PLANT RECORDS OF AN EXPEDITION TO LOWER CALIFORNIA.

By EDWARD A. GOLDMAN.

INTRODUCTION.

The list which is here published is based on a collection of plants made by Mr. E. W. Nelson and the author in the course of general exploration in the service of the Bureau of Biological Survey of the United States Department of Agriculture. The expedition upon which the collection was obtained occupied the period from April, 1905, to February, 1906, during which the entire length of Lower California was traversed. Lack of time and of transportation facilities limited our collection to the more conspicuous and important species, mainly trees and shrubs. Herbarium specimens gathered by others and published records have been used to some extent, but no effort has been made to complete the list of Peninsular species, which would necessarily be very long, owing to diversified conditions of climate and topography. The larger and economically more important native species are included as far as possible, the entries being accompanied by data of collection and distribution.

Although botanical collecting in Lower California began with the visit of H. M. S. *Sulphur* in 1839, comparatively little was known of the flora of the Peninsula until Dr. Edward Palmer visited the coast in 1887. T. S. Brandegee, landing at Magdalena Bay two years later, took up the work and prosecuted it at intervals in the field and in the herbarium during more than 13 years, greatly advancing our knowledge of the Peninsula flora, especially of the interior. The investigations of the various collectors have been largely restricted to particular areas which, owing to accessibility, have been repeatedly revisited, while much of the mountainous interior, especially of the central section, remains entirely unknown. The work of Brandegee was centered in the Cape District from Magdalena Bay southward, including the Victoria Mountains, but he made an overland journey from Magdalena Bay to San Quintín and visited the high mountains of the northern part of the Peninsula. The other principal collectors—R. B. Hinds, of H. M. S. *Sulphur;* L. J. Xantus, Dr. J. A. Veatch,

Dr. Edward Palmer, Lieut. C. F. Pond, and Dr. J. N. Rose—have confined their attention mainly to the coasts. Several important mountain ranges along the backbone of the Peninsula—the Sierra de Calamahué, Sierra de Santa Lucía, Sierra de San Francisco, and the Sierra de la Giganta—remain unexplored, and they doubtless bear on their upper slopes many new and interesting plants. New light on distribution is also to be expected, as a number of species now known only from near the summits of the Victoria Mountains will probably be found to range farther north in the Sierra de la Giganta.

Lower California was not included in the botanical treatment of Mexico in the Biologia Centrali-Americana and has been given no place in any general flora of North America, except the as yet incomplete North American Flora. The most important papers dealing with the flora of the Peninsula are those published by Brandegee, mainly in the Proceedings of the California Academy of Sciences and Zoe; by Bentham in the Botany of the Voyage of the *Sulphur;* and, as scattered articles, by Rose, Gray, Watson, Greene, and Hitchcock and Chase.

The flora of the Peninsula is readily separable into two main divisions: One, identical with that of southern California, which entering from the north occupies the northwest coast and the Sierra del Pinal and San Pedro Mártir mountain regions, comprising species which disappear rapidly to the southward, a few reappearing on the summits of the high mountains in the Cape District south of La Paz; the other, a more austral flora, derived from or related to that of the adjacent mainland coast of Mexico, occupying the entire southern part of the Peninsula except the summits of the higher mountains and extending northward in a narrowing strip east of the San Pedro Mártir Mountains. Brandegee[1] states that the greatest change in the flora takes place in about latitude 28°. While a rough division may be made in the vicinity of this parallel, many austral species reach much farther northward along the coast of the Gulf of California.

The region as a whole is of unusual interest, owing in part to its configuration and to the inclusion within its borders of these widely differing floral areas. The higher mountains are crowned by familiar appearing forests of oak and pine. In the more arid desert sections a number of species in adapting themselves to their environment have developed into monstrous forms which so prevail as to give the landscape an aspect of unreality. Several remarkable genera seem to be peculiar to the Peninsula and numerous species belonging to genera ranging widely in tropical America are here rather narrowly restricted in range.

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[1] Southern Extension of California Flora. Zoe 4: 190–210. 1893.

The subjoined list includes 3 species described in the present paper and 19 already described from material collected by this expedition:

For aid in the determination of species, I am especially indebted to Mr. T. S. Brandegee, the well-known authority on the botany of the region, his special field of study. Others who have given the

benefit of their knowledge of special groups are Dr. J. N. Rose, Mrs. Katherine Brandegee, Mr. Frederick V. Coville, Dr. William Trelease, Mr. George R. Shaw, Mr. Paul C. Standley, Mr. O. F. Cook, Mr. Carleton R. Ball, Dr. E. L. Greene, and Miss Alice Eastwood.

ANNOTATED LIST OF SPECIES.

ROCCELLACEAE. Orchilla Family.

Rocella sp. ORCHILLA.

The native name of this lichen is "orchilla." It was formerly the source of a large and profitable industry in the vicinity of Magdalena Bay, on the west coast of the Peninsula. It was shipped to England, where from the raw material fast dyes of several colors were extracted. When cheaper aniline dyes came into general use, however, the business became unprofitable. A recent demand for vegetable dyes may result in a revival of the industry. The plant seems to be confined mainly to a narrow strip of shore line, extending from near Magdalena Bay north for about 150 miles. Orchilla grows in thick drooping, moslike fringes along the branches of desert shrubs and trees near the coast.

PINACEAE. Pine Family.

Abies concolor (Gord.) Parry. WHITE FIR.

Occurs rather sparingly on the cooler slopes above 2,250 meters in the San Pedro Mártir Mountains. Collected at Vallecitos, July 15.

Cupressus guadalupensis S. Wats. (?). GUADALUPE CYPRESS.

A single cypress tree was found by us in a notch at about 2,700 meters altitude on the crest of the San Pedro Mártir Mountains several miles east of Vallecitos, July 15, and from it a branch bearing ripe cones was collected. From near the spot, which was reached on horseback, we had a splendid view of Santa Catalina Peak, the highest of the San Pedro Mártir Mountains, across a canyon to the southeast, and at our feet the east slope of the range broke away abruptly to the desert over 2,100 meters below.

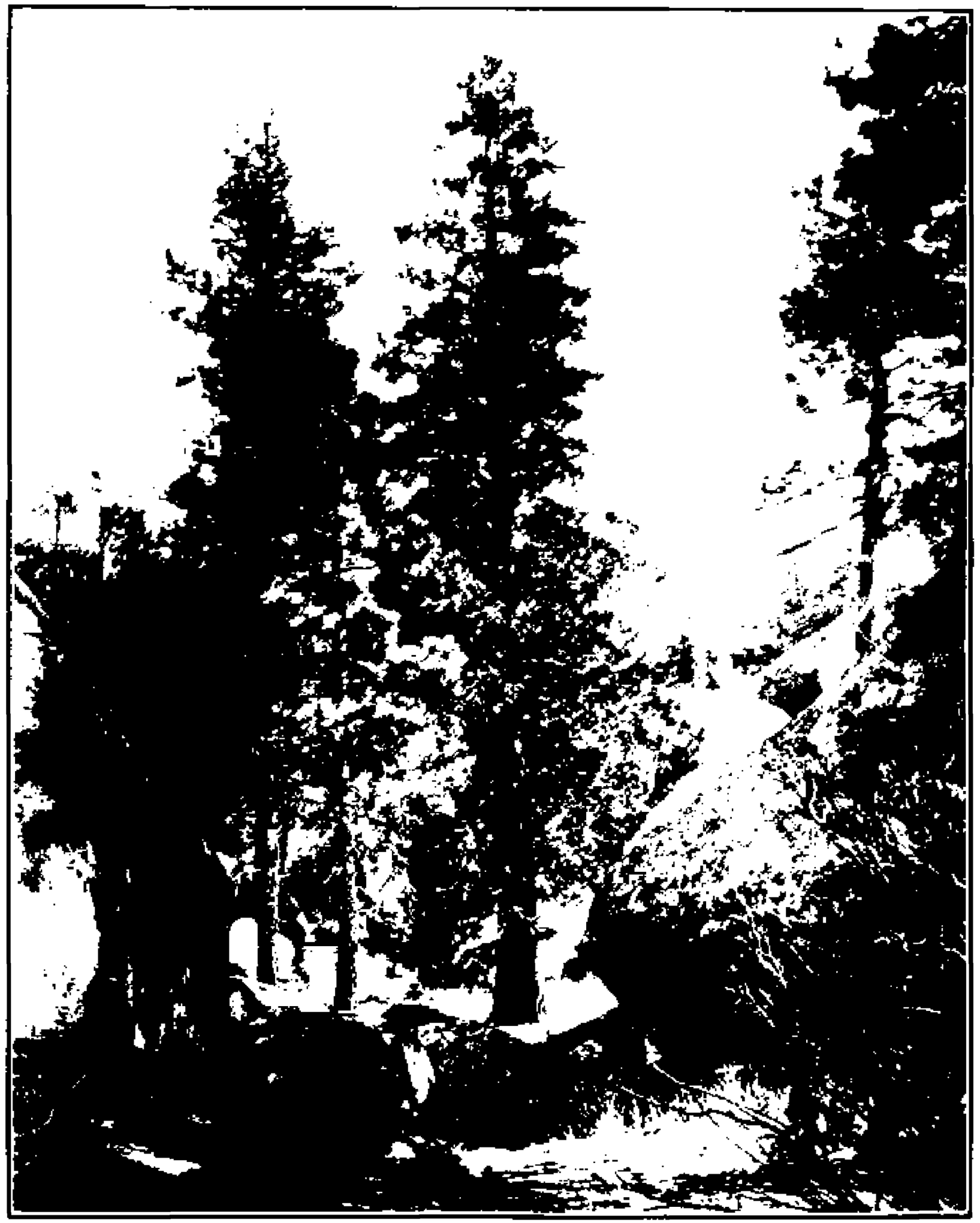
In the absence of specimens for comparison we assume ours to be the same as a species collected in the San Pedro Mártir Mountains by Townsend and Anthony, regarded by Dr. C. S. Sargent as somewhat different from the type of *guadalupensis*, but not separable from it.[1] It seems very unlike *C. goveniana*, a widely ranging species, which approaches the Lower California boundary, and may prove to differ from *guadalupensis*, which grows abundantly at lower elevations on the more humid, fog-enshrouded slopes of Guadalupe Island.

Juniperus californica Carr. CALIFORNIA JUNIPER. CEDRO.

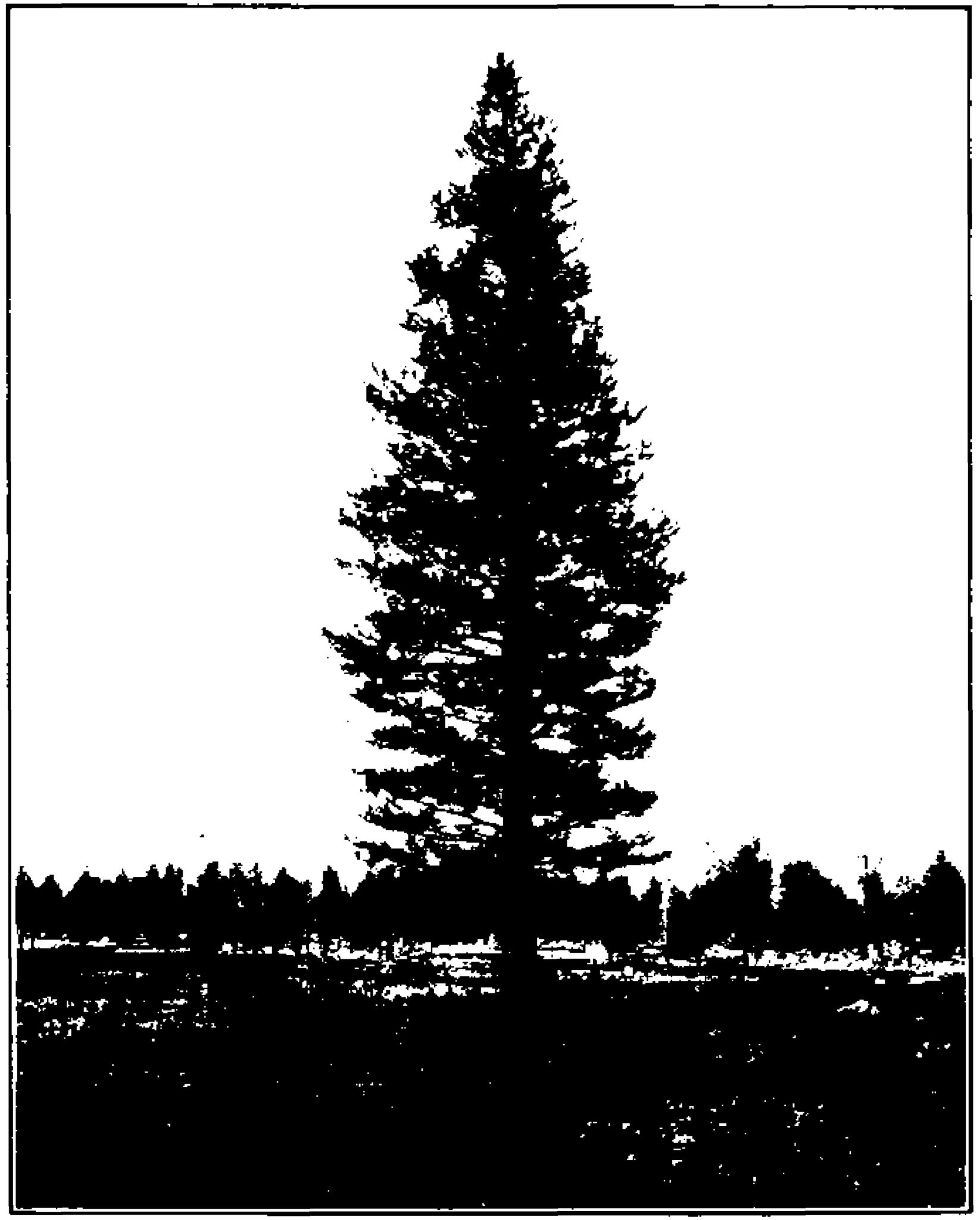
Abundant over many slopes along our route, beginning at about 450 meters altitude a few miles east of Ensenada, thence up through San Rafael Valley to the summit of the Sierra del Pinal. It was also noted near El Alamo and in Trinidad Valley, and farther south at 990 meters along the road from Rancho Santo Tomás to San Antonio, on the west slope of the San Pedro Mártir Mountains. A specimen in fruit was collected east of Ensenada, May 31. Brandegee records the species as far south on the peninsula as Agua Dulce.

Specimens in the U. S. National Herbarium taken on Cedros Island by Dr. Edward Palmer and by A. W. Anthony, determined as *Juniperus cedrosiana* Kellogg,

[1] Proc. Calif. Acad. II. 2: 216. 1889.



A. Libocedrus decurrens Torr., San Pedro Mártir Mountains.



B. Pinus contorta Dougl., San Pedro Mártir Mountains.

A. PINUS JEFFREYI OREG. COM., SAN PEDRO MÁRTIR MOUNTAINS.

B. PINUS LAMBERTIANA DOUGL. AND P. JEFFREYI, SAN PEDRO MÁRTIR MOUNTAINS.

appear like herbarium specimens of *J. californica*. Dr. J. A. Veatch, the collector of the type material of *J. cedrosiana*, says:[1] "This juniper grows rather abundantly in some localities on Cerros [Cedros] Island. It is found most abundant about the middle of the island, on the eastern side, in deep ravines, usually at an elevation of 600 or 700 feet above the sea."

It is worthy of note that in the remarks accompanying the original description of *J. cedrosiana* mention is made of specimens previously collected by Doctor Veatch in the hills along the west side of the San Joaquin Valley in California and supposed to represent the same species. This supposition seems confirmed by later investigations. The name "Cedros" usually applied to the island seems to be derived from the Spanish word "cedro," commonly used by the Mexicans as the name for trees of this group.

Libocedrus decurrens Torr. INCENSE CEDAR. PLATE 104, A.

Moderately common, mainly on the cooler slopes at 2,100 to 2,400 meters altitude near La Grulla and Vallecitos in the San Pedro Mártir Mountains. A specimen with immature fruit was taken at La Grulla, July 20. It also occurs sparingly on the Sierra del Pinal.

Pinus jeffreyi Oreg. Com. JEFFREY YELLOW PINE. PLATE 105, A, B.

Pines of the *ponderosa* type grow as a more or less continuous forest in the Transition Zone along the western side of the Pinal and San Pedro Mártir Mountains, extending from varying elevations between 1,200 and 1,800 meters (this lower limit depending on moisture and slope exposure), up to the summit of the range. In spite of poor soil these pines grow in places to large size and are by far the most important forest trees of the region. Some timber has been sawed in the Sierra del Pinal, but the rugged character of the San Pedro Mártir Mountains makes lumbering operations difficult. Having the somewhat uncertain status of *jeffreyi* in mind, we were anxious to discover whether more than one pine of the *ponderosa* type occurs in these mountains. Cursory examination in the field seemed to show a wide range of variation irrespective of altitude and we came to no satisfactory conclusion, possibly because we were unaware of some of the distinguishing characteristics of the two forms. We found trees with large and with small cones standing in close proximity and by this character alone easily separable. But other trees were seen with cones so nearly intermediate in size that we abandoned this character as unreliable. A study of these pines may demonstrate the occurrence of two forms, as in southern California. Our specimens collected at Vallecitos were referred to *jeffreyi* by George R. Shaw.

Pinus lambertiana Dougl. SUGAR PINE. PLATE 105, B.

The sugar pine, like the lodgepole pine, is known from Mexico only in the San Pedro Mártir Mountains. It was noted by us in the upper part of the Transition Zone, mainly on northern exposures above 2,250 meters, near La Grulla and Vallecitos, and thence upward to near the summit of the range. It occurs rather sparingly and is associated here with the yellow pine and white fir. A specimen taken at Vallecitos was determined for us by Mr. Shaw.

Pinus coulteri Lambert. COULTER PINE.

This pine occurs mixed with the Jeffrey yellow pine on the top of the Sierra del Pinal. It is not known from the San Pedro Mártir Mountains.

Pinus cembroides Zucc. MEXICAN PINYON.

The pinyons, or nut pines, are restricted in Lower California to the higher mountains in the northern and extreme southern parts of the Peninsula. According to

[1] Hesperian 4: 4. 1860.

the determinations of Mr. Shaw, typical *P. cembroides* is widely distributed on the Mexican mainland, but is known on the Peninsula only from the Sierra de la Laguna,[1] which it therefore must have reached from the opposite side of the Gulf of California. In these mountains we found it growing abundantly in the Upper Sonoran Zone above about 1,500 meters elevation, usually taking the form of a much branched, widely spreading tree 9 to 18 meters in height and 30 to 60 cm. in diameter at base. A specimen was taken at La Laguna, near the summit of the mountains, January 26. The species had previously been collected by Brandegee in the same vicinity.

Pinus edulis Engelm. PINYON.

A nut pine collected by us at 1,800 meters altitude near Rancho Santo Tomás, on the west slope of the San Pedro Mártir mountains has been referred by Mr. Shaw to *edulis*.

Pinus quadrifolia Parl. PARRY PINYON.

This is the abundant species of pinyon on the western and northern slopes of the San Pedro Mártir mountains and extends southward along the Rosarito Divide to the cliffs about Matomi, the extreme southern limit of the conifers in this range. On the northwestern basal slopes of the San Pedro Mártir mountains and outlying foothills considerable forests of these pinyons occur. This is the main nut pine of the Indians, one of whose old camp sites we found at Piñón.

The distribution of the pinyons, or nut pines, in northern Lower California is imperfectly known. Whether two or more forms occur together or have separate and well-defined ranges was not determined by us. The pinyon taken at Hanson Laguna has been referred by Mr. Shaw to *P. parryana*. None were seen in the coast region near Ensenada, but on the Sierra del Pinal they form a scattered growth over the western slopes above about 1,620 meters altitude and down to 1,350 meters on the east slope. A few were also seen on the rocky, rolling plains 15 miles east of El Alamo and at San Matías Spring. Pinyons were noted at a number of localities along the western side of the San Pedro Mártir mountains, where they apparently extend rather sparingly in a horizontal belt, reaching from about 990 to 1,500 meters (depending upon the slope exposure) and up to about 1,950 meters along the open ridges. They extend through San Matías Pass and along the north side of Windy Canyon; on the east slope of the mountains a few were noted as low as 900 meters altitude. From this low elevation on the east side a few scattering individuals range up to 2,700 meters on the warm, dry slopes facing the Gulf of California and unaffected by the cooler, more humid climate of the west slope.

Pinus monophylla Torr. & Frem. SINGLE-LEAF PINYON.

Edmund Heller reported this from the east slope of the Sierra del Pinal, east of Laguna Hanson, below 1,350 meters. Further work will probably show that it has a much more extended range in this region.

Pinus contorta Dougl. LONGPOLE PINE. PLATE 104, B.

Not known to occur in Mexico except on the upper slopes of the San Pedro Mártir mountains. It grows on the western side above about 2,400 meters altitude and is one of the few forest trees representing the Canadian Zone in these mountains. At Vallecitos, where specimens were taken, we found it the most common pine bordering open-mountain meadows. On the rough slopes it is associated with the yellow pine. The tree attains a height here of 22 to 30 meters or more, with straight stem

[1] Sierra de la Laguna is the name of the high northern section of the Victoria Mountains.

and rather long, narrow, tapering crown. This is the pine which has commonly passed under the name *murrayana*, but late authors, such as Sudworth [1] and Shaw [2] apply the name *contorta*.

GNETACEAE. Joint-fir Family.

Ephedra californica S. Wats.

Abundant near the Pacific coast at Ensenada, in San Rafael and Trinidad valleys, and up along sandy arroyos on the warmer slopes to about 1,560 meters on the west side of the Pinal and San Pedro Mártir mountains. Over parts of the bottoms of San Rafael and Trinidad valleys it is the principal shrub. Specimens were obtained in flower at Ensenada, February 28, in fruit at La Huerta, June 2, and lacking flowers or fruit in Trinidad Valley, July 4. This species appears to occupy the Pacific slope of the San Pedro Mártir mountain region, while *E. trifurca* extends southward in the delta of the Colorado River.

Ephedra trifurca Torr.

Noted near Volcano Lake, along the basal slopes of the Cocopah mountains, and at other localities on the Colorado Desert. Plants of the genus were seen along much of our route through the desert as far south in the Peninsula as Rosarito, but as no specimens were obtained south of the San Pedro Mártir mountain region the specific identity of the southern plants is uncertain. It seems probable, however, that *trifurca* extends for a considerable distance southward along the Gulf of California, leaving the mountain slopes, especially on the Pacific side, occupied by *E. californica*.

POACEAE. Grass Family.

Conchrus palmeri Vasey. HUITSAPOL GORDO.

The "huitsapol gordo," as it is known, at least in the vicinity of Matancita, is a burgrass growing abundantly on sandy deserts nearly throughout the Peninsula. The large, well armed burs of this species place it in the long list of desert plants to be avoided. Specimens with fully grown and ripening burs were taken at San Felipe on the Gulf of California, June 20, and with partly grown burs along the road from Santo Domingo to Matancita near the Pacific coast, November 15.

PHOENICACEAE. Palm Family.

Cocus nucifera L. COCONUT PALM.

The coconut palm has been introduced in a few places in the Cape District from La Paz southward. Small groves occur at La Paz, Cape San Lucas, and San José del Cabo.

Erythea brandegeei Purpus. BRANDEGEE PALM.

This is the tall species growing abundantly, especially in the canyons, on the middle and upper slopes of the Sierra de la Laguna, south of La Paz, where it is often associated with *Populus monticola*. Brandegee states that the leaves generally fall away, leaving hard, smooth trunks which may reach a height of 37 meters, though less than 60 cm. in diameter at the base, and which, lacking the stiffness of other species of the genus, wave with the wind.

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[1] For. Trees Pac. Slope 49. 1908.

[2] Publ. Arn. Arb. 1:29. 1909.

Glaucothea armata (S. Wats.) Cook. BLUE PALM. PLATES 106, 107, A.

Brandegee states that this species is abundant in northern Lower California, growing in canyons or along the sandy bottoms of dry streams in the foothills on both eastern and western slopes of the mountains. He records it from "San Esteban and northward." A blue-leaved palm collected at Yubay may be referable to *armata*. The palms of Lower California are very imperfectly known.

