The Flora of the California Coast Range.—1.

The Coast Range is the general name for the great mountain system which stretches along the coast from southern California to Puget Sound. It is not a continuous range, but a broken mass of parallel ridges from forty to seventy miles wide, with many other chains transverse to the general trend of the range, and enclosing numerous valleys, large and small, of widely different altitudes. Great streams rising in the Sierra cut through it there and there, while other streams rising in the range itself pour directly into the Pacific at various angles, and through the depressions where they flow, fog and wind pour in to modify greatly the local climates. At some points broad plains of low rolling hills lie next to the coast, and at others mountain ridges shut out the wind and fog from the country behind them. San Francisco Bay exercises a marked influence on the climate of a large area, and all these factors tend to produce diversity of temperature and moisture in an apparently capricious way in places near together; in fact two places have the same climate and rainfall. In the Sierra Nevada the frostless belt lies at a certain altitude; in the Coast Range there is no warm belt, but isolated warm spots which depend on altitude, prevailing wind, fog and exposure. The result is that the climate here can only be ascertained by experience.

The rainfall is even more capricious than the temperature. In every rain there is a considerable difference in the precipitation between Ukiah and the Insane Asylum, three miles away across an open valley, being invariably less at the latter place. Little Lave, twenty miles from here, has a greater rainfall. Mendocino City, on the coast, has an annual rainfall of more than fifty inches, while seventy miles away, Colusa County, in the Sacramento Valley, has eight inches, and at points in Shasta County, at the head of the Sacramento Valley, the rainfall has been as great as 200 inches. The geological formation of the ranges and the character of soils continually vary, and in the rugged sections they vary widely at very short distances. Under such conditions the flora of the Coast Range cannot be other than interesting, and it is hardly probable that there is a more captivating field for the botanist in the world. The species are much localized, and frequently found there out of their usual range. To be enthusiastic in natural science the study of these endless variations and their causes is a source of constant pleasure.

Nowhere in the range is there greater variety than in the area comprised within Mendocino and Lake counties. Here we have a narrow table, or hill-slope, next the ocean originally covered with Pinus muricata, sand and salt lagoons. A few miles back high table-lands lie between the deep-cut river channels, covered with a tangle of low shrubbery. Up the river canons on the ocean side, and fringing the valleys, the great coniferous forest begins, and after a few miles the Redwood begins and stretches to the tops of the range which, at twenty miles from the sea, forms a barrier 2,000 feet high between the coast and the interior. This barrier range, diversified by masses of Douglas Spruce, Oak woods, thickets of Chemical or mixed shrubs, long grassy slopes, tiny mountain meadows or wide enclosed valleys, and with small patches of Redwood in canons or cool slopes on its landward side, is a most interesting field for the botanist. Mendocino County a prominent ridge crosses the mountain range, towering up from five thousand to six thousand feet above its lofty neighbors, snow-capped until summer, its lower slopes covered with forests of Yellow
Pine or Sugar Pine. This is the San Hedrin Mountain, while farther east Mount Hall, Snow Mountain and Mount St. John are higher still, each having a geology and flora peculiar to its own. Rising at the base of this range Kelt River flows north-west to the ocean, while near by the Russian River flows to the south. The banks of the first are rugged and rich with conifers, while the basin of the latter is the home of a large and varied family of Oaks. Prunus River valley is another great barrier range, smooth and round topped, its higher slopes a vast even growth of brush, its lower slopes grassy and dotted with Oak woods, and its clefts of treasure-houses to the lovers of trees and flowers. High on these shrub-covered mountains are little vales which are also mines for the flower lover.

Beyond these lies Clear Lake, thirty-five miles long, surrounded by high mountains, and although 1,300 feet above the level of the sea, it furnishes congenial homes for Orange groves. Further to the east another lofty Pine-covered range divides Clear Lake from the headwaters of the Sacramento and offers a region, half-alpine, rough and hard, yet of surpassing interest. I have been collecting in this wonderfully diversified region for sixteen years, and yet there are numberless fields that I have not explored, and every year I find new things. I shall try to convey some faint idea of the characteristic trees and flowers of some of these sections, always keeping in mind that twenty other such belts might be cut from the Coast Range, each quite as interesting to the naturalist and without any danger of monotony, while the whole series terminates at the north in that wild Olympic range between Puget Sound and the ocean, one of the most striking and least known of our nation's possessions.

LEAVING Maria very early the thirteenth day of June, we arrived in the afternoon of the same day at El Paso, one of the best-known cities of Texas, situated at the western limit of the state. The city contains about twelve thousand inhabitants. It is the capital of a county of the same name, which covers eight thousand four hundred and sixty square miles. El Paso is near the one hundred and sixth meridian, near the thirty-second parallel, and the average annual rainfall for the last nine years is about ten and one-half inches.

