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The CCGE Publications Committee extends its sincere apologies to members and friends of the organization for the lengthy delay in publication of the 1973 and 1974 editions of The California Geographer. A special apology is extended to the authors of the enclosed articles.

The 1975 spring meeting of the Publications Committee authorized the appointment of a special editor for the combined 1973-74 issue. The 1975 through 1977 editions of The California Geographer will be edited by Dr. Donald Holtgrieve. Please address all correspondence regarding manuscripts and future issues to Dr. Holtgrieve at the Department of Geography, California State University, Hayward, Hayward, California, 94542.

With regard to this special issue, several articles were slightly reworked by the editor and his staff. In light of the lengthy delay between acceptance and publication most articles are printed as received from the former editor. Miss Rita Bowman provided the typing and assisted with the editing and layout design. Dr. Judith Tyner of CSULB kindly redrafted the graphics from Dr. Rushdoony's article. And special thanks to Dr. Christopher Salter of UCLA for time spent in editorial comment, proofreading, and general moral support.

Any comments regarding the 1973-74 issue may be directed to the special editor: Dr. Rod C. McKenzie, Department of Geography, University of Southern California, Los Angeles, California, 90007.
The teaching of a second language as an integral part of early childhood education has long been advocated. So far as is known, a mandated program of state-wide instruction for millions of children was first attempted in California. The California State Legislature in 1961 enacted into law the Casey Bill which required, for the first time, that foreign language instruction be given to children in grade six. The legislation took effect in the 1965-66 school year.

For the following reasons it is not surprising that San Diego City Schools formally chose Spanish as the program language:

1. According to the 1960 census, approximately nine and one-half percent of California's population had Spanish surnames.  
2. Approximately half of California's secondary public school students studying a foreign language choose Spanish.  
3. Previous elementary pilot programs used Spanish due to an appreciable number of native-speaking teachers.

In 1968 the strict curricular mandate for grade six language instruction was modified to permit courses to begin in grade seven. Nevertheless, the elementary program continued to function in the district. A characteristic of the program since its inception has been to permit wide latitude in the means of instruction. Audio-lingual tapes and the adopted text (Holt, Rinehart and Winston's
Primer Curso) are the barebones framework for the present program. More than a teacher's manual (the students do not use the text) and tapes are needed to sustain interest. Once the names of common household objects have been learned and the student achieves mastery of simple conversational patterns, something to sustain the program has to be created by the teacher.

A geographic theme was introduced in the form of classroom bulletin boards, most of which had six inch titles and two inch captions easily read from anywhere in a classroom. A number of these were prepared, and were effectively used in a program at United States International University in 1971. In the presentation, an eleven year old native speaker "instructor" asked class members questions based on concepts involving latitude (Figure 1). The questions and answers are relatively simple. The instructor's introductory "Hoy vamos estudiar latitud" was followed by a series of questions containing almost all of the vocabulary needed to frame a correct response. None of the vocabulary, of course, presented any difficulty to the young instructor, who greeted each appropriate answer with "Muy bien, gracias." The simplicity and repetitive nature of answers is illustrated by an example from a question in Figure 2. Travel time by passenger train and airplane is compared by asking "¿Cuál es más rápido?" The appropriate answer is "Por avión es más rápido."

A theme and the appropriate materials to implement an innovative program have to meet criteria stated in the foreign language framework for the state. The following criteria, taken from a checklist published by the State Department of Education entitled "Preliminary Data Necessary to Evaluate Foreign Language Materials," are typical:

1. Is their content appropriate to the age level of the students for whom they are intended?
2. Is their content appropriate to the grade of instruction for which they are intended?
APRENDIENDO LO DE LATITUD

¿Cuántos continentes atravesa el ecuador? ¿Cuánta latitud tiene Sydney?
¿Qué ciudad tiene 40° latitud norte? ¿Qué ciudad del hemisferio norte está cerca del ecuador?

Figure 1
APRENDIENDO LO DE VÍAJE
Del Mar al otro Mar

En mil ocho ciento cuarenta y ocho, el viaje necesitado: ciento treinta y nueve días.

¿Cuál es más rápido?
¿Cuál es la diferencia entre el tren y avión?

¿Cuántos días es el viaje por tren?
3. Are they (a) durable; (b) easily used; and (c) attractively presented?

4. Are language and cultural situations authentic?

5. Is the subject matter presented through a variety of techniques?

6. Does the sequence of the materials provide for smooth transition from unit to unit and from level of difficulty to level of difficulty?

7. Do the various components complement each other; e.g., do the visual components reinforce the textual ones?

The geographic themes presented in the four illustrations accompanying this paper are all appropriate for the middle grades. The mathematics (Figures 3 and 4), time and distance concepts (Figure 2), and the global grid or one of its components (Figure 1) were developed and integrated into the overall design with the conceptual level of the students in mind. The per capita income for South American nations as a topic has the additional virtue of being pertinent to the sixth grade unit on Latin America.

One well-attended session at the 1972 convention of the California Council for Geographic Education dealt with the topic, "Existing in Spite of the Confines of the Curriculum Guides." The writer is aware of many complaints that the curriculum framework provides insufficient opportunity to introduce, utilize, and reinforce geographic concepts. Geography can, however, serve as a vehicle to insure interest and student participation in an elementary foreign language program. Why could geography not be included in other situations that defy the confines of the curriculum guides and yet present material in a manner that is creative, interesting, and pedagogically sound?

REFERENCES

1 State of California Department of Industrial Relations, Californians of Spanish Surnames (n.d.), p. 25.

5
¿Qué le dice el primer mapa concerniente Arizona que no puede aprender del segundo mapa?

¿Cuáles estados tienen menos de cinco mil indios?

¿Cuántos estados tienen entre cinco mil y quince mil indios?


4 *Foreign Language Framework*, pp. 103-104.


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**Figure 4**

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**Figure 4**

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Figure 4
This study deals with nearly one hundred years of geography in California: 1850-1941. The presentation falls into two sections: geographers and naturalists in California before the turn of the century, and those coming after 1900. On the whole, this division represents the break between pre-geography and real geography; and the break between early, individual men and studies, and later groups and departments of geographers. As one follows the development of geography from those early days to the present, four distinct types of people emerge: (1) pre-geographers; (2) visiting geographers; (3) permanent emigrant geographers; and (4) resident or domestic geographers.

The pre-geographers or naturalists period is best represented by such people as John Muir, Josiah Dwight Whitney, Asa Gray, William H. Brewer, and Sir Joseph Dalton Hooker. None of these can be considered geographers. In the cases of Brewer, Gray, and Hooker, they were botanists; or geologists such as Whitney; or true naturalists or nature lovers such as John Muir, the champion of western wildlife. They came to the state in the last half of the nineteenth century, motivated by personal purposes. Joseph Ewan illustrates this point well:

Very early in the history of California reports came back of giants and riches, where ordinary things were extraordinary, and superlatives were elementary parts of speech. Great flocks of wild fowl in the marshes, grizzly bears that challenged the bravest of men, giant birds (the California Condor), giant trees, and giant seaweeds. Even the slugs in the settlers'
gardens were enormous! But it was those giant nuggets of gold! The spirit of the Seven Cities of Cibola lives on. 1

The second class of men are true geographers who visited the golden state for a variety of reasons (e.g., health, prosperity, or pleasure) and in varying degree have left their traces on the California shore. Some were extremely important to the overall, worldwide development of geography but left little impression on geography in California, while others came to California temporarily or permanently and had a tremendous impact on the development of local geographical study. Julius Froebel, Arnold Guyot, and Ferdinand Wilhelm von Richthofen exemplify well the first group. Much more significant to the California story are such men as Daniel Coit Gilman, George Davidson, James F. Chamberlain, and Harold W. Fairbanks. Each in his way left a legacy of thought and action to the science of geography in the state.

It should not be assumed that this division of geographers is unique to the nineteenth century, for during much of the first half of the twentieth century many eminent names in geography from the rest of the United States and the world have studied or given classes for brief periods, especially at Berkeley and UCLA. A "Who's Who" of twentieth century geography could easily be compiled from those names: Ellsworth Huntington, Ellen Churchill Semple, Vernor C. Finch, and Glenn Trewartha among others.

The most difficult to delineate is the third classification because it certainly overlaps the preceding group and encroaches upon the following division. The period from 1921 to 1941 also saw an unprecedented growth in the population of the state, in the growth of the University of California, and in the growth of the subject of this study. One man stands above all others as a prime example of an immigrant (to California) geographer--Carl O. Sauer. Sauer has served as the state's greatest stimulus to geographical inquiry and expansion upon the California landscape.
By 1941, a state of maturity in geography had been attained, perpetuating itself from among its own—native Californians or students in California. This era is marked by the students of Sauer (and, to a lesser extent, students from UCLA) departing their training institutions seeking new research frontiers. Some remained in the state to influence or initiate new departments at other colleges or universities, such as Peveril Meigs at Chico State, Clara Hinge at San Jose State, and J.E. Spencer at UCLA. Some left for other states, as did Jan O. Broek and C.W. Thornthwaite. Some remained at Berkeley, as did John Keselli and John Leighley.

Early Geographers and Pre-Geographers

Whether it was due to the lure of gold or in quest of adventure, naturalists, botanists, geologists, explorers, and geographers flocked to the virgin state of California in the first half of the nineteenth century. Most prominent among this group of men were the naturalists—historically the forerunners of geographers.

Naturalists have always been the vanguard of explorers; so it was in California. A few like John Woodhouse Audubon, Isaac J. Wistar, Titian Ramsey Peale, and John L. LeConte, were scions from old naturalist rootstocks. Some of these emigrant naturalists would cast their lot to stay in California—and California in a cultural sense meant San Francisco.2

The California Academy of Science was established in San Francisco in 1853 (just three years after statehood). The Academy served as a focal point for the hundreds of natural and physical scientists who visited the area from 1853 until the turn of the century.

The register of notables in science grew. In 1859, Louis Agassiz, son of Alexander, came to San Francisco to take a position with the Coast Survey as an engineer. He
later made studies in zoology and marine biology of the San Francisco area.  

The botanists Sir Joseph Hooker and Asa Gray (credited by Ronald Good as being the forerunners of modern plant geography) traveling together recorded their impressions of California in that era. After pausing in San Francisco and Chico, they continued to Shasta. Gray wrote, "The trip to Shasta involved a long stagecoach journey, but it was most interesting." Hooker was alarmed by the destruction of the Sequoias and by the wasteful lumbering practices that he saw--"the doom of these noble groves is sealed."  

On April 21, 1860, the California State Legislature created the office of State Geologist and authorized a geological survey of the entire state. Josiah Dwight Whitney was selected first State Geologist and William Henry Brewer became Whitney's first appointment as botanist. To accompany Brewer and Whitney on the survey came Clarence King, James T. Gardiner, and Charles F. Hoffman.  

Due to lack of public financial support, the survey never attained its original goals—that of a detailed study of the entire state with accompanying maps and texts. Some portions of their work have been published, however. Whitney managed to publish six volumes on California; while Brewer, almost bankrupt because of his unfortunate experience with the survey, published one book, his journal: Up and Down in California. He succeeded here only with the aid of an old friend, Daniel Coit Gilman and Leland Stanford. Brewer returned to Sheffield Scientific School to serve as Professor of Agriculture (1864-1903). Whitney left for Harvard in 1875, holding a position as Professor of Geology until his death in 1896. During his days at Harvard, he organized frequent field surveys, one of which went to the Rocky Mountains. Along with him came old friends Brewer and Hoffman, and (as a student) William M. Davis.  

John Muir was a completely different breed of man. Muir
is the west's foremost example of a true lover of nature; he felt a special communion with mother earth matched by few other men. After coming to the United States in 1849 and receiving his Bachelor of Science degree in geology from the University of Wisconsin, "John of the Mountains" set forth for California. Muir reached the golden state in 1868, spending the next ten years in the Sierra Nevadas studying, describing, and defending all facets of the natural landscape. His most noted book, *The Mountains of California*, published during the battle for a national forest in the Sierras, illustrates very well the inner sympathy he felt for nature. To Muir, sheep were "hoofed locusts"; the forests of California were "the inventions of God." ⁹

Yosemite excited John Muir like no other place. Unlike Whitney who felt that the valley of Yosemite was formed by a tremendous dislocation of a fault block, Muir believed that glacial action was responsible for the sculpturing of the beauty of Yosemite.

The real value of John Muir, however, lies in his writings about his wanderings. These tales aroused interest--public, private, and scientific--about the Sierra Nevadas and about California. He added to the growing body of knowledge about the state through his numerous articles, fine illustrations, and glittering stories. Muir was extremely important to the conservation movement within the state, for it was through him that the people and the politicians were encouraged to set aside large blocks of land as national or state forests. He died in 1914 in Los Angeles, but the Sierra Club, which he helped to organize, survives him to this day.

The overall contribution of Whitney, Brewer, and Muir is that they expanded what was known about California. They served as lures to future scientists and settlers. They were the stimuli to what was to take place during the last part of the nineteenth century and the first half of the
twentieth century. Thus, they set the foundation; the superstructure was yet to be built.

In 1869, the transcontinental railway was completed, linking San Francisco with the east. With the advent of the railroad new industry was possible. Closely interrelated with this period of economic transition were the influx of people, the chartering of the University of California, and the consequent development of geography in the state.

*Early Geographers*

In order to gain a detailed view of early geographers in the state, it is necessary to backtrack to the mid-nineteenth century once again. In 1854, Julius Froebel, the German geographer and critic of Carl Ritter's teleological views, visited California as part of his travel in Latin America and the western United States. Upon his arrival at San Francisco in the fall of 1854, after traveling by boat along the coast from San Pedro, he wrote:

> On the morning of October 3rd., we entered the Golden Gate. Much had I heard of the grand scenery of the Bay of San Francisco, and I can only say that reality surpassed my expectations. . . . Whatever splendid sites of cities other parts of the world may have to boast of, in North America the palm will never be disputed to San Francisco.

He continues:

> Every European, many Asiatic, and some American languages, meet the ear while you are walking the streets. This apparent chaos of heterogeneous elements has been brought together, and is kept in motion under the great form and system of Americanism, with its relentless labor, its ever-active spirit of speculation, and its devotion to utilitarian purposes.\(^{10}\)

He published a two volume narrative entitled *Seven Years*
Travel in Central America, Northern Mexico, and the Far West of the United States (1858). The book is essentially a diary of his days spent in North America with colorful descriptions and fine insights into the character of the west.

On the return voyage from China in 1862, the Prussian Expedition to East Asia lost the services of its geologist and geographer, Ferdinand Paul Wilhelm von Richthofen, as he chose to stay in San Francisco. Baron von Richthofen, credited by Van Valkenburg as one of the two men to carry on and keep alive the traditions of geography initiated in Germany by Ritter and Humboldt, found respite within the California Academy of Science. Although he had private means, Richthofen worked occasionally with the State Geological Survey, becoming a very good friend of Whitney. Apparently they worked very well together, for they soon conceived a similar geologic survey for China to which Richthofen devoted many years of his life before returning to the University of Berlin.

Arnold Guyot of Princeton, considered by many the holder of the first chair of Geography in an American university, visited California in 1871. The importance of Guyot's visit lies not so much in the work he carried out (some meteorological and altitudinal studies in the Sierra Nevadas), but in the fact that Guyot was such a prominent name in American geography in the nineteenth century.

The effect of the visits of the above three geographers, and the others who followed suite, is difficult to measure: at best they were minimal. They were merely passing through the neighborhood and they paid the state the compliment of a brief stay. In actuality, California geography inherited very little from these notable, though fruitless, visits.

