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States Department of Agriculture has taken up date culture at Indio and Mecca, and this year a crop was harvested.

Striking features of the climate of California are the low wind velocities, and the high percentage of sunshine. In San Francisco the percentage of possible sunshine is 63, in Los Angeles 73 and in Fresno 74. For New York the figures are 56, and for Chicago 57.

Mild winter temperatures, low humidity preventing oppressive summer heat, the invigorating sea breeze in the coastal regions, the absence of thunder storms and violent winds, and the high percentage of sunshine combine to make life in California particularly enjoyable. These conditions are rapidly increasing the demand for land, and filling the state with an intelligent, thrifty and happy population.

TOPOGRAPHIC ENVIRONMENT OF SAN FRANCISCO

By RULIFF S. HOLWAY

University of California

TO THE physiographer San Francisco is noteworthy for its location on a bay occupying a sunken valley situated on a rising coast. To the geographer San Francisco is interesting as the port at the mouth of the only low pass that opens entirely through the central thousand miles of the Coast Range System which rises abruptly along the western shore line of the United States. To the student of human life San Francisco is remarkable for the energy and courage of its cosmopolitan people—cosmopolitan yet not so removed from a certain youthful provincialism of the West but that they still encourage tales of the wickedness of their Bohemian ways rather than point to the sturdy but thoroughly unconventional morality that is carrying the city safely onward to its great future.

How is it possible to compress into four pages the story of the evolution of the marked topographic forms of this new country still being made, and being made so rapidly that we can watch the processes? And at the same time discuss the geographic situation of the Golden Gate that makes San Francisco the center of the forces which will shape the history of the Pacific as it is quickened by the life currents which will flow through the man-made Straits of Panama? And shall the same short Journal article attempt to portray the Oriental color of life and building in unassimilated Chinatown and yet analyze the subtle civic influences that permit Little Italy, for example, its cherished foreign atmosphere even while making every man a genuine Californian before he fairly learns our tongue?

A volume were all too short to present adequately any one of these aspects of the western metropolis and so the present article will be devoted to suggestions of those physical features in the immediate vicinity of San Francisco which may easily be reached and studied for themselves by the members of the National Education Association during its coming session. The physiographic aspect is chosen not because it is necessarily the most interesting even to the writer, but because the other two are more frequently discussed in current literature and because they are thrust upon the careful observer wherever he wanders in Greater San Francisco. But the cities on the shores of the bay are small when measured by the scale upon which Nature is building the Coast Ranges and some direction is needed by the stranger who has but little time to find the salient viewpoints from which to study the typical topography of the central California coast.

San Francisco Bay is itself both the evidence and the result of the local depression of this portion of the coast. The four mile ferry trip from San Francisco past Yerba Buena Island to Oakland or Berkeley is full of interest. The large area of deep water anchorage to the southward and the long San Francisco water front with its crowded wharves, tell something of the geographic advantages of the harbor, but in looking to the future it should be remembered that they are but a small part of the facilities afforded by the three hundred square miles of the bay. A fine view of the Golden Gate and the central portion of the bay is to be had in Berkeley from the buildings on the campus of the University of California and still better from the hills just east of the Greek Theater in which the Association holds its first meeting. The magnificent general view to be had from the slopes of these hills will convince the specialist that the bay is merely a valley submerged and filled by the influx of the sea through the former outlet—the Golden Gate. But even the novice in physiography who will go to the Presidio in the northwestern part of San Francisco and from Fort Point, on the southern shore of the Golden Gate, look northward to the Marin County hills, will see that their slopes to the very water's edge are those of the tops of hills whose bases rest far below the sea. A final view of the bay as a drowned valley is to be had on the trip to Mt. Tamalpais which rises sharply from shore line to over 2600 feet. A ferry boat carries the visitor from San Francisco northward across the bay past Alcatraz Island with its guns guarding the wide open Golden Gate to Sausalito, a town of picturesque homes clustered on the steep hillside. From here the electric cars which connect with the boat skirt an arm of the bay where newly made tidal lands meet abruptly the slopes of the submerged hills and finally stop at Mill Valley station. Choice can now be made of foot trail or of "the crookedest railroad on earth" to the top of Tamalpais from which may be seen a wonderful panorama of bay and ocean, of hills and mountains.

Viewed from the outlook station on the topmost crag, the branching arms of the bay outline the tributary gorges of the former valley. A slight exercise of constructive imagination will raise Tamalpais and the surrounding country some 300 feet to a former level and, in place of the bay, the Sacramento River will be seen winding its way along the now exposed floor of the valley in between Tiburon and the hill that a few moments before was Angel Island, and finally turning through the Gate-like pass westward to the Pacific. In descending the mountain no one should fail to take the side trip to the Muir Woods—the most accessible grove from San Francisco of the famous Redwoods, California's unique forest tree.

The foregoing facts indicate the formation of San Francisco bay by the sinking of the land, yet the California coast as a whole has been recently raised above the sea. One of the most popular of the tourist excursions is to a field rich in forms illustrating the evolution of coast topography, a locality where recent elevation is recorded with diagrammatic clearness. The eighty mile ride to Santa Cruz first along the western shore of the southern half of the bay, past Palo Alto and Stanford University, through the Santa Clara valley with its miles of orchards brings one to San Jose where if desired a stopover may be made for the stageride to the Lick Observatory the dome of which on the skyline of the eastern mountains is visible from the car windows. At Los Gatos the train leaves the open valley and crosses the Santa Cruz Mountains, winding upward through the narrow canons, plunging through the summit tunnel, and then downward by the Big Trees and along the wall of the canon of the San Lorenzo River to Santa Cruz on the shores of Monterey Bay.