Phoenix dactylifera L. DATE PALM. PLATE 107, B.

The common date palm, introduced many years ago in southern Lower California, is thriving in many places. About the towns of San Ignacio, Comandú, and San José del Cabo there are extensive groves, which produce good crops of the fruit without any care. Smaller groves grow in the moist, saline soil about some long-abandoned. water holes at San Angel, in the southern part of the Vizcaino Desert, about 40 miles west of San Ignacio. At this place, in their desert setting of shifting sand dunes, the palms suggest an oasis of the Sahara.

Washingtonia filifera Wendl.

The palms commonly referred to the genus Washingtonia (or Neowashingtonia) are very imperfectly known. One or more species are represented at isolated localities extending in a chain, mainly along the eastern side of the Peninsula, from near the international boundary to the Cape. Several names are based on plants raised from seed of uncertain origin. According to Brandegee many palms of this species now cultivated in California probably came from seed collected along the western edge of the Colorado Desert, and in Cantillas Canyon, a locality in Lower California, just below the boundary near Campo. Mr. O. F. Cook, who has devoted much study to American palms in general, suggests that *W. filifera* may have been carried by some of the early travelers from the Cape District of the Peninsula. Mr. S. B. Parish in "A contribution toward a knowledge of the genus Washingtonia" [1] arrives at no definite conclusion.

Washingtonia gracilis Parish.

This form was described from cultivated trees growing in San Bernardino and Riverside, California. Parish states that it is probably indigenous in northern Lower California. The characters he gives to distinguish it from *W. filifera* and its varieties are the more slender trunk and smaller, less deeply divided leaves, without filaments and on shorter petioles. In the northeastern part of the Peninsula the palms are of rather slender growth, as shown by photographs by Edmund Heller taken in Agua Caliente Canyon and by my own photographs and specimens from farther south, and if not *W. filifera* they may represent this species. In this region they grow mainly along the rocky sides of watercourses.

Washingtonia sonorae S. Wats. SONORA PALM.

Under this name Brandegee records the large palm which grows along the coast in parts of the Cape District from La Paz southward. On account of an apparent preference for the low elevations in the vicinity of the seashore he regards it as a more suitable species than *W. filifera* for cultivation near the coast of California. *Washingtonia sonorae* was described from specimens collected near Guaymas by Palmer, and Watson assigned to this species specimens taken by the same collector at La Paz, Lower California. Brandegee suggests that the species may extend northward along the Gulf of California to the region about the mouth of the Colorado River. This seems very doubtful, as we found no palms of any kind at the localities visited on the coast near the upper end of the Gulf.

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[1] Bot. Gaz. 44: 408–434. 1907.

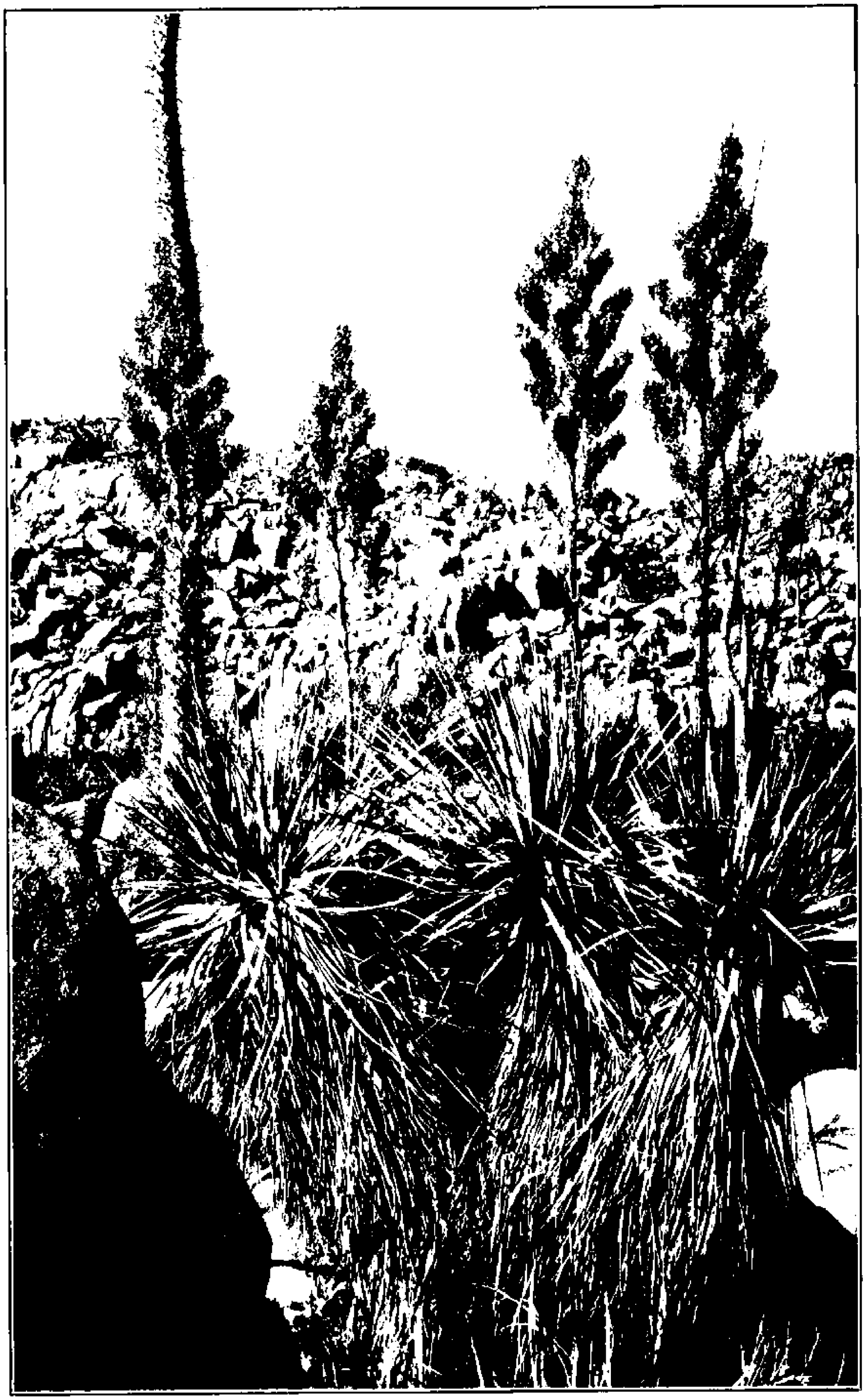
GLAUCOTHEA ARMATA (S. WATS.) COOK, JARAGUÁY.

A. GLAUCOTHEA ARMATA (S. WATS.) COOK, CATAVIÑA CANYON.

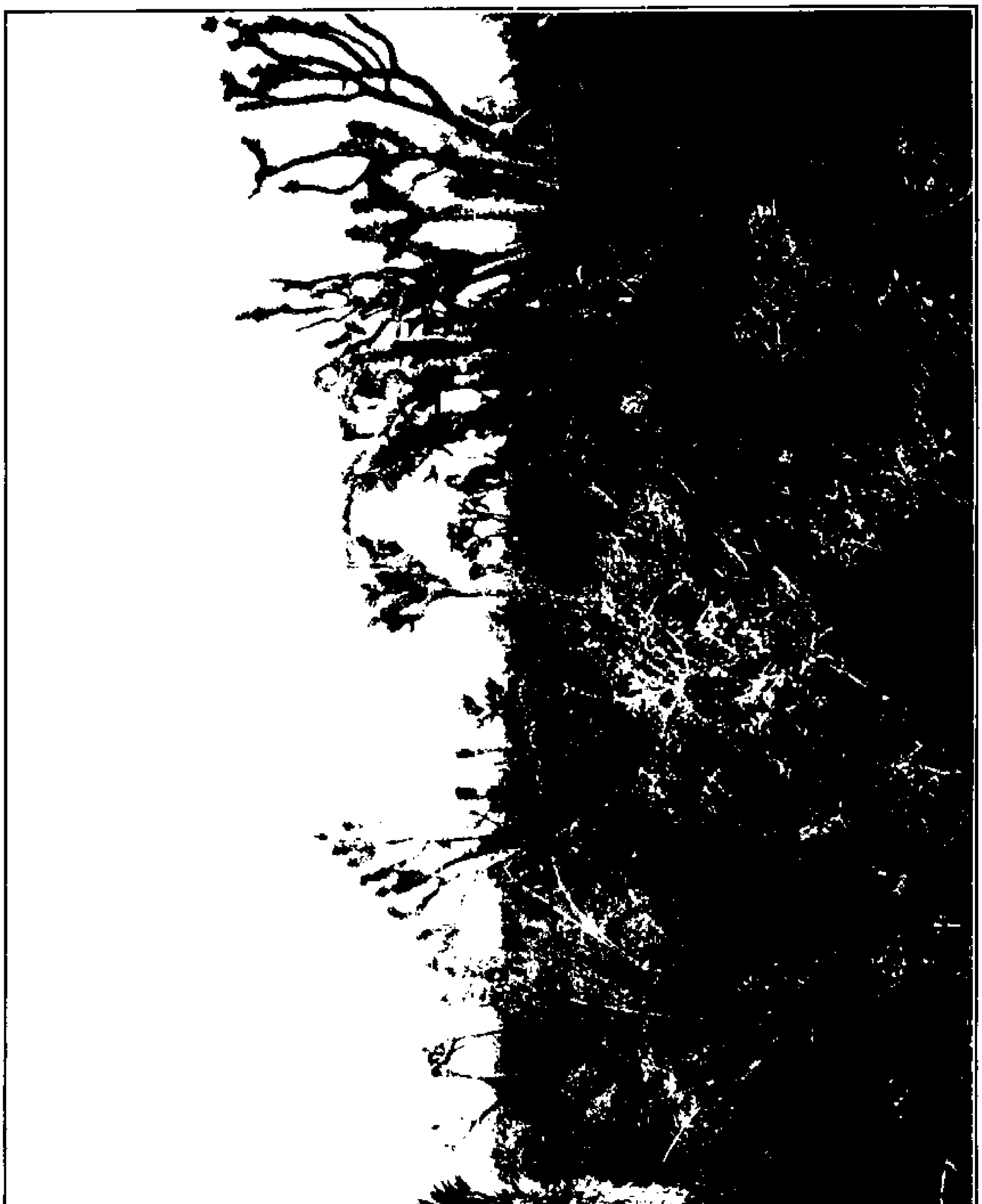
B. PHOENIX DACTYLIFERA L., SAN ANGEL.

PLATE 108.

NOLINA BELDINGI T. S. BRANDEG., SIERRA DE LA LAGUNA.



NOLINA BIGELOVII S. WATS., YUBAY.



YUCCA VALIDA T. S. BRANDEG., SANTA ROSALÍA BAY.

BROMELIACEAE. Pineapple Family.

Hechtia montana T. S. Brandeg.

First noted by us at about 450 meters altitude on a mountain 5 or 6 miles southwest of El Potrero, where a fruiting specimen was taken October 31. It was afterwards seen at intervals along our route and was most abundant in places on the basal slopes of the Victoria Mountains in the Cape District south of La Paz.

DRACAENACEAE. Yucca Family.

Hesperoyucca whipplei (Torr.) Baker. WHIPPLE YUCCA.

This Yucca is common on open slopes above about 1,440 meters altitude in the Sierra del Pinal. A few were found in flower and a specimen taken June 7, at about 1,680 meters on the west slope just below the summit of one of the higher peaks near Laguna Hanson.

Fruiting specimens of Hesperoyucca from Jaraguáy, 58 miles southeast of San Fernando, are doubtfully referred to this species by Trelease. In a letter he states that the leaves are broader than usual, with watered-silk marking, and that the specimens extend the known range of the genus southward from the northern part of the Peninsula. As they represent a species 2.5 to 3.5 meters high growing abundantly in an extremely arid, Lower Sonoran desert region (the character of country avoided by *whipplei* farther north), their identity with the present species would seem well questioned. A Hesperoyucca occurs also on the desert near San Fernando.

Nolina beldingi T. S. Brandeg. BEARGRASS. PLATE 108.

Abundant in many places in the oak forest from about 1,300 meters altitude to the summit of the Sierra de la Laguna.[1] It is a large, conspicuous, branching species, attaining a height of 7.5 meters. At the time of our visit most of the ripe seeds had fallen, but a specimen retaining a few was taken at La Laguna, January 27.

Nolina palmeri S. Wats. BEARGRASS.

The genus Nolina was noted in only a few places along our route. *Nolina palmeri* was abundant at about 900 meters in the canyon leading from San Matías Spring down into San Matías Pass, and above 840 meters along the open bottom and sides of Windy Canyon on the east slope of the San Pedro Mártir Mountains. It grew to a height of 3 to 3.5 meters. A specimen in flower was taken near San Matías Pass, June 28. Trelease [2] gives the type locality of this species as Tantillas Mountains and assigns it a range overlapping those of *N. bigelovii* and *N. beldingi deserticola*.

Nolina bigelovii S. Wats. BEARGRASS. PLATE 109.

This species was noted at about 540 meters elevation on a rocky mesa near Jaraguáy, 58 miles southeast of San Fernando, where it was collected in fruit September 9. Only a few plants were seen there growing among large bowlders. The leaves are about 120 cm. long and the flower stalk 1.8 to 3 meters high.

Yucca valida T. S. Brandeg. TREE YUCCA. PLATE 110.

Yuccas were abundant at intervals along much of our route throughout the Peninsula, except in the high mountains, but too few specimens were collected to throw much light on the number or distribution of species. Specimens taken at 600 meters near Yubay and at about the same elevation on the southern slope of the Victoria Mountains have been referred to this species by Trelease. The localities represented

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[1] See footnote, p. 314.

[2] The Desert Group Nolineae. Proc. Amer. Phil. Soc. 50: 420. 1911.

give *Y. valida* a range in the Peninsula from near Cape San Lucas northward to about latitude 29° 30′, and it probably reaches still farther. It is a tree species, growing in the vicinity of Yubay and southward to a height of 6 to 7.5 meters, in places forming a real forest. At Yubay the fruit was ripening September 18. Brandegee, who discovered and described the species, says: "This Yucca is certainly distinct from *Y. baccata*[1] and does not seem referable to any of its Mexican varieties. It does not begin to bloom until about the middle of May, when *Y. baccata* to the north of it has already nearly mature fruit. It was observed from San Jorge to San Borgia [San Borja], and near Patrocinio formed forests miles in extent; the trees in general appearance strikingly like *Y. brevifolia*, though the trunks were much less covered with old reflexed leaves."

AMARYLLIDACEAE. Amaryllis Family.

Agave nelsoni Trel.[2] PLATE 111, D.

This Agave, remarkable for the shortness and breadth of its leaves, was first seen and collected in flower at San Fernando, September 4. It was noted as abundant along the road from Pozo San Augustín to Onyx and a species supposed to be the same was seen in a number of places along the backbone of the Peninsula southward to near Yubay. The leaves in this species are 25 to 30 cm. in length and overlap for about half of this distance. The leaf margins are often nearly smooth, or the thorns inconspicuous and falling off almost at a touch. The flower stem is 3 to 7.5 meters in height. Under the name *shawii* Brandegee records this species as very abundant between Rosario and San Quintín.

Agave pringlei Orcutt.

This Agave belongs to the pinyon and lower part of the yellow pine forest on the slopes of the Sierra del Pinal and San Pedro Mártir mountains. It is a small species with short and rather narrow leaves, the flowers in dense clusters on 10 or 12 short stalks near the top of the main stem.

Agave cerulata Trel.[2]

The type specimens of this Agave were collected in flower at about 240 meters altitude at Calmallí, and a species we took to be the same was abundant on rocky, rolling plains, and rocky slopes of hills from Calmallí south to San Ignacio. The leaves are not numerous; the flower stem averages 3 to 3.5 meters in height.

Agave consociata Trel.

We found this Agave rather common in places at about 1,110 meters altitude on the Alamo Plain, where it was collected June 11. The leaves were 30 to 50 in number and the flower stalks 1.8 to 3.5 meters high. The type was collected by Parish at San Felipe, California. The species seems to range southward from the basal slopes of the mountains of the southeastern part of that State to the desert mountains of northern Lower California. Trelease records specimens collected by Mearns near the international boundary in Nachoguero Valley and by MacDougal in the Cocopah Mountains.

Agave promontorii Trel.[2] PLATE 111, B.

This large Agave, recently described, was found growing rather sparingly at 720 to 1,500 meters altitude on the warmer slopes of the Victoria Mountains, in the Cape Dis-

[1] The plant here referred to as *Yucca baccata* is of some other species.

[2] See p. 311.

A B C D

FOUR SPECIES OF AGAVE: A, A. GOLDMANIANA TREL., SAN ANDRÉS; B, A. PROMONTORII TREL., SIERRA DE LA VICTORIA; C, A. VEXANS TREL., EL POTRERO; D, A. NELSONI TREL., SAN FERNANDO.

trict south of La Paz. A flowering specimen was collected along the road from San Bernardo to El Saúz, January 21. The broad leaves are about a meter in length and closely beset with stout pines. The flower stalks vary from 3.5 to 7 meters in height.

Agave aurea T. S. Brandeg.

We first noticed and collected this handsome Agave on the lava-capped mesa a few miles north of Comandú, where it at once attracted our attention by its large size and showy flowers. The leaves, 25 to 30 in number, are 90 to 120 cm. in length, and the flower stems range from 1.8 to 3 meters in height. It is an abundant species at 180 to 360 meters altitude in the vicinity of Comandú, but was not noted elsewhere. It is unevenly distributed, growing in patches usually a few acres in extent, where the soil is thickest or where the loose lava bowlders are least numerous on the surface. At Comandú we were told that some years previously a company had been organized with a view to extracting the fiber on a commercial scale, but that the venture failed before thorough tests had been made. It seemed to us that unless the plant grows in greater abundance elsewhere than here the field for such an enterprise would be small.

Agave vexans Trel.[1] PLATE 111, C.

Five or six miles southwest of El Potrero this recently described species grew sparingly on a steep mountain side leading up from about 300 meters altitude to 720 meters on the summit of a ridge forming here the backbone of the Peninsula. It is distinguished from the other species noted in the general region by its small size and by the slenderness of the leaves. The fruit stalks stand 1.2 to 1.8 meters high. On October 31, when our specimen was taken, the ripe seeds were falling from the capsules at every jar.

Agave goldmaniana Trel.[1] PLATE 111, A.

This large and conspicuous species is abundant in many places along the Pacific slope of the Peninsula from near San Telmo southward to Santo Domingo. The flower stalks reach a height of 4.5 to 6 meters. The leaves, for several feet upward from the base of the stem, form a mass which appears to become top-heavy, causing the plants to assume a somewhat reclining position unlike any other Agave we had ever seen. In some sections these plants formed forests over considerable areas. The species was described from specimens with ripe fruit collected by us near Yubay, September 18.

SALICACEAE. Willow Family.

Populus tremuloides Michx. QUAKING ASPEN.

Quaking aspens were found sparingly, mainly along north slopes in canyons above 2,100 meters altitude in the vicinity of La Grulla and Vallecitos, in the San Pedro Mártir mountains. The species belongs to the Canadian Zone, but reaches downward along cold streams well into the Transition Zone.

Populus monticola T. S. Brandeg. HUIRIGO.

The cottonwood, locally known as "huirigo," is common along canyons at about 660 to 1,650 meters in the Sierra de la Laguna. It is a handsome species, growing 15 to 22 meters high and 60 to 90 cm. in diameter, the bark often smooth and white, much like that of an aspen. In the lower part of its vertical range it is associated with the tall slender palm, *Erythea brandegeei*. A specimen with leaves was collected along the road from Rancho San Bernardo to El Saúz. On the sugar plantation of

[1] See p. 311.

San José del Cabo loaves of raw sugar, called "panocha," are made by pouring hot sirup in molds cut in slabs of huirigo timber. This well marked species of Populus was described by Brandegee from the Sierra de la Laguna and is not known to occur elsewhere.

Populus fremontii S. Wats. FREMONT COTTONWOOD. ALAMO.

Rather common along arroyos at 1,350 to 1,500 meters along the boundary between the Upper Sonoran and Transition zones, near El Piñón on the northwest slope of the San Pedro Mártir mountains. *Populus trichocarpa* also was found along one stream in the vicinity; but the two species were not associated in the same situations. At San José del Cabo, where it may have been introduced, we found *P. fremontii* a common species. It grows here near sea level in the vicinity of the town and is known locally as "álamo." A specimen collected January 6 was in flower. Brandegee records the species as introduced at La Purísima and Comandú, but perhaps indigenous at San Enrique.

Populus macdougalii Rose. ALAMO. MACDOUGAL COTTONWOOD.

This species has recently been recognized and described [1] as distinct from the delta region of the Colorado River. The trees grow most abundantly in belts along the complicated series of ever shifting river channels. When we descended the river on the crest of the spring flood in 1905, the soft alluvial banks were being very rapidly undermined in places, involving the destruction of the cottonwood timber along the water. We often noted first a slight quivering of the topmost branches of tall trees, which then toppled and fell into the stream, one after another, and were swept away. Dense new growths of small cottonwoods, mixed with willows, spring up in old river channels which have filled and become blocked with silt.

Populus trichocarpa Torr. & Gray. BLACK COTTONWOOD.

At about 1,350 meters altitude, close along the course of a stream about 10 miles southwest of El Piñón, on the west side of the San Pedro Mártir mountains, we found this species abundant. It was not noted elsewhere. It forms here a rather small, but relatively tall, very straight tree with a long tapering spire. Compared with some specimens of *trichocarpa* from farther north the stems of this form seem more slender and the leaves smaller and more pointed. We have seen no other record of this species from Lower California.

Salix lasiolepis Benth. AHUEJOTE.

This willow was noted by us only along the banks of a small stream at 1,650 meters at La Laguna, near the summit of the Sierra de la Laguna. It appears to belong to the Upper Sonoran Zone, growing here as a tree 7.5 to 9 meters in height. The new leaves and flowers were coming out January 27, as shown by our specimen. The species is recorded by Brandegee from Rosario.

Salix exigua Nutt. SANDBAR WILLOW.

The only record obtained of this little willow was at Arroyo de León, on the northwest slope of the San Pedro Mártir Mountains. Here, at an elevation of about 900 meters, a few individuals were growing in a wet meadow along a small stream as small shrubs 1.8 to 2.5 meters high. A flowering specimen was taken July 4.

Salix bonplandiana Kunth. SAÚZ. BONPLAND WILLOW.

This willow is moderately abundant along streams in the Cape District south of La Paz at elevations varying from near sea level up to at least 450 meters on the south-

[1] Smiths. Misc. Coll. 61[12]: 1. 1913.

ern slopes of the Victoria Mountains. It forms a tree 6 to 9 meters in height. Flowering specimens were taken along the road from El Sacatón to Cape San Lucas, December 29, and between Miraflores and Rancho San Bernardo, January 20. Brandegee records the species from La Purísima and La Paz.

Salix taxifolia H. B. K.

This handsome willow, with small, silvery gray leaves, was found sparingly in small marshy spots along a stream at about 1,050 meters along the road from Rancho San Bernardo to El Saúz on the southern slope of the Victoria Mountains in the Cape District. It grows to a height of 10 meters. The new leaves and abundant flowers were coming out January 21.

FAGACEAE. Beech Family.

Quercus brandegei Goldman, sp. nov. BRANDEGEE OAK.

Tree 12 to 20 meters high; branches widely spreading, slender, and somewhat drooping toward ends; leaves persistent through winter, the blades 40 to 65 mm. long, 13 to 18 mm. broad, elliptical, normally acute at apex and cuneate at base, but sometimes slightly rounded at one or both ends, usually entire, but occasionally with 1 to 6 short, irregularly distributed, spiny teeth, short-petioled, glabrous above, scurfy or slightly roughened beneath; fruits single or several on peduncles 14 to 34 mm. long; acorns fusiform, 30 to 37 mm. long, 9 to 10 mm. in diameter, attenuate toward the apex, inclosed in a cup for one-fourth or less of their total length; cups deeply turbinate, 11 to 13 mm. high, the scales small, acute, grayish-tomentose, becoming brownish and appressed at tips.

Type in the U. S. National Herbarium, no. 565544, collected at Rancho El Paraíso, 18 miles southwest of El Triunfo, at northwest base of the Victoria Mountains, Lower California, altitude about 540 meters, January 30, 1906, by E. W. Nelson and E. A. Goldman (no. 7475).