Quite differently, four men—George Davidson, Daniel Coit Gilman, Harold Fairbanks, and James F. Chamberlain—migrated west between 1850 and 1890; and with them they brought prestige, intellect, and vigor. All four geographers were unique, singularly brilliant, and individually fascina-
ting characters deserving of detailed personal analysis.

George Davidson came to California in 1850 as a scientific assistant to the United States Coast Survey, the beginning of a long, colorful career in such endeavors within California. Until his death in 1921, Davidson labored with limitless energy. His accomplishments: (1) concise study of San Francisco Bay for harbor improvements; (2) two hundred and sixty books and pamphlets—including the geography and history of the Pacific states, *The Coast Pilot*; (3) thirty years as president of the Pacific Geographical Society; (4) Regent of the University of California; (5) Professor Emeritus at Berkeley; (6) teacher of geography from 1898 until his death at Berkeley; (7) an important figure in the establishment of Lick Observatory in San Francisco.

Obviously, Davidson was more than a geographer, but he always returned to his true love, geography. In fact, he gave the first geography course at Berkeley in 1898, "The Currents and Climatology of the Pacific Coast." During his twenty-three years at Berkeley, as through his writing, he stressed the physical and geologic aspects of geography. Davidson's name must be underscored when speaking of early geography in California.

Daniel Coit Gilman came to California in 1872 to serve as the second president of the University of California. Trained at Yale in history and geography, Gilman did his graduate work at Harvard where he lived at the home of Arnold Guyot. A frequent visitor to the Guyot home in those days was Alexander Agassiz. Gilman traveled to Europe and became well acquainted with Carl Ritter. Returning to the United States, he organized the Shelfield Scientific School at Yale (the institution from which William H. Brewer was to be graduated) before moving to California.

In his inaugural address he spoke earnestly and eloquently on the subject of scientific and technical educa-
tion. "Science, though yet you have built no shrine for her worship," he said,

was the mother of California. . . . My chief anxiety is whether the people of this coast are yet ready to pay for the luxury and the advantage of such serviceable institutions. It will require a great many teachers, costly laboratories, large funds—more, I fear, than the University, with all the claims upon its treasury, is yet able to command. 15

Under his direction, the present site of the Berkeley campus was chosen and developed with "proper regards to topographic features, preserving and utilizing the irregularities of the surface; carriage ways, broad areas of approach, equestrian trails, and hotels for faculty and students." 16

Gilman was responsible for the inception of the botanical planting program in evidence today at all of the University of California campuses.

Many of his philosophies and programs were basic to the study of geography today in California, as well as in Wisconsin and Michigan (where he later served as president). From his training in Germany, Gilman developed the system of educating graduate students through the seminar method. He was an innovator when it came to giving financial assistance to his graduate students. He also stressed the importance of research and publications as the way of life for a scholar, and as a means of evaluating the merit of his faculty members.

Probably the least known of the geographers in this group is Harold W. Fairbanks, geographical photographer. Fairbanks followed a familiar path: he came to California in 1890 (the year of his B.S. in geology from Michigan) to work with the State Mining Bureau. In 1896, he received his Ph.D. from Berkeley in geology. Fairbanks is best known for his collection of over four thousand photographs of California illustrating various phases of physical geography. The years from 1911-1926 were spent trying to improve the design
and content of geography courses in the elementary and secondary schools of California. He was interested in seeing students answer the "why" questions in geography, rather than learning places and facts by rote. He believed that "no combinations of courses could take the place of geography." Many of his books aimed at accomplishing the improvement of such courses. In 1915 he was Supervisor of Geography for the Berkeley Public Schools. During two different summers he gave courses on the teaching of geography and on the geography of California at the University of Southern California and at the University of California, Los Angeles. Fairbanks died in Santa Monica, humble and sure that his endeavors were in vain.

Far more influential than Fairbanks was James F. Chamberlain of the Los Angeles Branch of the San Jose State Normal School. He defined geography as "the study of human conditions as they actually exist, and of their intimate relations to physical phenomena and forces." His study of secondary schools of the Pacific Coast states in the 1930's revealed the extremely low status geography had at that level. Teachers were, for the most part, unprepared to teach geography correctly, or geography was not considered important enough to teach. Chamberlain remained at the University of California, Los Angeles, serving as Chairman of the Department of Geography until the mid-1930's.

These four pioneer geographers serve as ties with the past in California geography, as bridges with other geographers in America at that time, and as links to present studies--each through his own endeavors. Fairbanks was the photographer and educator, Gilman the organizer and innovator, Davidson the scientist and author, and Chamberlain the leader and builder. All four were geographers by training and by vocation; all were interested in making geography an important part of all levels of education. Together, they devised the guidance system that lifted geography into the
twentieth century--the epoch in which the discipline has attained its apogee.

The Evolution of Modern Departments

Although it is generally assumed that the University of California was the initial department of geography in the state, the fact is that the State Normal Schools included geography in their course of instruction as early as 1881. In that year, the first session of San Jose State Normal School (the first such school in California) was held. Instruction included two required semester courses in geography. The Southern Branch of the Normal School began instruction at Los Angeles in 1882, offering geography also as part of its basic curriculum. By 1887, Chico had become part of the system following the same plan of instruction as San Jose and Los Angeles.

The individual schools did not develop similarly, however. Only at Los Angeles did geography become a separate department before the turn of the century. It was in 1895 (three years before the first class of geography was given at Berkeley by Davidson) that James F. Chamberlain served as chairman of that first department. Consequently, the Los Angeles department has the distinction of being the oldest department of geography at any institution of higher learning in the state. What occurred at Los Angeles between 1895 and 1919 is neither particularly startling nor interesting. A more accurate account of the Normal School scene is best illustrated by developments at San Jose and Chico.

Geography, as required during the first term of a student's work at San Jose Normal School, was defined as: "The earth as a planet; defining the terms; dimensions and motions; continents, vegetation, and mapping." During the second term of instruction, all students were compelled to take: "Physical Geography--a review of various phenomena of the earth studied with reference to natural laws." Other
than these two compulsory courses, the student was not offered (nor could he elect) any other classes in geography. The school required the student to take other, more important courses such as penmanship and outline drawing.

Geography as an individual discipline at San Jose dates from the 1920's, and it saw rapid advancement during the 1920's under the leadership of Miss Clara Hinge. After receiving her Bachelor of Arts from Berkeley in 1912, Miss Hinge began teaching at San Jose. Not until 1920, when Miss Hinge overhauled the entire program of instruction, did the department there begin to achieve its modern status.

Within seven years of the founding of San Jose, the third Normal School was established at Chico. Chico followed a pattern of courses of instruction similar to that of San Jose--both as a Normal School and as a State Teachers College. Geography, in 1929, was combined with geology under the leadership of C.K. Studley, Professor of Geography. Studley was assisted in his work by Peveril Meigs, III--a then recent graduate of Berkeley (B.A.) in geography.

By 1940-41, Meigs had taken the reins of leadership in geography at Chico State; Studley was no longer with the school. The interim saw Meigs become the fifth man to be granted a Ph.D. from the Department of Geography at Berkeley. From 1933 forward, he could be seen to put his stamp, and that of Sauer, on the department at Chico. Meigs introduced such courses as: "The Cultural Landscape," "General Anthropology," "Middle America," and "Anthropology of Native American Indian Cultures"--all very closely related to what Sauer was teaching at Berkeley. The influence of Sauer in this case, and many others, is undeniable.

Carl Sauer serves as an excellent point of reference when dealing with the Department of Geography at Berkeley, for such a discussion neatly falls into two sections: "Before Sauer" and "After Sauer." The first was characteristically centered on physical geography, geology, and climatology;
while the latter has been based on Sauer's man-land, historical geography concepts.

The department at Berkeley dates formally from 1908, when Ruliff Holway served as chairman. Holway, characteristically for his time, had been trained at Stanford in geology; he gave classes in physiography. With him on that first faculty were Dr. Lincoln Hutchinson (Commercial Geography) and Cleveland Abbe (Climatology). In 1913, the University of California Press printed its first publication in geography: "The Russian River, A Characteristic Stream of the California Coast," by Ruliff Holway. The monograph was sixty pages long.

During the period from 1908 to 1923 (the year of Sauer's assumption of the chairmanship), the department was oriented around physical geography.

With the retirement of Holway in 1923, Sauer took the helm in June, symbolic of methodological and philosophic change that was to take place. Within eighteen months, Sauer had published through the University Press his "Morphography of Landscape," representing a considerable change in the orientation of geography at Berkeley. The dominance of Sauer's teaching is quiet obvious, when viewing the list of Ph.D.'s granted at the school from 1927-1941. The first such degree went to John Leighley, "Study in Urban Morphology: the Towns of Malardalen in Sweden" (1927). During those fourteen years, twelve more doctorals were completed by some of the most influential geographers in California and the United States: Charles W. Thornthwaite (1930); Peveril Meigs, III (1933); Joseph E. Spencer (1936); Lauren C. Post (1937); John E. Keselli (1938); and Henry J. Bruman (1940).25

The impact of Carl Sauer on the department at Berkeley must be reiterated for through Sauer it developed an entirely new approach to geographical study, a new philosophy of what geographers were supposed to be doing. There was no longer a barrier to halt advances in the direction of either cultural, historical, or physical geography as had existed earlier
under Holway. Sauer's themes admitted the need to balance the dualism in geography that exists between the cultural and the physical spheres; consequently, the curriculum at Berkeley was enriched and the diversity of geographers there increased.

In many ways the course of instruction at Los Angeles resembled the structuring at Berkeley before Sauer. It was in 1919 that the Southern Campus of the University of California was established at the site of the Los Angeles Normal School on North Vermont Avenue. Along with Chamberlain that year were Myrta McClellan, B.S. (Instructor); Kathleen Beck, B.S. (Instructor); Ruth Baugh, A.B. (Instructor); and Ford A. Carpenter, LL.D. (Lecturer in Meteorology).

In spite of its early origin, the department at Los Angeles did not attain a prominent level within modern geography until about 1930. At best, the period from 1919-1928 can be seen as maintaining the status quo. Burton Varney joined that staff in 1927 from Berkeley, and Clifford Zierer, visiting from the University of Chicago in 1926 during a summer session, decided he liked southern California and remained. 1929-31 marked the origin of the modern department at Los Angeles, characterized by two periods of growth. First, teaching assistantships were initiated, the faculty grew to five full-time geographers, and the course content had evolved to a new level. By 1933-34, such names as Kawai Kuozo, Glenn Cunningham, and Hallock Raup were on the faculty and at the dissertation stage of their work--usually through Berkeley.

The second period at Los Angeles began in 1936, when Joseph E. Spencer came to the department fresh from the tutelage of Carl Sauer at Berkeley. Spencer's technique and views reflected those of Sauer quite clearly; the main difference in their work was in the areas of study that they stressed--Sauer, northern Mexico; Spencer, eastern Asia. The influence of Spencer was, in many ways, to Los Angeles what Sauer's was to Berkeley.
The UCLA department did serve an additional, and very interesting, purpose during the 1919-1941 era. It acted as a resort or spa for prominent geographers of the time who were seeking either leisure for the summer coupled with gainful employment or who were here for studies. The eminent names that visited UCLA once or more during those summers is quite amazing: 1921, Derwent Whittlesey (University of Chicago); 1923, Charles C. Colby (University of Chicago); 1926, Vernor C. Finch (University of Wisconsin); 1925, Clifford Zierer (University of Chicago); 1927, Ellen C. Semple (University of Chicago); and 1920, Glenn Trewartha (University of Wisconsin). Today the tradition continues as many renowned geographers from all parts of the world visit, from time to time, UCLA, Berkeley, and various state universities.

There is a very telling and significant comparison from the public sector to what was occurring at the two major private institutions in California. Stanford University and the University of Southern California are both the oldest and most esteemed private schools in the state, and importantly they share a common history of underdeveloped geographic studies.

Stanford from the outset was without a separate department devoted solely to geography. By 1914, the discipline was taught, precariously, within the department of geology. Geology, for that matter, was fairly well entrenched at Stanford by this time; courses in geology and mining today continue to dominate the earth sciences there. Bailey Willis, a geologist by training, gave both geography classes, the only two such classes.26

Meanwhile, at the University of Southern California, geography had become an independent study in 1934.27 From that date until 1942, Malcolm Haven Bissell was chairman and sole instructor at USC. The courses were predominantly economic in nature, stressing such studies as "Commodities of Commerce, Resources of North America, and Regions and Resources." Before the independence of geography, it was
taught under the geology department which offered many classes in mining and mineralogy--very similar to Stanford.

What was taking place at both schools was a squeeze between budgetary limitations and the needs of the physical and social sciences. Both institutions were founded in bedrock—that is, geology, mining, and physiographical sciences. When choices were made on expanding existing departments or expanding into new fields (namely, geography), the decisions were made in favor of the fundamental sciences of geology and physiography. It is quite possible that geography, in a modern sense of the word, was considered to be a luxury department. This is conjecture, but it is founded on fact: the state institutions have backed, quite heavily, modern geography, while the private schools have been ambivalent.

Epilogue

The phenomenal expansion of geography in the United States during the years since World War II is paralleled by its growth in California. Few states can boast of such superiority in the field of geographic endeavors--quantitatively or qualitatively. This point is especially valid when one is referring to historical-cultural aspects of geography. California proudly serves as the residence of many top men in the field: Sauer, Glacken, Leighley, Spencer, Parsons--to name just a few. The two largest branches of the University of California are home to two extremely influential departments of geography, and the California State Universities and colleges have a number of superior programs in geography. The density of geographers, graduate students in geography, and geographical work is greater in California than in any other place in the United States. More than any other state of recent times, California has been responsible for "exporting" geographers to other parts of the nation and the world to serve in various departments of geography or to become part of diverse and private agencies.
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* The author wishes to thank Dr. Gordon Lewthwaite, California State University, Northridge, for assistance with the early drafts of this paper.


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HELPING CHILDREN CONCEPTUALIZE
AND DETERMINE SIZE OF AN AREA
IN RELATIONSHIP TO SPACE AND TIME*

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Elsewhere it has been proposed that ideal geographic
education in the elementary school necessitates the child's
precise observation of and interaction with "geographic"
phenomena to understand man interacting within his environ­
ment. In this paper, it will be shown anew that this edu­
cation will help the child in his spatial analysis of the
earth as his personal home. The expected outcomes will in­
clude the awareness of the distribution, association, organ­
ization, or integration of phenomena in the man-earth eco­
system.

As in my previous paper, the following questions bear
consideration: to what extent can the elementary school
child observe and interact with his environment? what kind
of learning experiences may nurture his study of the earth
as his home?

Among the several skills needed by the child to observe
phenomena directly or through the reading lens of a map is
the ability to visualize and determine size of an area in
relationship to space and time. The purpose of this paper,
therefore, is to demonstrate from a multi-sensory point of
view how a child through the grades may be taught the abili­
ty to visualize and and determine size of an area in rela­
tionship to space and time by comparison of things and places,
numerals, graphs, shapes, points or circles, line segments or arcs, maps and time zones. Three ways will be utilized to illustrate teaching this conceptualization of the varying facets of size of an area: namely, comparing (1) things and places; (2) square miles; and (3) relative size through time zones.

