A PHYTOGEOGRAPHIC AND TAXONOMIC STUDY OF THE SOUTHERN CALIFORNIA TREES AND SHRUBS; FROM BULLETIN OF THE NEW YORK BOTANICAL GARDEN, VOL. 6, NO. 21, 1910, PP. 300-483

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PREFACE

In the study of the trees and shrubs of southern California I have endeavored to discuss the phytogeographic as well as the taxonomic features, as trees and shrubs, being long-lived and non-migratory, furnish excellent material for phytogeographic observations. The present paper is the result of field studies carried on along these lines for a number of years, together with an examination of specimens in the principal herbaria of the United States.

Many helpful suggestions in the study of the phytogeographical

problems have been obtained from Coville's "Botany of the Death Valley Expedition," Parish's "Sketch of the Flora of Southern California," and Hall's "Survey of San Jacinto Mountain," as well as from Merriam's paper dealing with his system of life zones, which latter I have adopted.

Acknowledgments are most heartily given to the following persons for the loan of material, or for assistance in determining questions of taxonomy and nomenclature: Dr. B. L. Robinson, Mr. F. V. Coville, Dr. J. N. Rose, Dr. J. K. Small, Dr. P. A. Rydberg, Dr. H. M. Hall, Mr. S. B. Parish, Dr. A. Davidson, Mr. W. F. Wight, Mr. C. R. Ball, Mr. P. L. Ricker, Mrs. K. Brandegee and Miss M. A. Day.

To Professor W. R. Dudley, who has courteously given much time and valuable assistance, and through whose advice and encouragement I undertook the study of the southern California flora, and to Dr. N. L. Britton, who has given valuable aid in carrying on these studies, is due whatever merit this paper may possess.

INTRODUCTION

PHYSIOGRAPHY

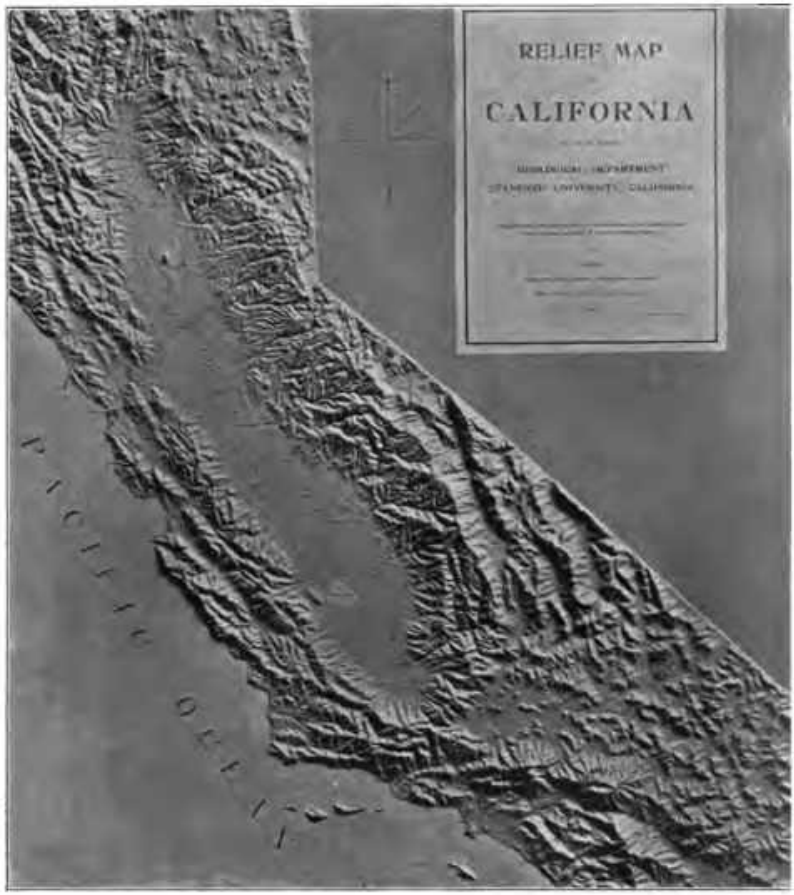
Southern California is the name popularly applied to that part of the State of California which lies south of Point Conception and the Tehachapi Mountains, a territory lying between 32° 35′ and 35° 45′ north latitude, and extending from the 37th to the 43d meridian west. Its western boundary is the Pacific Ocean, its southern Lower California, and its eastern the Colorado River, which separates it from Arizona. On the north the boundary is formed by the crosss ranges which break up the general trend of the Coast Ranges and the Sierra Nevada. Its line extends from Point Conception eastward along the Santa Ynez Mountains, Mount Pinos, and the Tehachapi Mountains to the southern extremity of the Sierra Nevada, thence eastward to the southern boundary of Nevada. East of the Sierra Nevada the northern boundary is arbitrary, as the Mohave Desert merges into the desert regions northward and eastward with no definite line of demarcation.