This oak evidently belongs to the *Q. virginiana* group and seems most like Small's *Q. fusiformis* from Texas. The leaves are very similar, but the acorns present an extreme development of the tendency toward elongation and attenuation shown in *fusiformis*. After leaving the San Pedro Mártir Mountains we saw no oaks until we entered the Victoria Mountains in the Cape District, where three species are apparently isolated from their congeners to the north by several hundred miles of intervening desert. *Q. brandegei* was first noted at about 150 to 450 meters near Miraflores and later at about 540 meters near Rancho El Paraíso at the northwest base of the Victoria Mountains on our way to El Triunfo. It is a handsome species, growing scattered along alluvial valley bottoms, the slender, drooping branches in places gracefully overhanging the arroyos and roads. At the time of our visit most of the acorns had very recently fallen, many of the empty cups still remaining in place. The ground under some trees was fairly covered with shell fragments left where small rodents had been at work. The species is named for Mr. T. S. Brandegee, who collected flowering specimens at Miraflores, March 21, 1892.

Quercus idonea Goldman, sp. nov. ENCINO ROBLE.

Tree 8 to 10 meters high, the branches rather stout, moderately spreading, forming a symmetrical rounded top; leaves persistent through winter, the blades 85 to 115 mm. long, 40 to 50 mm. in greatest width, oblong, acute or slightly obtuse or somewhat rounded at base, entire or irregularly sinuous and spinescent, with rather short tomentose petioles, deep green and shining above, beneath duller and paler, with scattered stellate hairs; fruit sessile or with short peduncles; acorns ovoid, rather narrow at base, acute at apex, 20 to 25 mm. long, 8 to 10 mm. in diameter, inclosed

in cups for about one-third their total length; involucres deep cup-shaped, 9 to 11 mm. high, the scales hoary-tomentose, roughened or tuberculate on outer surface.

Type in the U. S. National Herbarium, no. 565500, collected near Rancho San Bernardo, 13 miles west of Miraflores on the eastern slope of Victoria Mountains, Lower California, altitude about 600 meters, January 20, 1906, by E. W. Nelson and E. A. Goldman (no. 7423).

This oak is similar to *Quercus glaucoides* Mart. & Gal., from Oaxaca, but the acorns are more elongate, the cup scales thicker, more tuberculate, and less acuminate at the tips; the leaves have longer, more densely tomentose petioles (leaves nearly sessile and smooth in *glaucoides*), and their lower surfaces are stellate-hairy (glabrous in *glaucoides*).

On the lower slopes of the Victoria Mountains, mainly on the east side, this oak grows abundantly and is generally distributed at about 600 to 900 meters altitude. It is overlapped by the "encino negro" (*Q. devia*), which gradually becomes the dominant species, especially on north slopes, and replaces it entirely in the Upper Sonoran Zone above about 1,500 meters on the south side of the Sierra de la Laguna. At the time of our visit the ripe acorns had recently fallen in abundance, but a few still remained in the cups.

Quercus devia Goldman, sp. nov. ENCINO NEGRO.

Tree 20 meters high, the branches mainly upright and tending to form a cone-shaped top; leaves persistent through winter, the blades 60 to 100 mm. long, 15 to 31 mm. broad, elliptical, acute or cuspidate at apex, usually rounded or cordate at base, entire for one-third to one-half their length, becoming sinuate-dentate, with slender, rigid spinose points along terminal portion, short-petioled, thinly pubescent with scattered short stellate hairs and bearing longer tufts of stellate pubescence on midrib near base and in angle between midrib and revolute margin; acorns small, 15 to 17 mm. long, 7.6 to 8.4 mm. in diameter, rather narrow and rounded at base, tapering and acute at apex, set in shallow cups for less than one-fourth their length; cups saucer-shaped, about 4.5 mm. high, the scales thin, acute, grayish-tomentose, margined with reddish brown.

Type in the U. S. National Herbarium, no. 565525, collected near La Chuparosa, a spring at about 1,500 meters altitude in the Sierra de la Laguna, Lower California, January 23, 1906, by E. W. Nelson and E. A. Goldman (no. 7454).

The leaves of this species superficially resemble those of *Quercus acutifolia* Née, but are shorter petioled, the blades more rounded and wedge-shaped at the base, with pubescence less generally distributed over the lower surface. The fruit somewhat resembles that of *Q. phellos*, but the acorns are larger, more slender, and less expanded near the base, and the leaves are so widely different that the two are evidently not closely allied. *Q. devia* ranges upward from about 1,050 meters on the south slope of the mountains to the summits at about 1,800 meters, where it is one of the few species that characterize the Upper Sonoran Zone. It is associated with *Q. idonea* below about 1,500 meters, but replaces the latter entirely above this elevation. Its native name is "encino negro."

Quercus agrifolia Née. CALIFORNIA LIVE OAK.

The California live oak ranges southward into the Peninsula through the Upper Sonoran foothill region between the Pacific coast and the western slopes of the high mountains. It was noted mainly along arroyos and canyons in a number of localities from near Ensenada northward to the Valley of Guadalupe along the road to Tijuana and eastward to La Huerta at the western base of the Sierra del Pinal. It was abundant also along small arroyos at about 1,110 meters altitude near El Alamo and between La Posa and Rancho Viejo. The largest trees were seen along the river at San Antonio, where at about 900 meters elevation a permanent stream emerges from the west slope of the San Pedro Mártir Mountains. Oaks supposed to be of this species were noted

by us at higher levels near El Rayo and Sangre de Cristo in the Pinal Mountains and near Rancho Santo Tomás in the San Pedro Mártir Mountains, but they may have been *Q. wislizeni*.

Quercus chrysolepis Liebm. CANYON LIVE OAK.

The canyon live oak is common in the Transition Zone over the higher parts of the Sierra del Pinal and San Pedro Mártir mountains, reaching down along the western side to about 1,200 to 1,500 meters, the variation depending on the slope exposure. Specimens bearing well-developed acorns were obtained by us, however, along a water course as low as about 1,050 meters altitude in the San Pedro Mártir Mountains, on the road from Rancho Santo Tomás to San Antonio, July 28. In the Pinal Mountains we found *Q. chrysolepis* common among the great bowlders on the summits at between 1,500 and 1,800 meters elevation near Hanson Laguna. Specimens in the U. S. National Herbarium from Cedros Island seem referable to this species. They were collected by A. W. Anthony, July–October, 1896.

Quercus palmeri Engelm. PALMER OAK.

Noted in a number of places at 900 to 1,500 meters elevation, along the western basal slopes of the Sierra del Pinal and San Pedro Mártir mountains. It grows usually as a stout shrub or small tree, 1.8 to 4.5 meters high, forming patches a few yards in extent. The foliage is very stiff and prickly, making it uncomfortable to force one's way through thickets containing it. It was collected by us at about 900 meters elevation near Arroyo de León, on the northwest slope of the San Pedro Mártir Mountains. This oak was originally described by Engelmann as a variety of *chrysolepis* and later raised by him to specific rank. It seems quite different from *chrysolepis* and, moreover, ranges in the Upper Sonoran Zone on warmer slopes and at lower elevations than the latter species in the same general region.

Quercus dumosa Nutt. CALIFORNIA SCRUB OAK.

This species enters Lower California on the Pacific coast, ranging southward through the foothill region to near San Quintín. It is a low growing species, not usually over 3.5 to 4.5 meters high, forming thickets on hillsides and along the bottoms of arroyos in the Upper Sonoran Zone. It was collected by us 40 miles south of Tijuana, on the road to Ensenada. A specimen in the U. S. National Herbarium, taken at San Quintín by J. D. B. Stillman, November 18, 1862, seems referable to this species.

Quercus tomentella Engelm. GUADALUPE ISLAND OAK.

Described from Guadalupe Island and represented in the U. S. National Herbarium by specimens collected there by A. W. Anthony, July–October, 1896, and March–June, 1897, by Dr. F. Franceschi in 1893, and by Dr. J. N. Rose in 1911. It has also been recorded from the islands off the coast of southern California. The species seems to be assignable to the Upper Sonoran Zone.

ULMACEAE. Elm Family.

Celtis reticulata Torr. HACKBERRY.

A small hackberry, apparently *C. reticulata*, which ranges widely in the southwestern United States, was noted by us in only a few places at about 720 meters altitude near the road from Miraflores to San Bernardo on the southern slope of the Victoria Mountains in the Cape District. It grows here as a mere shrub, 3 to 4.5 meters high. Reported by Brandegee from San Julio Canyon and as a small shrub growing about the Sierra San Lázaro, not far from where we found it.

The lower elevation of its range and its difference in floral area suggest the possibility that with additional material the Lower California plant may prove not to be true *C. reticulata*.

MORACEAE. Mulberry Family.

Ficus palmeri S. Wats. WILD FIG. SALATE.

Wild fig trees were first met with at Yubay, where a very few stunted trees were growing about large bowlders near the water hole. No others were seen until we again entered the hill country along the backbone of the Peninsula between Pozo Altamirano and San Pablo and in the vicinity of Tinaja de Santana. This fig was also found in the hills at El Potrero, 25 miles southwest of Mulegé, and more abundantly in the Cape District south of La Paz, where it is known to the people as "salate." The species appears to be at home on the warm slopes of rocky canyons in the hill country, growing usually as a small tree 4.5 to 7.5 meters high, but sometimes reaching a height of 10 meters. It was not observed on the plains along the Pacific coast. Specimens in fruit were taken as follows: Yubay, September 18; El Potrero, October 21; between El Cajón and El Sacatón, December 28. Concerning this species Brandegee says: "*Ficus palmeri* is found from San Ignacio to the Cape, especially among rocks and upon the face of cliffs. The trunk is very white, and on the perpendicular rocks flattens out at the base and assumes various fantastic forms, some of them, even when the trees are small, becoming 4 feet wide while only 2 or 3 inches thick, and finally branching out in all directions seeking crevices for a foothold. In good soil, in the bottom of canyons or about springs, it is a fine, well-shaped, large tree and affords an agreeable shade from the hot sun. The small figs are edible, but I think no one eats many of them, and certainly would not eat any without a good appetite. The trunk never grows tall enough to be made into boats or canoes and all the 'dugouts' so common about Magdalena Bay, San José, and La Paz are fashioned from the fig trees of Mazatlán on the mainland. When the small figs are ripe the tree is full of animal life; numerous insects are buzzing around, attracted by the sweet exudations of the fruit, and hummingbirds are continually flying through the branches. Sometimes in canyons this fig bears numerous aerial rootlets, but generally the trunk is smooth and light colored."[1]

LORANTHACEAE. Mistletoe Family.

Loranthus sonorae S. Wats. INJERTO.

This parasite was described from material collected by Palmer near Guaymas, Sonora, where it was "growing on *Bursera microphylla*." It was taken in flower by us and noted as common on this same species (now known as *Elaphrium microphyllum*) 5 miles southwest of El Potrero, October 31. Seen at intervals throughout the southern part of the Peninsula.

OLACACEAE. Ximenia Family.

Schoepfia californica T. S. Brandeg.

First noted near Santo Domingo and then seen occasionally along our route over the Coastal Plain to Matancita, growing as a shrub or small tree 4.5 to 6 meters high. Its grayish foliage and general habit at a little distance somewhat suggest an olive tree. A flowering specimen was collected on the road a few miles north of Matancita, November 15. A species which we took to be this was noted on Cerralvo Island. Recorded by Brandegee at San Gregorio, Comandú, and in the Cape District.

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[1] Zoe 2: 149, 150. 1891.

POLYGONACEAE. Buckwheat Family.

Antigonon leptopus Hook. & Arn.

This beautiful plant was first seen about 5 miles southwest of El Potrero as we climbed the steep slope of the backbone of the Peninsula on our way from Mulegé to La Purísima. It was noted at intervals thereafter and was abundant at all the lower levels throughout the Cape District south of La Paz, from the sand dunes along the beach up to 600 meters or more on the southern slopes of the Victoria Mountains. It grows as a vine 3 to 4.5 meters in length, spreading along the ground and climbing in masses over other vegetation. The flowers seem to be always coming out, the large dark-red sepals fading gradually as the seeds mature. Flowering specimens were taken at El Potrero, October 31, and along the road from Tres Pachitas to Valle Flojo, December 25. Brandegee records it as occurring at Comandú and La Purísima and common at low and middle elevations in the Cape District.

Eriogonum fasciculatum Benth.

The genus Eriogonum well represents the Californian flora in the northern part of the Peninsula, but comparatively few species reach far south of the San Pedro Mártir Mountain region. *Eriogonum fasciculatum*, apparently a somewhat variable species, is one of the most abundant. It was a common shrub from near the Pacific coast up to about 2,100 meters altitude on southwest slopes on the west side of the San Pedro Mártir Mountains and was noted along Windy Canyon on the east side down to 750 meters. South of the mountains it was seen at intervals along our route as far as Agua Dulce, 30 miles southeast of San Fernando, where a flowering specimen was taken at 660 meters altitude, September 9. Another specimen, also in flower, had been collected east of Ensenada, May 31. Brandegee, on his overland journey, found this shrub at Pozo Alemán.

Eriogonum elongatum Benth.

Noted as abundant and generally distributed in the desert region along the middle of the Peninsula from near Onyx to Yubay. It is a handsome plant, growing 60 to 120 cm. high, but is rather inconspicuous owing to the blending of its silvery-gray color with that of the bleached sand. At the time of our visit it was flowering mainly along dry arroyos or in the vicinity of water. A specimen was taken at Jaraguáy, about 58 miles southeast of San Fernando, September 9. Brandegee records the species from San Julio Canyon.

Eriogonum orcuttianum S. Wats.

This large species was noted by us while skirting the east base of the San Pedro Mártir Mountains from the mouth of Windy Canyon southeast of San Matías Pass to La Providencia Canyon. It occurred in a few places in the gravelly deltas at the mouths of canyons, where flood waters spread over the neighboring desert. It grows here as a stout bush 90 to 120 cm. high. A flowering specimen was taken at the mouth of Esperanza Canyon, June 27. The species is recorded by Brandegee from Paraíso.

Eriogonum parishii S. Wats.

Near La Grulla and Vallecitos on the upper slopes of the San Pedro Mártir Mountains we found this Eriogonum common in the loose, decomposed granite soil on dry, open hillsides.

Eriogonum polifolium Benth.

Noted in abundance at elevations ranging from about 780 meters in Trinidad Valley up to about 2,100 meters on open, brush-covered, southerly slopes along the west side of the San Pedro Mártir Mountains. It grows as a shrub 60 to 90 cm. in height. Specimens in flower were taken at Arroyo de León, near Trinidad Valley, July 4.

Eriogonum trichopodum Torr.

In the sandy and gravelly desert region near Agua Dulce, 30 miles southeast of San Fernando, this Eriogonum was one of the characteristic species. It grows to a height of 60 to 90 cm., but the slender, hairlike branchlets render it almost invisible at a short distance. It was associated here with *E. fasciculatum* and, like that species, was not observed farther south. A flowering specimen was taken at Agua Dulce, September 9.

CHENOPODIACEAE. Goosefoot Family.

Atriplex canescens (Pursh) Nutt. CHAMISO.

Various species of Atriplex are commonly called "chamiso" in Lower California. In the San Pedro Mártir Mountain region *A. canescens* ranges widely in both the Upper and Lower Sonoran zones, and extends southward to an undetermined limit. It is the principal shrub at about 810 meters over Lower Sonoran parts of the bottom of Trinidad Valley, whence it reaches eastward through San Matías Pass and in less abundance upward over open Upper Sonoran mountain slopes to at least 1,500 meters altitude. One or more forms of the *A. canescens* type are among the most abundant desert shrubs, ranging at low elevations nearly throughout the Peninsula. Thickets in which Atriplex, Covillea, Simmondsia, and Prosopis bushes are dominant afford cover and food for small desert mammals. The seeds of all these bushes are eaten by mammals, as shown by the fragments of seed capsules left about the entrances to burrows or under rocks where they have been carried and left by the animals. Specimens of *A. canescens* were collected in Trinidad Valley and San Matías Pass.

Atriplex linearis S. Wats. CHAMISO.

A specimen referred to this species by Mrs. K. Brandegee was taken at Tinaja de San Esteban, 25 miles north of San Ignacio, where it grew as a shrub 1.2 to 2.5 meters in height. The species, much resembling *A. canescens*, was originally described from Guaymas. Mr. Brandegee records it from San Jorge and La Paz.

Atriplex barclayana (Benth.) Dietr. CHAMISO.

Along the route from Calmallí to San Ignacio this species was seen in abundance. It forms thickets in soft soil along arroyos, avoiding stony hillsides. It grows as a shrub 90 to 120 cm. high, with somewhat drooping habit. A specimen was collected at Tinaja de San Esteban, 25 miles north of San Ignacio. Brandegee records it from Magdalena Island.

AMARANTHACEAE. Amaranth Family.

Celosia floribunda A. Gray.

This species was abundant in the valley at Comandú, growing as a shrub 1.2 to 1.8 meters high. A flowering specimen was collected November 6. Brandegee likewise records this species from Comandú, as also from San José del Cabo and Todos Santos in the Cape District, and says it seems to reach its greatest development along the streams north of Todos Santos, sometimes forming small trees.

Dicraurus alternifolius (S. Wats.) Uline & Bray.

First met with and a flowering specimen taken at about 600 meters altitude 5 or 6 miles southwest of El Potrero, on a steep mountain side toward the crest of the Peninsula, October 31. It was noted in a few places farther south along our route from La Purísima to Comandú but was nowhere very abundant. It grows as a shrub 3 to 3.5 meters in height.

AIZOACEAE. Carpetweed Family.

Mesembryanthemum crystallinum L. ICE PLANT.

At least one species of ice plant was noted on the beach at Ensenada and San Quintín and near the Pacific coast as far south as the vicinity of San Andrés and Rosarito. It was one of the most abundant plants on the Coronados Islands and on Todos Santos, San Martín, and San Gerónimo islands, growing often as the exclusive species, the masses densest where most exposed to the ocean fogs.

ALLIONIACEAE. Four-o'clock Family.

Abronia gracilis Benth. SAND VERBENA.

A little herb, discovered at Magdalena Bay, on the voyage of the *Sulphur*. We found it one of the most abundant species along the sandy coast from San Jorge south to the Llano de Yrais. It grows prostrate, the branches spreading 10 to 25 cm. over the sand, and is one of the few species which gain a foothold in and along the edges of dune areas and tend to check the constant drifting. Specimens in flower were taken a few miles north of Matancita, November 15.

Hesperonia californica (A. Gray) Standley.

A common little shrub in the hill country along our route from San Pablo to San Ignacio. It grows to a height of 90 to 120 cm. A specimen in flower was taken at about 360 meters altitude, near Tinaja de San Esteban, 25 miles north of San Ignacio.

Quamoclidion triflorum (Benth.) Standley.

First noticed along our route from Cerro Colorado to Rodríguez northwest of La Paz, but seen more abundantly in the hills along the basal slopes of the mountains in the Cape District south of La Paz. It grows as a shrub, varying from 1 to 2.5 meters in height. Specimens were collected in flower between Cerro Colorado and Rodríguez, December 16, and at 720 meters altitude, near the Rancho San Bernardo in the Victoria Mountains, January 20.

PHYTOLACCACEAE. Pokeweed Family.

Phaulothamnus spinescens A. Gray.

Noted only at about 600 meters altitude on a northeast mountain slope 5 or 6 miles southwest of El Potrero on the road from Mulegé to La Purísima, where a fruiting specimen was taken October 31. It was growing as a shrub 1.8 to 2.5 meters high.

Stegnosperma halimifolium Benth.

This shrub was first noted at Calamahué. From this point south to Cape San Lucas it was very abundant along much of our route, especially in fertile soil along arroyos, ranging upward from near sea level to about 720 meters in the hills along the backbone of the Peninsula and on Espíritu Santo Island. This species, like *Calliandra californica* and a number of others of the region, may be found flowering and fruiting at almost any time of year. It is a handsome shrub 1.8 to 3.5 meters

high. Specimens in flower and fruit were collected as follows: Calamahué, September 15; El Potrero (about 5 miles southwest), October 31; road from Cerro Colorado to Rodríguez, December 16; San José del Cabo, January 6; Espíritu Santo Island, February 7.

RANUNCULACEAE. Crowfoot Family.

Thalictrum peninsulare (T. S. Brandeg.) Rose.

Common in the oak forest on cool, moist, northerly slopes above about 1,500 meters altitude on the Sierra de la Laguna. This familiar-appearing plant was associated with a number of others whose habitat is above the Lower Sonoran Zone and which are therefore isolated here on the mountain tops. A specimen with leaves only was taken at about 1,650 meters near La Laguna, January 29. This was the first time we had observed the genus Thalictrum since leaving the San Pedro Mártir Mountains. Brandegee records this plant as common at middle elevations in the mountains south of La Paz.

BERBERIDACEAE. Barberry Family.

Berberis fremontii Torr.

This species was found rather sparingly in the Upper Sonoran Zone at the lower end of Trinidad Valley and in open arroyos up to about 1,500 meters altitude near El Piñón on the northwest slope of the San Pedro Mártir Mountains. It grows here as a shrub 1.8 to 3 meters high. A specimen with leaves only was collected in Trinidad Valley, June 16 and one with fruit near El Piñón, July 7. Brandegee records it growing in great rounded patches 3 meters high at San Sebastián and Rancho Viejo.

CAPPARIDACEAE. Caper Family.

Atamisquaea emarginata Miers.

On the shore of the bay near La Paz we found this species flowering February 3. It was also seen occasionally along the route to Cape San Lucas growing as a shrub 1.8 to 3.5 meters high. It was collected by Palmer at Mulegé in 1887 and by Brandegee at San Gregorio in 1889. The species has also been recorded from the opposite side of the Gulf of California at Guaymas and near Hermosillo, Sonora, by Brandegee, who refers to it as "that disagreeable bush."[1]

Forchammeria watsoni Rose. PALO SAN JUAN.

The "palo San Juan," as this species is called by the people, occurs rather sparingly in the Cape District near San José del Cabo and on Espíritu Santo Island, as also on the coast of Sonora. It is a thick-trunked tree 4.5 to 7.5 meters in height, spreading abruptly to form an umbrella-shaped top. On Espíritu Santo Island a few individuals were growing on steep rocky slopes 30 to 60 meters above sea level. A fruiting specimen was taken February 7.

Isomeris arborea Nutt.

Abundant in sandy places near Ensenada and on the coastal plains from near San Telmo southward at least as far as the San Simón River. Specimens in fruit and flowers were collected at Ensenada, May 20, and near San Quintín, August 2.

Wislizenia palmeri A. Gray.

An abundant species along arroyos or in the vicinity of water at San Francisquito and Calamahué, growing as a shrub 1.2 to 1.8 meters high. Specimens in flower and fruit were taken at Calamahué, September 15. The species belongs in the Lower Sonoran Zone.

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[1] Zoe 3: 344. 1893.

DUDLEYA ANTHONYI ROSE, SAN MARTÍN ISLAND.

CRASSULACEAE. Orpine Family.

Dudleya anthonyi Rose. PLATE 112.

Found growing abundantly on the rocks along the shores of San Martín Island, where the type was collected by A. W. Anthony, July–October, 1896. The large size and light color of the leaves render the plants conspicuous in contrast with the dark-colored rock.

HYDRANGEACEAE. Hydrangea Family.

Philadelphia pumilus Rydb.

A rather common species in the Transition Zone at Vallecitos in the San Pedro Mártir Mountains. Here, at 2,400 meters altitude, it grows as a shrub 1.2 to 1.8 meters high on dry rocky slopes bordering open meadows. A species here assumed to be the same was recorded by Brandegee from these same mountains under the name *P. serpyllifolius*,[1] as also by Hall from the San Jacinto Mountains in southern California.[2] This name belongs to a different species found in western Texas and New Mexico. One of Hall's specimens subsequently became the type of *P. pumilus*. Our material, taken in flower July 15 at Vallecitos, agrees well with Rydberg's description, and it therefore seems probable that the species has a more or less continuous range in the Transition Zone from the mountains of southern California southward to the San Pedro Mártir Range.

GROSSULARIACEAE. Gooseberry Family.

Grossularia quercetorum (Greene) Coville & Britton. GOOSEBERRY.