I. Comparison of Things and Places

To prepare the elementary school child in conceptualizing size of selected areas, first-hand sensory experiences of phenomena in the visual world may be introduced initially. Among some of these sensory-visual experiences are helping a child with the comparison of relative size regarding the following: (1) play blocks as frequently found in kindergarten classes; (2) work and play areas indoors and out; (3) tables, desks, and chairs in the classroom, cafeteria, library, or yard; and/or (4) items and books in the classroom and library. These activities would likewise involve the youngster in an exploration into the relationship between the shape and size of an area. An additional activity could involve the relative size of one's shadow in relationship to time. Shadow dolls could be prepared, cut out, and utilized in comparing size of shadows during different times in the day and school year.  

As a child increasingly is able to visualize the shape and size of things around his immediate environment, the teacher may introduce him to compare spatial areas on globes and maps. For example, the teacher could ask, "Which of the land areas in Diagram 1 is greater in size?" Another step would be to compare and locate these land areas on a globe.

Adding the dimension of time, the growth of the United States can be assessed in terms of historical land increase, using a succession of maps such as the following.
An investigation into the areal size of a city can lead into plotting its shape, such as the following:

Here, City A is shown as a circular settlement pattern and City B as a rectangular settlement pattern. In addition, City A and City B may be compared as to the size of one city with another. A question may arise as to why each is shaped the way it is. This could develop into the study of settlement patterns. Further inquiry may result into an examination of each city's shape and size in time, requiring plotting the settlement patterns of the cities at selected historical periods.

Another and more symbolic way that a child can be assisted to visualize and determine size is to represent a place or an area with representations of a point or a circle. In doing this, it needs to be remembered that an area of a circle is proportionate to the size of the place it is representing. Size of a place such as a city or region may be determined by increasing the size of a circular representation such as appears in Figure 1. Or, size of a place may be determined by assigning numerical value to geometric representations as in Figure 2. Or, it may be ascertained by clustering representations of points or circles as appears in Figure 3.
Figure 1

Size of Place Determined by Size of Circle

Figure 2

- Under 50 Sq. Mi.
- 50 - 100 Sq. Mi.
- 101 - 150 Sq. Mi.

Numerical Value Assigned to Point or Circle to Determine Size of a Place

Figure 3

Size of Place Determined by Clustering Points or Circles
One will note that, in the preceding examples, conceptualization and utility of relative terms such as those appearing in Figure 4 would be a primary means for comparative size of an area. Furthermore, these relative terms would continue to be basic vocabulary for the child after the introduction and use of precise measurement.

Figure 4
Sample List of Relative Terms

<table>
<thead>
<tr>
<th>Large</th>
<th>Big</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger</td>
<td>Bigger</td>
<td>Smaller</td>
</tr>
<tr>
<td>Largest</td>
<td>Biggest</td>
<td>Smallest</td>
</tr>
<tr>
<td>In Between</td>
<td>Greater</td>
<td></td>
</tr>
</tbody>
</table>

As the child learns to use a ruler and/or tape measure, he may compare sizes of phenomena more precisely through the measures of inches, feet, or yards. The use of precise measurement can lead to comparisons of the size of geometric figures, including, for example, road signs (see Figure 5). In later years, the use of geometric figures for comparative size will be the focal point in determining size of an area in space and time.

II. Comparison of Square Miles

As the child deals with relative and exact shape and size of things and places and begins to conceptualize them in space and time, he would be introduced to these skills through a second and more mathematical means. This involves the understanding and use of square miles to determine the size of an area in space and time.

One way to help the child is through the presentation of raw data in numerals on a table such as Table 1. A child may determine the rank order of areal size from greatest to
least through numerical computation.

A modification of this procedure would be to have a child first indicate an approximation of area in nearest millions and then determine the rank order.

A second modification would be to present the approximated rather than the raw data such as appears in Table 2.

TABLE 1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAZIL</td>
<td>3,286,170</td>
<td></td>
</tr>
<tr>
<td>CANADA</td>
<td>3,621,616</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>3,554,609</td>
<td></td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>8,570,600</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAZIL</td>
<td>3,286,170</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>CANADA</td>
<td>3,621,616</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>3,554,609</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>8,570,600</td>
<td>8.6</td>
<td></td>
</tr>
</tbody>
</table>

Still another step would be to convert the data from the table to a graph, preferably a bar graph in the beginning (Figure 6).

For greater visualization of the differences in area, an abstract reshaping of places into squares or rectangles such as appear in Figure 7 may be more helpful to the child.
FIGURE 6

Land Area of Brazil, Canada, U.S.A. and U.S.S.R.
(millions of square miles)

FIGURE 7

COMPARATIVE LAND AREA SHOWN RECTANGULARLY

U.S.S.R.

CANADA

U.S.A.

BRAZIL

1 million sq. mi.

37
The mathematical data for Figure 7 may be derived from Table 2, having each square inch of the shapes in Figure 7 represent a million square miles. When these shapes are cut out similarly to those of the land areas shown in Part I of this paper, they may be readily compared by placing one over the other.

Space permits exploration of one additional technique; namely, using line segments or arcs. Figure 8 is a representation of a line segment or arc which in turn is a linear approximation from the data indicated in Table 1.

In all instances—whether through numerals, table, or graphs, or through such geometric representations as shapes, line segments or arcs—the illustrations cited were in relationship to space. That of time would be easily done by adding tables, graphs, and the like to represent the areal size during selected historical periods.

III. Comparison of Size through Time Zones

In the first two portions of the paper several ideas for visualizing and determining exact and relative size of things and places were presented, including determining relative size longitudinally.

A technique which may capture the imagination of a child in the middle grades is that of a longitudinal comparison of areal size, for example, through the use of time zones. In attempting to determine which nation is greater in longitudinal extent, a child may be asked to count the time zones within the United States of America and the U.S.S.R. His finding seven for the U.S.A. and eleven for the U.S.S.R. will help him visualize the difference in areal size of these two powers. With further probing the child will discover the areal extent of these two nations, longitudinally speaking, over the face of the earth.

Space disallows exploration into other facets of visualizing and determining size in space and time and of related
FIGURE 8

Line Segment Representing a Linear Approximation of a Measure of a Region

Brazil

Canada

U.S.A.

U.S.S.R.

| in. = 1 million sq. mi. |
concepts other than size—such as population, use of highways, and the like.

In closing a word of caution needs to be expressed. Every illustration herein given has its limitation. Wrongfully used, it can mislead a child. A child needs to be aware, for example, that a comparison of the size of Peru and the United States by use of time zones would be out of place as the two nations are not latitudinally similar.

IV. Conclusion

In summary, three means have been utilized to illustrate the different ways an elementary school child may be helped to visualize and determine size of an area in relationship to space and time. The three are comparison of (1) things and places; (2) square miles; and (3) relative size through time zones.

From a multi-media point of view, an imaginative and resourceful teacher can effectively help a child use these and many more means to visualize and determine areal size in space and time. In doing so a teacher will be nurturing the child's curiosity, skill, and involvement in the study of the earth as his personal home.

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Grateful acknowledgement is extended to Dr. John C. Archbold, San Diego City Schools, and to Dr. William F. McClinton, California State College, Stanislaus, for their suggestions and clarifications regarding geographic and mathematical terminology.


2 The term area is used in reference to places and/or phenomena.

4Possibly a more precise delineation would read "Comparison of Areas" as an area may be defined as a measure of congruent square regions such as square miles, which is the focus of this section of the paper. (For a geographic definition, see F.J. Monkhouse, Dictionary of Geography [Chicago: Aldine, 1965], p. 19).

CHANGING NET TECHNOLOGY AND RESOURCE DEPLETION IN THE SARDINE FISHERY AT MONTEREY, CALIFORNIA

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A common pattern in the development of primary extractive industries often follows this sequence: continual introduction of, resistance to, and eventual acceptance of ever more efficient modes of resource extraction. Implicit in this process, but generally unstated, is the notion of an infinite resource base. Although cries of resource depletion may be sounded under the veil of ecological concern, in reality such resistance is most often shown by those possessing less efficient systems of resource extraction, thus reflecting little more than the fear of the inability to compete with newer technology.

One of the more dramatic examples of the introduction—resistance—acceptance pattern in technological development occurred in the sardine fishing industry in and around Monterey Bay during the first half of the twentieth century. Viewed in retrospect, the role of changing net technology can be seen as one of the fundamental causes of the vicissitudes and decline of that industry. What follows is a survey and analysis of the major introductions, oppositions, and adaptations of fishing net technology.

Early Nets

The inception of the sardine fishery at Monterey can be traced to the efforts of Frank E. Booth, northern California businessman and entrepreneur. Booth was head of the Sacramento Packer's Association in the 1890's, and owner of the
Black Diamond (later Pittsburg) Cannery on the Sacramento River. In 1895, Booth began canning operations in Monterey based primarily on canning salmon. In 1900, the canning of sardines (*Sardinops sagax*) was initiated on an experimental basis. Although Booth's initial attempt in 1900 yielded only three hundred cans of sardines, by 1902 output had increased to three thousand cans. During this experimental period the sardines were caught with gill nets stretched between two anchored points. The mesh of the gill net was of such size that the sardines could readily extend their heads through the openings in the net, but in backing out would catch their gill covers in the webbing, thus entangling themselves. The net was periodically hauled aboard a small boat, but a large percentage of the fish escaped, often incurring fatal injuries in the process. Those that did not escape had to be removed from the net by hand.

The commercial phase of the fishery began with the completion of Booth's new and larger cannery in 1903. For commercial purposes the gill net promptly proved to be unsatisfactory and was replaced by the hand-operated purse seine. The purse seine was made of one-inch mesh, twelve fathoms deep and two hundred fathoms long. The length of the net allowed for nearly complete encirclement of a school of fish with the webbing draping down around the fish. A line which extended through rings on the lower side of the net was pulled, causing the net to close from the bottom and thus trap the fish in the pocket formed.

Although the size of the catch varied from run to run, the purse seine temporarily supplied the rather limited demand required by Booth's operation. One of the major disadvantages of the early purse seine was its relatively shallow depth, which excluded fishing in deep water, a hindrance which was magnified by the fact that sardines were rarely found in shallow water during daytime, and night fishing had not yet been perfected.
The second limitation of the early purse seine was that because of the thin mesh and manual operation, which required a crew of ten to twelve men, the net had to be laid out and "pursed" (i.e., gathered) very slowly. Therefore, when operating in relatively deep water, large numbers were able to swim out of the net before complete closure.

As the demand for sardines continued to mount, discontent with the purse seine increased. The unreliable nature of the early purse seine was, in part, a function of the fishermen's inexperience at sardine fishing in general, and relatively inefficient netting procedures in particular. Concomitantly, there was a general lack of knowledge concerning the habits and movements of the sardines.

Lampara Net

In 1906, Booth consulted with Peter Ferrante and Orazio Enea of the Black Diamond Cannery on possible methods of increasing the supply and reliability of the sardine catch. Both men were born in Sicily and had fishing experience in the Mediterranean. At their suggestion, Booth ordered a lampara net, common in the Mediterranean, from Tangier. Its name was derived from the Italian word lampo, because of its strength and "lightning" fast haul. Although the original imported lampara net quickly tore to pieces, it was, nevertheless, used as a model for the construction of subsequent lampara nets. Constructed of rather thin, tight webbing, except in the wings, its operation involved encirclement of the fish, merging of the two ends, and constriction of the webbing (see Figure 1). As opposed to the purse seine, the lampara net contained a "bag" or bunt sufficient in size to enable holding tons of fish until the bottom of the net could be closed, thus increasing the relative efficiency of the net and of the catch.

Initial experiments with the lampara net revealed that in daytime sardines could swim through the coarse webbing in the
Three major types of nets used in the sardine industry at Monterey.
(After Fry, 1931.)
wings of the net. During night, however, it was discovered that, as the webbing was pulled through the water, it agitated phosphorescence in the water which increased the effectiveness of the constricting wings in directing the fish into the bag.

The introduction of the lampara, and the advent of night fishing, proved to be a resounding success causing the total size of the catch to increase dramatically. Furthermore, the lampara net required less labor, while being faster and more efficient. It was also significantly cheaper, costing $600 as compared to $2,500 for the purse seine.⁵

Despite the numerous advantages of the lampara net, many of the local fishermen remained skeptical. They claimed that the net was unduly destructive and would lead to the depletion of the resource. Yet, with each successive season, the number of crews using the lampara net continued to increase. The controversy was still being waged six years after the introduction of the lampara net when, in 1913, a bill prohibiting the use of the lampara net in the Monterey Bay was introduced in the California legislature.⁶ Fortunately, it failed to pass. In 1914, of the eight crews employed by the two canneries at Monterey, five used the lampara, one the purse seine, one used both but preferred the purse seine, and another used a modified lampara.⁷

One or two purse seine crews at Monterey operated until 1917, but by 1918 the lampara had become virtually the only net in use, and remained unchallenged until the late 1920's, although structurally it did undergo a series of modifications which led to a rudimentary version of a ring net—the half-ring net or "purse lampara."

Purse Seine

At San Pedro, California, during the early months of 1925, a single crew once again employed an improved version of the purse seine in catching sardines. As a result of the
success of that venture, twenty-five additional crews were using the purse seine at San Pedro by November of 1925. The reintroduction at Monterey, however, was interestingly and somewhat paradoxically delayed. Following the success of the purse seine in southern California, the Hovden Cannery at Monterey retained two purse seines for use in the 1926-27 season. The success of those two crews resulted in a coalition between the Monterey Fishermen's Organization and the Sardine Boat Owner's Organization in an effort to prohibit further use of purse seines at Monterey. The further entry of purse seines was temporarily stifled by the unified action of these two groups. The lampa fisherman, once the controversial vanguard element themselves, conservatively argued that the purse seine was more destructive than the lampa net, and would lead to depletion of the resource.

Structurally, the improved version of the purse seine had rings strategically located on the lead line which facilitated a quick closing of the net. The bag was also at one end rather than in the middle as in the lampa. The advantages of the new purse seine were said to be its superiority in rough water, in fog, and on nights when the sardines were extraordinarily active. The mechanical pursing of the net was also found to be quicker and more efficient than the lampa, thus reducing the labor requirement. Perhaps equally or even more important than the net per se was the newer, larger, and more mechanized boat employed by the purse seine fishermen. The transportation and storage advantages allowed movement to more distant fishing areas, and storage capacity was increased from sixty to two hundred tons. These factors became increasingly important as the burgeoning demands of the canneries greatly diminished the once adequate local supply, thereby necessitating expansion to more distant fishing grounds. During the 1928-29 season, the Monterey sardine fleet ventured as far as Half Moon Bay, California, seventy miles to the northwest.
In the spring of 1929 at Monterey, there were fifty-eight lampara crews, two purse seine crews, and one Japanese crew using a modified lampara net. By December, 1929, and with the ban imposed on purse seines lifted, the number of purse seine crews increased to twenty-eight, with the majority berthed in southern California. During the 1929-1930 season, the purse seine crews accounted for forty percent of the catch received by the canneries at Monterey. The extent of that success meant the virtual termination of the lampara net in its familiar form.

The relatively large capital investment required to purchase the purse seine ($5,000 to $6,000), and purse seine boat ($20,000 to $25,000), deterred most lampara fishermen from immediately shifting to the purse seine. In lieu of adopting the expensive purse seine, the lampara fishermen, following a pattern established earlier at San Pedro, demonstrated their resilience by replacing lampara nets with ring nets and installing drum winches on their boats.

The ring net was essentially a light-weight, high-speed purse seine. In general, it differed from the purse seine in the lighter twine used in the webbing and in its shorter length. By February 1930, fifty-five lampara boats were using ring nets, while not a single boat was utilizing the lampara net.