Across the river, and nearly opposite El Paso, is the Mexican city, Ciudad Juarez, the two cities standing near the head of the "Pass," a nearly level valley extending many miles down the river, and probably an earlier lake-like expansion of the Centuries ago the beauty of the Pass, and its adaptability to irrigated agriculture, led to the establishment of a Spanish colony and mission at Juarez, which is one of the oldest cities of America, and Baron Humboldt, who visited this locality early in our century, speaks in praise of El Paso, of the Mission, of the vineyards there and of the Mission grape.

The vicinity of El Paso is one of the principal seats of Texas of successful agriculture by irrigation. At the river rapids, about a mile above the city, low dams have been built letting the water of the river into the main ditches on each side of it for distribution to the fields of grain, vegetables and fruit. At this immediate point most of the farming is done on the Mexican side of the river.

But on the American side, farther down the river, and near Yalets, fields of Wheat, Barley, Corn and other grains are common. Alalfa, the great forage plant of irrigated lands, is raised in great quantity on such well-cultivated lands, so wonderful, three or four cuttings of it being made in a season. At Juarez are numerous Pear-trees, two or more feet in diameter, larger Apricot trees than I had seen before, vineyards, Apple orchards, and occasionally a Quince tree, and this where cultivated trees, as well as cultivated smaller plants, live only by irrigation.

While in Mexico I visited the extensive orchards and vineyards of Dr. Alexander, a sturdy hospitable German of the old school, who bought his grape of a son of the priest who wasshielded by Humboldt in his home at the time of his visit to the Pass. The vineyards contain about thirty thousand vines of the Mission Grape, which was probably introduced into this country by the Spaniards. Little is known of its origin or of its introduction to America. The fruit when ripe is dark purple in color, of fair size, well clustered and full of body, sweet juice, fermenting into a rich strong wine. Its leaves in general outline resemble those of the southern Muscadine, but they are larger and more deeply lobed, the larger leaves sometimes approaching in form those of our common Ampelopsis. The trunk readily takes a tree form and requires no trellis. The vine would be better if the grapes remained on the vines until November. But for obvious reasons it is necessary to gather them much sooner.

On an average each vine yields an annual crop of ten pounds of grapes. Four hundred pounds of grapes will afford a gallon of ripe wine. A glass of this wine kindly proffered by Dr. Alexander, although not ten years old, was well matured for its age, healthful full of good cheer, and vivacious. Long experience has led my friend to conclude that the Mission Grape is the only variety that is well adapted to the conditions of climate and soil which exist in the El Paso region, and that will afford at the least cost of production a good potable wine.

In the streets, yards and parks of El Paso I saw growing western Cottonwood, Silver Poplar, Lombardy Poplar, Willow Cutilpa in handsome tree form. Barbadoes Flowers Fence, or, as some people call it, Bird of Paradise Tree (Cordilia purpurea), Jerusalem Thorn, Yellow Locust (Robinia), Silk Tree (Albizia), Mexican Elder (Sambucus), China Tree (Melia), Paradise Tree (Allanthus), Wild China (Capilosa), Osage Orange (Kojon), English Ivy (Helara), Virginia Creeper (Ameloplos), Red Mulberry, Mormus, and others. There are thousands of acres of land in this great valley now vacant, but capable, under irrigation, of becoming highly productive. Nature is doing all that is in her power to assist in redeeming and fitting the alkaline flats for agriculture. She is employing several Hippomai-segins, some Dalcus, a half dozen species of Atriplex, three or four Amaranths, a species of Lepidium, Sugaras, Bigelovias, Helianthi, Sesuvium, Triantana, coarse Grasses and Sedges and other plant laborers, to change and purity the soil by their living, and by their death and decay to add to its permanent fertility. The refuse-matter of the streets and stables should be utilized for the same purpose, and then the only great need would be a permanent supply of water for irrigation.

As it is now, irrigation at El Paso is far in advance of actual agriculture. Probably three times the amount of farm and garden products might be raised with little additional expense for water. But the river-bed itself is sometimes as dry and dusty as the unsprinkled streets of the city. Irrigation is yet in its infancy. A dam sufficiently strong to hold the accumulated floods of the Rio Grande and of other large rivers would involve an expense of millions of dollars and heavy damages for overfows, and could exist here only by international agreement. In time such structures might be worth far more than the cost of building them. The general features of the flora around El Paso are somewhat peculiar. Species of the Pea family have decreased, while species of the much smaller Malva family have increased in numbers. Species of Composite, especially shrubby species, are very numerous in the ground, species of Bellas being unusually abundant. Certainly two, perhaps three, species of Agave rep-