Found growing rather sparingly at 810 meters on the nearly open plain in the bottom of San Rafael Valley, a few miles west of La Huerta, where specimens were collected June 2. It was also noted in Trinidad Valley, in San Matías Pass, and at 1,080 meters elevation in ascending the dry northwestern slopes of the San Pedro Mártir Mountains, along the road from Trinidad Valley to Pozo Luciano. It grows as a shrub 1 to 1.5 meters high in the lower part of the Upper Sonoran Zone.

Ribes indecorum Eastw. CURRANT.

From the type locality near San Diego this currant ranges southward into Lower California. It was first noted by us at 840 meters elevation, growing on north slopes only, near La Huerta at the western base of the Sierra del Pinal. It grows as a shrub 1.8 to 2.5 meters high. Specimens were collected June 2, when the plants were well laden with young fruit. A currant which we took to be this species was seen at 900 meters near San Antonio, at the west base of the San Pedro Mártir Mountains.

Ribes brandegei Eastw. CURRANT.

Known only from the upper slopes of the Sierra de la Laguna, where, like a number of other Upper Sonoran species, it is isolated from its congeners by a wide desert interval. It occurs rather sparingly, mainly along water courses, from an elevation of about 1,380 meters to near the summit in the vicinity of La Laguna. It is a slender species, reaching a height of about 2.5 meters. A flowering specimen was collected January 26.

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[1] **Zoe 4:** 205. 1893.

[2] **A Botanical Survey of San Jacinto Mountain.** Univ. Calif. Pub. Bot. **1:** 83. 1902.

PLATANACEAE. Sycamore Family.

Platanus racemosa Nutt. CALIFORNIA SYCAMORE.

Noted by us at Ensenada and on the west slope of the San Pedro Mártir Mountains. It grew along a watercourse at 1,080 meters elevation below Rancho Santo Tomás and was common along the river at 900 meters near San Antonio. Brandegee records it from the slopes of the San Pedro Mártir Mountains.

ROSACEAE. Rose Family.

Adenostoma fasciculatum Hook. & Arn. CHAMISO.

Perhaps the most abundant shrub in the Upper Sonoran Zone on the western slopes of the Sierra del Pinal and San Pedro Mártir mountains. East of Ensenada on open southwest slopes it was noted at altitudes ranging from about 300 meters up to about 1,800 meters, and in places probably reaches still higher. It is absent from the bottoms of San Rafael and Trinidad valleys, which are largely Lower Sonoran in character, but grows on adjacent hill slopes. Brandegee records the species as far south as Rosario. A flowering specimen was collected east of Ensenada, May 31. The name "chamiso" is also commonly applied to the various species of Atriplex growing in the Peninsula.

Adenostoma sparsifolium Torr. PALO AMARILLO.

The Mexican name for this shrub is "palo amarillo," the name given to *Esenbeckia flava* in the southern part of the Peninsula. It ranges irregularly over the western slopes of the Sierra del Pinal and San Pedro Mártir mountains. Near San Antonio it was observed as low as 1,020 meters and from this level upward in favorable situations on warm slopes to 1,740 meters near Rancho Santo Tomás. On open slopes about Laguna Hanson, near the top of the Pinal Mountains, it is one of the most characteristic species. It grows in thickets almost to the exclusion of other shrubs on some hillsides with a surface of loose, decomposed granite, and where the formation changes abruptly to harder rock it may disappear almost entirely and be replaced by a thick growth of manzanita and *Adenostoma fasciculatum*. Specimens were taken along the road from Ojos Negros to Alamo and between Rancho Santo Tomás and San Antonio.

Cercocarpus rotundifolius Rydb. MOUNTAIN MAHOGANY.

This mountain mahogany was common along small canyons from about 1,440 meters elevation on the west side of the Sierra del Pinal to about 1,680 meters near the summit of the range in the vicinity of Laguna Hanson. It grows as a shrub 3.5 to 5.5 meters high and, combined with *Adenostoma fasciculatum* and other species, forms dense thickets on some slopes. A specimen with the flowers dropping and the hairy fruits just appearing was collected at Laguna Hanson, June 2. The species was not noted by us in the San Pedro Mártir Mountains, but may occur there.

Heteromeles arbutifolia Roemer. CALIFORNIA HOLLY.

Common only locally, usually along streams or near springs, from near the Pacific coast up to about 1,200 meters elevation on the west side of the Sierra del Pinal and San Pedro Mártir mountains. A specimen still retaining fruit was taken about 10 miles east of Ensenada, May 31, and others in flower at Arroyo de León and San Antonio, July 4 and July 28. South of the high mountains of the northern part of the Peninsula the California holly was not seen until we entered the Sierra de la Laguna, in the Cape District, where the same or a related species occurs on the upper slopes at from

1,200 to 1,680 meters. It is associated here in the Upper Sonoran Zone with a number of other plants which are isolated by hundreds of miles of desert from their congeners to the northward. It is rather common, especially along streams or about springs, growing as a shrub 3 to 6 meters high. A specimen in fruit was collected at about 1,350 meters near El Saúz on the trail from Miraflores to La Laguna. Brandegee records it from the Cape District as follows: Sierra de la Laguna, flowering in January; Sierra de San Francisquito, fruit in October.

Rosa californica Schlecht. & Cham. CALIFORNIA ROSE.

Common in or along the borders of wet meadows in the Transition Zone along the western side of the San Pedro Mártir Mountains. Specimens in flower were taken at La Grulla, July 20.

Rosa minutifolia Engelm. SMALL-LEAVED ROSE.

Abundant in the lower part of the Upper Sonoran Zone, near San Quintín, where it is found along dry, stony arroyos among the lower hills and up over gravelly mesas to at least 300 meters altitude. It was also noted along the road from San Quintín north as far as San Telmo. It is a peculiar little species, 1 to 1.5 meters high, in places forming dense thickets, from which almost all other shrubs are excluded. Although the regular flowering season had passed, a few plants were still blooming when our collection was made near San Quintín, August 2. Of this rose and its limited known distribution Brandegee says: "Abundant near the coast from north of Ensenada to below El Rosario. It extends into the interior a dozen or more miles from the Pacific slope. In some localities most of the bushes produce white flowers." [1]

Rubus sp.

An unidentified Rubus is rather common in the oak forest on the upper slopes of the Sierra de la Laguna. It was collected in flower at 1,650 meters, in the Upper Sonoran Zone, January 27.

Sericotheca dumosa (Nutt.) Rydb.

In the upper part of the Transition Zone in the San Pedro Mártir Mountains this shrub is fairly abundant. It forms clumps in the pine forest where other undergrowth is scanty and is often associated with other shrubs on more open slopes, especially among rocks near the tops of hills. A flowering specimen was collected at 2,400 meters altitude near Vallecitos, July 15.

AMYGDALACEAE. Almond Family.

Emplectocladus fasciculatus Torr.

This small almond, forming a shrub 1.8 to 2.5 meters high, was found near the western end of Trinidad Valley. It occurs here on rather dry slopes at about 780 meters altitude, where the greater part of the vegetation is assignable to the Upper Sonoran Zone. The species has been recorded from southern California eastward to Utah, but apparently has not been taken before in Lower California. The genus to which it belongs is credited with representing the nearest approach in the American flora to the old genus Amygdalus, the almond of the Old World. A specimen bearing immature fruit was collected June 16.

Prunus ilicifolia (Nutt.) Walp. HOLLY-LEAVED CHERRY. ISLÁY.

In Lower California this cherry is well known locally as "isláy." It is abundant in places in the Upper Sonoran Zone, from near the coast at Ensenada up to the tops of the Sierra del Pinal and at least as high as 1,500 meters on the west slope of the San Pedro Mártir Mountains. It grows here as a shrub 1.8 to 3.5 meters high. The large, well-flavored fruit is gathered to some extent by the people at La Huerta and

[1] Zoe 4: 205. 1893.

other localities. Specimens in flower were taken east of Ensenada, May 31, and at La Huerta, June 2, and with green fruit along the road from Rancho Santo Tomás to San Antonio, July 28.

MIMOSACEAE. Mimosa Family.

Acacia filicioides (Cav.) Trel. TIMBE.

Specimens in flower and immature fruit were taken at Tinaja de Santana (altitude 1,020 meters), 35 miles north of San Ignacio, October 4. The species was found growing as a shrub 1.8 to 2.5 meters high, on stony hill slopes. Brandegee records it from San José del Cabo and Todos Santos.

Acacia flexicaulis Benth. MEXICAN EBONY.

First noted and a specimen in fruit collected between Agua Colorada and Cerro Colorado, northwest of La Paz, December 15. From this vicinity southward to Cape San Lucas it was one of the characteristic species at the lower elevations, growing as a thorny shrub 1.8 to 2.5 meters high, with short, broad, thickened pods.

Acacia greggii A. Gray. CAT'S-CLAW.

This Lower Sonoran species was common on the desert near the east base of the San Pedro Mártir Mountains; on the western side of the Peninsula it was first seen near Las Cuevas, northwest of San Fernando, and thence it was noted at intervals along our route southward to near San Pablo south of Calmallí. Its general range thus seems to include the northern half of the Peninsula, exclusive of the high mountains and the northwest coast region. Specimens in flower and immature fruit were taken at La Providencia Canyon, June 26, and in ripening fruit at Jaraguáy, about 58 miles southeast of San Fernando, September 9. This Acacia is usually a shrub 1.2 to 4.5 meters high, but sometimes becomes a tree with a height of 6 meters. Dense clumps are often formed, the shade and thorny protection of which afford favorite hiding places for jack rabbits and other mammals.

Albizzia occidentalis T. S. Brandeg. PALO ESCOPETA.

The "palo escopeta," so called by the people of the Cape District, is one of the characteristic species, growing as a forest tree 6 to 9 meters high, from the west coast near El Pescadero up the basal slope of the Victoria Mountains in the vicinity of Miraflores. A specimen with large, flat, ripening pods was taken on the road from El Pescadero to El Cajón, December 27.

Calliandra californica Benth.

Widely distributed in the Peninsula. Flowering specimens were collected at San Fernando, September 4; on Margarita Island, November 29; and between Santa Anita and Miraflores, January 19. It was an abundant species along much of our route, especially in the foothills of the mountains in the Cape District south of La Paz. It forms a shrub 1 to 2 meters high and seems to prefer rather sterile, stony hillsides. The species is recorded by Brandegee from San José del Cabo and from Magdalena and Margarita islands northward to San Borja.

Lysiloma microphylla Benth.

This tree is associated with *Albizzia occidentalis* in many places along the western and southern slopes of the Victoria Mountains in the Cape District. It grows to a

PLATE 113.

LYSILOMA CANDIDA T. S. BRANDEG., 40 MILES WEST OF SANTA ROSALÍA.

height of 6 to 9 meters. A specimen with immature pods was taken on the road from Tres Pachitas to Valle Flojo, December 25. This species is recorded by Brandegee from mountains near San José del Cabo and Todos Santos.

Lysiloma candida T. S. Brandeg. PALO BLANCO. PLATE 113.

This tree, well known to the people as "palo blanco," ranges in suitable localities throughout the Peninsula south of about latitude 27° 30′. It was first met with by us when we descended from the high mesa on which Tinaja de Santana is situated into a deep canyon on the road to San Ignacio. A few trees only were seen near the bottom, but later the same day we crossed another canyon in which it grew in a fairly heavy belt along each side of the water course, being here the most prominent species. From this point southward to the Cape the palo blanco was noted in the hill country at frequent intervals. In the northern part of its range the tree grows only in a narrow belt along dry washes in canyon bottoms, where it is often the largest and most abundant species. It was not seen on the plains along the west coast, but in crossing the backbone of the Peninsula from Cerro Colorado to Rodríguez and in the Cape District south of La Paz we found it much more generally distributed over the rocky hill slopes than farther north.

The palo blanco is, economically, one of the most important trees of the Peninsula. One of the leading industries of the Cape District is the gathering of the bark, which is used locally for tanning, from San Ignacio southward, and is shipped in considerable quantities, especially from the port of San José del Cabo. The trees grow from 15 to 30 cm. in diameter and from their whitish bark present a striking appearance. The bark is taken off in strips and packed in sacks for transportation on the backs of burros to the coast.

Specimens of the tree were collected by us near Tinaja de San Esteban, 25 miles north of San Ignacio, October 5, and 20 miles east of San Ignacio, October 19. At both localities the ripe pods were falling from the trees. In ripening the stout marginal threads split away and often adhere to the branch for some time after the pod bearing the seeds has fallen. A specimen in the U. S. National Herbarium was collected by Palmer on Carmen Island, November 1–7, 1890.

Mimosa purpurascens Robinson.

Specimens in flower and ripening fruit were taken on the road from Agua Colorada to Cerro Colorado, December 15. It grows as a shrub 2 to 3.5 meters high. Not noted in abundance.

Mimosa xanti A. Gray. CELOSA.

This mimosa, locally known as "celosa," is abundant throughout much of the lower country in the Cape District south of La Paz, where it helps to make up many of the denser thickets. It grows as a shrub 1.2 to 3.5 meters in height. The strong recurved thorns seem always ready to tear the flesh or clothing, whence the name "celosa," meaning in the Spanish language "jealous." Specimens with flowers and ripe pods were taken along the road from El Cajón to El Sacatón, December 28, at Santa Anita and Cape San Lucas January 3–11, and at San José del Cabo, February 22. Brandegee records it as very abundant at San José del Cabo, Todos Santos, and on the Victoria Mountains.

Pithecolobium dulce Benth. GUAMUCHIL. GUAMUCHLI.

This species, a tree of wide distribution on the mainland of Mexico, is abundant at San José del Cabo and was noted along the road between Santa Anita and Miraflores. Brandegee records it from Todos Santos, La Paz, and San José del Cabo. It ranges much farther north on the coastal plains in Sonora. The white pulp surrounding the seeds is eaten by the people.

Pithecolobium tortum Mart.?

This species was collected in fruit on the road from Santa Anita to Miraflores, January 19. It was rather common, growing as a tree 4.5 to 6 meters high. Brandegee refers our specimen provisionally to *P. tortum* Mart., the name he used with reservation for the species recorded in his Flora of the Cape Region as growing at low elevations at San José del Cabo and Todos Santos. This was described as a handsome small tree with horizontal dark-green leaves.

Prosopis glandulosa Torr. MESQUITE.

One of the most abundant and generally distributed plants in Lower California. It spreads over nearly the whole of the Peninsula, ascending from the desert bordering the shores of the Gulf of California through San Matías Pass into Trinidad Valley, San Rafael Valley, and other valleys west of the higher mountains and occurring up to 1,350 meters on southwest slopes. It is absent, however, on the upper slopes of the Sierra del Pinal, the San Pedro Mártir Mountains, and the high mountains of the Cape District. It varies in size from a small shrub to a tree 4.5 to 9 meters in height. Usually it grows more abundantly and to a larger size in the alluvial soil in arroyos, in some places to the exclusion of other trees, but it may also overspread desert plains and rocky hills. Economically it is one of the important plants of the Peninsula. The pods, leaves, and even twigs furnish valuable forage for stock, and the pods are eaten by many of the native mammals. A specimen in fruit was collected on the road from Santo Domingo to Matancita, November 15.

Prosopis odorata Torr. & Frém. SCREWPOD MESQUITE.

This species occurs rather sparingly on low-lying areas in the delta of the Colorado River.

Prosopis palmeri S. Wats. PALMER MESQUITE.

First noticed by us while crossing the rugged backbone of the Peninsula near Guajademí, on our way from Mulegé to La Purísima. It was more abundant, however, along much of our route from Matancita to La Paz, occurring as the principal species on the more fertile soil in some of the arroyos between 30 and 150 meters altitude. Brandegee records the species as abundant on the high, rocky mesas near La Purísima and Comandú. It forms a tree 4.5 to 7.5 meters high, with the trunk thickened from the ground up to about 3 meters, where a great number of small, spreading branches are given off. The bark is rough and splits off in long strips. Specimens bearing flowers and ripe fruit were taken between Agua Colorada and Cerro Colorado, December 15.

Vachellia farnesiana (L.) Wight & Arn. HUISACHE. VINORAMA.

The "huisache," as it is commonly called, is widely dispersed in tropical and subtropical Mexico and ranges well into the Lower Sonoran Zone. Its irregular distribution in Lower California may be due to its not being native, having supposably been introduced and cultivated about some of the missions. This would explain its absence from large areas apparently well suited to its growth. A few trees were noted by us along the road from Onyx to Agua Dulce, but the species was more abundant from San Ignacio southward to San Jorge. South of San Jorge it was not again seen until we entered the Cape District south of La Paz, where it was abundant in many localities, especially in the vicinity of towns. At Miraflores it has received the local name "vinorama." It was collected in flower between Tres Pachitas and Valle Flojo, December 25. Brandegee records the species from San José del Cabo.

CASSIACEAE. Senna Family.

Cassia confinis Greene.

This Cassia was noted at Tinaja de San Esteban, 25 miles north of San Ignacio, and thence southward at intervals to near La Paz, and on Espíritu Santo Island. It grows as a shrub 1 to 2 meters in height. Like many other plants of the region, it produces flowers and fruit irregularly during a considerable part of, if not the entire, year. Specimens in flower and fruit were taken at Tinaja de San Esteban, October 5, and on Espíritu Santo Island, February 7.

Cassia occidentalis L. PALO DE ZORILLA.

The "palo de zorilla," as it is known to the people, is common at the lower elevations south of La Paz. Along the basal slopes of the Victoria Mountains it forms a good-sized tree, 7.5 to 9 meters high. A specimen with the long, slender seed pods fully ripe was taken between Tres Pachitas and Valle Flojo, December 25. Not noted by us north of La Paz. Brandegee records the species from San José del Cabo and San Bartolomé. He remarks that the name "palo de zorilla" (skunk tree) seems wholly inappropriate, as the tree possesses nothing to suggest such a name.

Cassia articulata Rose.

The type of this recently published species was collected by C. A. Purpus near San José del Cabo in 1901. A specimen with ripe seed pods was taken by us at about 600 meters elevation between Miraflores and Rancho San Bernardo in the Victoria Mountains. Only a few shrubs 1.8 to 2 meters high were seen. These two records give the species a very limited known range in the extreme southern end of the Peninsula.

Cassia purpusi T. S. Brandeg.

This species was based on material collected by C. A. Purpus near Calmallí in 1898, and by us (in flower and fruit) at Rosarito, 18 miles southeast of San Andrés, September 25, 1905. Its known range is thus limited to a small area in the central section of the Peninsula. At Rosarito it was found growing in a moist place along an arroyo. The plant is a handsome shrub.

Cassia goldmani Rose.[1]

While on our way from Mulegé across the mountains to La Purísima this previously unknown species was found in a few places between 450 and 720 meters altitude on the steep eastern slope leading up to the backbone of the Peninsula, 5 or 6 miles southwest of El Potrero. It forms a large shrub or small tree 3.5 to 5.5 meters high and is associated with such southern species as *Esenbeckia flava*, *Antigonon leptopus*, and *Erythrina purpusi*. The specimens, with ripening pods, were collected October 31.

Cercidium torreyanum (S. Wats.) Sarg. PALO VERDE.

No trees were so nearly omnipresent along our route throughout the greater part of the Peninsula as those of the genus Cercidium. They abound in nearly every part except the higher slopes of the Sierra del Pinal and San Pedro Mártir mountains, the Victoria Mountains, and the northwest coast region. But the number of species and the boundaries of their respective ranges are not definitely known. *Cercidium torreyanum* is assumed to range from southeastern California southward through the desert region between the Gulf and the high mountains to an undetermined southern limit. On the east slope of the San Pedro Mártir Mountains it ascends along the open bot-

[1] See p. 311.

tom of Windy Canyon to 1,080 meters altitude near San Matías Pass. It is associated with many Lower Sonoran plants and seems to belong in the list of species characteristic of this zone, but it represents a genus mainly tropical in distribution. In northeastern Lower California it grows 4.5 to 7.5 meters high. Like other species of the genus it is commonly called "palo verde," a name derived from the smooth, greenish bark.

Cercidium peninsulare Rose. PALO VERDE. PALO DE PÚA. PLATE 114.

The type of this species was taken by the present writer on the open plain near La Paz April 16, 1899, then in flower. It is abundant throughout the Cape District south of La Paz except on the upper slopes of the mountains and reaches northward to an undetermined limit, its range overlapping or so continuous with that of *torreyanum* that we did not distinguish between them. The species was collected by Dr. J. N. Rose in the spring of 1911 at various places in the Cape District and on Carmen and Cerralvo islands. Where forage for stock is scarce, especially in the extremely arid central desert region, the branches of palo verde trees are lopped and the tips and leaves are eaten by mules with apparent relish. Although generally known as "palo verde," this tree is also called locally "palo de púa." It is generally distributed over rocky hills and sandy deserts, but is usually more abundant along dry washes. During the dry season and droughts the trees are nearly or quite bare, but leaves appear in a remarkably short time after even a single local shower. In places the appearance of the palo verde trees showed a sharp line of demarcation between the area recently visited by rain and that over which drought still prevailed. The abundance of this species in the Cape District and its association with so many tropical plants seem to place it with the tropical element, to which most members of the genus Cercidium belong.

Haematoxylon boreale S. Wats. BRASIL. PALO DE BRASIL. LOGWOOD.

The "Brasil," or "palo de Brasil," as it is called by the people, was common at the lower elevations along our route in the Cape District south of La Paz. It grows as a scrubby tree 4.5 to 7.5 meters in height. The trunks of the older trees may be very thick at the base, but are usually hollow and have deeply fluted bark. We did not find the species used as a dyewood. Specimens with ripe seed pods were taken between Tres Pachitas and Valle Flojo, December 25, 1905, and in flower between San Pedro and La Paz, February 1, 1906. Brandegee records the species from La Paz, Todos Santos, and San José del Cabo.

Hoffmanseggia microphylla Torr.

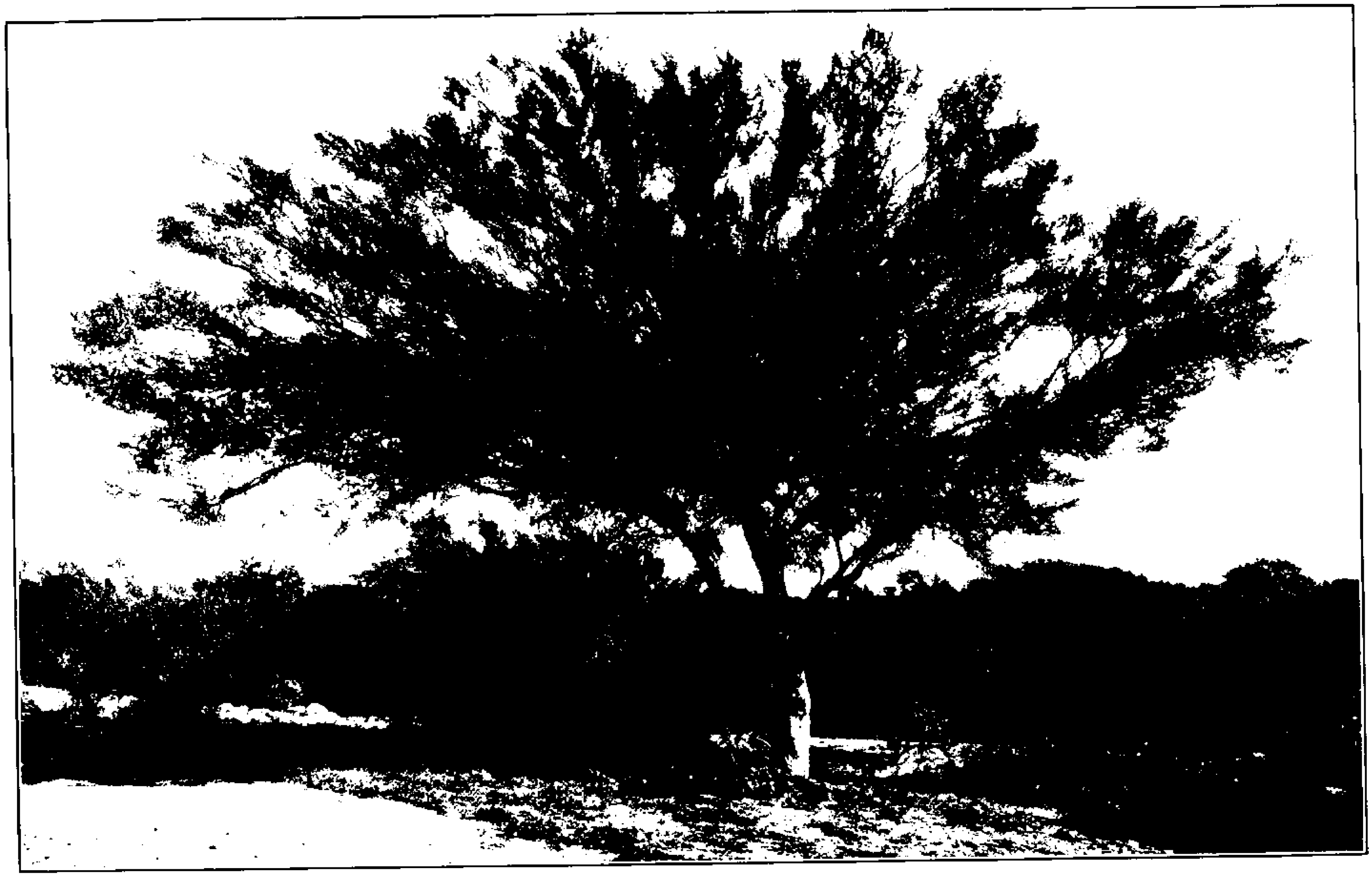
At San Felipe this species is quite common in sandy places along the Gulf shore. It grows as a shrub 1 to 1.5 meters high. At the time of our visit, June 20, it was nearly leafless, but bearing flowers and fruit. Recorded by Brandegee from Calamahué.