Despite the abrupt abandonment of the lampara net and adoption of the ring net, the purse seine continued to be the dominant net in use. By the 1936-37 season, of ninety-three boats delivering sardines to canneries at Monterey, sixty-three used purse seines. Beginning in 1936, the following decade saw the virtual disappearance of the ring net, leaving, through the abrupt collapse of the fishery, the purse seine as the only net in use.

The purse seine was, however, continually modified during the final decade of the Monterey sardine fishery. The most important change was an increase in the size of the net from
approximately two hundred fathoms in length to three hundred fathoms or more. In general, the trend was toward increasing mechanization, thus reducing the input of labor. Further changes, such as adoption of "floats" that were snapped along the cork line to increase buoyancy, were aimed at increasing the efficiency of the net.

Summary and Conclusion

There were three persistent trends that characterized the evolution of fishing nets used in the sardine fishery at Monterey. The first and most obvious trend was the increasing use of mechanization in all applicable phases; the second was the increasing efficiency of the net in retaining larger percentages of the potential catch; while continual increase in the size of the nets was the third. Although the implementation of the changes which resulted in these trends was persistent, the rate of change was sporadic and often based upon the innovative efforts of one or two individuals. The most successful changes were often met by initial resistance, and followed by improvements in existing systems and eventual acceptance of the new.

Cultural geographers have long pondered the processes by which innovative technology is introduced, examined, and either accepted or rejected. That particular sequence, however, often fails to convey the range of differential acceptance patterns during the examination and/or early introductory phases. In that regard, even for innovative technology that is vastly superior in terms of resource-converting capacity, the pattern of introduction-resistance-acceptance appears to be common. While the motives for resistance may vary, only rarely and recently do they seriously include the ecological component in the list of operative criteria in decision-making policy. The consequences may be—as they were in the sardine fishery at Monterey—disastrous.
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14. N.B. Scofield, 1931, p. 84.

15. Bonnet, p. 129.


The historical geography of California during the Spanish period, 1769-1821, has received relatively little attention. This lack of attention is most apparent when one attempts to locate maps for classroom use. To the author's knowledge, no detailed map of California's population exists for any time during the Spanish period. The accompanying map of California's population in 1798 is an attempt to provide such a map.

The base upon which the map was drawn came from Jose Narvaez, *Carta Esférica de los Territorios de la Alta y Baja California y Estado de Sonora*, 1823. Data for the map were obtained from a Spanish census of all presidial districts dated 31 December 1798. The census was found in the California State Archives, Sacramento. Each presidio gathered for its district demographic information on age, sex, race, marital status, and total numbers present. The census also contained other material, the nature of which varied considerably from presidio to presidio. For example, the Santa Barbara Presidio added a few notes concerning teaching the Christian doctrine to the mission Indians, principal industries of the region, and the type of crops planted most frequently within the district.

Regional data accompanying the map reveals that at the end of the eighteenth century both the Spanish and mission populations were primarily in the southern part of the state. The heaviest concentration of mission Indians occurred in the San Diego District, while the largest number of Spaniards was found in the Santa Barbara District. The overall population distribution reveals a steady
decrease by district from south to north. Additional census data, which should broaden the perspective presented here, are currently being tabulated and mapped.
THE FRONTIER HYPOTHESIS AND RELATED SPATIAL CONCEPTS

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In the period following World War II, geographers increased their utilization of information from neighboring academic disciplines. One result has been the expanded use of historical data by geographers. During the 1960's geographers began to examine seriously one of the great interpretations of history, the frontier hypothesis of Frederick Jackson Turner. It was the historian Murray Kane who first suggested that many of Turner's ideas about the frontier qualify as part of the subject matter of geography rather than history.

Frederick Jackson Turner's frontier hypothesis, unlike most hypotheses, cannot be adequately summarized in a two or three sentence statement. The Turner Thesis is comprised of as many as twenty individual propositions. In this paper I will briefly review only those propositions that are spatial in nature with a sampling of various views presented in the past. This review of Turner's spatial concepts is being presented not to further any particular viewpoint, but in the hope that some of Turner's ideas might be utilized in courses in cultural and historical geography.

Turner did not include all of his essential ideas in his often quoted 1893 statement, as some were added in the long series of articles that appeared subsequent to the original pronunciation.

Turner's central theme was "the existence of an area of free land, its continuous recession, and the advance of American settlement westward explained American development." After 1890 the receding frontier line ceased to exist because
the remaining unsettled areas of the United States were broken up by a series of scattered settlements. At this juncture in our history the frontier as a place or zone had been closed, and the first period of American history had come to its conclusion.

Besides being depicted as the edge of settlement or free land, the frontier was also portrayed in terms of successive occupational groups migrating westward. The frontier may be understood as a combination of geography and psychology in that free land served as a gateway to opportunity and a source of hope. The frontier zone was to serve as an escape from the traditions and rules of organized society in the East and as a safety valve during times of economic stress. Turner characterized the frontier as a process of "perpetual rebirth" where civilization commenced repeatedly and as the zone of most rapid Americanization.6

Economic Advancement through Space7

Turner viewed American westward expansion as successive waves of economic development, with the most primitive economy in the west and the most advanced economy in the east. Each successive stage involved a more intensive use of the land. Each region was to go through a series of predetermined economic stages or frontiers. The following, from Turner's 1893 article, illustrates this phenomenon:

The Atlantic frontier was compounded of fisherman, fur-trader, miner, cattle-raiser, and farmer. Excepting the fisherman, each type of industry was on the march toward the West, impelled by an irresistible attraction. Each passed in successive waves across the continent. Stand at the Cumberland Gap and watch the procession of civilization, marching single file—the buffalo following the trail to the salt springs, the Indian, the fur-trader and hunter, the cattle-raiser, the pioneer farmer—and the frontier has passed by. Stand at
South Pass in the Rockies a century later and see the same procession with wider intervals between.  

Turner's economic frontiers are like the waves of the ocean, one rolling after the other with each wave to the east representing a higher economic stage. In the above quotation Turner utilized the vertical approach in describing the stages of economic development. In order to describe this economic succession horizontally, one would travel from the West to the Atlantic coast on a given day before 1890, the assumed year of the closing of the frontier. On this imaginary journey one would supposedly first encounter the Indian, then the fur trader and hunter, the cattle-raisers, the farmer, and finally the manufacturer.

The influence of Turner's concept of specific economic stages can be seen in later works on the American West. Many of Turner's "frontiers" are listed in the table of contents of such volumes on the West as Billington's Westward Expansion: A History of the American Frontier and Spence's The American West.  

Turner's concept of a specific sequence of economic development was open to criticism. Alvord, in his examination of early Illinois and Kentucky, found that several of the economic stages did not occur in successive waves but instead almost simultaneously. Carl Sauer, who was influenced by the writings of Eduard Hahn, discredited the ancient view that human civilization develops through a series of predetermined stages. The specific stages of economic development in any given location on the frontier were determined by the local physical environment, by the previous experiences of the cultures that were brought in, and by the circumstances of that particular time in history. Sauer was opposed to any such simplistic formulas, for, as he wrote:

No groups coming from different civilizations and animated by different social ideals have reacted to frontier life in iden-
tical fashion. The kind of frontier that develops is determined by the kind of group that is found upon it.  

Sauer analyzed the individual stages of frontier development as "a series of secondary culture hearths, of differing origin and composition, which there (at the frontier) began their individual evolution." He did admit, however, that some of this development had been convergent, not necessarily as a result of a compelling physical environment or pre-determined economic stage, but because of a desire for unity that developed from the growing common political awareness.

Even if one overlooks Sauer's criticism of Turner's view on presumed successive development one should examine the mining frontier in relationship to this view. In the mining camps of the American West, Turner's stages did not occur in succession, but simultaneously in a six month period. The mining camp formed a kaleidoscope of all the frontiers. The mining frontier was generally an urban experience in the sense that the mining camps were market centers into which the other frontier populations came—the traders, the cattle-men, and the farmers. On his way to the mines of Virginia City, Nevada, J. Ross Browne vividly described this phenomenon in 1860:

An almost continuous string of Washoeites stretched "like a great snake dragging its slow length along" as far as the eye could reach. In the course of this day's tramp we passed parties of every description and color: Irishmen, wheeling their blankets, provisions, and mining implements on wheelbarrows; American, French, and German foot passengers,—Mexicans, driving long trains of pack mules,—whisky peddlers with their bar fixtures,—drovers, riding, raving, and tearing away frantically through the brush after droves of self-willed cattle—in short, every imaginable class, and every possible species of industry, was represented in this moving pageant.
Athearn suggested that the frontier, prior to the mineral discoveries of the Far West, consisted of a slowly moving westward edge of civilization dominated by the rural ideal. Once the news of fabulous mineral wealth became widespread, the frontier no longer moved forward in its slow steady pace but in a series of irregular leaps.\textsuperscript{14}

It is apparent from the above criticism that Turner's geographic proposition of economic advancement through space lacks conclusive evidence. Turner, in working with John Wesley Powell's physiographic regions, was supplied a stable framework to utilize in his studies. A good verification of Turner's economic succession concept would be to apply a sequent occupant study to one of the physiographic provinces of the West. If the concept has any validity, the study would indicate a clear succession of stages of human occupancy.

\textit{The Frontier as a Cultural Hearth}

The frontier writings of Frederick Jackson Turner utilized the geographic themes of cultural hearths and diffusion of ideas. Meinig suggested the idea of spatial linkages between two areas, the frontier of the West and the earlier developed East as one of the geographic elements of the Turner Thesis.\textsuperscript{15} The frontier served as a cultural hearth or center of invention from which innovations, particularly of a political nature, were disseminated to the older portions of our country and Europe. Turner in 1914 described American democracy as an innovation of the frontier:

American democracy was born of no theorist's dream; it was not carried in the Sarah Constant to Virginia, nor in the Mayflower to Plymouth. It came out of the American forest, and it gained new strength each time it touched a new frontier. Not the constitution, but free land and an abundance of natural resources open to a fit people made the democratic type of society in
America for three centuries while it occupied its empire.  

According to Turner, the frontier not only promoted democracy in the United States, but also promoted it in Europe as well. Turner stressed the role of the wilderness in the development of American institutions. The uniqueness of our institutions, he argued, was a result of the fact that they were compelled to adapt to the changes involved in crossing a new continent, and in conquering a new physical environment.

Ray Allen Billington, a Turnerian, argued that the West had made a unique contribution to America's expanding culture. It was on the frontier that nineteenth century romanticism was replaced by creative realism in the various artforms. America had finally won its literary independence from Europe with the writings of Bret Harte and Mark Twain.

A leading geographic historian, Walter Prescott Webb, was an ardent supporter of the contention that the frontier should be considered a center of invention. In his book, The Great Plains, he outlined various adaptations to the Great Plains environment to illustrate his thesis. Examples of the types of innovations and inventions that made the farmers' approach to the American West possible included the colt revolver, the windmill, the barbed wire fence, and adjustments in water law.

The California Gold Rush served as a center of invention for the American mining frontier. Several of the innovations that were disseminated from California to mining camps in other western states included the California stamp mill, hydraulic king, and western mining law such as the apex law dealing with claims. W. Turrentine Jackson's Treasure Hill reports some of the innovations that were stimulated by certain needs in the White Pine silver mining rush of Eastern Nevada. For example, experimentation was begun with reduction furnaces when the stamp mill proved inadequate in processing certain ores.
However, not all writers accepted the Turner proposition that the frontier was a cultural hearth. Benjamin Wright argued for the diffusion of political institutions from the East to the West. He felt that very little desire existed among those who framed the early western constitutions to introduce governmental forms different from those that had been long established in the East. Slightly altered forms of the Eastern political and governmental models do not constitute a basis for suggesting that the westerners adopted innovative governmental structures. Hence, the frontiersmen were noncreative in the establishment of their political institutions and, in this sense, the West exerted its influence through imitation.

John Hicks maintained that the distinctive Midwestern social theories and educational practices were imported from Europe. He also argued that the ideas brought across the Atlantic were more tenacious than those which originated in the East. Fox, in examining the concept of the origin and dispersal of ideas in relationship to the American frontier and Europe, concluded that there was a transport of ideas in both directions.

In a recent article Meinig rejected the notion of frontier inventiveness as being overly simplistic. The West has always tended to be the imitator rather than the innovator. The basic social institutions such as churches, Meinig argued, are generally part of the larger national network of such institutions.

Turner's early views on American originality were more moderate than his later ones. In 1892 he suggested that the study of innovation on the frontier was the study of European germs developing in an American environment. His later writings placed less emphasis on importations and a greater emphasis upon originality. In his publications Turner utilized some of the concepts of culture traits, but his later work has received little attention from scholars of this
area because of its vague and elusive nature.

The Frontier as a Region

The third spatial element of the frontier hypothesis was a dominant theme among geographers during the early decades of the present century—regionalism. Through the influential writings of Alfred Hettner and Pierre Vidal de la Blache, this approach was brought to America where it became a dominant force after World War I. It is remarkable that many of Turner's thoughts in the area were expressed when regionalism started to catch hold in American geography. In 1926 Turner expressed the need for regional study:

As the years go on and the United States becomes a settled nation, regional geography is certain to demand at least the same degree of attention here as in Europe. 28

The writings of Frederick Jackson Turner were devoted largely to two types of regions: the frontier and the section. Turner's early definitions of the frontier were rather vague. In 1893, he described the frontier as a boundary or line between specific types of areas such as "the meeting point between savagery and civilization" or "the margin of that settlement which has a density of two or more to the square mile." 29 In the same essay he pictured the frontier as being comprised of successively westward moving zones of occupational groups as discussed earlier in this paper. 30 His 1925 statement sustained the notion that the frontier was a unique region:

The West was a migrating region, a stage of society rather than a place. . . . The "West" was more than "the frontier" of popular speech. It included also the more populous transitional zone adjacent, which was still influenced by pioneer traditions and where economic society had more in common with the newer than with the older regions. 31
Turner's concept of the section was largely formulated upon the physiographic regions of John Wesley Powell. The frontier advance was not into uniform space, but into a series of physiographic provinces equivalent in size to many European nations. According to Turner, when settlers of differing origins adapted themselves to new geographic environments, new societies and sections were created in the pioneering process. The sections formed by this process created a different type of regional entity, namely the political region. Turner asserted that it was not the individual states but a regional group of states acting in concert that exerted the greatest political muscle.

In its simplest form, Turner's classification contained four basic sections: the three static sections of the Atlantic seaboard and the moving section which could be best described at any time as the West. However, as his interest in sectionalism grew, his regional classification gained sophistication as indicated in the following 1922 statement:

So I was forced to undertake a survey of the Region in American history as well as the Frontier. I was forced to study the evolution of society and politics in the old Northwest, the Middle West, the western border states like West Virginia, Kentucky, Tennessee, the Cotton Kingdom of the Southwest, in contrast to the tobacco planting states of the Old South; the opening of a New Southwest in Texas and its neighbors, the colonization of a New Northwest along the Columbia basin, the California empire along the Pacific coast; the conquest of the Great Plains and the Rocky Mountains; the dealings with Arid America. . . .