The area comprised within these boundaries is approximately 113,250 square kilometers, a little over one fourth that of the entire State. The greatest width from east to west is 520 kilo-

meters, and from north to south 350 kilometers. Southern California covers an area somewhat greater than the entire State of Pennsylvania. If placed on the northern Atlantic coast it would extend east and west from Boston to Buffalo, and southward as far as Philadelphia.

The topography is broken and irregular, with numerous mountain ranges separated by narrow passes or valleys of greater or less extent. The main axis of these mountains lies generally parallel with the coast at a distance of 40 to 120 kilometers inland. At intervals of 60 to 100 kilometers narrow passes divide this axis into several rather distinct sections. Of these sections the northernmost, which lies between Tejon and Soledad Passes, is composed of a series of comparatively low, chaparral-covered mountains, the culminating peak of which (Liebre Mountain) is only 1737 meters above the sea. South of Soledad Pass, between it and Cajon Pass, are the rugged peaks of the San Gabriel Mountains, which rise abruptly out of the coastal valleys to altitudes ranging from 1800 to over 3000 meters (Mount San Antonio = 3024 meters). The San Bernardino Mountains, although less broken and irregular, reach even higher altitudes. In this range, which is separated by the narrow Cajon Pass from the San Gabriel Mountains, is the highest mountain south of the Sierra Nevada (San Gorgonio, 3428 meters). Extending southeastward from Mount San Gorgonio, at a much lower altitude, are the desert ranges, the Cottonwood and the Chuckawalla Mountains, which separate the Mohave and the Colorado Deserts. To the southward, again, between the Colorado Desert and the coastal region, rise the San Jacinto Mountains. The eastern base of Mount San Jacinto, the highest peak in this range, rests almost directly upon the low depressions of the Colorado Desert (Palm Springs, altitude 137 meters) while its summit, scarcely eight miles distant in an air line, rises with an almost sheer ascent to 3242 meters. South of the San Jacinto Mountains are the less rugged Palomar, Santa Rosa, and Cuiamaca Mountains. This series of mountain ranges divides the deserts from the coastal region, and is one of the principal factors which influence the climate of southern California.

The arid desert country east of the mountains, comprising over one half the entire area of southern California, is separated by the Cottonwood and Chuckawalla Mountains into two distinct divisions, the Mohave and the Colorado Deserts.



RELIEF MAP OF CALIFORNIA.

The Mohave Desert, which lies to the north of the dividing ranges, is triangular in outline and covers an area of approximately 51,200 square kilometers. It is chiefly an arid plateau with an elevation of 300 to 900 meters, but north of our limits is the low depression of Death Valley which is nearly 90 meters below sea level. The broad level expanse is broken here and there by short isolated ranges or "lone mountains," the rocky barren slopes of which, save for their talus bases, rise abruptly from the floor-like plain. Between these elevations are numerous low depressions which have become sinks or "dry lakes." The surfaces of these are frequently crusted over with the deposits of soluble salts, and the margins lined with characteristic saline vegetation.

To the south of the Cottonwood and the Chuckawalla Mountains lies the Colorado Desert, which extends southward along the gulf slope of Lower California, and eastward into southern Arizona and northwestern Sonora. Within the boundaries of California this desert, the area of which occupies a little over 16,000 square kilometers, is principally the dry bed of a large inland sea or lake, with pebble-covered beaches that are still clearly discernible along the base of the surrounding mountains. At one time this depression was a continuation of the Gulf of California, from which it was cut off in comparatively recent times. This separation was accomplished partly, perhaps, by a slight elevation of the land between the vicinity of Yuma and the Cocopa Mountains, but chiefly by the delta formed at the mouth of the Colorado River, which latter carries great quantities of silt. Inward from the gravelly rim of the depression the character of the soil gradually changes from a sandy loam into the heaviest of clays, while the center, now covered by an accidental overflow from the Colorado River, is normally a salt bed several feet in thickness.

On the western or coastal side of the mountains the foot-hills and mountains give way here and there to valleys often of considerable extent. These valleys are mainly very fertile, supporting a luxuriant vegetation wherever water is plentiful, but areas of low alkaline soil, or dry gravelly mesas or washes are frequently interspersed. Along the southern base of the San Gabriel and the San Bernardino Mountains the original floor of the valley has been buried by debris of gravel and coarse sands, washed down by the winter torrents from the steep mountain slopes. Here