Parkinsonia aculeata L. RETAMA.

This species has a wide range in Mexico, extending southward from near the southern border of the United States within the limits of the Lower Sonoran Zone. It occupies the greater part of Lower California, but is absent on the high mountains and in the northwest coast region. Specimens were collected at Agua Dulce, 30 miles southeast of San Fernando, in September, 1905. The species was noted by Brandegee from San Gregorio to Calamahué and San Fernando. It was also collected at La Paz by Doctor Rose in June, 1897.

Parkinsonia microphylla Torr. RETAMA.

The range assigned this species by Sudworth comprises adjoining portions of the desert region in southern California, southern Arizona, northeastern Lower Califor-



CERCIDIUM PENINSULARE ROSE, SANTA ANITA.

nia, and Sonora. It was recorded by Brandegee at Calamahué. Palmer collected specimens at Santa Rosalía in March, 1890, and Doctor Rose at Agua Verde and at the head of Concepción Bay in April, 1911. It seems to be less widely dispersed than its congener, *P. aculeata*, like which it belongs to the Lower Sonoran Zone.

Poinciana placida (T. S. Brandeg.) Rose.

A few of these bushes, 3 to 3.5 meters high and bearing handsome orange and reddish flowers, were found in a stony place near the shore of Espíritu Santo Island, February 7.

Poinciana californica (A. Gray) Rose.

About the middle of November this plant was practically leafless, but bearing deep, dark red flowers near the tips of the slender twigs, while other branches still held ripe seed pods. It was seen in a few places on the sandy Coastal Plain from San Jorge to Matancita, growing as a shrub 2 to 3 meters high. Specimens were collected a few miles north of Matancita, November 15.

Tamarindus indica L. TAMARINDO. TAMARIND.

The tamarind, which is so widely distributed in cultivation in tropical Mexico, was seen at San José del Cabo, where Brandegee has already recorded it as common. The tart pulp surrounding the seeds is used to make a refreshing drink.

FABACEAE. Pea Family.

Brongniartia peninsularis Rose.[1]

The type of this species was collected by us at about 450 meters while we were ascending the backbone of the Peninsula, about 5 miles southwest of El Potrero and about 30 miles southwest of Mulegé, October 31. It was growing on the rocky mountain side as a shrub 2 to 3 meters high. Not noted elsewhere.

Erythrina purpusi T. S. Brandeg. CORAL BEAN.

We first noted and collected this species along the road 5 miles southwest of El Potrero, between Mulegé and La Purísima. It was described by Brandegee and recorded by him as common at low elevations in the Cape District. It was also seen between Guajademí and Agua Grande and at several localities near the west coast between Todos Santos and Cape San Lucas. It belongs to the tropical or subtropical element of the flora of the region.

Olneya tesota A. Gray. MEXICAN IRONWOOD. UÑA DE GATO. PALO DE HIERRO.

Few plants reaching tree size have so wide a range and are at the same time so abundant in Lower California as the ironwood. It was noted from the basal slopes of the desert mountains near the delta of the Colorado southward to La Paz and on Cerralvo Island. It was not observed in the Cape District south of La Paz nor along the west coast north of the Santa Clara Mountains, but may reach farther in suitable situations. It grows 6 to 7.5 meters in height. Although it may occur on gravelly plains, it is more at home along rocky arroyos and on the slopes of desert mountains, situations so frequent in the Peninsula. It belongs to the Lower Sonoran Zone, occurring on both sides of the Gulf of California. A specimen was taken at Tinaja de San Esteban, 25 miles north of San Ignacio. Brandegee records it from Comandú to Calamahué. He also mentioned its native name, "uña de gato," which is also applied to several other thorny species.

Parosela spinosa (A. Gray) Heller. INDIGO BUSH.

First met with by us at San Felipe on the Gulf of California. Here we found a few scattered groups of these desert plants in sandy arroyos near the beach, growing

[1] See p. 311.

as trees (instead of bushes) and becoming 4.5 to 6 meters high. Specimens were collected in flower on June 20, the trees presenting a showy appearance, the deep dark blue flowers affording a pleasing contrast. When not in flower the gray foliage blends with the desert surroundings and the plants are inconspicuous. The species was afterwards noted along the trail from Agua Dulce to Jaraguáy and between Calamahué and Yubay. Brandegee found it growing as a small tree or bush in the sand of dry stream beds at Calamahué. It has also been recorded from Sonora and the lower Colorado Valley north of the United States boundary, and thus seems assignable to the Lower Sonoran Zone.

GERANIACEAE. Cranesbill Family.

Erodium texanum A. Gray. ALFILERILLA.

This, or one or more allied species, grows abundantly in many places, especially on sandy or gravelly mesas in the northern half of the Peninsula. At the time of our visit the rains of the preceding season had matured a crop which added materially to the scanty forage available for our pack and saddle animals. The species presents wide variation in size and form, evidently due to local environmental conditions. On very dry gravelly slopes tiny upright plants 2 inches or less in height mature seed, while along moist sandy arroyos, perhaps only a few feet away, vigorous individuals may spread like a mat for several feet over the ground. Watson records this species from Dr. Palmer's collection at Los Angeles Bay on the Gulf coast.

ZYGOPHYLLACEAE. Caltrop Family.

Covillea glutinosa (Engelm.) Rydb. CREOSOTE BUSH.

This is one of the most abundant and widely ranging shrubs in the Peninsula. It extends southward from the Colorado Desert along the east side of the Sierra del Pinal and the San Pedro Mártir mountains, reaching upward through San Matías Pass into Trinidad Valley, while south of the mountains it is abundant from near Rosario over the greater part of the Peninsula as far as La Paz. Brandegee records the species as far as Todos Santos on the west coast. It was not noted in the Cape District south of these points and is absent from the high mountains and the northwest coast region. Along the adjacent coast of the Mexican mainland it seems to reach its extreme southern limit a few miles south of Guaymas, but on the tablelands of the interior it ranges to the southern part of the State of San Luis Potosí. It is one of the species which serve best to characterize the Lower Sonoran Zone.

RUTACEAE. Rue Family.

Cneoridium dumosum Hook. f.

This shrub was common at altitudes between 900 and 1,200 meters in the Upper Sonoran Zone on the west slope of the San Pedro Mártir Mountains. A specimen still retaining a few ripe fruits was taken above San Antonio, July 28.

Esenbeckia flava T. S. Brandeg. PALO AMARILLO.

First seen along our route 5 or 6 miles southwest of El Potrero, where it was taken in fruit at about 600 meters altitude on a steep mountain side, October 31. It was not noted again until we entered the hills between Agua Colorada and Cerro Colorado on our way from Matancita to La Paz. From this point southward to Cape San Lucas it was rather common at the lower elevations in the hill country. It is a small tree 6 to 9 meters in height and is well known to the people in the Cape District as "palo amarillo," a name applied farther north to *Adenostoma sparsifolium*.

Brandegee, who described and named this species,[1] outlined its range as extending northward on the western coast to some distance above Todos Santos and on the eastern as far as La Paz. In the same paper he states that the name "palo amarillo" is due to the color of the wood and that the tree is often used for poles in the construction of houses. He found the flowers of a sickish-sweet odor, appearing in August, the fruit falling in December.

Xanthoxylon pterota H. B. K.

This thorny shrub was rather common in places along the southern slope of the Victoria Mountains. It grows 4.5 to 5.5 meters high. A specimen with ripe fruit was taken at about 750 meters, between San Bernardo and El Saúz, January 21.

BURSERACEAE. Torchwood Family.

Elaphrium macdougalii Rose.

The copal trees of the genus Elaphrium are widely dispersed in tropical America and are found nearly throughout Lower California, except in the extreme northern part, the San Pedro Mártir Mountains, and the northwest coast region. Collectively the species form a very important part of the flora of the Peninsula. The present species ranges in the Lower Sonoran desert strip between the Gulf of California and the eastern base of the San Pedro Mártir Mountains and has been reported from the coast of Sonora. Growing as a tree 6 to 7.5 meters in height, it is especially abundant on the plain along the eastern basal slopes of the Borrego and Consag mountains, near San Felipe Bay, where specimens were taken June 26. *Elaphrium microphyllum* occurs in much smaller numbers in the same locality.

Elaphrium rhoifolium (Benth.) Rose.

Although this species is not known to reach so far north as *E. microphyllum*, it is probably as widely dispersed in the Peninsula, since north of San Ignacio it spreads over much of the Pacific slope from which *E. microphyllum* is absent. It is one of the characteristic species of the Cape District and ranges thence northward to the southern slopes of the San Pedro Mártir Mountains. On the Pacific slope it was first seen on a rocky hill near San Fernando, where specimens with young fruit and flowers were taken September 4. At Calamahué young leaves, flowers, and fruit were appearing September 15. Specimens with fully developed fruit were taken at El Potrero, October 14, and between La Purísima and Comandú, November 5. It is also an abundant species on Magdalena Island.

Elaphrium cerasifolium (T. S. Brandeg.) Rose. CHERRY-LEAVED COPAL.

This Elaphrium is known only from the Cape District south of La Paz, where it was not abundant. A small tree 6 or 7.5 meters in height was noticed on the slope of the deep wash at El Cajón, from which a specimen in fruit was taken December 28. The type came from San José del Cabo.

Elaphrium epinnatum Rose.[2]

This species, recently described from our material, was found only at Cape San Lucas, where the type was collected December 30, 1905. It grows as a tree about 7.5 meters in height.

Elaphrium filicifolium (T. S. Brandeg.) Rose.

Brandegee records this species as common throughout the Cape District south of La Paz. It is the only species of the genus known to occur in the Peninsula which we did not collect.

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[1] Zoe 1: 378. 1891.

[2] See p. 311.

Elaphrium odoratum (T. S. Brandeg.) Rose. TOROTE. PLATE 115.

The name "torote" is shared by this tree and *E. microphyllum* and may be applied to others. *Elaphrium odoratum* was first noted along our route at El Potrero, 25 miles southwest of Mulegé. It was abundant and generally distributed at the lower elevations along with *E. rhoifolium* and *E. microphyllum* from this point southward to Cape San Lucas. The bark is yellow and, as in some of the other species, peels off in large, thin, papery flakes. Fruiting specimens were taken at El Potrero, October 31; between La Purísima and Comandú, November 5, and at San Pedro, 18 miles south of La Paz, December 23.

Elaphrium microphyllum (A. Gray) Rose. TOROTE.

This "torote" ranges from southern Arizona southward along both coasts of the Gulf of California. It was first noted by us at San Felipe and was found in small numbers along with *E. macdougalii* on the plain bordering the basal slopes of the Borrego Mountains. It was again observed at San Francisquito, but was much more abundant from Santa Rosalía southward to Cape San Lucas, spreading across to the west coast at least as far north as San Jorge. On Magdalena, Espíritu Santo, and Cerralvo islands it is one of the most abundant trees. In the Cape District it is associated with *E. rhoifolium*, *E. odoratum*, and others, and very generally distributed from the coast to 750 or 900 meters altitude on the slopes of the Victoria Mountains. The trees ordinarily vary from 3 to 9 meters in height, but on Cerralvo Island were unusually stocky and only 1.5 to 3 meters high. Specimens were taken at San Felipe, San Francisquito, and at various localities in the Cape District and on the neighboring islands.

Walter E. Bryant, in a general account of the Cape District south of La Paz, in 1891, says that many tons of the bark of this species are exported for dyeing purposes from the vicinity of Buena Vista. The bark, which is reddish, is cut in small pieces from the trunks and larger limbs of the trees and spread on the ground to dry, and is then shipped in sacks.

Elaphrium goldmani Rose.[1]

Soon after leaving Matancita this species was recognized as one not seen in the region previously traversed to the northward. It was abundant on the plains and low mesas as far as the vicinity of Cerro Colorado along our route to La Paz. The species was based on specimens collected by us between Matancita and La Cruz, December 9, 1905.

MALPIGHIACEAE. Malpighia Family.

Janusia gracilis A. Gray.

In San Matías Pass, at about 900 meters, we found this shrubby little vine common. It grows in sandy soil and climbs over other vegetation. Specimens in fruit and flower were taken June 28. Mr. Brandegee informs us that it has not heretofore been reported from Lower California.

Malpighia diversifolia T. S. Brandeg.

In the valley at Comandú we found this species common, forming a shrub 2 to 2.5 meters high. A specimen in fruit was collected November 7. It was not again noted by us, but has been recorded by Brandegee as common about San José del Cabo, the type locality. He further states that the fruit is called by the people "manzanita" and "without any special reason is sometimes eaten by them." The species forms a part of the subtropical flora of the Peninsula.

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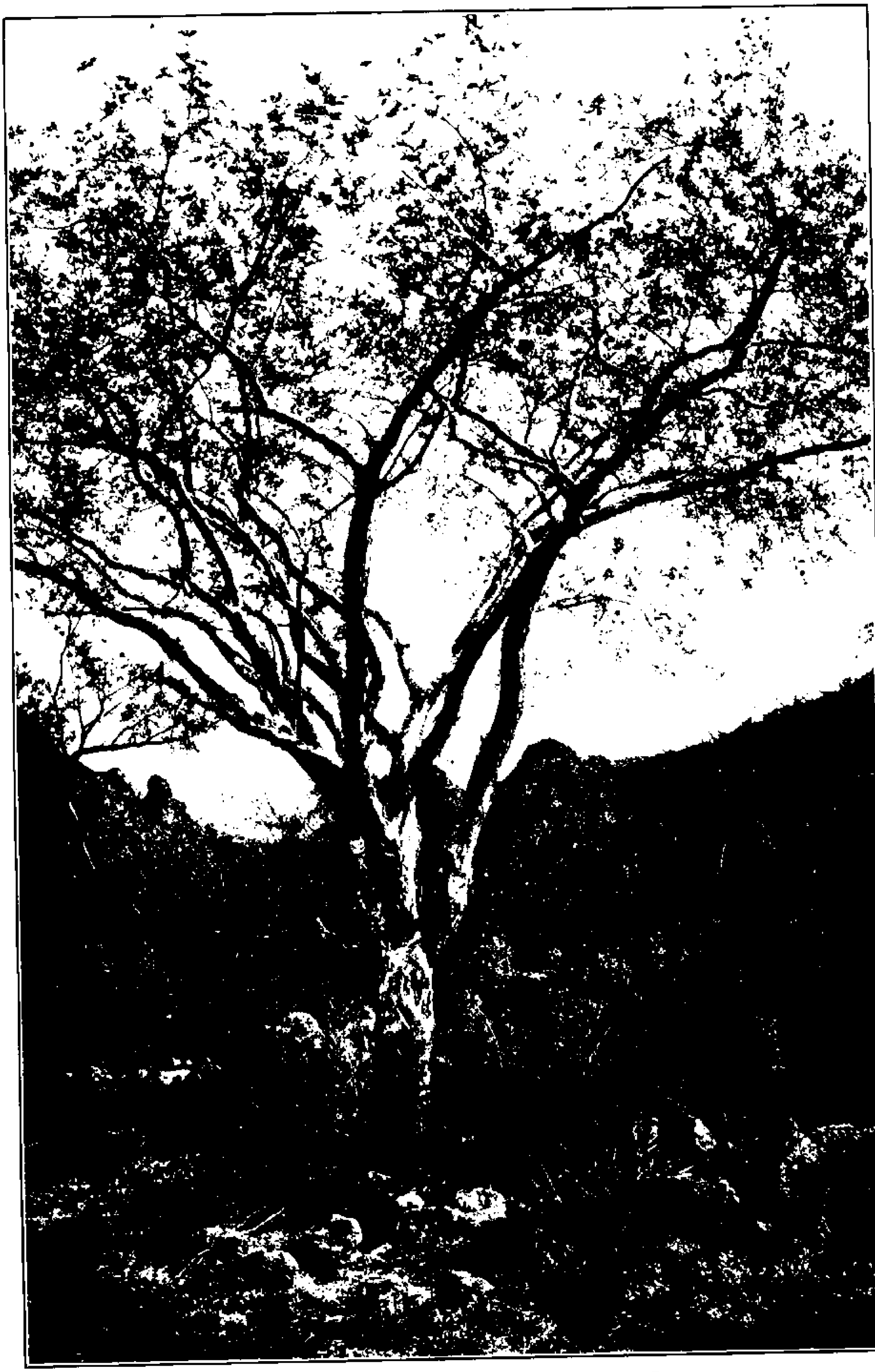
[1] See p. 311.



ELAPHRIUM ODORATUM (T. S. BRANDEG.) ROSE, EL POTRERO.

Mascagnia macroptera (Moc. & Sessé) Niedenzu.

This species has a wide range in tropical and subtropical portions of Mexico, from the type locality near Monterey, Nuevo León, to southern Sonora and Lower California. It was first noted by us on the Peninsula, about 20 miles east of San Ignacio, where specimens bearing flowers and fruit were collected October 19. From this point southward to near La Paz it was noted along canyons in the hill country. Flowering specimens in the U. S. National Herbarium were collected by Palmer at Mulegé in 1887 and at Santa Agueda, March 4–6, 1890. The species grows as a small shrub, often climbing over other vegetation.

EUPHORBIACEAE. Spurge Family.

Acalypha californica Benth.

Flowering specimens of this species were taken at the mouth of La Providencia Canyon, where it opens on the desert at the east base of the San Pedro Mártir Mountains, June 26. It was rather common, growing here as a shrub 0.5 to 1.2 meters high.

Cnidoscolus palmeri (S. Wats.) Rose.

Collected at about 450 meters in the hills along the backbone of the Peninsula, about 20 miles east of San Ignacio, where it seemed to be rare. We have no other record of its collection since the type was taken near Guaymas, Sonora, by Palmer. As seen by us, the plant is a shrub about a meter high. Our specimens are in flower and fruit and have the leaves and tender branches armed with stinging hairs, such as characterize some of its congeners, known locally as "mala mujer" in Vera Cruz and other parts of tropical Mexico. The species was originally described under the name *Jatropha palmeri*.

Croton magdalenae Millsp.

First noted about 5 miles southwest of El Potrero on the way from Mulegé to La Purísima. It was common at Comandú, and a Croton which we took to be the same was seen at intervals along the route southward to Cape San Lucas. It grows as a shrub 2 to 3.5 meters high. A specimen in fruit was taken about 5 miles southwest of El Potrero, October 31. Reported by Brandegee from San José del Cabo and in the mountains. Brandegee remarks that some forms are much less pubescent or hirsute than the type from Magdalena Island.

Croton californicus Muell. Arg.

In the vicinity of La Paz and at the lower elevations southward to Cape San Lucas this species was noted in abundance as a shrub 1.2 to 1.5 meters high. A flowering specimen was taken at La Paz, February 17. Millspaugh records specimens in fine flower and fruit collected by Brandegee on Magdalena Island, January 23.

Ditaxis brandegei (Millsp.) Rose & Standl.

A specimen of this species in flower was taken on the shore of La Paz Bay, near Rodríguez, December 16. A shrub about a meter high. Not noted in abundance. The type was collected by Brandegee at San Gregorio.

Euphorbia californica Benth.

From near Tinaja de San Esteban, 25 miles north of San Ignacio, southward this species was noted at intervals, but was more common at the lower elevations in the Cape District south of La Paz. It grows as a shrub 1.2 to 1.5 meters high. A specimen in flower and with young leaves just coming out was taken at Tinaja de San Esteban and one in flower and fruit between El Cajón and El Sacatón, December 28. Brandegee records this species from Todos Santos.

Euphorbia misera Benth.

This species was noted by us only in the vicinity of San Franciscquito and Calamahué. It grows on dry, rocky hillsides as a shrub or very short-trunked tree 1.2 to 1.8 meters in height and very thick at the base. The trunk and branches are much gnarled or contorted. A specimen with flowers and growing fruit was taken at Calamahué, September 15. The species is based on specimens taken at San Diego and San Quintín during the voyage of the *Sulphur*. It is recorded by Brandegee from San Martín and Natividad islands.

Euphorbia tomentulosa S. Wats.

A specimen of this species in flower and fruit was taken at the mouth of La Providencia Canyon at the east base of the San Pedro Mártir Mountains, June 26. It grows here as a shrub 0.5 to 1.2 meters high. Recorded by Brandegee from La Paz.

Euphorbia xanti Engelm. LIGA.

The "liga," as it is called in the Cape District, was abundant on the coastal plain near Matancita and southward along much of our route to Cape San Lucas. It grows as a shrub 1.2 to 3 meters high. After rains fresh shoots thrown out are so tender that they snap off at the basal joints almost at a touch, allowing the poisonous, milky juice to flow freely. This juice often gets on the lips and faces of feeding animals and causes the hair to come off. It sometimes enters their eyes and results in more or less severe inflammation and even blindness. Several of our mules were affected by it. Flowering specimens of the plant were taken between Agua Colorada and Cerro Colorado, December 15, and between El Sacatón and Cape San Lucas, December 29. Brandegee records it from San José del Cabo, Todos Santos, and La Paz.

Euphorbia eriantha Benth.

In places along our route through the hill country from La Purísima to Comandú this species was common. A plant which we took to be the same species occurs on the coastal plain at least as far south as Matancita. It grows as a shrub 1.2 to 1.5 meters high. A specimen in flower and growing fruit was taken between La Purísima and Comandú, November 4. Millspaugh records specimens in full fruit collected by Brandegee on Magdalena Island, January 22. Brandegee in his Flora of the Cape Region lists the species from San José del Cabo. This Euphorbia doubtless has a wide range, mainly in the Lower Sonoran Zone of the Peninsula. It has been recorded by Parish as far north as Agua Caliente, in southern California.[1]

Jatropha canescens Muell. Arg. LOMBOI. PLATE 116, A.

A widely ranging representative of the flora of the Cape District. It was first seen by us near Santo Domingo, whence it was one of the most abundant and generally distributed species along nearly the whole route to Cape San Lucas, as also on the islands of Magdalena, Margarita, and Espíritu Santo. It forms a large shrub or a small tree 4.5 to 6 meters high. Specimens in flower were taken at Santo Domingo, September 26, and Tinaja de Santana, October 4, and in fruit between Tres Pachitas and Valle Flojo, December 25. This species is also common on the east side of the Gulf of California.

Jatropha cordata (Orteg.) Muell. Arg.