According to Turner each of the above regions would influence the balance of political power and economic life of the United States. Each section of several states would act as a bloc in Congress, and Congressional compromises might be suggestive of certain agreements between European nations.
Despite the fact that Turner was familiar with the work of regional geographers like Bruhnes, his work was not entirely in their tradition. Turner's regional discussions were largely dominated by the distribution of political power, and regional geography served as a background. Turner certainly would not qualify as the "life-time" regional specialist suggested by Carl Sauer.34

The Frontier as a Closed World

The postulated closing of the frontier is an important component of the geographic question of closed versus open space. The heretofore mentioned geographic concepts have considered the frontier as it existed before 1890 but did not account for its passing. Turner formulated his hypothesis upon a statement in the 1890 U.S. Census Report, which asserted that the frontier line had ceased to exist because the unsettled area had been interspersed with many isolated settlements.35 The frontier was to serve as a place of opportunity and an economic safety valve. In one of his most famous statements Turner noted that "never again will such gifts of free land offer themselves," and "the frontier is gone, and with its going has closed the first period of American history."36 According to Turner's assumption, the American frontier had undergone a transition into a world of closed space. Man had to plan his living accordingly and compete for the most valuable space and resources.

Turner's concept of "free land" was by no means new. He had been familiar with the work of the Italian economist, Achille Loria, and his Analisi della proprietà capitalista, which held that the relationship of man to the amount of "free land" available for cultivation provided the key to human history.37 Turner was likewise indebted to Henry George and his Progress and Poverty for concepts relative to the public domain.38

The historian James Malin interpreted the role of
Turner's closed space concept upon subsequent events in American history. During the Great Depression the idea of a closed frontier was accepted literally by many individuals. To them it meant that the "safety valve" ceased to exist as a cure for economic hard times. Under the subsequent New Deal program, a planned economy was to serve the function performed by the free land of the frontier prior to its closing about 1890. 39

Frederick Jackson Turner and James Malin were not the only scholars to utilize the closed world theme. The idea of closed space also had its impact upon the geographic writings of Halford Mackinder. His "heartland concept" led to the field of geopolitics, which was to explain German imperial interest in world politics. The events of World War II virtually destroyed geopolitics as a respectable field of study. In the final analysis, if one accepts literally the closing of the frontier in a spatial sense he could best be described as an adherent of what Malin calls "closed world determinism." 40

As president of the AAG in 1945, Derwent Whittlesey suggested that geography should be viewed in a broader perspective than suggested by the Turner and Mackinder doctrines of closure of the "two dimensional earth." He offered the view that geographers should not only take into account the "two dimensional earth" on which we live but also "the three dimensional earth which we are using without occupying it, and a four dimensional earth which appears to offer scope for continued regulated advance." 41

Although Turner expressed himself in spatial terms, it is likely that he never intended the pessimism that later writers attributed to him. It seems probable that Turner intended the closing of the frontier to be more symbolic than real. In 1914, he stated:

In place of frontiers of wilderness, there are new frontiers of unwon fields of science, fruitful for the needs of the race;
there are frontiers of better social domains yet unexplored.42

In his later writings, Turner did not dwell excessively upon the much debated question of the frontier but instead turned to a consideration of the section.

In conclusion it is evident that several of the spatial propositions that Turner advanced form an important part of the subject matter of geography. The themes of economic advancement through space, cultural origins, the region, and closed world doctrines are important ingredients in the realm of spatial study. Turner's geographic contributions were not only spatial in nature but also included the question of environmental influences.

Certain aspects of Turner's methodology, such as the use of predetermined economic stages and physiographic regions, have been employed by various geographers. Despite the strong geographical orientation of Turner's methodology, his works have not attracted the interest of a large number of geographers. Part of this situation is undoubtedly the result of Turner's vague style. Turner could best be described as a "broad brush" historian whose work was based upon flowery language and sweeping generalizations. However, Mikesell suggested in 1960 that the Turner Thesis could form a satisfactory framework in analyzing frontier advances into unsettled areas.43 Admittedly, the spatial concepts presented in this paper are not plausible in certain frontier situations; nevertheless, they should serve as a starting point for a geographic study of the processes of settlement.

REFERENCES


5 Turner, p. 1.

6 Turner, p. 1.

7 This concept is synonymous to Meinig's "cultural succession in space." See Meinig, p. 95.

8 Turner, p. 12.


12 Sauer, p. 282.


15. Meinig, p. 95.


24. John D. Hicks, "The Development of Civilization in the Middle West, 1860-1900," in *Sources of Culture in the Middle West*.


38. Jacobs, pp. 15-16.


40. Malin, pp. 41-3.


Teaching children to be aware of the world around them is one of the classical aims of liberal education—liberal in the sense of liberating the individual. A few simple exercises can be worked into the elementary school curriculum to enhance the child's awareness of his surroundings, thereby adding to that child's liberal education. The exercises presented here introduce scale, maps, and spatial relations, and through these increase awareness of one's environs. The material required is minimal—a few maps (either readily available or easily constructed). Photographs, including air photos, would be helpful but are not necessary.

The procedure used is a succession of maps of decreasing scale, i.e. maps covering successively larger areas (and concomitantly successively more generalization). At each stage, salient features are identified and the linkages between places are illustrated. The focal character of places—the fact that different activities occur at different places—is stressed. The maps may be accompanied by photographs, which would ease the students' transition from the comprehension of what they see around them to the comprehension of that abstraction called a map. Throughout the exercise, the child moves from the familiar to the unfamiliar.

Procedure

The first exercise is to map the classroom. Obviously each child is familiar with the area enclosed by the room.
The teacher (or the class) provides outline maps showing the proper shape of the room and the location of such "border" elements as doors, windows, and chalk boards. The children are asked to map the contents of the classroom. For younger children, the transformation from what they see in the room to the "birdseye," two-dimensional view of the map, may be taxing. This should present little challenge for the older children, but the experience may make later exercises more meaningful as they move from the familiar to the unfamiliar. The maps could include the teacher's desk, cloakroom, special equipment, children's desks--really anything in the room. If appropriate to the spatial and functional organization of the classroom, the maps could also show areas reserved for special activities, e.g. a reading area or painting area. This would convey the focal character of place, the fact that some activities are limited to particular, restricted locations. By working on such a large scale, with minimal generalization of shapes and little need for symbols, this exercise conveys the concept of a map as a representation of reality. Having learned this, the students are prepared for the next exercise.

The second exercise revolves around the school. It is here that photos may most profitably be introduced. By leading from ground shots to aerial obliques to an aerial overhead view, the visualization of the area to be mapped could be made, reinforcing the first exercise. Whether photos are available or not, scale is reduced from that of the classroom map to enable the entire schoolyard to be portrayed. For upper grade children, the actual mathematical differences between the two scales would be illuminating, but such precision would probably be lost upon younger children.

The school maps could include elements of form, as well as function: the buildings, playground, parking lot, land-
scaped areas for the former: the classroom, cafeteria, specialized parts of the playground, or areas "possessed" by specific groups for the latter. Routes used as one switches from one activity and its place to another activity at another place could also be extended or introduced here, as the case may be.

Having familiarized the class with the two worlds they share--classroom and school--one may proceed to a more complex, more distant world. This third exercise involves the neighborhood, possibly best defined by the area served by the school. Armed with street maps, the students could locate: first, the place they hold in common, the school; second, their individual residences; and third, the typical routes they take to school. Thus the main elements of the school community could be established. Following this, other neighborhood places and activities could be mapped. These might include stores and parks frequented by the children and their families. Barriers inhibiting movement might be mapped, too, if any exist in the area. These might include railroads or drainage channels. Earlier lessons could be expanded through discussion of different land uses and the juxtaposition of these. Travel behavior could also be profitably discussed, and this could include such topics of interest to children as mobility via different modes of transportation, e.g. walking, riding a bicycle, or driving.

Having discussed the neighborhood, the area in which the children spend the bulk of their time, the fourth exercise is to increase the scope (decrease the scale) to the city as a whole. Street maps of the area are required, and it would be helpful if these were supplemented by maps of land uses and landforms. For starters, the children could locate their neighborhood, then expand to their parents' places of employment. Lines could be drawn to connect the two, both on individual maps for each child and also on a composite map for the whole class. This could convey not only the larger scope of adult living but also the inter-
relatedness of various parts of the city. To kindle the children's interest, places of importance to them could be identified, places such as a zoo, stadium, or amusement center. The degree to which this exercise is extended would depend on the time available and the sophistication and interests of the students.

The progression could be completed with still smaller scales: state, region, nation, and world. Communication among places and the products available locally from distant places would be pertinent topics, as would the ways children live in other societies.

Through these exercises the child may develop a keener awareness of the world around him, as well as grasp the essence of maps, the concept of scale, and the spatial dependence we have in a complex, specialized world. Though photographs could be usefully employed, the equipment requirements are really limited to obtaining maps at the appropriate scales. The instructor should be able to ditto maps of the room and school, find street maps of the neighborhood and city, and obtain outline maps of any larger areas desired.

Practice

The ideas outlined above have been employed in the classroom, adapted to local conditions and to the needs and abilities of the children involved. The results were encouraging, especially considering that the class in question was a kindergarten class, albeit one with the school's more mature kindergarten children. Nancy Maack presented the exercises to her kindergarten class in the Las Virgenes Unified School District in Los Angeles County. The rest of the paper is her report of that experience.

Geography for Kindergartners

Thirty-two children from middle and upper middle class homes comprised the class. They measured average to mature
on the Gesell Test of Maturity given before the school year began. The objectives of the geographic exercise were:

1. To expose the children to the cardinal directions and means of finding those directions with shadows and compass;
2. To help the children to read simple picture maps;
3. To enable the children to find their homes and bus stops on a neighborhood map;
4. To expose the children to maps in general and to relate the location of home, school, city, state, and nation;
5. To expose the children to the skills needed in drawing simple maps and to have them try to draw maps; and
6. To have the children go as far as they could in geographic learning without crossing the frustration level.

The unit began at a level to which the children could relate, the classroom. Outside the room, shadows were used to determine directions, and the findings were supported by a compass. The directions were labeled in the room, and all this was reinforced by reading to the children from Franklin M. Branley's *North, South, East and West*, which discusses directions and simple maps.

A few days later a large outline map of the room was presented to the students. Following the prompting of the children, the teacher located the furniture on the map. Then each child was given a small outline map of the room and asked to fill it in. One very good map is reproduced on the facing page. A few of the children were frustrated, but all of them did try. Some of them needed a lot of guidance, but most of the class successfully located the rug and tables. Most of the children seemed to enjoy the exercise and were proud of how well they had done. The proportions of the objects were surprisingly accurate.

The next step was the playground. Again, a large map for the whole class was used, then smaller individual maps. An outline was provided with little direction on what should be done with the inside area. This exercise was performed
outside so the children did not have to work from memory. A major problem was transforming the three-dimensional world onto a two-dimensional map. The tables were easy, but the swings and barrel were not. Eventually one child drew the swings, and the others filled in the other equipment. The teacher guided them by asking, "Have you forgotten anything?" or "Can you see other things in the yard which you can't see on our map?" After everything was drawn, the map was color ed. No legend was included because the children were not regarded as prepared for that concept. The individual maps presented more difficulty than those of the classroom. More children were frustrated, but many were excited and eager. Again, one of the better maps is reproduced opposite. Ten children were unable or unwilling to complete the exercise. The rest did fairly well.

Before leaving the scale of the school, the teacher provided maps for a treasure hunt. This reinforced the meaning conveyed by the maps and showed how useful a map could be. When it was felt that the children had a sufficient understanding of what a map is, the teacher moved to the next exercise.

The neighborhood exercise began with a discussion of the areas in which the children live. No satisfactory map existed for the school's catchment area as a whole, so a composite was made. A large map was drawn on poster board for classroom use. Small houses were cut out of construction paper and identified with a child's initials and house number. The children placed their homes on the map. (Since the teacher had visited each child at home there was an accuracy check.) Guidance was given if necessary, but usually the child either knew where to place the house or obtained help from other children who live nearby. A few days later the teacher asked the children to identify their homes on the map, and this they did with ease, evidence that they understood what was going on. Since the children all took a bus to school, bus stops were mapped.
K1 Playground
The next step was to introduce a map of Los Angeles and places the children had been were discussed. Initially there was trouble because the children did not have a realistic idea of the distances involved in their travels. They wanted to locate Mexico, Palm Springs, and Denver in the Los Angeles area, but they soon caught on. Places such as Disneyland, the ocean, Griffith Park, and the airport were identified on the map.

From Los Angeles it was an easy shift to maps of California and the United States. The children discussed the oceans, states in which their grandparents lived, or where the children themselves had lived. Their excitement over all this was magnified through the reading of Laurent de Brunhoff's *Babar Comes to America.* A map was utilized to follow Babar's trip across country.

The final exercise was a discussion of the globe and why it was a good type of map. The children mentioned that it was good because it was round, just like the earth. They enjoyed finding the United States and California.

Several concepts were left out of this unit. Perhaps it should be explained why. Nothing was done with exact size relations because of the maturity level and lack of understanding measurement. Proportions were stressed, and this the children comprehended. Legends were ignored partly because of the children's minimal reading skills and partly because they were not really necessary for the children to understand their own maps. Nor was a scale used. The children had not learned about feet or miles.

During conferences with the parents and during open house, several parents commented on how great they thought this map unit had been and how interested the children had been in it. One mother told of a weekend outing during which her son had used a map to follow the family's route. This boy had also drawn several maps at home.

The unit was an easy one to teach, and it was quite successful. It was fun for the children and they gained
understanding and exposure which will make geography easier for them to learn. They may not retain that much now, but when the subject is taught again in a higher grade, it should be easier for them for having been exposed to it this young.

REFERENCES


THE POLITICAL GEOGRAPHY OF THE RELICTED LANDS OF THE GREAT SALT LAKE

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For most of the period that the white man has been in the Great Basin, the development of the Great Salt Lake's resources has been given little consideration, especially in view of the potential which the lake possesses. Although a number of ponds for the evaporation of sodium chloride have existed for many years along the lake shore, their output has been limited almost entirely to local demand for salt. The existence of many chemicals other than common table salt in the lake has been known since the mid-eighteen hundreds, but little research and practically no investment in facilities have taken place to retrieve other potentially more profitable chemicals from the lake. In 1967 the lake's economic potential came to the attention of some of the largest chemical producers in the United States as well as to some foreign producers, and subsequent feasibility studies have indicated the practicability of extracting a variety of chemicals from the lake.

The process of extracting minerals from saline brine is known as fractional crystallization and depends basically upon evaporation for its implementation. Fractional crystallization means simply that certain salts before others will precipitate out of brine as solids as the salinity of the brine increases. This process, which results in the concentration of solids in the brine, is carried out by evaporation in ponds built to maximize brine exposure to solar energy. In the case of the Great Salt Lake brine, the first solid to precipitate is sodium chloride. This
salt is the most abundant lake mineral but is the least important economically. Other salts, such as potassium sulfate and sodium sulfate, precipitate at a point of greater concentration than sodium chloride and are of greater value. The liquor which remains after the first three salts have been precipitated contains a high percentage of magnesium chloride, magnesium sulfate, and a small percentage of trace elements such as lithium, bromine, iodine, cobalt, and strontium. The commercial value of magnesium salts is the greatest of all minerals in the brine.

The total value of all mineral salts in the lake is estimated to be many billions of dollars. According to the Utah Geological and Mineralogical Survey, the lake contains between "4 and 6 billion tons of dissolved mineral solids" which are estimated by Professor Glassett of the Brigham Young University to be worth between "60 and 75 billion dollars." This sum is almost equal to the value of such fabulous mineral finds as the East Texas oil field and the Prudhoe Bay discovery in Alaska. The cost of salt extraction would be higher than drilling for oil; and profits, therefore, would not be as great. But the Great Salt Lake's brines are a fabulous mineral lode measured by any standard.

