for the purpose of ascertaining the effects of human action on the physical conditions of the Earth is one of great importance, especially in a country like California, where there is such a wide and peculiarly favorable field for investigations of this kind. I shall do what I can to have the project carried out at the earliest possible moment and also be glad to send you the results as fast as they are published, or systematically seconded. I know of no one who could make better use of the facts for the advancement of science than yourself. Mrs. Evans and myself will probably visit Italy next autumn, when I hope to have an opportunity of conversing with you on the subject and obtaining from you some definite ideas as to the best plan of making these observations.[3]

In his centennial edition of Marsh's great book, Man and Nature(1864), published by Harvard University Press in 1965, David Lowenthal made a brief, but careful citation of Evan's letter in a footnote.[4] In an essay surveying the early literature of ecology, Frank Egerton cited Lowenthal but said that Marsh "urged the support of ecological research when he was consulted in 1870 about the use of funds for the development of the University of California."[5] But Marsh did not use the words ecology or ecological (nor did he refer to geography), and the university in question was not the fledgling University of California, which was established in Oakland in 1868 and would move to its present Berkeley site in 1873, but the still-born Mont Eagle. One can only speculate about what form Marsh's proposals would have taken if the University had actually been given life. Would a department or teaching unit have been established with the name Geography? Could a place have been made for another of Marsh's correspondents, the French geographer Elisee Reclus, who was imprisoned in April 1871 for participating in the Paris Commune but who went into exile in Switzerland in March 1872? Reclus had considered the United States, where he had spent more than two years in the 1850's, as a possible refuge.

In an earlier letter to Evans (5 December 1870), a draft of which has been preserved, Marsh speculated about the commanding position that a wealthy new

university would take among the educational establishments of California.

> If a donation were absolute, you would be able to provide all the facilities for university education required for the whole population of California, and perhaps for that of the entire Pacific slope of our territory; this idea ought to be kept in view even in the fundamental organization and I cannot but think the legislature and all other persons interested in the cause of secular educ. would do wisely in taking measures for the consolidation of all the great educ.estab. of the state under your general direction.[6]

One can only speculate about the place of power that Mont Eagle University might have assumed vis-a-vis the University of California, which was then only in its infancy. It had been suggested to Horace Hawes that, instead of starting a new university, he should give the money to the struggling state university, but he "utterly repudiated the idea, saying that it would never do, the State University could never succeed."[7] Could a wealthy private university have placed the University of California in the shade in the way that many of the older private universities of the East had done in their respective states? Could Daniel Coit Gilman have been attracted to the presidency of Mont Eagle University, instead of the state university in Oakland?

Henry Tappan's letters to E. P. Evans are especially interesting for his clear conception of what a university ought to be. Tappan thought that the Hawkes endowment "is sufficiently without aid from other sources to complete a University better than either Harvard or Cornell are likely to be, for these are not real Universities; nor is there in our country yet a real University, although there are many institutions of learning.

> A course of four years leading to the degree of A.B. gives us the English College which is by no means a University. It is the English College & <u>something more</u> which the Indenture has in view; an English College & <u>something more</u> which appear in Yale, Harvard, Cornell &c &c, & which appeared also in our University of Michigan, but which I hoped in time to change into the true form of a University. Now, in founding a New University it is well to escape at once from this mongrel pattern, and to make a real University.....
>
> [Mont Eagle indenture calls for an establishment of 35 professors]

> I hold that the number of professors in a University can never be fixed. This can be done only in a College or Gymnasium where there is a determined disciplinary course. But in a University which embraces Universal Knowledge, and is designed for the increase as well as the diffusion of knowledge, how is it possible to limit the number of professors? The riper development of different branches of science necessitates a division of departments; and with the increase of knowledge there must be a multiplication of professors...None but genuine men of science ought to be collected at a University. It is better to leave chairs vacant and to depend on the books in the library than to appoint men who cannot speak as well as the books; and who are incapable of advancing beyond what has been written; and cannot even expound what has been developed, or aid in its comprehension.[8]

In a later letter Tappan suggested that Evans would be the ideal president of the new university (something that might have been in Evans' mind from the start and he came back to the point that it is professors who make the university.

> We want genuine professors--but we shall never have them without a genuine University--so there is the difficulty in making a right beginning--I found that in Michigan--I could not find the right men. If I could found a University according to my own ideas--I would be content to begin with a few men of the right sort--undoubted scholars & of genuine culture--Then I would add to them only as I could find them or rear them up. But library, apparatus, museums of all kinds I would complete as rapidly as possible--These once in existence the men would grow up aroun them.[9]

Although Mont Eagle University never left the drawing board, Tappan was to see many of his ideas realized in the Johns Hopkins University, which opened in 1876 as the first truly modern university established in the United States. If Horace Hawes had only resisted the blandishments of the Grim Reaper for a few more years, Johns Hopkins might have become known as the Mont Eagle of the East--or perhaps Mont Eagle would be the Hopkins of the West.