This species resembles *J. canescens* in size and general appearance, but differs conspicuously in its smoother leaves, which, as Brandegee says, "glisten in the sunlight as if varnished."[2] Specimens in fruit and flower were collected at about 600 meters altitude, 5 miles southwest of El Potrero on our way across the mountains from Mulegé

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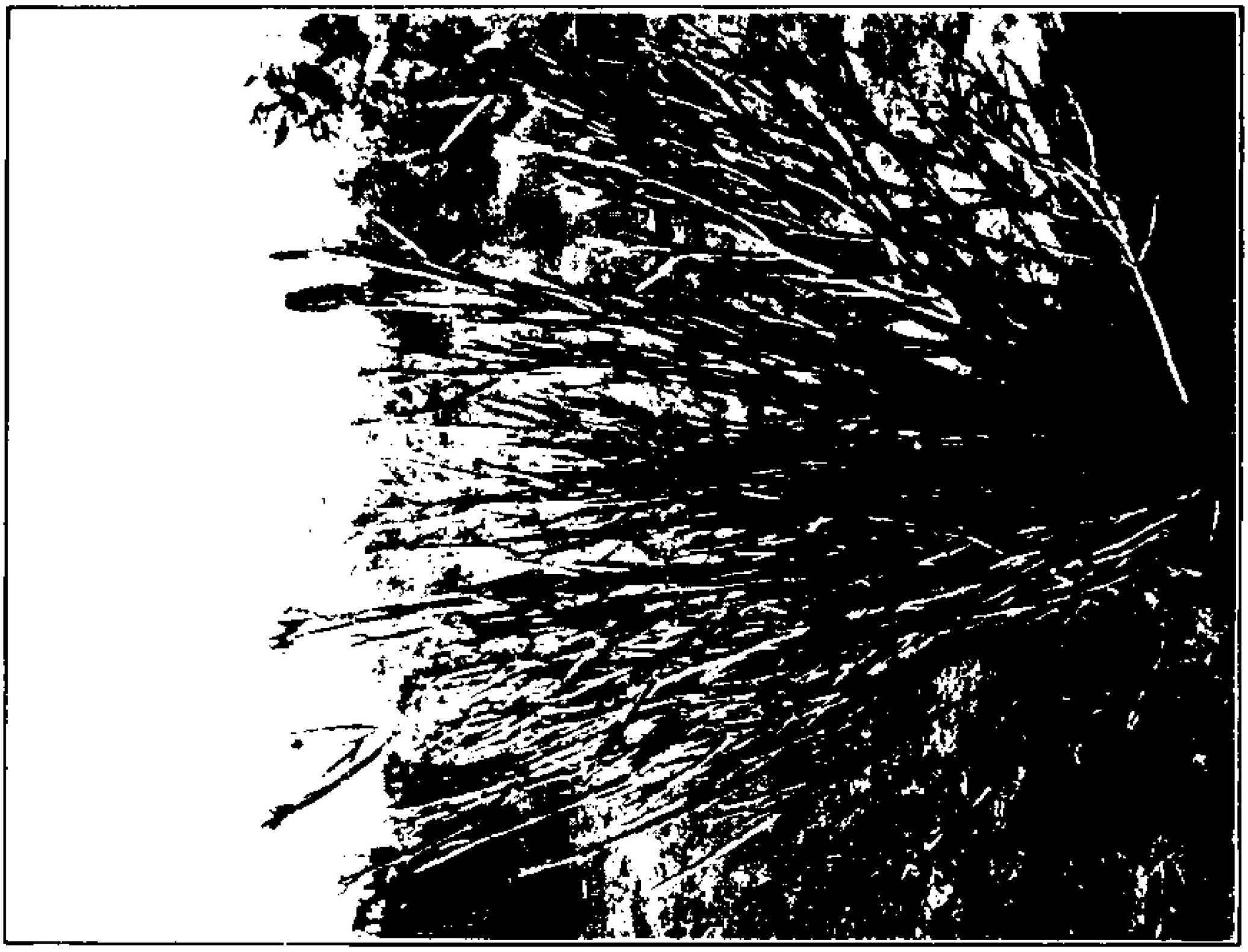
[1] Zoe 4: 166. 1893.

[2] Zoe 2: 149. 1891.

A. JATROPHA CANESCENS MUELL. ARG., CAPE SAN LUCAS.

B. JATROPHA SPATHULATA MUELL. ARG., IN DRY SEASON, SANTA ROSALÍA.

B. SEBASTIANIA BILOCULARIS S. WATS., EL PESCADERO.



A. PEDILANTHUS MACROCARPUS BENTH., MATANCITA.

to La Purísima. In his Flora of the Cape Region Brandegee records it as common at the higher elevations of the interior mountains. It was not seen by us, however, on the higher part of the Victoria Mountains. The species appears to belong in the subtropical area on both sides of the Gulf of California.

Jatropha spathulata Muell. Arg. MATACORA. PLATE 116, B.

One of the widely ranging species which belong to the Cape District and reach well northward. Its distribution corresponds closely to that of *Pedilanthus macrocarpus*. First seen by us near Calamahué and thereafter abundantly nearly all along the route to Cape San Lucas and on the islands of Margarita, Cerralvo, and Espíritu Santo. A very small tree or a shrub, 1.5 to 2.5 meters high. At San Ignacio we were told that the women formerly wove the peeled branches of this species into baskets. The baskets were called "coras" and the name "matacora" appears to be derived therefrom. Specimens of the plant were collected at Calamahué, September 15, and at Tinaja de Santana, 35 miles north of San Ignacio, October 4.

Manihot chlorosticta Standl. & Goldm.[1]

Among the many plants of the Cape District that are evidently derived from the tropical flora of the adjacent mainland of Mexico is a Manihot which has recently been described from specimens taken by us, January 6, 1906, at San José del Cabo, where it is rather common. It had been collected before in the same vicinity, but was confused with *M. carthaginensis*, a more southern species with very different leaves and seeds. The species was not seen farther north.

Pedilanthus macrocarpus Benth. CANDELILLA. PLATE 117, A.

One of the most widely ranging and characteristic plants of the Peninsula. Its distribution corresponds closely with that of *Jatropha spathulata* and other species of that genus. It was first seen at Calamahué and was noted as abundant at many localities southward on the mainland to Cape San Lucas and on the islands of Magdalena, Margarita, and Espíritu Santo. Shrub 1 to 1.5 meters high. Rather generally distributed, but most abundant on the coastal plains along the west side of the Peninsula. The thick, milky sap is very sticky and is said to produce a substance similar to rubber, with commercial possibilities. Specimens in flower and fruit were taken at Calamahué, September 15, and along the road from Santo Domingo to Matancita, November 15.

Sebastiania bilocularis S. Wats. HIERBA DE LA FLECHA. PLATE 117, B.

Known to the people throughout the southern part of the Peninsula. It was first noted by us about 20 miles east of San Ignacio, and was abundant thence at intervals southward in the lower hill country to the vicinity of Cape San Lucas. It grows as a tree 3 to 6 meters in height, with spreading branches and rounded top clothed with dense, dark green foliage, in contrast with other desert vegetation. The tree is said to be poisonous and the local name implies an arrow poison. Exposure to the smoke from the burning wood and sleeping in the shade of the tree are said to cause sore eyes. At El Pescadero we were told that the milky juice from the finely chopped branches placed in water is used to kill fish. Specimens in flower were taken about 20 miles east of San Ignacio, October 19, and in flower and fruit between El Pescadero and El Cajón, December 27. Millspaugh records material collected by Brandegee at La Purísima February 12, in excellent floral condition but lacking fruit.

Under his original description Watson gives the type region as consisting of dry watercourses on the hills and mountains of northwestern Sonora. He also states that the plant is described as a tree 3 to 6 meters high with upright slender branches, and is called "yerba de fleche" by the Papago Indians, who say that the Apaches used to poison their arrows with its milky juice.

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[1] See p. 311.

BUXACEAE. Box Family.

Simmondsia californica Nutt. JOJOBA.

The "jojoba," as it is known in Mexico, ranges mainly in the Lower Sonoran Zone, reaching southward along the basal slopes of the mountains from San Diego, California, and the Colorado Desert into Sonora and Lower California and becoming less abundant near La Paz and on Carmen and Espíritu Santo islands. A species apparently the same was described by Kellogg from Cedros Island under the name *Simmondsia pabulosa*. Dr. J. A. Veatch, the collector, in notes accompanying the description of Kellogg, says: "Growing in the ravines as well as in the crevices and fissures of nearly perpendicular cliffs. Fruit generally abundant, ripening in July and August, has the taste of a chestnut, with a slight bitterness. The goats and deer of the island are exceedingly fond of both the fruit and leaves and seem to live mostly upon them."

Few shrubs were as abundant or generally distributed along so much of our route. It was first seen in a dry rocky canyon near the eastern base of the Cocopah Mountains. Near the west coast it was found as far north as the Valley of Guadalupe, north of Ensenada, and thence upward along the basal slopes of the Sierra del Pinal and San Pedro Mártir mountains to 840 meters at La Huerta and 900 meters near San Antonio. Along the open bottom of Windy Canyon on the east slope of the San Pedro Mártir Mountains it was noted as high as 1,140 meters. It is associated with *Covillea glutinosa* throughout much of its range and, like it, extends from the desert east of the high mountains through San Matías Pass into Trinidad Valley on the west slope; but it reaches its greatest abundance near the center of its range between San Fernando and San Ignacio, in the extremely arid central section of the Peninsula. It grows as a shrub 1.2 to 2.5 meters high. The evergreen leaves are thickened and leathery; the flowers and fruit seem to be produced irregularly throughout the year. Specimens in fruit or flower, or both, were obtained as follows: Ensenada, February 28; La Huerta, June 2; Trinidad Valley, June 16; Jaraguáy, September 9; Agua Colorada to Cerro Colorado, December 15; Espíritu Santo Island, February 7.

ANACARDIACEAE. Cashew Family.

Pachycormus discolor (Benth.) Coville. COPALQUÍN. PLATE 118, A, B.

This species, like *Idria columnaris*, represents a monotypic genus confined to Lower California. The two are associated in the extremely arid central section of the Peninsula and by their abundance, large size, and striking appearance. They, together with other strange desert forms, make that region seem a wonderland of plant monstrosities. The impression that we were traversing an unreal world was especially strong during our night journeys, when the contorted trunks of the copalquín assumed still more fantastic shapes in the moonlight.

The species was first seen by us near Agua Dulce, a few miles south of Onyx, and was very abundant in suitable situations along the route southward to Magdalena Bay, where it was first discovered during the voyage of the *Sulphur*. It was found to be at home on the stony slopes of desert mountains at all elevations up to about 600 meters, usually disappearing as we ascended the higher, lava-covered mesas and rugged ridges along the backbone of the Peninsula, and was less abundant on sandy plains. It grows as a short-trunked tree, varying from 1.8 to 4.5 meters, very crooked, and tapering rapidly from the ground upward. The species apparently reaches its greatest development on the basal slope of the Santa Clara Mountains, near the coast west of San Ignacio, where a number of trees with a basal trunk diameter of a meter were seen. During the dry season most of the trees are leafless, but they may produce flowers. Specimens in flower were obtained at Jaraguáy, Septem-

A. PACHYCORMUS DISCOLOR (BENTH.) COVILLE, IN DRY SEASON, SAN ANDRÉS.

B. SAME SPECIES, SHOWING LARGER GROWTH, SANTA CLARA MOUNTAINS.

TAPIRIRA EDULIS T. S. BRANDEG., CAPE SAN LUCAS.

ber 9, at San Andrés, September 21, on Margarita Island, November 29. On Cedros Island these trees were seen in 1859 by Doctor Veatch, who published some interesting notes concerning them, accompanying the description of a supposed new species by Kellogg.[1] He found the main trunks of full-grown trees averaging 60 cm. in diameter with the height of the trunk often less than that. A few exceptionally tall trees reached a height of 1.8 meters. He further says: "The trunk divides into several ponderous branches that shoot off horizontally and are bent and contracted into grotesque resemblances of the flexed limbs of a corpulent human being. These huge branches often terminate suddenly in a few short twigs covered with a profusion of red flowers, reminding one of the proboscis of an elephant holding a nosegay. The resemblance is heightened by the peculiar brown skinlike epidermis that forms the outer bark, which splits and peels off annually, accommodating the increase of growth. This epidermis, when removed, exposes the smooth greenish-colored surface of the spongy inner bark, which is from 1 to 2 inches in thickness. When this bark is cut through, a milky juice exudes that soon hardens into a compact mass of gum and resin. The quantity furnished from a single cut is considerable.

"The branches of the larger trees often shoot out to a horizontal distance of 20 feet from the trunk, thus covering an area of 40 feet in diameter. Smaller subordinate limbs spring upward from the upper side of the large boughs, and in this way give a neat oval appearance to the outline of the tree. When loaded with its bright red flowers, the effect is strikingly beautiful, particularly where hundreds of the trees stand near each other, intertwining their boughs, and forbidding ingress to the mysterious space they cover and protect. The leaves are minute and fall off before the blossoms are fairly developed. The young tree looks a good deal like a huge radish protruding from the ground. On the mountain sides, from a little above seashore to an elevation of 1,500 feet, these trees grow scatteringly, singly, and in small clumps, but in the narrow vales of the ravines they sometimes form groves of several acres in extent, presenting the impenetrable and compact form above described. From June till August seems to be their blooming season."

Brandegee says the species also occurs on Natividad Island.

Schmaltzia ribifolia Greene.[2]

The type of this species was taken by us at 1,140 meters elevation in San Matías Pass at the north end of the San Pedro Mártir Mountains. It is rather common here, growing as a shrub 1.8 to 2.5 meters high and bearing ripe fruit June 28.

Tapirira edulis T. S. Brandeg. CIRUELA. PLATE 119.

The "ciruela," as it is called in Lower California, is quite unlike the species of Spondias with which we became familiar under the same local name on the Isthmus of Tehuantepec and along the west coast of the Mexican mainland. The trees are somewhat similar in general appearance, but the fruit and leaves of this Tapirira are velvety and the fruit tasted by us was by no means so agreeable in flavor. The fruit, however, is eaten by the people of the Cape District and Brandegee says: "The ripe fruit is usually very pleasant to the taste, although on some trees it is always bitter. On a hot afternoon, far from water, it is always delightful to find the shade of one of these trees and eat the juicy ripe fruit with which the ground under them, in September, is in most cases plentifully sprinkled."

The ciruela was first seen by us in the hills between Agua Colorada and Cerro Colorado, northwest of La Paz. It was abundant at the lower elevations along much of our route throughout the Cape District south of La Paz and is a representative here of the tropical flora of Mexico. J. E. McLellan, in a field report dated August, 1895, mentions the "pits" of ciruela fruit as the chief food at that season of the antelope

[1] Hesperian 4: 49–50. 1860.

[2] See p. 311.

squirrel (*Ammospermophilus*) inhabiting Espíritu Santo Island. The ciruela grows as a tree 7.5 to 9 meters in height, with a trunk diameter of 15 to 30 cm. A specimen in fruit was taken between Agua Colorada and Cerro Colorado, December 15.

CELASTRACEAE. Staff-tree Family.

Maytenus phyllanthoides Benth.

Along the shore of the bay a few miles north of La Paz we found this species abundant. It grows as a tree 4.5 to 7.5 meters high in low, swampy places, which may be submerged at high tide. A specimen was collected here February 3. The species was discovered at Magdalena Bay on the voyage of the *Sulphur*. It was noted by Brandegee on the coast at Todos Santos, San Jorge, La Paz, and San José del Cabo, and on Margarita Island.

Watson records the species from the collection made by Palmer at Mulegé in 1887.

STAPHYLEACEAE. Bladder-nut Family.

Viscainoa geniculata (Kellogg) Greene.

A Lower Sonoran desert shrub which, like *Simmondsia californica*, ranges widely in the Peninsula, but reaches its greatest abundance in the extremely arid central section from the vicinity of San Fernando south to San Ignacio. It was first met with at 1,140 meters altitude near San Matías Pass, where it was taken in flower June 17. It was not again noted until we were nearing Jaraguáy, 58 miles southeast of San Fernando, when it suddenly became abundant on an open gravelly mesa and was seen along most of the route thence to San Ignacio. Beyond San Ignacio it was noted at intervals as far as Cerro Colorado, northwest of La Paz. The species has also been recorded from Sonora. Like *Simmondsia californica* it shows a preference for the desert region along the gulf side of the Peninsula, reaching across to the Pacific coast mainly in the central part of its range. It grows 1.5 to 3.5 meters high and is commonly associated with such species as *Simmondsia californica*, *Covillea glutinosa*, *Idria columnaris*, and *Prosopis glandulosa*. Besides a flowering specimen in San Matías Pass, one was taken in fruit at Jaraguáy, September 9.

AESCULACEAE. Buckeye Family.

Aesculus parryi A. Gray. PARRY BUCKEYE.

Found common on steep hill slopes facing the coast near Ensenada and up to about 780 meters altitude near Ojos Negros in San Rafael Valley. It was also noted at intervals along the route from San Telmo southward to a point in the hills between Rosario and Las Cuevas, but beyond this it was not seen, the country becoming pure Lower Sonoran in character. The plant is a shrub 1.2 to 2.5 meters high and appears to belong in the Upper Sonoran Zone. Specimens in flower were taken at Ensenada, May 20. Recorded by Brandegee from Rosario.

SAPINDACEAE. Soapberry Family.

Dodonaea viscosa L. SWITCH SORREL.

With this species we had already become familiar over wide tropical and subtropical areas in western Mexico. Although ranging so widely, it was not found in great abundance in the Peninsula. It was first noted at Yubay and then along the route from Pozo Altamirano to San Pablo. Farther south it was not seen again until we entered the foothills of the Victoria Mountains, south of La Paz, where it was more common. The species grows as a slender shrub 3 to 6 meters high, reaching

up on the slopes of the Victoria Mountains to between 900 and 1,200 meters. Specimens were obtained as follows: Yubay, September 18 (flowers); San Bernardo to El Saúz, January 21; La Laguna to El Paraíso, January 29 (fruit). Recorded by Brandegee from Jesús María and San Pablo and in the Cape District.

RHAMNACEAE. Buckthorn Family.

Adolphia infesta Meisn.

This well-armed and widely ranging species is common in places along dry arroyos at about 600 meters, on the west side of the San Pedro Mártir Mountains. It grows as a shrub 1.5 to 2.5 meters high and appears to belong to the Upper Sonoran Zone. A flowering specimen was taken near San Antonio, August 1.

Ceanothus goldmanii Rose.[1]

Along the west slope of the Sierra del Pinal and San Pedro Mártir mountains this abundant species is associated in the Upper Sonoran Zone with *C. submontanus*. It was noted at elevations ranging from 840 meters on north slopes near La Huerta up to about 1,680 meters on the upper slopes of the Pinal Mountains and from 1,290 meters between Pozo Luciano and El Piñón on open southwest slopes to about 1,950 meters above Rancho Santo Tomás in the San Pedro Mártir Mountains. It was most abundant on warm slopes at about 1,500 meters, growing as a stout shrub 1.8 to 3.5 meters in height and forming dense thickets. When one of the shrubs dies the branches have a peculiar habit of interlocking or knitting together at the tips, forming a spire. The type, in flower and fruit, was taken at La Huerta, June 2, and a specimen with empty seed capsules at El Piñón, July 5. The species passed as *C. rigidus* Nutt., until recently described as new.

Ceanothus divaricatus Nutt.

In the Transition Zone near La Grulla and along the road from La Grulla to Rancho Santo Tomás, in our descent of the San Pedro Mártir Mountains, this shrub was noted in a number of places, sometimes associated with *Arctostaphylos pringlei*. It grows 1.8 to 3.5 meters high. A specimen with ripening fruit was collected at La Grulla, July 20. The species is common in the same zone in the mountains of southern California.

Ceanothus submontanus Rose.[1]

This recently described shrub, closely resembling *C. cuneatus*, ranges with *C. goldmanii* in the Upper Sonoran Zone on the western slopes of the Sierra del Pinal and San Pedro Mártir mountains, but was less abundant than that species and not observed at so high elevations. It was noted at elevations ranging from 840 meters on north slopes near La Huerta up to about 1,650 meters near the summit of the Pinal Mountains and from 1,200 to 1,500 meters near El Piñón in the San Pedro Mártir Mountains. It grows 1 to 3 meters in height. The type, in fruit, was taken at Alamo, June 11, and a specimen with empty seed capsules at El Piñón, July 5.

Ceanothus palmeri Trel.

A specimen with empty seed capsules was taken near El Piñón, on the northwest slope of the San Pedro Mártir Mountains, July 5. It was noted between 1,350 and 1,500 meters on brush-covered hillsides, where *C. submontanus* and *C. goldmanii* grew more abundantly, with other vegetation of the Upper Sonoran Zone.

Colubrina glabra S. Wats.

Specimens of this shrub in flower and fruit were taken at 360 meters near Tinaja de San Esteban, 25 miles north of San Ignacio, October 5, and between 360 and 600

[1] See p. 311.

meters, 20 miles east of San Ignacio, October 19. It grows as a shrub 1.8 to 3.5 meters high and appears to belong to the subtropical flora. Recorded by Brandegee from Magdalena Island, San Julio Canyon, and San José del Cabo.

Karwinskia humboldtiana Zucc.

A specimen in fruit, taken about 5 miles southwest of El Potrero, October 31, has been referred to this species by Mr. Brandegee. Another, also in fruit, which may represent another species, but is provisionally included in this, was collected between Cerro Colorado and Rodríguez, December 16. Brandegee records the species from La Paz, Todos Santos, and San José del Cabo. *Karwinskia humboldtiana* is apparently a very variable and widely ranging species, or possibly more than one species is passing under this name. As recognized at present, it ranges in the warmer areas from southern Texas and Lower California to southern Mexico or Guatemala. In southern Lower California it is associated with many tropical species. It grows here as a shrub 2.5 to 3.5 meters high.

Rhamnus californica Eschw. CALIFORNIA BUCKTHORN.

Specimens referred to this species by Mrs. Brandegee were taken in the San Pedro Mártir Mountains. The species is common at the upper levels and was flowering at 1,500 meters on northwest slopes near El Piñón, July 7, while it bore both flowers and partly grown fruit at 2,100 meters near La Grulla, July 20.

Rhamnus crocea Nutt. EVERGREEN BUCKTHORN.

The evergreen buckthorn is abundant in the Upper Sonoran Zone along the western side of the Sierra del Pinal and San Pedro Mártir mountains, especially on open slopes, at about 1,350 meters altitude. Specimens were collected as follows: Laguna Hanson (1,680 meters), in flower, June 2; between Rancho Santo Tomás and San Antonio (1,350 meters), in about full grown but still green fruit, July 28; near San Antonio (750 meters), in ripe fruit, August 1.

MALVACEAE. Mallow Family.

Abutilon californicum Benth.

This shrub was discovered at Magdalena Bay on the voyage of the *Sulphur*. We collected it in flower and ripe fruit at Tinaja de San Esteban, 25 miles north of San Ignacio, October 5. It appears to belong to the subtropical flora of the Peninsula. Brandegee records it from Magdalena and Margarita islands, from the adjacent mainland, and from San José del Cabo.

Abutilon palmeri A. Gray.