With many billions of dollars in mineral wealth at stake, it is not surprising that the lake has begun to attract a number of investors to tap its resources. Since 1967 three major companies have built large scale solar pond complexes on the shores of the Great Salt Lake and have begun the initial operations of mineral extraction. Since the ponds, of necessity, must be located close to the brine source, the abundant mudflats that formerly composed the lake bottom when it was at a higher stage serve as the usual ponding location. Most of the land upon which these ponds have been built has been exposed since the arrival of the white man in the area. From the 1870's onward the lake datum has been falling due to drier weather conditions and
to large scale diversion of tributaries which feed the lake. Water diverted is mainly used for irrigation and culinary purposes with a high percentage lost due to evaporation. (See Figure 1 for lake levels at various time periods.)

The land which has been exposed by the falling lake level is of great value to mineral companies for ponding operations as well as to the State of Utah for tax and royalty revenues. The cost of pumping plus the cost of purchasing higher and usually more valuable industrial sites requires that solar ponds be located on these newly exposed or relicted lands. Ownership of the former lake bottom is, however, the object of a dispute between the State of Utah and the federal government. The lands now exposed could belong to one of two parties: either the State of Utah, which owns them by virtue of sovereign rights over navigable waterbodies within its borders as well as the earth under them, or the owners of land on the adjacent uphill slope above the lake bed. Since the federal government holds title to the largest percentage of property above the shoreline, the State of Utah is suing, in the Supreme Court of the United States, to quiet title of all relicted lands. Numerous private owners with holdings uphill from the lakeshore are also extremely interested in the outcome of the case since the value and extent of their land will be affected by its outcome (see Map).

In the case presently before the Supreme Court, the State of Utah is contesting the right of ownership to the lake's relicted lands in addition to the minerals which lie therein; the suit is based upon the doctrine of navigability:

The State of Utah claims that by virtue of its admission into the Union on January 4, 1896, on an equal footing with all other states of the Union, it received title to the beds of all navigable lakes and rivers located within the State of Utah.
Figure 1: Fluctuations of Great Salt Lake
The lake level at the time of Utah's entry into statehood stood at 4200.8 feet, considerably higher than the present level. An earlier survey, conducted by the United States Geological Survey in 1855, attempted to determine the mean water level of the lake and to survey at that time a "meander line" as the legal extent of the lake. This line lies at a point approximately 4205.0 feet above sea level (see Figure 2).

The State of Utah lays claim to all the lands which are exposed below the "mean high water mark," a delineation which the state construes to be the surveyed "meander line." This land it claims by virtue of the doctrine set down in *United States v. Utah*, 283 U.S. 64 (1931), an earlier case involving the navigability of the Colorado River and thus establishing the ownership to lands under that waterbody. In the decision handed down by the Supreme Court in this case, the Court held that there were indeed portions of the Colorado River which were navigable; therefore, Utah held title to those parts of the underlying river bed which were covered by navigable water. According to the present case presented by the State of Utah, this doctrine of navigability applies to the Great Salt Lake which is obviously navigable.

The United States, on the other hand, holds that the test of navigability is not whether the water is in fact navigable--the federal government agrees that the Great Salt Lake could float the Queen Mary. What the federal government does contend is that the waterbody must be used as a highway of commerce, and that in its natural state the lake must be capable of being used for the purposes of transport. The federal brief on the lake holds, however, that the lake is too desolate and isolated to serve as a highway of commerce. The federal case states that there is no need to utilize the capability of the lake for commercial navigation and that the lake does not, in fact, now serve as a highway of commerce nor has it in the past served as a commercial
Figure 2

RE LIC TED LANDS
SCHEMATIC OF OWNERSHIP CLAIMS

A. ABOVE MEANDER
B. EXPOSED BETWEEN SURVEYED MEANDER 1855 & STATEHOOD 1896
C. EXPOSED BETWEEN STATEHOOD & PRESENT
D. SHALLOW AREA COVERED BY WATER
E. DEEP AREA NOT PRESENTLY AFFECTED
route for anything but excursion boats and other light craft on a nonscheduled basis. The decision of the Court will depend upon which of the two interpretations constitutes navigability.

Once the question of navigability is established, the Court must next determine what constitutes a valid shoreline. This will be of particular importance if Utah wins the initial case, since the ownership of the relicted lands will be at stake. As in all law cases before the Court, either the ownership of the relicted lands and their geographic extent will be determined by past legal precedent or else a new precedent must be established. The unique character of the lake presents no small problem in using past precedents on relicted lands for none of them apply directly to the present controversy.

In the past, the principal reliction cases have been decided on the basis of common law, which defines reliction as the gradual, imperceptible, natural, and permanent uncovering of land along the shoreline. In such cases the mean shoreline must be determined by using tested scientific methods acceptable in courts of law. The Great Salt Lake, however, does not fall into the category of waterbodies which have easily defined shorelines and the tests of reliction do not fully apply to the lake. The exposure of land along its shores has been neither gradual nor imperceptible, and the land uncovered was not permanently exposed. In addition, the reasons for its being uncovered were only partly natural since man has played a major role in lowering the lake.

A number of attempts have been made in the past, and attempts are still being made, to use modern remote sensing techniques to determine if there is such a thing as a mean high water level of Salt Lake. Early surveys attempted to determine the mean high water level by tracing a "storm line" of driftwood left around the edge of the lake by wave action. This system proved to be of little use because the
line changed with the intensity of the wind, the time of the year, and the climatic conditions of the area. Vertical variation of the lake has been as much as forty inches in one year, and this change would cause a horizontal variation of up to ten miles in some sections of the lake's shoreline.

The written record of Captain Stansbury and his party explains that he was unable to determine with any accuracy the lake level at the time he surveyed the lake in 1850. He pointed out that the usual tests determining average or mean high level did not apply to the Great Salt Lake. The fluctuations of the lake have since been determined by the Utah Geological and Mineralogical Survey to be substantial, erratic, temporary, and to a large extent manmade. Shoreline variation has been caused, in part, by the artificial impounding and diversion of the natural tributaries of the lake. It is interesting that the level of the shoreline cannot be ascertained in advance by evaporation and precipitation data. On the contrary, the lake is itself a very good barometer of the meteorological conditions in the Great Basin, rather than the reverse.

Modern sophisticated methods of infra-red and high altitude color photography have been used to see if the U.S. Geological Survey can find a reasonable scientific method of determining what constitutes a valid shoreline. At the time of this writing, no method has been found which proves beyond reasonable doubt that a valid shoreline exists. Thus, the State feels that by choosing the already accepted "meander line" the burden of establishing any other line rests upon the federal government. This means that either the federal government must discover a new acceptable technique for determining the shoreline or the Supreme Court must set a new precedent concerning the old methods of determining its location. Otherwise, the State of Utah's case, based upon an accepted "meander line" and "navigability," will produce a decision in favor of the State.
From the information available to date in the form of preliminary briefs, past precedents set by the U.S. Courts, and hearings held by the House of Representatives, it appears that the case presented by the State of Utah has the greater validity. Sufficient proof exists to show that the Great Salt Lake is navigable and has served as a highway of commerce for gravel barges, ore boats, and even a sternwheel steamer (the President Garfield) in the past. The navigability of the lake, whether measured by the test of physical ability or commercial use, is probably one of its most obvious characteristics. Therefore, Utah apparently will be given title to all relicted land surrounding the lake.

The problem of establishing an acceptable shoreline will be a bit more difficult problem for the Courts, since a lack of legal precedent exists for a waterbody with abnormal variations, such as the Great Salt Lake. However, the Supreme Court is usually reticent to set new precedents even though facts surrounding a given case may be quite different from previous cases. Since the position of the State of Utah places the burden of finding a new "meander line" upon the federal government, past legal precedents which could be used as the basis for a decision favor the State. Thereupon, the extent of Utah's ownership will probably be determined by the 1855 "meander line," or perhaps by the line scribed by the lake's water level at the time Utah entered the Union. In either instance, the State of Utah will be given title to nearly one thousand square miles of lakeshore lands—and those are lands that have a significant tax base potential because of the rich potential of mineral extraction from the Great Salt Lake.

REFERENCES


Physical Geography has been a "traditional" course in most California Community Colleges. This appears to have been the case in the days of fewer colleges with limited course selection, and it appears to be the situation today with more than ninety colleges offering hundreds of courses. Over the years, Geography I, the introductory physical course, has provided a substantial challenge for thousands of lower division students. Unfortunately, significant numbers have either failed to complete the course or have earned low marks; thus, Geography I has the reputation of being a "hard" course.

Student Background

A recurring theme in discussions with students who had withdrawn from or earned low marks in Geography I centered on their lack of academic preparation to deal with the subject matter. Considering the state of high school geography, this does not come as a surprise to the experienced instructor. It is, however, a significant factor when considering the potential success level of a given group.

Another problem theme centered on the difficulty in grasping spatial concepts on a world-wide basis. For example, introductory students appeared to have a particularly difficult time in trying to understand the descriptive, explanatory, and interpretive relationships of the earth's climates. During several years of interviews, students have frequently pointed out their frustrations in relating world patterns to their own situation.
Thus, with little or no formal geographic preparation, and with an inadequate understanding of their own geographic environments, the challenge of learning about the geographer's perspective in terms of areal and spatial concepts ensures the continued labeling of Geography I as "difficult."

Course Content of Geography I

Realistically, the course content of Geography I does not vary significantly between two and four year institutions. The body of subject material to be considered is large. Many experienced instructors agree that the generally traditional three hours per week meeting pattern barely allows time to consider subject material. Trying to compensate for the unevenness of student backgrounds is not only subordinated, but clearly often neglected due to the pressure of the time commitment.

There has been, in short, no suitable way to provide class time for either involvement or tutorial exercises.

In these times of competitive enrollment, requiring additional tutorial hours or increasing the informal out-of-class study time decreases the likelihood of large enrollments. And, on occasion, there is the additional task of providing the exceptionally able student with exciting challenges beyond the normal scope of the course.

We at Southwestern College decided that the logical solution would be to transform Geography I from straight lecture to lecture/laboratory.

The Laboratory Program

Consultations with staff members in the physical and life sciences provided encouragement to prepare a one-unit laboratory supplement to Geography I. This new course, Geography 5, was initially offered in the Spring of 1971.
Four one-unit laboratory sections were scheduled at various times on Tuesdays and Thursdays to allow students maximum program flexibility.

The current course organization of Geography I is as follows:

Unit I - The Discipline of Geography
Unit II - Spatial Concepts and Maps
Unit III - The Earth
Unit IV - The Oceans
Unit V - Weather and Climate
Unit VI - Soils
Unit VII - Natural Vegetation

Geography 5 was designed with several specific factors in mind. Recollecting discussions with students concerning difficulties in Geography I, the staff agreed that each laboratory session had to include three main considerations: (1) to allow time to explore basic aspects of each topical area; (2) to explore, in an informal and unhurried atmosphere, the characteristics of geographic relationships; and (3) to use the local environment as a case example of the topic under consideration as often as possible.

With the goals identified, the laboratory course was developed on an experimental exercise basis; each class meeting was devoted to a specific topical area correspondent with the Geography I lecture series. Thus far, the Geography 5 course pattern has been as follows:

Ex. I - Classroom - Atlas Orientation
Ex. II - Classroom - Basic Location
Ex. III - Fieldwork - Topographic Maps
Ex. IV - Fieldwork - Contour Drawing
Ex. V - Field/Class - Rocks and Minerals
Ex. VI - Field/Class - Stream Flow Mechanics
Ex. VII - Fieldwork - Beach, Shore, and Coastline Observation
Transportation for off-campus sessions has been by college station wagons assigned to the geography classes on a semester basis. Section enrollments have been limited to fifteen students; thus, both students and equipment have been easily transported in two or three vehicles. The three hour class schedule has permitted off-campus exercises which include study of sites of exceptional instructional merit. For example, each laboratory section has been able to observe rock and mineral displays at the San Diego Museum of Natural History and has visited the Thomas Vaughn Museum-Aquarium at Scripps Institution in La Jolla.

In some cases investigative work could be done within walking distance of the college. A local coastal terrace formation, about a mile and a half walk from the college, has provided students an excellent field introduction to water erosion.

Preliminary Results

Of course the most significant question is whether students who were concurrently enrolled in Geography I and Geography V have a greater course success rate than those students who enrolled only in Geography I. An analysis of grade reports suggests that they do.

By comparing the grade distributions and withdrawal patterns of students not enrolled in the laboratory program with those who were not, it is possible to assert that at least two of the Geography V goals are responsible for better education: (1) exercise material supporting Geography I lectures, and (2) local field experiences demonstrating many of the geographic relationships presented in Geography I.
Students concurrently enrolled in Geography I and Geography V appear to build an early confidence level and an interest threshold that give them a decisive advantage over those who attend Geography I as a straight lecture course.

Conclusion

It is still too early to draw any firm conclusions about the value of the Physical Geography Laboratory Class as a part of a community college geography program. Nevertheless, at this time a strong case could be made for requiring concurrent enrollment in Geography I and Geography V. There are, however, other factors to be considered. These include the changing nature of requirements by upper division institutions, the problem of geography as a suitable physical science experience, and the course needs of students who may be Geography I enrollees. Moreover, establishing a physical geography laboratory program in competition with the traditional laboratory sciences such as chemistry, physics, geology, and astronomy, is a formidable task.

The present situation is encouraging. Several more semesters of experience will allow a more complete appraisal of this curricular innovation in community college geography.

REFERENCES


The relationship between geography and mapping has always been close. In fact the original name of the Topographic Division of the Geological Survey was the Geographic Division, and the head thereof was known for several decades as Chief Geographer. Furthermore, three of the four great surveys that preceded and which were unified into the Geological Survey were titled Geographical Surveys. These surveys are most commonly known by the names of their leaders: Wheeler, Powell, Hayden, and King; but their official names were: Geographical Survey West of the 100th Meridian (Wheeler's), Geographical and Geological Survey of the Rocky Mountain Region (Powell's); Geological and Geographical Survey of the Territories (Hayden's); and Geological Survey of the 40th Parallel (King's). History proves these were truly four great surveys. Over a period of about twelve years (1867-1879) parties from these Surveys mapped and classified a great deal of the topography and geology of the western region. By Congressional Act of March 3, 1879, they were combined into the U.S. Geological Survey with King as the first Director. King was succeeded by Powell a year later, and the golden days of the Survey began.

The production of maps, which is the job of a cartographer, topographer, photogrammetrist, surveyor, and engineer, is of considerable concern to the geographer. The production of special kinds of maps is a primary concern of the Geological Survey. The production of the National Topographic Map Series is the principal concern of our Topographic Division.
The content, scale, and quality of the National Topographic series has changed over the years. In fact, in Powell's day (1880-1894) its scale was 1:250,000 for the western part of the United States; 1:125,000 for rural areas, and 1:62,500 for urban areas. Their content was sketchy and the accuracy, by today's standards, was questionable. This odd scale series incidentally was derived by dividing each smaller scale by two; i.e., the 1:500,000 to 1:250,000 to 1:125,000 to 1:62,500 to 1:31,680.