NOTES

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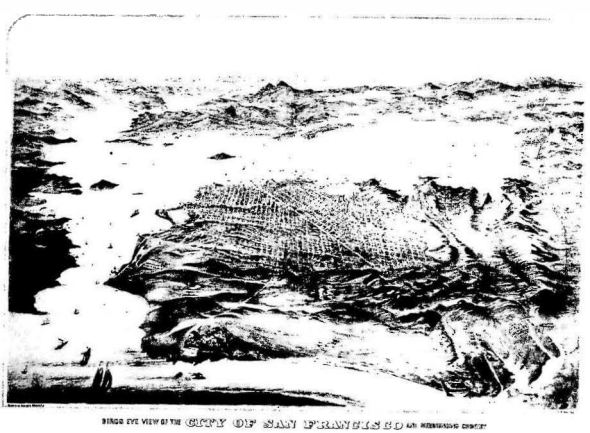


BIRDS EYE VIEW OF THE CITY OF SAN FRANCISCO

THIRTY-FIFTH ANNUAL MEETING, C.C.G.E.

Lake Tahoe, California/Nevada, May 8&9, 1981

With the theme "Lake Tahoe - Problems and Future", the Annual Meeting was sponsored by the Executive Board and hosted by William J. Fraser, Sonoma State Univ. ; Dennis Dingemans, U.C. Davis; Donald G. Holtgrieve, C.S.U. Hayward; John James, University of Nevada, Reno; Joanna Jones, South Lake Tahoe Community College; John Passerello, California Conservation Corps, Sacramento;&Beth Pelletier, Sonoma State University. A Field Trip, "Geographical Assessment of the Tahoe Basin" was organized and run by John James. The meetings were held in Harrah's Convention Center and in a change of normal format presentations by local experts on regional concerns were featured.

PRESENTATIONS

Jan Denton, *Director, California Department of Conservation,* "The Lake Tahoe Basin and Investing for Prosperity: Enhancing California's Resources to Meet Human and Economic Needs."

Charles R. Goldman, *Department of Limnology, University of California, Davis,* "Lake Tahoe: Its Land and Water Problems." Banquet Address.

Roy Hampson, *Executive Director, Lahontan Regional Water Quality Control Board,* "Preserving the Water Quality of Lake Tahoe."

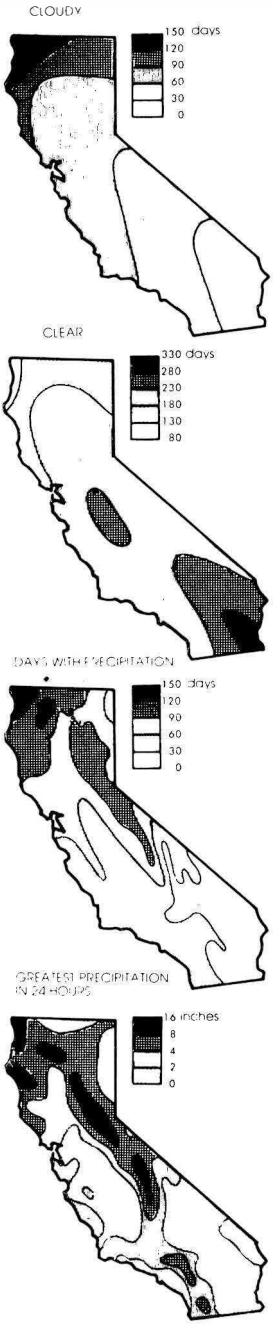
Jim Hildinger, *Landscape Photographer,* "Lake Tahoe: A Journey Through Time." Illustrated lecture at the Awards Luncheon.

William A. Morgan, *Forest Supervisor, Lake Tahoe Basin Management Unit, U.S. Forest Service,* "The Role of the Forest Service in Acquisition and Management of Federal Lands in the Tahoe Basin."

Dennis Winslow, *Executive Director, California Tahoe Regional Planning Agency,* "Management of the Tahoe Basin from the California Side."

Roland Westergard, *Director, Nevada Department of Conservation and Natural Resources;* Ken Smith, M.D., *League to Save Lake Tahoe;* and Terry Trupp, *Mayor, City of South Lake Tahoe, California,* Discussants, in Panel Disscussion on "Development Issues in the Lake Tahoe Basin".

Typist: Carol Rush



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