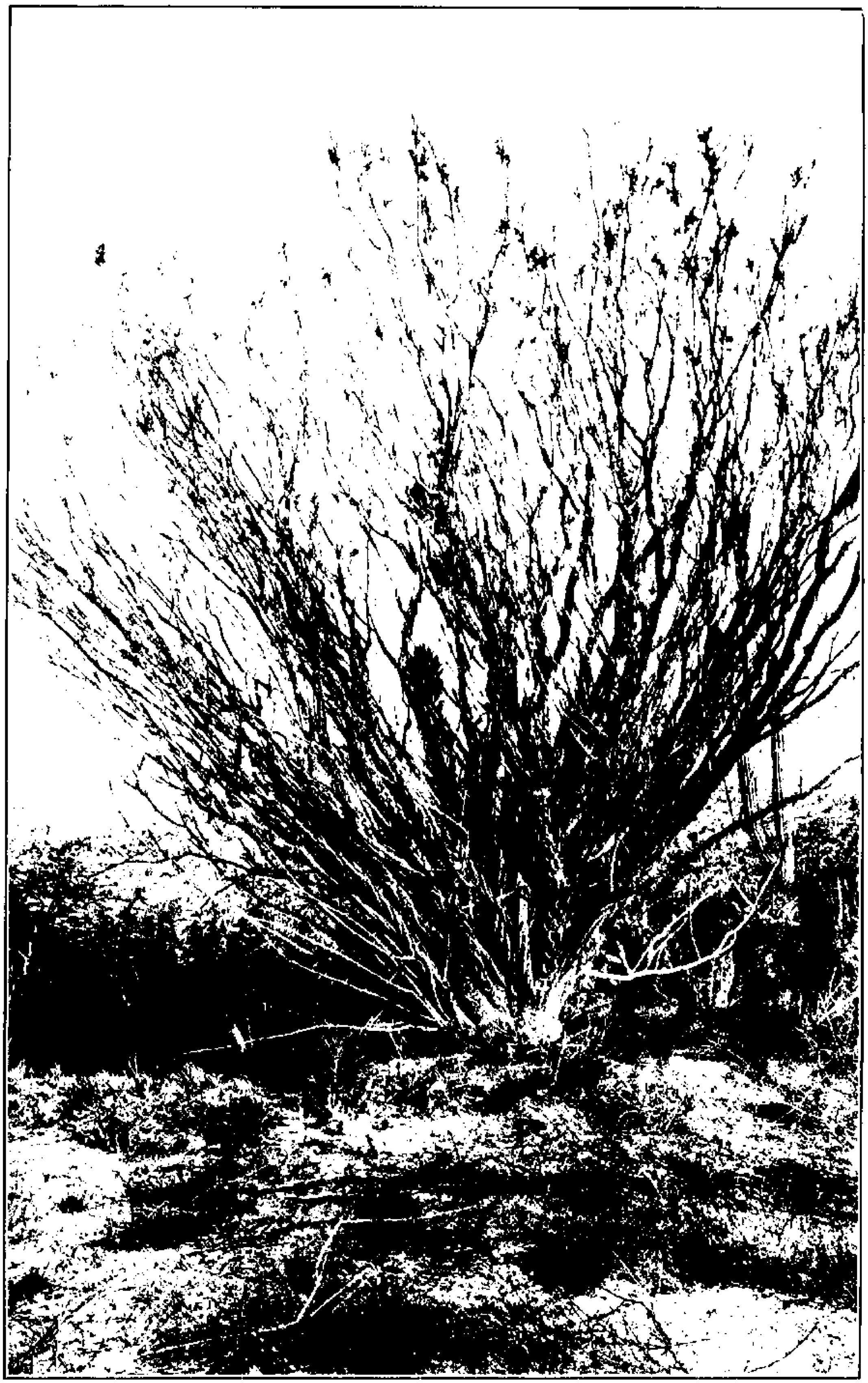
A handsome shrub, 1.8 to 3.5 meters high. A specimen was taken in flower and fruit along the road from Agua Colorada to Cerro Colorado, December 15. Brandegee records this species from La Paz and Todos Santos, and specimens referred here were collected by him on Margarita Island.

Gossypium herbaceum L. COTTON.

Cotton was formerly cultivated at San José del Cabo, La Purísima, Comandú, and as far north as San Fernando, but has been neglected in more recent years. A few plants were growing in old fields and gardens. Brandegee records the species as escaped from cultivation at San José del Cabo.

Gossypium davidsonii Kellogg. DAVIDSON COTTON.

Wild cotton, referred to this species by Brandegee, was seen several times in the hills between Cerro Colorado and the Cañón de los Reyes in crossing the Peninsula



FOUQUIERIA PENINSULARIS NASH, SAN ANDRÉS.

from Matancita to La Paz, but was more common at low elevations south of La Paz. Specimens with ripe bolls were collected between Cerro Colorado and Rodríguez, December 16, and with ripe bolls and flowers between Tres Pachitas and Valle Flojo, December 25. It is a shrub 1.2 to 2.5 meters high of no known economic value. Recorded by Brandegee from Magdalena Island, San Gregorio, and San José del Cabo.

Gossypium harknessii T. S. Brandeg. HARKNESS COTTON.

This wild cotton, forming dense patches 1.2 to 1.8 meters high, is very abundant on the basal slopes of hills on Margarita Island, where it was discovered by Brandegee. Specimens with flowers and maturing bolls were collected November 29.

Hibiscus coulteri Harv.

The handsome flowers of this species were seen in a few fertile spots along the road through the lava beds from La Purísima to Comandú. It is a shrub 1.8 to 2.5 meters high. Specimens were taken in flower November 5. Brandegee records the species from San José del Cabo and La Paz.

STERCULIACEAE.

Fremontodendron californicum (Torr.) Coville. FREMONTIA.

We observed this handsome shrub or small tree only in the Upper Sonoran Zone at San Matías Spring, where the extreme northern end of the San Pedro Mártir Mountains slopes down into San Matías Pass. Flowering specimens were taken June 28.

Melochia tomentosa L.

The range of this tropical shrub includes the southern half of the Peninsula. It was rather common in places, mainly near water among the hills in the interior. It was taken in flower and immature fruit at Tinaja de San Esteban, 25 miles north of San Ignacio, October 5. Brandegee records the species as common everywhere in the Cape District south of La Paz, except in the mountains.

FOUQUIERIACEAE. Ocotillo Family.

Fouquieria splendens Engelm. OCOTILLO.

Among the most abundant shrubs in the Peninsula are this and the following species of Fouquieria. The "ocotillo," as *F. splendens* is locally called, ranges in the Lower Sonoran Zone from southeastern California southward along the east side of the high mountains, spreading across the Peninsula south of the San Pedro Mártir Mountains, and finally meeting and, for a short distance only, overlapping the range of *F. peninsularis* in the vicinity of Rosarito. It is rather partial to gravelly or rocky hillsides and ascends the eastern basal slopes of the San Pedro Mártir Mountains to 1,140 meters in San Matías Pass. Near the west coast it was first seen between Rosario and Las Cuevas. It was taken in flower at San Fernando, September 4.

Fouquieria peninsularis Nash. PALO DE ADÁN. PLATE 120.

The "palo de Adán," as this species is called by the people of the Cape District, was first noted near San Andrés. Here it occurs along with *F. splendens*, from which, however, it differs very noticeably in habit. That species ramifies from near the ground into comparatively few stout, straight stems. *Fouquieria peninsularis* is usually not so tall, the stems are more numerous and much more ramified, and the small branches are more slender and crooked. It usually has a well-formed but short trunk. Southward from the vicinity of Rosarito, beyond which *F. splendens* was not noted,

the palo de Adán was one of the most abundant shrubs except on the upper slopes of the mountains. It was also seen on Magdalena and Cerralvo islands. It is more generally distributed than *splendens*, which prefers gravelly or rocky places, while the present species spreads from such areas out over sandy deserts. Like many other shrubs of this region, it is nearly or quite leafless during the dry season, but the full foliage appears in remarkably short time after the first rains. A deer killed on the desert west of San Ignacio about the middle of October had its stomach entirely filled with newly grown leaves of palo de Adán. Specimens were taken at various places from San Andrés to near Cape San Lucas between September 21 and January 19, showing that flowers and fruit are produced irregularly during much of the year. The range of this species and its association with so many southern plant forms seem to place it in the subtropical section of the flora. In his Flora of the Cape Region Brandegee records this species under the name "*Fouquiera spinosa*" as occurring throughout the whole region excepting the high mountains.

Idria columnaris Kellogg. CIRIO. PLATES 121, 122, A, B.

Near Las Cuevas, a few miles southeast of San Fernando, we abruptly entered the range of the extraordinary tree known locally as "cirio." It became at once a dominant species, giving to the entire landscape, by its strange configurations, an aspect very unlike anything we had ever seen. It is generally distributed over rocky hills and sandy flats, but is most numerous on the lower ground, where it commonly forms a scattered forest, the taller trees reaching a height of about 18 meters. In many places, especially along the high rocky backbone of the Peninsula, its range was interrupted, but it would reappear a few miles farther on. It was found to be distributed along our route from near San Fernando to near the Tinaja de Santana, about halfway between Calmallí and San Ignacio, and its general range thus includes one of the most arid sections of the Peninsula. The younger trees are stocky and quite symmetrical, but the older ones are apt to become top-heavy and in overhanging assume many fantastic shapes. A flowering specimen was obtained at Jaraguáy, about 58 miles southeast of San Fernando, September 9. The following notes on this species by Doctor Veatch accompanied the original description by Kellogg:

"I found the *Idria columnaris* growing rather abundantly on the margin of the Bay of Sebastian Viscanio, at a point east of Cedros Island, on the coast of Lower California. It was observed mostly on the sandy and gravelly flats formed by the expansion of hill ravines in their approach to the shore. Near the same locality was also found the kindred genus Fouquieria, whose bright scarlet blossoms contrasted strongly and pleasantly with the pale yellowish inflorescence of the Idria."

Many of the larger trees are hollow. Bees introduced into Lower California have thrived in a wild state and frequently occupy the hollow trunks of the cirio.

KOEBERLINIACEAE. Junco Family.

Koeberlinia spinosa Zucc. ALLTHORN.

A common Lower Sonoran species of the southwestern United States. Recorded by Brandegee at San Jorge.

TURNERACEAE. Turnera Family.

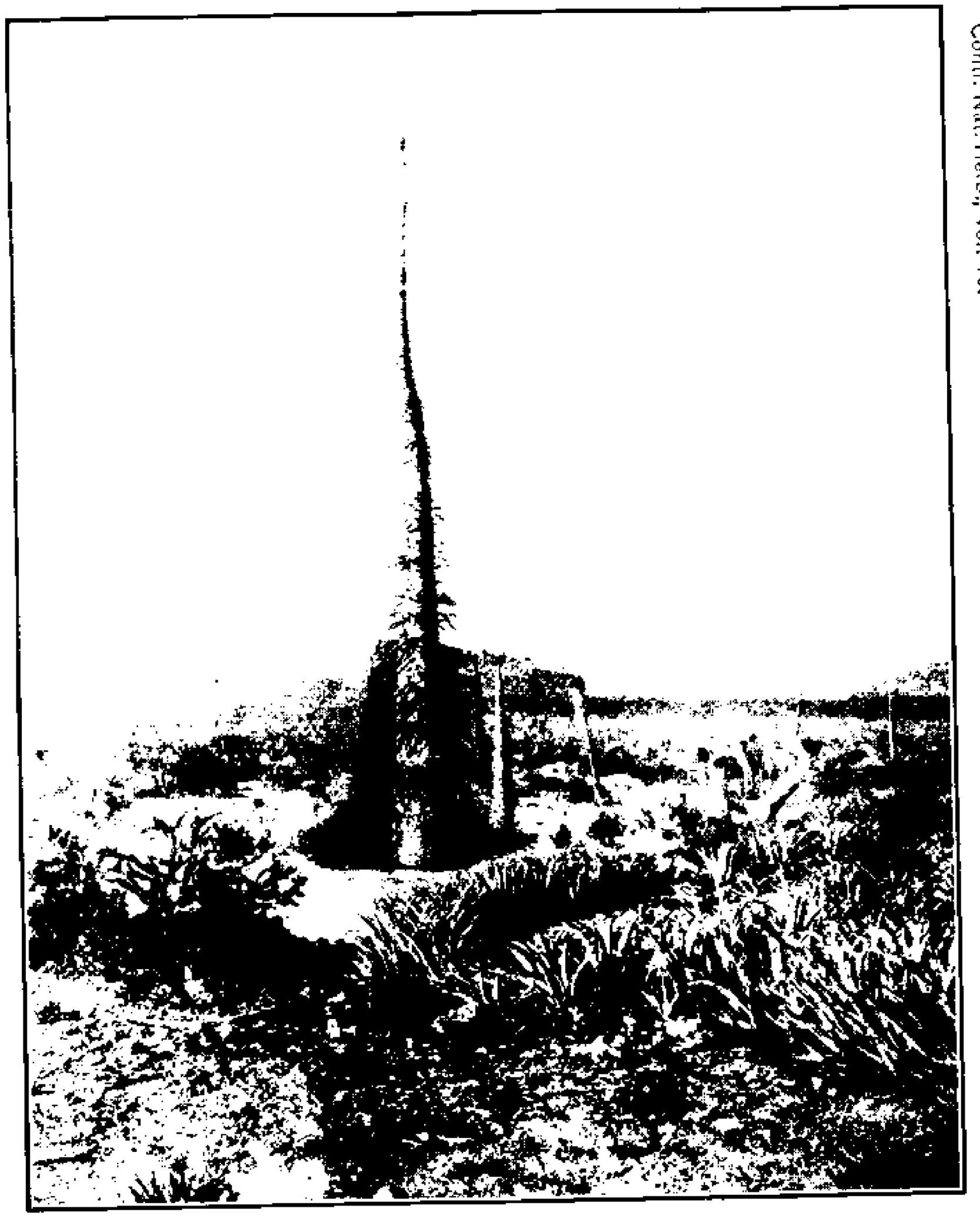
Turnera humifusa (Presl) Endl. DAMIANA.

A small shrub found in the Cape District south of La Paz, as also along the west coast of Mexico, in both regions called "damiana." It is common, with a height of 30 to 60 cm. along the basal slopes of the Victoria Mountains up to 1,050 meters. It is used as tea and in flavoring a liquor called "pazanita." A flowering specimen was taken between San Bernardo and El Saúz, in the Victoria Mountains, January 21. Brandegee records it as common at low elevations in the Cape District.

PLATE 121.

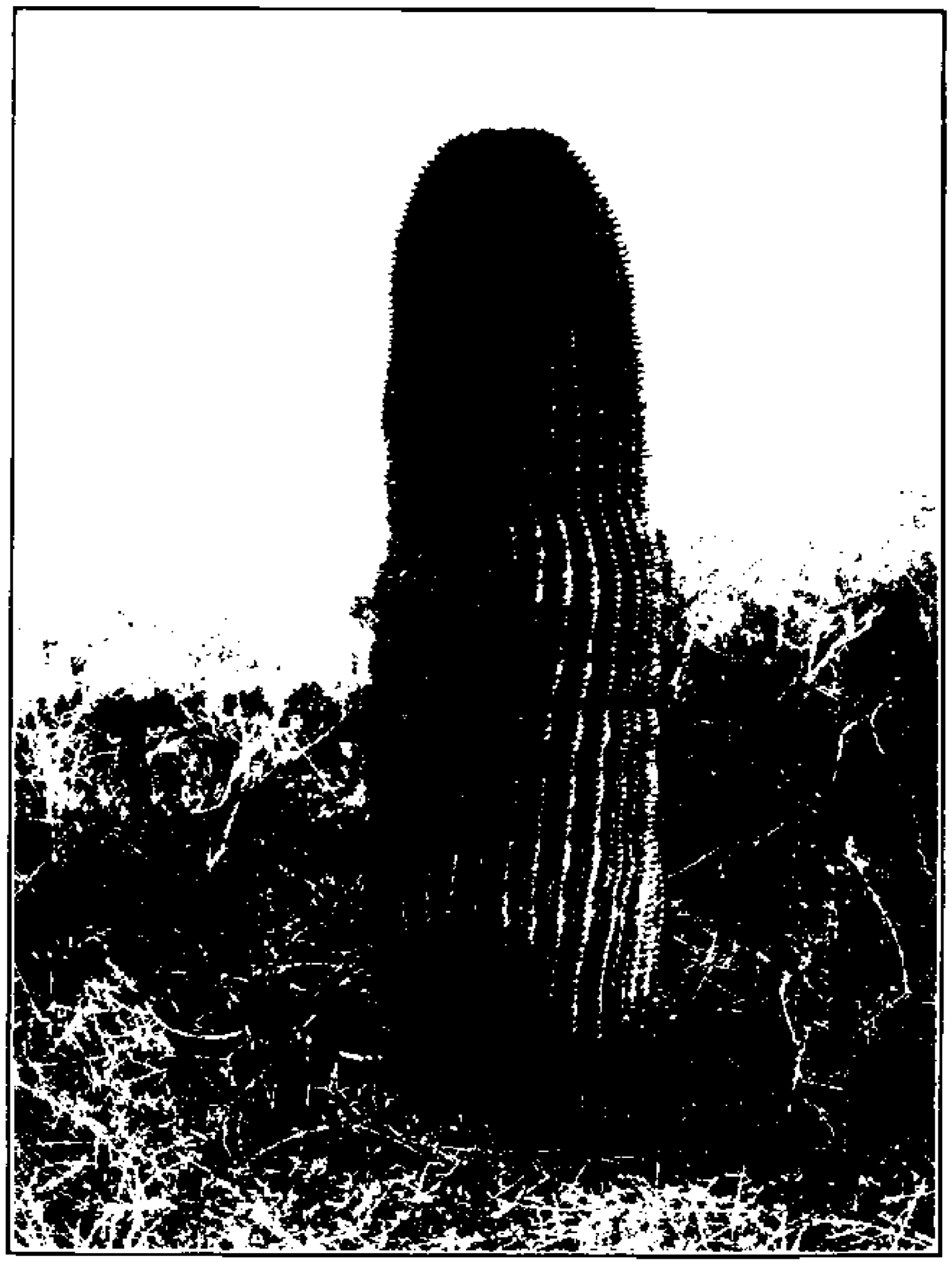
IDRIA COLUMNARIS KELLOGG, SAN FERNANDO.

A. IDRIA COLUMNARIS KELLOGG (YOUNG PLANT, IN FLOWER), AGUA DULCE.



B. THE SAME SPECIES (FULL GROWN), CALMALLI.

A. Echinocactus falconeri Orcutt. San José del Cabo.



B. Echinocactus digueti Web., Cerralvo Island.

CACTACEAE. Cactus Family.

Bergerocactus emoryi (Engelm.) Britt. & Rose.

Patches of this serpentine cactus were seen on the shores of the Bay of San Quintín and along the beach south of Socorro on the road to Rosario. The range of the species is doubtless more or less continuous along the coast northward to the type locality at the international boundary and may include some of the islands. The stems vary in length from less than 20 to 150 or 175 cm. In some of the larger patches the stems grow more or less upright to a height of a meter or more and then turn downward and trail along the ground.

Echinocactus falconeri Orcutt. PLATE 123, A.

The genus Echinocactus is represented in the desert regions nearly throughout the Peninsula, but the number of species and their respective ranges have not been fully determined. The present seems to be the most abundant and generally distributed species from at least as far north as latitude 28° to Cape San Lucas. It also has an extended range along the coast on the east side of the Gulf of California. As usual in the group to which it belongs, this species prefers stony places, especially the rock-covered slopes along the backbone of the Peninsula. It grows commonly 0.5 to 1.2 meters high. Specimens were collected at Calmallí, San José del Cabo, and along the road from El Sacatón to Cape San Lucas.

Echinocactus rectispinus (Engelm.) Rose.

This Echinocactus was collected by us at 1,020 meters altitude near Tinaja de Santana, 35 miles north of San Ignacio, October 4. It was growing to a height of 1 to 1.5 meters among the rocks on a lava-covered mesa. A species which we took to be the same was abundant nearly all the way from the Santa Clara Mountains across the Peninsula to Santa Rosalía and northward at least to Calmallí. The type came from the vicinity of Mulegé, where it was collected by Gabb in 1867. Specimens referred to this cactus by Rose were collected by him at the head of Concepción Bay, April 5, 1911. The species probably has an extended range in the Peninsula similar to that of *E. falconeri*.

Echinocactus fordii Orcutt.

Rose refers to this species specimens collected by him on San Bartolomé Bay, March 13, 1911.

Echinocactus chrysacanthus Orcutt.

Specimens referred to this species by Rose were collected by him on Cedros Island, March 10, 1911.

Echinocactus orcuttii Engelm.?

A species found growing abundantly in San Matías Pass, at the north end of the San Pedro Mártir Mountains, was photographed but not collected. It is probably *orcuttii*, which was based on material collected by Orcutt in Palm Valley, in the drainage of the Tijuana River.

Echinocactus digueti Web. VIZNAGA. PLATE 123, B.

While in the vicinity of the Cape we were told of the giant "viznaga" of Cerralvo Island, and on our visit found this species quite common. It grows mainly, or is more abundant, along the rocky lower slopes of this mountainous island, often within a few feet of the water. One of the larger plants, which was chosen to be photographed and from which specimens were taken, measured 2.3 meters in height and 2 meters

in circumference, as measured by a tape line drawn as closely to the trunk as the projecting spines would permit. The usual height, however, is 1 to 2 meters.

This Echinocactus was originally discovered by Leon Diguet on Santa Catalina Island, in the Gulf of California, about 100 miles north of La Paz. It was re-collected by Rose at the type locality and on Carmen Island in April, 1911. The species is not known to occur on the mainland.

Echinocereus brandegei (Coult.) Schum. PLATE 124.

Discovered at Campo Alemán by Brandegee, April 24, 1889. It was first noticed by us and collected at about 300 meters altitude in the bottom of the canyon at San Pablo. From this point southward to Matancita it was seen in a number of places along our route. Unlike the species of Echinocactus, it prefers the softer soil in the bottoms of canyons along the backbone of the Peninsula or on the plains near the west coast. It was noted as far west as the Santa Clara Mountains, but was more abundant on the coastal plain between San Jorge and Matancita, where it was collected in flower November 14. It grows in thick bunches usually not more than 0.5 to 1.5 meters in diameter, the stems 15 cm. in length, some upright and others reclining.

Lemaireocereus thurberi (Engelm.) Britt. & Rose.

PITAHAYA DULCE. ORGAN PIPE CACTUS. PLATE 125, A.

The "pitahaya dulce," so called in Lower California, was originally described from "a rocky canyon near the mountain pass of Bacuachi, a small town on the road to Arispe, in Sonora." It was first seen on our route near Pozo Altamirano and afterwards from this point southward to Cape San Lucas we found it fairly common, except on very sandy areas. Its range in the Peninsula thus includes the southern half, from near latitude 28°. It occurs also on Cerralvo Island. The species grows among the rocks on the lava-covered mesas along the backbone of the Peninsula and on the plains near the Pacific coast. The fruit is gathered in quantities by the people, but seemed to us less palatable than that of the next.

Lemaireocereus gummosus (Engelm.) Britt. & Rose.

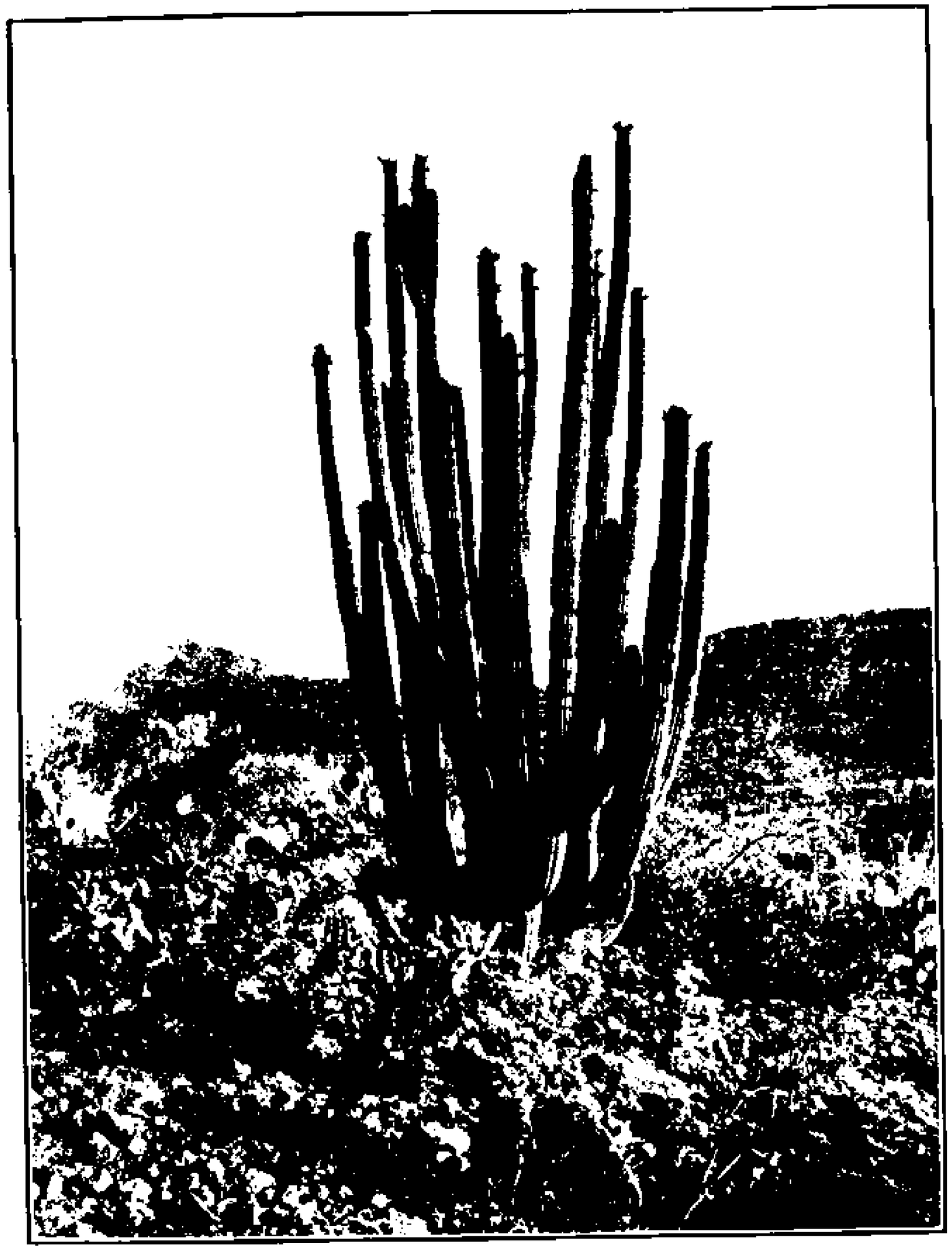
PITAHAYA AGRIA. PLATE 126, A.