Change in mapping character has been very slow until recently. For example, although the Geological Survey was created in 1879, twenty years elapsed before the Survey dropped the 1:250,000 scale series, kept the 1:125,000 and 1:62,500 series, and picked up a new 1:31,680 series for urban areas. It took another thirty-five years to eliminate the 1:125,000 scale. The 1:62,500 scale has been retained. The 1:31,680 scale was changed to 1:24,000 after World War II; however, even today, the scale of 1:15,840 (half of 1:31,680) is occasionally encountered. Content and accuracy changed over this period of time, too, though it was gradual and inconsequential compared to later changes (except the early change in terrain registration from hachures to contours). Major Powell presented a plan to the Congress in the 1890's to complete the mapping of the U.S.; the requested $10,000,000 for a period of ten years was never appropriated. In 1927, the Temple Act was passed to complete the mapping of the U.S.; again, the requested $20,000,000 for a period of twenty years was not appropriated. At the end of World War II, the status of quadrangle mapping, at what was then considered acceptable standards, was 27% complete. In 1972, the status of quadrangle mapping in the U.S. was 52% complete for 7½' quadrangles and an additional 25% complete for 15' quadrangles (or, altogether, 77% complete). The only complete map coverage of the U.S. is at 1:250,000, not the series Powell started, but a new, post-World War II
series essentially designed by the Army and executed largely by contract. The series was turned over to the Geological Survey in the 1950's for maintenance and distribution.

Over the past 85 years, the single major purpose of the Topographic Division has been to compile and to publish the standard $1^\circ$, $30'$ or $\frac{1}{4}^\circ$, $15'$, and $7\frac{1}{2}'$ topographic map series in addition to the production of a few state maps, national park maps, and other special maps. The principal mapping objective of the Geological Survey for 85 years has been to cover the U.S. with standard topographic quadrangle mapping, little more, little less.

A recent project—the San Francisco Bay Region Study—is changing this old focus and effecting new trends in topographic mapping.

The San Francisco Bay Region Study was created by the Survey as an inter-disciplinary study to develop and to depict earth science data in order to allow more intelligent regional and urban planning in the Bay area. The Bay Area abounds in examples of disregard of local hazards such as seismic fault zones, plastic bay muds, landslides, floods, and so on. In order to provide the mapping tools considered essential to such a project, several new map products were conceived. Since the envisioned planning was to be regional, a scale of $1:125,000$, to allow a regional overview, was selected. In addition, some products were produced at larger scales.

At that time, Interim Revision, a short-cut photo revision process, had just been developed by the Topographic Division, which was looking for meaningful areas in which to test the process. The San Francisco Bay Area had been included in an interim revision project several years prior to the start of the San Francisco Bay Region Study, thereby saving considerable time as well as providing local users of standard $7\frac{1}{2}'$ quadrangles with up to date map information instead of, in some cases, twenty year old maps. Interim re-
vision allows photo revision of all features that can be interpreted on an aerial photograph. Such features are necessarily planimetric and mostly cultural. No hypsographic revision is possible with this method. Since the primary purpose of the method is to reduce effort, thereby saving time and money, no field check was included, and, as a consequence, interim revised features might not be as accurate as the original features (plotted on the map and field checked). The interim revision was therefore printed in purple to distinguish it from the original, and perhaps more accurate, compilation.

The Survey was surprised to find an extra benefit of the purple overprint. Planners liked the purple representation of change between the original date of the map and the date of the interim revision. In fact they seemed to anticipate additional color overprints.

The color separation material of the interim revision 71/4" quadrangles was reduced to 1:62,500 and mosaicked, and then further reduced to 1:125,000 to create the regional map. This map carries a complete pattern of streets instead of an urban tint. In fact, the predominance of streets in the urban areas created the effect of an urban tint, but still remained a valid street pattern. Since the contours and cultural detail, as well as the streets, are a reduction of their delineation on the 1:24,000 quadrangles, the usual generalization of detail normal to a 1:125,000 scale has been replaced by accurate and complete delineation of these features. This means more expressive contours and more cultural detail more accurately placed. Consequently, new regional interpretations are possible. Twenty-five to twenty-eight color separation plates were used to represent all features and colors on the 1:125,000 scale sheets so that a potential user could purchase numerous combinations of those best suited to his needs. This map has been a real "best seller" and is considered by many a collector's item, if not a work of art.
The Survey also created an orthophotomosaic at 1:125,000 from quad-centered photography flown at 40,000 feet. It is a companion document to the 1:125,000 line map. This mosaic was intended to show the myriad detail contained in a photo and not possible on a line map. It was not as successful as hoped, however, due primarily to varying reflections in the photographs. It did, however, direct the geologists’ attention to several regional linear features that revealed structures hitherto undiscovered.

The production of the orthophotomosaic required the production of larger scale (1:62,500) increments suitable for mosaicking into the smaller scale mosaic. Fortunately, the photography was quad-centered; that is, each exposure centered over a standard 7½' USGS quad. The initial reason for this was economy; however, it also facilitated the production of the 1:24,000 orthophotos. Although the quad-centered photography, flown at 40,000 feet, did not produce a sparkling 1:125,000 orthophotomosaic, it did produce high quality orthophotoquads. As soon as copies of these quads came to the attention of users, the demand for them soon outstripped photolab capacity, and large orders had to be discouraged. Although orthophotoquads were not a part of the original San Francisco project, they were soon added and their availability was possibly the greatest map contribution of that project. Two of the attractive features of the orthophotoquad are its relative cheapness (ca. $300 per quad) and its quickness of production (months instead of years). Furthermore, the success of orthophotoquads on this project hastened their acceptability nationally and promoted, about a year later, an even larger project. In the fall of 1972, the State of Arizona and the Geological Survey commenced a project of two thousand 1:24,000 orthophotoquads for state-wide land use planning activities. This was the first large project that recognized the full value of this new product. Photography,
in this case, was U2 flown on quad centered flight lines. Again top quality quads were produced. It was largely these two projects that caused the Geological Survey recently to accept orthophotoquads as a standard product.

It must be evident from references above that another new and influential element in the field of mapping is improved photography, particularly at higher altitudes. Photography from 40,000 feet is quite common now, and from 50,000 to 60,000 feet is available. Once-over coverage of the entire conterminous U.S., from an altitude of 40,000 feet, has been considered for some time; however, budgetary reasons have delayed implementation. Of course, ERTS-1 has given us photography from even greater altitudes; nevertheless, satellite photography has been most useful in very small scale mapping such as 1:250,000 and 1:500,000 and studies dependent upon remote sensing.

Another new tool that accompanied the orthophotoquad is what was originally dubbed the orthophotopoquad, but which is now referred to more simply as the orthophotoquad with contours. This very useful product resulted from curiosity relative to the fit or register of the contour or hypsographic plate of a topographic map on a companion orthophotoquad. One must recognize that the production of a contour plate is usually the most expensive part of topographic mapping and that an orthophotoquad is normally without elevation data unless spot heights are added. If a contour plate exists for a quad, even though it be ten or twenty years old, the chances are its character is essentially unchanged due to the works of man. Or, even if hypsographic changes have been made, percentagewise they are minimal. Therefore in almost all cases a contour plate, even though old, should fit an orthophotoquad. The experimental combination fit perfectly and was immediately hailed by geologists as the best mapping tool yet devised for their studies, particularly in field operations.
An old handy tool that has always been rather "do-it-yourselfish" is a slope map. Nearly every student or practicing professional has had occasion to make a linear scale which, when laid across the contours of a topographic map, will determine terrain slope. By combining areas of equal slope into zones, one can produce a slope map. This is a laborious job fraught with countless human error possibilities. The Survey's objective was to automate the process to increase accuracy and to shorten the time of preparation.

After several false starts, the solution was found in a photomechanical process being used for other purposes. For several years, the photolab had been manipulating the line weights of original drawings to facilitate revision procedures and, more recently, to salvage compilation manuscripts for use as final reproduction materials. This was done by using a transparent spacer between subject and object films and by overexposing by a predetermined amount. The use of wider spacers, with an opal plastic overlay for a diffuser, provided line-weight changes great enough to cause contour lines to coalesce at a predetermined value of slope, thus creating solid areas identifying all slopes of the chosen value or greater. Later techniques included a revolving light source to widen the range of manipulation, and orbital movement of the film carriage, which may prove to be the most versatile method.

This procedure, utilizing new and still-experimental techniques, results in a considerably more detailed presentation of slope information than previous slope maps prepared by hand delineation. The added detail allows geologists and other earth scientists a fresh look at the terrain. Among other benefits, more precise trace ment of earthquake faults and more accurate plotting of landslide hazards are foreseen.

Already, many requests for other slope maps have been received, and several have been produced. These include two-zone maps of twenty-five quadrangles for the San Diego
County Planning Department, and eight quadrangles showing six slope zones and covering about 450 square miles of the central and western Santa Monica Mountains--part of a cooperative program with the Department of the County Engineer, Los Angeles County.

Now under way is slope-map coverage of 2,700 square miles of the Bitterroot National Forest in Idaho and Montana for the U.S. Forest Service. And just beginning is the production of slope maps of the Phoenix-Tucson, Arizona Urban Pilot Project area, which may total more than one hundred 7½' quadrangles.

These maps have been so useful that a standard series covering the U.S. has been suggested. Although such maps are useful in certain areas, the need for a national series, particularly when one considers the varying need for zone values by types of users and varying terrain, is doubtful. Customized slope map preparation may be the best answer to the users' needs.

Although large scale urban maps at 1:6,000 scale were suggested in the original San Francisco Bay proposal, they were canceled due to budgetary restraints.

At the time of the San Francisco Bay Region Study, the Topographic Division was experimenting with a new product called an orthophotomap. It differs from the orthophotoquad in line and in color. The orthophotoquad is black and white and essentially a photograph in appearance with some cartographic assistance; whereas the orthophotomap is essentially a line map with a photo background and a cartographic color assist in such areas as land, water, and foliage. An orthophotoquad can be produced independently of other mapping effort, but an orthophotomap is dependent upon the production of an orthophotoquad as well as the full range of mapping efforts. Consequently an orthophotoquad is produced relatively quickly and cheaply, but an orthophotomap is more expensive than a normal quad and requires considerably more preparation time.
The Topographic Division is now considering altering their standard map production procedure to allow the production of an orthophotoquad as an early product, a standard line map as an advance product, and an orthophotomap as a final product. The latter is to be produced only in those areas that warrant their production. Such areas are ones in which water features predominate. This procedure is termed phase mapping.

A new program and product that is in early stages of production is large scale urban orthophotomaps. In this case the new feature is the scale and contract execution. Two projects under way are at a scale of 1:2,400. One at Fort Wayne, Indiana, has 440 sheets, each covering a half section. The other at the same scale is in Charleston, South Carolina. Both of these projects are by commercial contract. Somewhat similarly, county format is being restudied as a possible new series.

Another new program on the horizon is metrication. The Survey has two series of maps now in the metric scale; they are the quadrangle maps of Puerto Rico and Antarctica. These admittedly are small programs; however, a third program will soon start in Alaska providing coverage for Anchorage and vicinity. The scale will be 1:25,000, with 5, 10, and 20 meter contour intervals. The bulk of the quadrangle maps of the United States (some sixty thousand quadrangles when complete coverage is accomplished) do not lend themselves to easy conversion to the metrical scale and obviously a patchwork of English and metric systems would be unthinkable. Like most other published scientific information, the Survey's maps will begin carrying duplicate values. When the eventual complete changeover comes, the principal problem will be the hypsography. Scales can easily be changed by photography, but contour lines in English units cannot be converted to metric, except by recompilation. Unfortunately the preparation of the contour plate is by far the most ex-
pensive of the five or six separate plates of a topographic map.

Another new horizontal program is digitization. Many maps prepared by other agencies, usually planimetric, are already digitized as are some contour maps. However, no program exists that will allow digitization and duplication of features of our large scale maps (notably contours) and maintain the map accuracy demanded by critical map users. The 1:250,000 map series of the U.S. is digitized allowing a computer-plotted production of maps at any desired scale within an acceptable range.

Development of a map-related digital computer-based information system is under contract with the Raytheon Company. The overall project is called NRIS (National Resource Information System). Eight agencies of the Department of the Interior are sponsoring the project.

The National Cartographic Information Office that will eventually replace the Survey's Map Information Office is progressing toward its goal of providing one stop service to a seeker of cartographic information generated by any agency of the Federal Government. Catalogues, browse files, ordering facilities, and expert assistance will be available so that a user can determine what is available, how it fits his needs, and how to order the materials directly. This will be done by combinations of microfilm in its various forms and computer storage and display systems.
Annual Meetings
1972-74
TWENTY-SIXTH ANNUAL MEETING

MAY 5-6, 1972

Pasadena, California

The Pasadena Hilton was the setting for the Twenty-Sixth Annual Meeting of the California Council for Geographic Education, hosted by California State University, Los Angeles. The formal sessions were preceded by a steak barbecue in Eaton Canyon Park on Friday evening. On Saturday, forty-five papers were presented in morning and afternoon sessions; in addition, a number of special sessions and panel discussions were held, including one on the California environment and another on the implications of the Ryan Act for geographic education in California. The evening banquet featured an address by John S. Tooker, director of the State Office of Planning and Research, who spoke on "California's Primary Goal, Planning a Better Scene."
PAPERS PRESENTED


Mutwakil A. Amin, *California State University, Chico*, "The Sudd of Southern Sudan: An Environmental Barrier."


Bruce Bechtol and Jerry Williams, *California State University, Chico*, "Making a Litter Bit Count: The Litter Census as a Geographical Tool."

Tom Best, *California State University, Los Angeles*, "Remeditation Revisited: A New Serpent in the Garden of Media."

Peter Bradshaw, *California State University, Los Angeles*, "The Impact of Race on the Spatial Organization of Education: The Case of Pasadena."


William G. Byron, *California State University, Los Angeles*, "Pre-Conquest Settlement Patterns in Nayarit, Mexico: The Persistence of Physical Geography in Studies of Cultural History."


Richard Ellefsen, *California State University, San Jose*, "Identification and Classification Problems Met in Mapping Urban Land Use From High Altitude Color Infra-Red Air Photographs."

Abraham J. Falick, *El Camino College*, "Regional Transport Planning and the Interface Problem."

Donald K. Fellows, *Los Angeles City College*, "Tape Talk: A Teaching Technique."


Rudolph Frank, *California State University, Los Angeles*, "Prospect for Development in Griffith Park."

John J. Fulford, *California State University, Long Beach*, "The Geography of Retail Automotive Sales in Long Beach: 1905-1971."
William Gaffaney, California State University, Los Angeles, "A Multivariate Approach to Ecosystem Analysis."

Harold F. Gilman, University of California, Riverside, "Human Impact Along the West Coast of the State of Baja California."

Sin-Fong Han, California State University, Los Angeles, "A Conceptual Model for Ethnic Groups Study."

Linn B. Hansen, California State University, Chico, "Population Density and Its Effects on Human Beings."

John W. Hendricks, California State University, San Francisco, "Coastal Geography: An Experiment in Beach Profile Survey Techniques."

James R. H境ing, University of California, Riverside, "A Preliminary Examination of Visibility Distance at Los Angeles International Airport (LAX), 1947-1967."

Elmer A. Keen, California State University, San Diego, "San Elijo Lagoon: The Board of Supervisors' Nightmare."

John C. Kimura, California State University, Long Beach, "Spatial Analysis of Typhoon Rain in Japan."

Lorraine Manoogian, Pasadena City College, "California Resources: Planning and Management."

Peter F. Mason, University of California, Santa Barbara, "Some Aspects of the Ecological Structure of the City: The Case of Ventura Avenue, Ventura, California."

Michael Matherly, Grossmont College, "Streets and Freaks, or the Student in the City: Urban Geography at the Community College."

Thomas A. McDannold, California State University, Northridge, "Xerography As a Means of Cartographic Reproduction."

Jene S. McKnight, Los Angeles County Regional Planning Commission, "The Los Angeles Regional Core: Emergent Heartland of Southern California Megalopolis."