The evidences of recent uplift are found along the coast to the north-westward. For the first ten or fifteen miles there is a magnificent series of old ocean terraces varying in height from rock cut shelves just above sea level to obscure weathered benches at an elevation of over twelve hundred feet. The three major terraces resemble the steps of some giant stairway with cracklike gorges incised by the main streams. On the gentle slope of the lowest great terrace—about 100 feet high and in places a mile wide—two lines of railroad run to Davenport. This trip gives a constantly changing view of the ocean and the present vertical sea cliff on the left, while on the right rises the old sea cliff of the second terrace—an escarpment softened by erosion and accumulation of talus. At intervals a bend in the road, especially on the trestles crossing the gorges, affords a fine view of three major terraces above at elevations of 250, 500 and 800 feet. If proof is needed that the fronts of these terraces are old sea cliffs, on reaching Davenport a climb should be made up the face of the bluff to the branch railroad that starts back into the mountains on the slope of the second terrace. As the road

reaches the front of the third terrace it turns into the canon of San Vincente creek. Here a fortunately placed railroad cut has opened the talus slope and revealed the base of the old vertical sea cliff with its sandy beach sloping seaward from its foot. Good exposures of fossil sea-cliffs are not so common but that the physiographer is well paid for the short mile walk from Davenport. Added evidence that this series of benches are old elevated sea strands may be had by leaving the railroad at the east end of the trestle crossing Laguna creek and walking up to the rear of the second terrace. A little search will show rock ledges outcropping in the grass and filled with holes bored by sea urchins and rock clams. These rocks are duplicated exactly in the tidal water at the foot of the sea cliffs of today.

While at Davenport there may be seen at the mouth of the creek low benches cut in the rock at the foot of the cliff. Similar forms in the vicinity testify to a recent uplift of some ten or fifteen feet. On the other hand some of the creeks crossed by the railroads three or four miles out from Santa Cruz have lagoons near their mouths and have evidently been recently submerged. These local alternations of uplift and depression probably have their extreme illustration in the depression which formed San Francisco Bay. The undulatory character of the general uplift is not extreme in amount when it is considered that terraces similar to the Santa Cruz series are found all along the coast from Mexico to Oregon wherever the rock is of a character to yield rather easily to the mechanical erosion of the waves and yet is fairly resistant to atmospheric weathering. The uplift indicated by the ocean terraces occurred in the physiographic yesterday. The active youth of the California coast today is best seen by taking the Ocean Shore R. R. from San Francisco southward about ten miles to Mussel Rock station. From this point the trace of the San Andreas Fault is so plainly expressed in recent topographic forms that it has been followed without interruption nearly 500 miles until lost in the sands of the Colorado Desert. An hour's walk along the fault zone is well repaid. There is still to be seen at intervals the crumpled sod along the fault plane between the portion of the earth's crust that moved to the northwest in 1906 and that which went to the southeast. Offsets in fences still bear testimony to the direction of the movement. Previous, but relatively very recent, activity in the same fault zone is indicated by the succession of ponds, small linear valleys, and low escarpments which mark the zone whether it follows the top of ridges, hangs on hillside slopes, or follows the floors of larger valleys.

Space has forbidden more than mere mention of the most interesting features of the trips suggested. A day each to Mt. Tamalpais and Mussel Rock, and two days for the Santa Cruz trip will cover the main points outlined and give some glimpses of the general topography of

this portion of the Coast Ranges. With the exception of the Mussel Rock trip these excursions may be taken with practically no walking and are full of scenic interest to every visitor while to the special student they furnish striking illustrations of the great forces affecting the California coast and of the types of topography being evolved.

NOTE.—The location of the minor places mentioned in discussing terraces will be found on the topographic map of the Santa Cruz Folio, U. S. G. S. The following topographic maps are useful for the bay region: Tamalpais, San Francisco, Concord, San Mateo, Haywards, and San Jose.

THE YOSEMITE VALLEY

By MABEL B. PIERSON

Pasadena, California, High School

THE Sierra Nevada, seventy miles in width, falls steeply on its eastern edge by a fault scarp to the desert floor; but its western flank slopes gradually for many miles to the great valley of California. Midway on this western slope is sunk the valley of the Yosemite, eight miles long, one-half to one mile wide, and two-thirds of a mile deep. It is 140 miles easterly from San Francisco, and can now be easily reached by rail and stage.

The railroad takes us up the valley of the Merced through the gold-quartz belt to El Portal, at the boundary of the National Park; then we are carried by stage into the valley in a few hours, following a well built road which winds up the steep valley amongst gigantic talus boulders. The canyon grows wilder and deeper, the walls more precipitous. At last we catch sight of El Capitan ahead, and get a glimpse of Bridal Veil through the pines. Then the falls come fully into view, a beautiful, wistful, filmy veil of white, ever drifting as it drops into space from the cliff 620 feet above.

When we are torn from this enchanted spot, we find ourselves gazing in awe up the perpendicular face of El Capitan right into the sky. Nothing ever looked so high. It is 3,000 feet in height, as far as the valley is wide. This one face contains 165 vertical acres; while the rest of the cliff, forming a right angle with this, is more massive still. On the right we pass the Cathedral Peaks, not of such impressive size, but more beautiful, with their jutting crags and graceful spires piercing the sky and casting deep shadows on the cliff behind them.

The valley meanwhile has changed completely: just below, narrow and full of talus, here it spreads out a level floor, carpeted with ferns and flowers, and covered with a beautiful forest of pines, firs and oaks.