Howard W. Mielke, University of California, Los Angeles, "Discussion of the Impact of Individuals of UCLA on Los Angeles Air."

Lawrence G. Miller, University of California, Los Angeles, and Mark D. Pahuta, University of Southern California, "The Use of Super-8mm Film in Environmental Teaching."

Robin Parer, California State University, Los Angeles, "An Historical Sequence of Land Use in the South-Central San Gabriel Mountains."

Duilio Peruzzi, California State University, San Jose, "Experiments and Problems in Land Use Mapping from Remote-Sensed Imagery in the San Francisco Bay Area."

Lester Rowntree, California State University, San Jose, "Perception and the Sense of Place: Some Considerations."

Haig A. Rushdoony, California State College, Stanislaus, "Establishing Learning Environments for Elementary School Children."

William Rutledge, California State University, Northridge, "Adaptation of the HSGP Game of Farming to California Localities."

Christopher L. Salter, University of California, Los Angeles, "A Speculative Cultural Geography."

David E. Schwarz, California State University, San Jose, "Geographic Applications of Imaging Radar."

John Spring, Ocean View School District, Huntington Beach, "The Sunset Beach-Bolsa Chica Area: An Analysis of a Politically Fragmented Coastal Region that is Faced with Encroachment by the Urban-Industrial Society."

Mary J. Starr, California State University, Los Angeles, "The Camper Industry in El Monte and South El Monte."

W. James Switzer, Southwestern College, Chula Vista, "The Laboratory Course for Introductory Physical Geography: A Community College Pattern."

Randolph R. Thaman, University of California, Santa Barbara, "The Use of Aerial Photography to Facilitate the Construction of Land-Use and Vegetation Transects."

David L. Weide, University of California, Los Angeles, "The Ring of Fire: Wild Fire and Man in the Santa Monica Mountains."

Kenneth L. White, University of California, Riverside, "Preliminary Statistical Investigation of Climatic Change in Middle North America."

Jean D. Wheeler, California State University, Long Beach, "Accessibility as an Influence upon the Ecological Impact of Camping in the Southern Sierra Nevada."
TWENTY-SEVENTH ANNUAL MEETING
MAY 4-5, 1973
San Jose, California

The San Jose Hyatt House was the setting for the Twenty-Seventh Annual Meeting of the California Council for Geographic Education, hosted by California State University, San Jose. The formal sessions were preceded by the annual picnic held in Alum Rock Park. This was followed by a presentation by David W. Lantis entitled, "Impressions of the High Arctic." On Saturday, papers were presented in morning and afternoon sessions; in addition, a number of special sessions and panel discussions were held.

Sessions included: "Future Trends in Social Sciences and Social Studies Education in California," "Two Year-Four Year College Articulation and Integration of Geography Curriculums," and "Job Opportunities and Suggested Modifications in Degree Requirements." The evening banquet featured an address by Mr. Roy F. Thurston, Assistant Director, Western Region, U.S. Geological Survey, who spoke on the subject, "The U.S. Geological Survey Maps for Tomorrow."
PAPERS PRESENTED

Harry O. Bain, Environmental Information Coordinator, PG&E, "Multiple Land Use Management."

Thomas D. Best, California State University, Los Angeles, "Don't Forget the Postcards."

John Bishop and Duane Kerber, Shafter High School, "Let Your Students Do It Too."

Mrs. Joshua A. Burns, University of California, Berkeley, "Single-Purpose Suburbs and Local Control of the San Francisco Peninsula."

Stephen A. G. Burpo, California State University, Los Angeles, "In Search of a Safer Highway."

James Caswell, West High School, and George McJannet, Standard Oil Company of California, "Bringing the Rural Environment to Your Classroom."

W. Tim Dagdag, California State University, Northridge, "Public Policies and Their Relationship to Urban Mexican-American Housing."

Marlene Duncan and Jack Duncan, Rincon Learning Center, "Laguna Salada: Someplace That's Nowhere."

Daniel M. Epstein, San Jose City College, "A Geopolitical Anachronism: The East-West German Border (The Iron Curtain)."

John E. Estes, University of California, Santa Barbara, "Geographic Applications of Earth Resources Technology Satellite 1 (ERTS-1) Imagery."


Allan R. Fishman, California State University, San Jose, "Relative Change in Manufacturing Employment in the United States, 1954-1967, by County."

Lawrence R. Ford, California State University, San Diego, "Structuring Images: Mental Maps and a Humanized Scientific Geography."


James L. Goggin, Advanced Planning Division, Sonoma County, "Present Economic Conditions in Guyana."
Gerald L. Greenberg, California State University, Sacramento, "Modern Map Library Functions, Facilities, and Filing."

Wayne Harmon, Grossmont College, "Industrial Diversity of the City of Birmingham, England, and the West Midlands."

Floyd M. Henderson and Lawrence R. Ford, California State University, San Diego, "Urban Perceptions in Music: Spatial and Temporal Variations."

Alan M. Henninger, Oak Grove High School, San Jose, "Using Local Resources in Geography Classroom Instruction."

James A. Henry, California State University, Long Beach, "Comparative Change of Agricultural Production in the Central Valley of California, 1949-1969."

Jerald J. Holland, Mineral Elementary School, "Hawaiian Land Use on the Island of Hawaii About 1825."

Donald G. Holtgrieve, California State University, Hayward, "Gas Station Road Maps for Junior High School Geography."

Rex D. Honey, California State University, Northridge, and Nancy Maack, Las Virgenes School District, "Elementary Exercises in Exploration."

Richard F. Hough, California State University, San Francisco, "Thompson's 'Urban Agriculture': A Japanese Case."

Wayne R. Irwin, Merritt College, "Geography Aerial Observation: A New Short Course."

Michael W. Kuhn, University of California, Santa Barbara, "Mental Maps: Useful Instructional Exercise."

Michael W. Kuhn and Peter F. Mason, University of California, Santa Barbara, "The Geography of California Open Lab: An Autotutorial Application."

George R. Land, Irvington High School, Fremont, "Viticulture in San Benito County."

Jene S. McKnight, Section Head, Policies Planning Section, Regional Planning Commission, County of Los Angeles, "ERTS Over Los Angeles: Aspects of the Macro-Form and Structure of Metropolitan Los Angeles."

Marilyn Millington, California State College, Bakersfield, "Water and the Villain Mosquito."

Lea A. Nicholson, California State College, Bakersfield, "The Full Impacts of Air Pollution."

Dennis O'Connor, California State University, Long Beach, "Census Data as a Research Tool in Regional Delimitation: A Case Study of the Morticians' Goods Industry."

Robert D. Picker, California State University, San Francisco, "Man and the Physical Environment: An Alternative Teaching Strategy."

Richard Raskoff, Los Angeles Valley College, "Some Successful Audio-Visual Approaches to Presenting Geographic Concepts and Information."
John D. Rees and William Byron, *California State University, Los Angeles*, "Planning and Operation of a Mexican Field Program by California State University, Los Angeles."

David W. Reese, *Colonel Nichols School, Bakersfield*, "Turn Your Classroom into an Environment Measurement Instrument Shop."


Lester B. Rowntree, *California State University, San Jose*, "Urban Preservation and Local Building Codes: Some Observations."

Gregory Smith, *California State College, Domínguez Hills*, "David Thompson's Compendium of Geographic Knowledge."

Stephen L. Slakey, *La Puente High School*, "Local Area Studies in the Classroom."

Joel B. Splansky, *California State University, Long Beach*, "The Hypothesis as a Tool for Teaching Field Work and Field Trip Geography."

Ruth H. Stanley, *San Jose*, "What Can You Do With a Handful of Soil?"


Gary Wulfsberg, *California State University, San Jose*, "Guanajuato: An Anomaly in Mexican City Development."
The Bakersfield Inn was the setting for the Twenty-Eighth Annual Meeting of the California Council for Geographic Education, hosted by California State College, Bakersfield. The formal sessions were preceded by two field trips: one to the Edmunston Pumping Plant on the California Aqueduct, the other to Kern River Field and Getty Oil Company. On Saturday, papers were presented in morning and afternoon sessions; in addition, a number of special sessions and panel discussions were held. These included: "Experiential Learning and Internship Programs," "The Social Science Framework," and "Non-Academic Opportunities and Requirements." The evening banquet featured an address by the Honorable Walter Stiern, State Senator, who spoke on "The Fight for the Education Tax Dollar."
Burton Anderson and Gary Peters, *California State University, Long Beach*, "Industrial Landscapes: Some Views from Artists and Poets."

John C. Archbold, *San Diego City Schools*, "A Plea for a Focus on Geography in the 'New' Social Studies."

Susan Atwater and John E. Estes, *University of California, Santa Barbara*, "Aerial Photo Interpretation: Oil Field Environmental Project."

Thomas D. Best, *California State University, Los Angeles*, "The Land is Their Land: Private Property vs. Public Access in the Crucial Coastal Zone."


Peggy Bravard, *Modesto City Schools*, "WEATHER: Learning Center Approach to the Teaching of Social Studies."


Charlotte Crabtree, *University of California, Los Angeles*, "Teaching Children Analytic Processes and Geographic Concepts."

Arthur Dahlstrom, *Kern County Schools*, "Geography for the Visually Exceptional."

Robert C. Dreiling, *South High School, Bakersfield*, "Urban Problems in the Bakersfield Area."

Fran Evanisko, *University of California, Santa Barbara*, "An Evaluation of Passive Microwave Radiometric Imagery as a Data Source in the Analysis of Urbanized Areas."


John Ferguson, *California State College, Bakersfield*, "The Bakersfield Area: Then and Now."


Harold Gilman, *University of California, Riverside*, "Historical Geography of the Eastern Mojave: Utilization of Spacecraft Imagery."
James Goggin, George Nolte and Associates, San Jose, "The Planning Process: Did Geography Have a Place in Sonoma Valley?"

James Goodman, University of Oklahoma, Norman, "The Navajo: Their Crumbling Traditional World and the Pressures to Modernize."

Richard L. Haiman, University of California, Santa Barbara, "The Distribution and Abundance of Agave shawii in Northwestern Baja California."

Tara Hardoin and Janet Rantz, University of California, Santa Barbara, "Analysis of Land Use Change in the Santa Ynez Valley."

Donald G. Holtgrieve, California State University, Hayward, "The Status of Geography in San Francisco Bay Area Secondary Schools."

Larry Hosler, Foothill High School, Bakersfield, "Field Trips and Topographic Mapping with Mentally Gifted Students."

Donn C. Jewell, West Valley College, Los Gatos, "From Tribes to Triage: A Game Series for the Ninth Grade."

James Johnston, California State College, Bakersfield, "Geography as a Stepping Stone to Learning in Special Education."

Thomas M. King, California State University, San Jose, "The Use of Geographic Methodology in an Historic Inventory."

Marijo Koerting, Wonder Window Pre-School, Bakersfield, "Piaget's Implications for Geographic Education."

Melvin Krause, California State College, Bakersfield, "Man and Air Pollution in the Southern San Joaquin Valley."

Michael Kuhn, University of California, Santa Barbara, "Impact of Off-Road Vehicles on the Kelso Dunes Area of the Mojave Desert."

Joseph S. Leeper, California State University, Humboldt, "Field Problems in Economic Geography."

Peter Mason, University of California, Santa Barbara, "Mid-Term Evaluation in Geography Courses at UCSB."

John W. McDonald, University of Southern California, "With Computer Map and Camera in the Los Angeles Coastal Zone."

Rod C. McKenzie, University of Southern California, "The Role of Geography in the USC Joint Education Project."

Michael Mel, University of California, Santa Barbara, "Remote Sensing and the California Coastal Zone Conservation Act."

Louis Mihalyi, California State University, Chico, "Charcoal Burning in Zambia: Economy and Ecology of an Indigenous Industry."

John Passerello, Governor's Office of Planning and Research, "State Environmental Planning with an Environmental Emphasis."


Michael R. Rector, Kern County Water Agency, Bakersfield, "Water, Geology, and Man in Kern County, California."

Marlene Row, Weaver Union School District, Merced, "Teaching Map Skills in the Reading Curriculum."

Orrin Sage, Jr., University of California, Santa Barbara, and Cynthia Sage, Henningson, Durham & Richardson, Santa Barbara, "University of California Extension: Yosemite Institute Environmental Education Program."

Christopher Salter, University of California, Los Angeles, "The Street as a Treat: The Geographer's Lab."

Mary Ann Sanders, Modesto City Schools, "Quantitative Concepts in Social Studies."

Frederick H. Scantling, California State University, Long Beach, "The California Bungalow: Westward Diffusion in a Southern California Culture Trait."

Jack L. Schuertz, Moderator; James Johnston, Arthur Dahlstrom, Larry Hosler, Clair M. Walter (Summerville Elementary School, Tuolumne), Panelists, "Geography in Special Education Curricula: Panel Discussion."

David L. Smith, Apollo Airways, Santa Barbara, "Diversity and Conflict in Recent Pacific Northwest Landscape Changes."

Jonathan Smolen, University of California, Santa Barbara, "The San Rafael Wilderness Area of Santa Barbara County, California: A User Profile."

Joel Splanksy and Richard Outwater, California State University, Long Beach, "To Park or Not to Park: A Question for Geographers?"

J. Robert Stinson and Robert Johnson, California State College, Dominguez Hills, "Environmental Impact Analyses: Geographies of the Future, the Hayward-Fremont, Foothill, and Dumbarton Freeways Examples."

George J. Suchand, California Polytechnic State University, San Luis Obispo, "Using Photos to Teach Historical Change in Man-Nature Relationships."

Austin E. Sullivan, University of California, Riverside, "Central Place Theory and the Distribution of Derelict Housing in Chicago, Illinois."

W. James Switzer, Southwestern College, Chula Vista, "Fulbright Opportunities for California Geography Teachers."

Gerald Tapper, University of California, Riverside, "Edge Enhancement Delimitation of Suburban Environments: The Washington-Baltimore Exurban Fringe Region."

Larry Tinney, University of California, Santa Barbara, "Remote Sensing Applications: Operational Crop Identification Techniques."


Michael Walters, California State College, Bakersfield, Kern County Population Distributions from 1850-1900."
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The California Council for Geographic Education (CCGE), an affiliate of the National Council for Geographic Education, was organized in 1946 to foster interest in geography and to increase the effectiveness of geography teaching within California. Membership is drawn from all teaching levels, elementary through university, and from others who subscribe to the objectives of the organization.

Two publications are issued regularly by the CCGE to all members. The California Geographer, which appears annually, is a high-quality professional journal containing articles on geographic topics of general interest to the membership. The Bulletin, issued four (4) times a year, contains announcements and information relating to the annual meeting and other business of the organization, news of recent developments from schools and colleges within the state, and a number of columns containing information regarding geography and education. Another publication, the Looseleaf Geographer, containing notes on teaching methods in geography, is issued periodically.

Complementing these publications is the California Map Series. The first sheet of this project, California Population Distribution, is furnished without cost to all new members of CCGE.

Each year, on the first weekend in May, the CCGE meets for review and discussion of problems and developments affecting geographic education in California. Papers and symposia are presented on a variety of topics, especially the teaching of geography and the geography of California. In addition to these formal presentations, the members enjoy informal contacts with old friends and new acquaintances at this annual meeting. The 1976 meeting will be held in Long Beach, and the 1977 meeting is scheduled to be held in San Jose.

All persons interested in the objectives of the CCGE may become members simply by submission of their annual dues: $3.00 for students; $6.00 regular; and $10.00 contributing. Checks should be made payable to CCGE and mailed to:

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