Well known throughout its range by the name given. It was first noted and collected by us in the vicinity of Yubay and was one of the most abundant and generally distributed cactuses along our route from this point southward to Cape San Lucas. It is also common on Magdalena, Margarita, Espíritu Santo, and Cerralvo islands. Brandegee recorded the species from San Martín and Cedros islands, and more recently Dr. Rose has collected it on the islands of Catalina and Santa Cruz in the Gulf of California. The plants grow 1.5 to 2 meters high, with numerous branches. The large fruit is slightly tart and very agreeable to the taste. It is much prized by the natives and to us seemed much superior to that of *L. thurberi*, which is sweeter and more insipid.

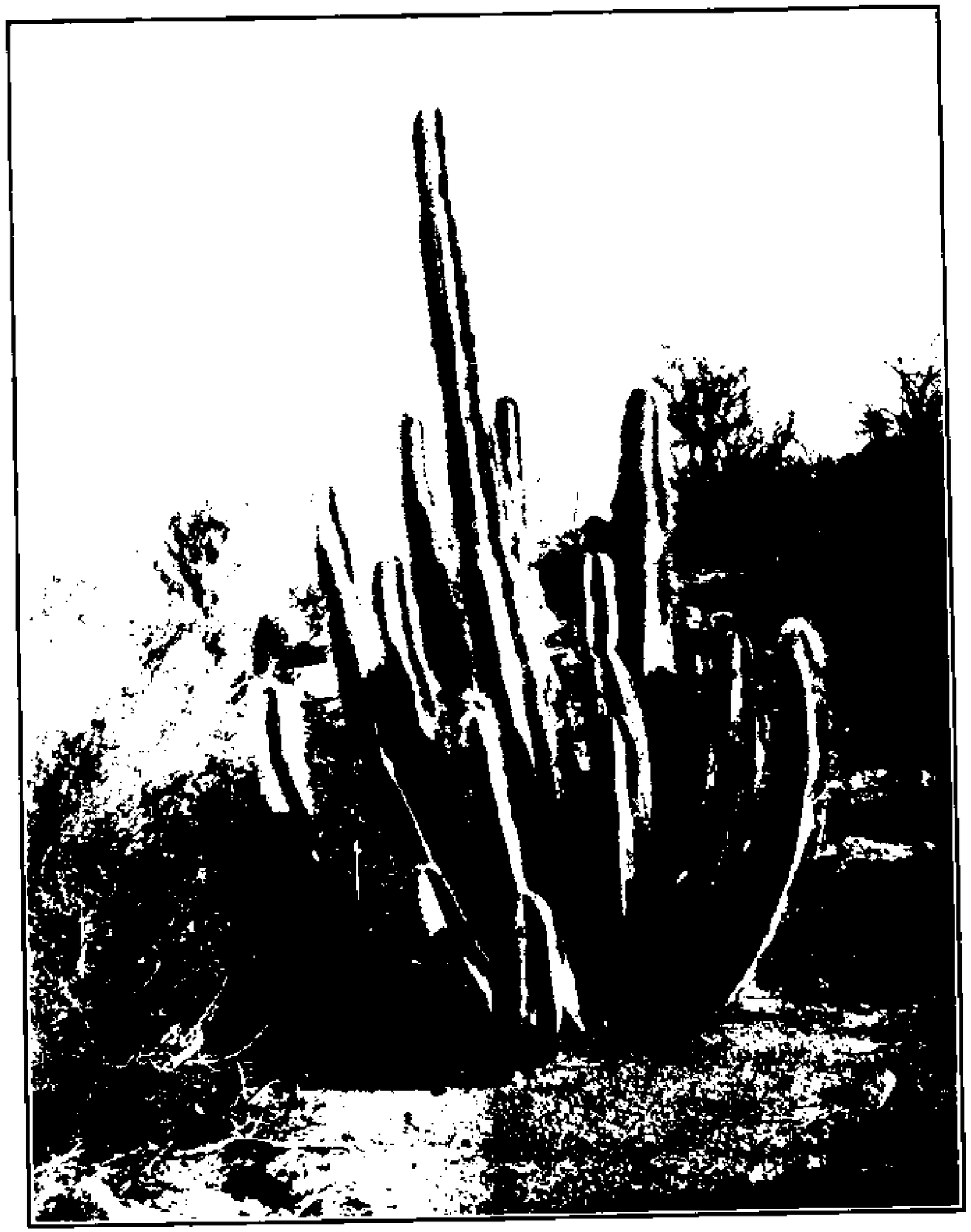
Lemaireocereus eruca (T. S. Brandeg.) Britt. & Rose. CHIRINOLA. PLATE 127.

We first saw this remarkable cactus on the coastal plain near Santo Domingo, about 30 miles north of Matancita and here made a collection. From this point southward it was noted at intervals on the plains as far as the Llano de Yrais and on the lower and more sandy parts of Magdalena Island. The stems grow 1 to 3 meters in length and are nearly prostrate, and from this habit and their long whitish recurved spines have aptly been likened to huge caterpillars. The growing ends of the branches stand up from the ground, but progressive growth leaves the main body lying prostrate. The stems become rooted along the lower sides and gradually die behind, resulting in a slow progression of the living portion along the ground. Multiplication of individuals frequently results from the decay of connecting parts. In some places

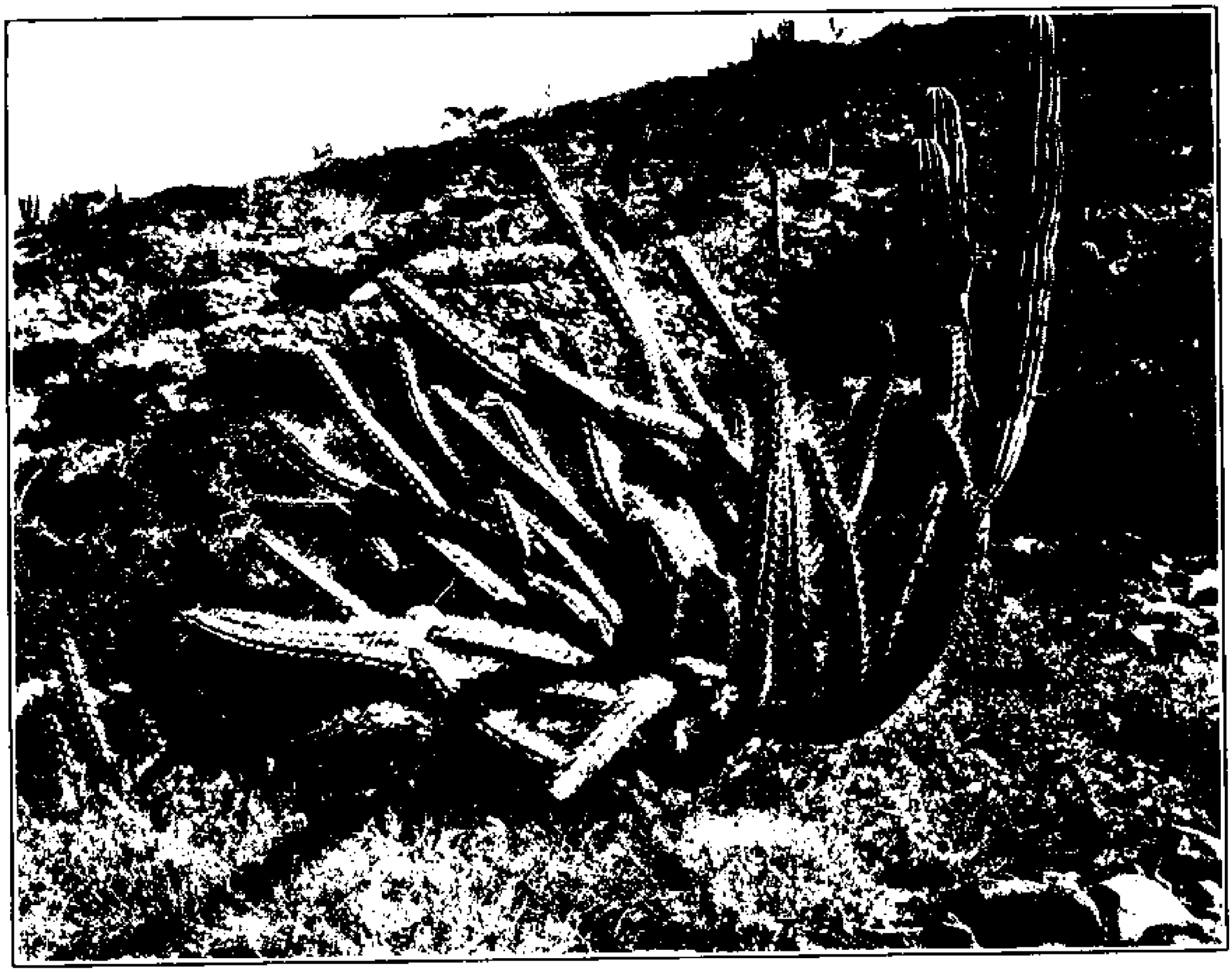
ECHINOCEREUS BRANDEGEI (COULT.) SCHUM., MATANCITA.



A. LEMAIREOCEREUS THURBERI (ENGELM.) BRITT. & ROSE, TINAJA DE SANTANA.



B. LOPHOCEREUS SCHOTTII (ENGELM.) BRITT. & ROSE, SAN FRANCISQUITO.



A. LEMAIREOCEREUS GUMMOSUS (ENGELM.) BRITT. & ROSE, ESPIRITU SANTO ISLAND.

B. LOPHOCEREUS AUSTRALIS (K. BRANDEG.) BRITT. & ROSE, CAPE SAN LUCAS.

LEMAIREOCEREUS ERUCA (T. S. BRANDEG.) BRITT. & ROSE, SANTO DOMINGO.

disconnected plants forming a hollow circle can be traced by the remains of dead trunks to a common center. The plants show a preference for soft parts of the coastal plain and grow usually in groups, often topping a slight eminence formed of wind-drifted material. These cactuses serving as a sand binder and preventing erosion tend to favor further accumulations. The desert foxes (*Vulpes macrotis devius*) of the region find congenial burrowing places among the procumbent trunks.

Lophocereus sargentianus (Orcutt) Britt. & Rose.

Species of the genus Lophocereus range nearly throughout the desert regions of Lower California from the Cape northward to San Quintín on the Pacific coast and to the arid region near the upper end of the Gulf of California. The genus is also represented in southern Arizona and Sonora. The distribution of the species, however, is imperfectly known. The present species was not distinguished from *L. schottii* by us in the field and may have been confused with it. We failed to note *L. sargentianus* at San Quintín, the type locality, but a Lophocereus seen in several places on the sandy plains between San Fernando and Pozo San Augustín may have been this species.

Lophocereus australis (K. Brandeg.) Britt. & Rose. PLATE 126, B.

First noted by us along the road from San Pedro to Tres Pachitas, south of La Paz. From this point to the Cape and eastward to San José del Cabo it is quite common at low elevations wherever the soil is soft. It was noted by us north of La Paz. It has been credited by Britton and Rose to southwestern Sonora. Specimens were collected at Cape San Lucas, where the plant was growing in dense patches. It differs from *schottii*, which it seems to replace here, in its taller, more slender, and much more numerous stems. The ridges are 6 to 8 in number along the basal parts of stems, becoming irregularly more numerous toward the long-spined fruiting tips.

Lophocereus schottii (Engelm.) Britt. & Rose. GARAMBULLO. PLATE 125, B.

Originally described from Sonora and probably extending throughout the greater part of Lower California. It was first seen and collected by us near the mouth of Esperanza Canyon, at the east base of the San Pedro Mártir Mountains and was common over the desert to San Felipe on the Gulf of California. A species assumed to be the same was seen at San Francisquito and noted many times along our route southward to La Paz. From near La Paz to Cape San Lucas it is replaced by *L. australis*. *Lophocereus schottii* grows 1.8 to 3.5 meters high in alluvial valleys and canyon bottoms along the backbone of the Peninsula and on sandy plains. The spines are of two kinds, slender ones massed on the ends of the branches and extending downward from 30 to 125 or 150 cm. and shorter and stouter ones ranged along the ridges, into which the former change rather abruptly. The ridges are commonly 5 in number, but vary from 4 to 6. The large flowers appear along the line of demarcation between the two sets of spines. In the vicinity of La Purísima the species was in flower November 4. It is commonly known in the Peninsula as "garambullo," a name applied also to *Myrtillocactus geometrizans* in the southern part of the plateau region of Mexico.

Mamillaria roseana T. S. Brandeg.

A specimen referred by Rose to this handsome species was collected at about 360 meters elevation 20 miles east of San Ignacio. Brandegee gives its range as the lower elevations throughout the Cape District south of La Paz and northward to Calmallí. He further says:[1] "This cactus is one of the most showy of Lower California. Palmer collected it at La Paz, and it is no. 139 of the list from that place in Contributions

[1] Zoe **2**: 19. 1891.

from the U. S. National Herbarium, no. 3,[1] catalogued by Rose, for whom it is appropriately named. The stems pendent from rocks at Comandú are sometimes 6 feet long."

Myrtillocactus cochal (Orcutt) Britt. & Rose.

Originally described from Todos Santos Bay; first seen by us in the hills along the road from Pozo Altamirano to San Pablo, October 3. It was at this time in flower, and the resemblance to *M. geometrizans*, the garambullo,[2] with which we became familiar in the plateau region of Mexico, was noted at once. The flowers are small, whitish, and inconspicuous. This was one of the rarer cactuses along our route from this point southward to the Cape. It was afterwards seen near Tinaja de Santana, in the hills about 20 miles east of San Ignacio, along the road from Agua Grande to Paso Hondo, a few miles north of Comandú, and near San José del Cabo. Brandegee records the species from San Martín Island.

Opuntia pycnantha Engelm.

Four species of flat-jointed Opuntia are known to occur in Lower California. The type of *O. pycnantha* came from Magdalena Bay, but little is yet known of the distribution of the species. It was collected by Brandegee on Magdalena Island in March, 1889, and by Rose at Santa María Bay in March, 1911. Short, closely set, yellowish spines distinguish this form from its insular representative, the subspecies *margaritana*.

Opuntia pycnantha margaritana Coulter.

Margarita Island is the type locality of this form, which was described by Coulter in 1896. It was again collected there by Rose in March, 1911. It differs from *O. pycnantha* of the mainland in its reddish instead of yellowish spines.

Opuntia tapona Engelm. TUNA TAPONA.

A species bearing edible fruit, described from material collected by William M. Gabb near Loreto while on his overland journey in 1867. Specimens recently collected by Rose indicate that its range extends thence to San José del Cabo. Rose also obtained this species on Pichilinque Island and on Espíritu Santo Island, where we had also collected it in 1906.

Opuntia comonduensis (Coulter) Britt. & Rose.

The known range of this species extends on the mainland from Comandú, the type locality, southward to San José del Cabo, where the plant was collected by Rose in March, 1911. He also obtained specimens on Carmen Island in April, 1911.

Opuntia sp. PLATE 129, B.

A species with short pinkish thorns grows abundantly along with *O. cholla* or a form of this in the vicinity of Agua Dulce and as far southward as Comandú.

Opuntia cholla Engelm. CHOLLA. PLATE 128, A.

One or more species of the *O. cholla* type are among the most abundant and generally distributed cactuses throughout the desert region from Cape San Lucas north to the basal slopes of the San Pedro Mártir mountains. This type of cactus does not occur or is not abundant on the desert near the delta of the Colorado nor in the northwest coastal region.

Opuntia bigelovii Engelm. PLATE 128, B.

This species, distinguishable at once from *O. cholla* by joints much more thickly beset with whitish spines, was seen in a few places near the Gulf coast from the Cocopah mountains south to Calamahué. It is abundant on the coastal plain near San Felipe Bay.

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[1] 1: 70. 1890.

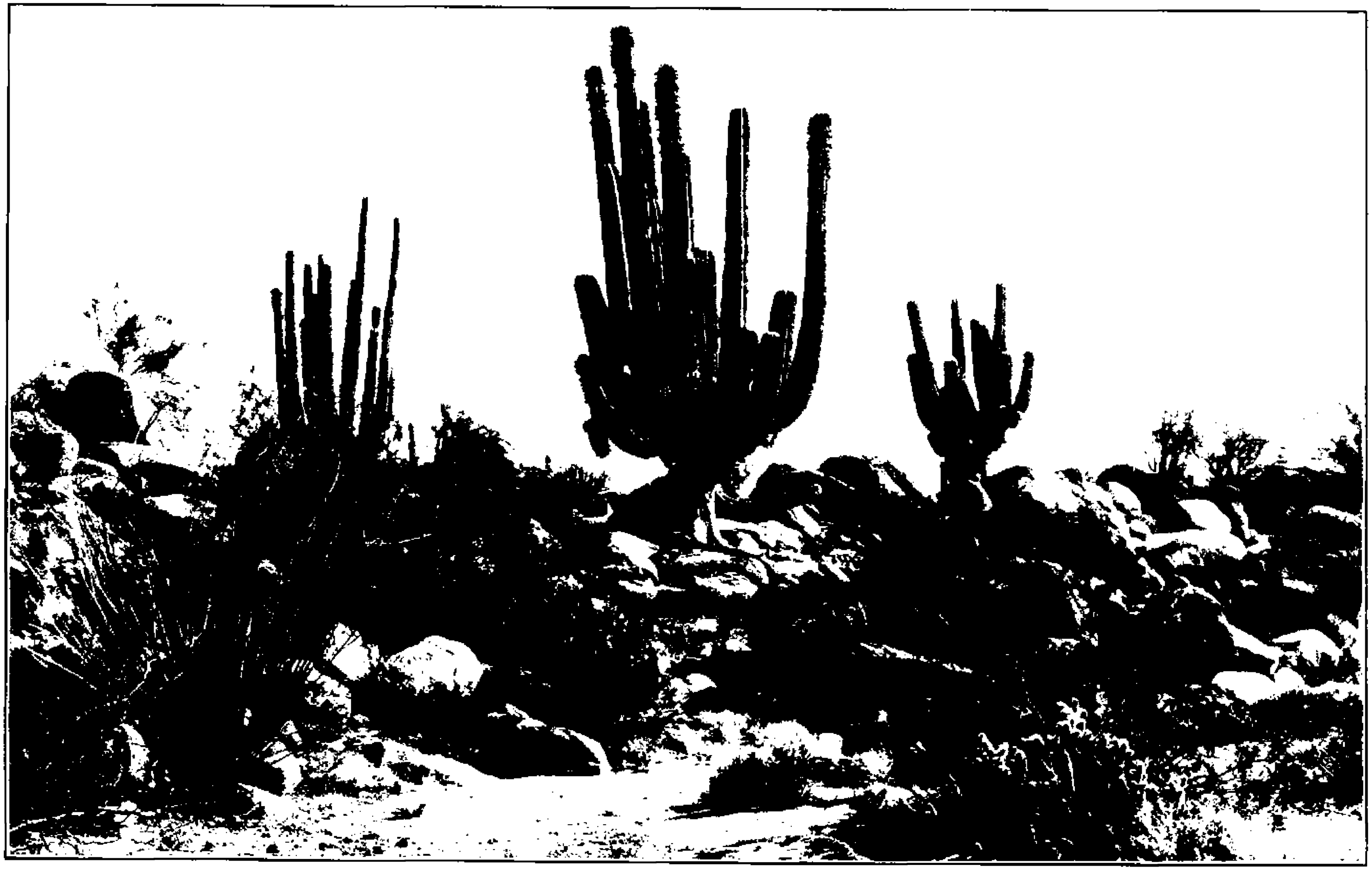
[2] See under *Lophocereus schottii*, p. 353.

A. OPUNTIA CHOLLA ENGELM., ESPÍRITU SANTO ISLAND.

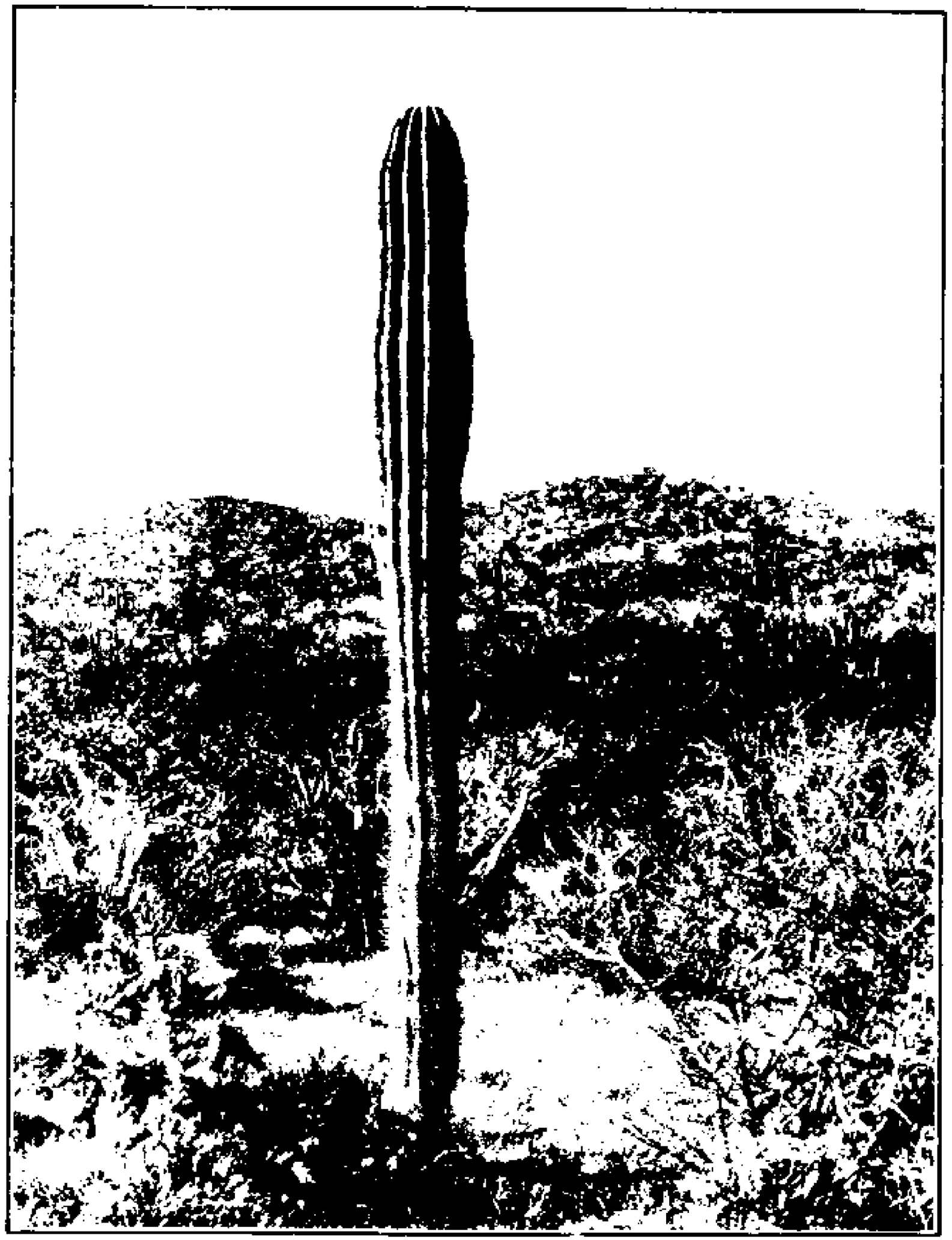
B. OPUNTIA BIGELOVII ENGELM., SAN FELIPE BAY.

A. Opuntia clavellina Engelm., San Andrés.

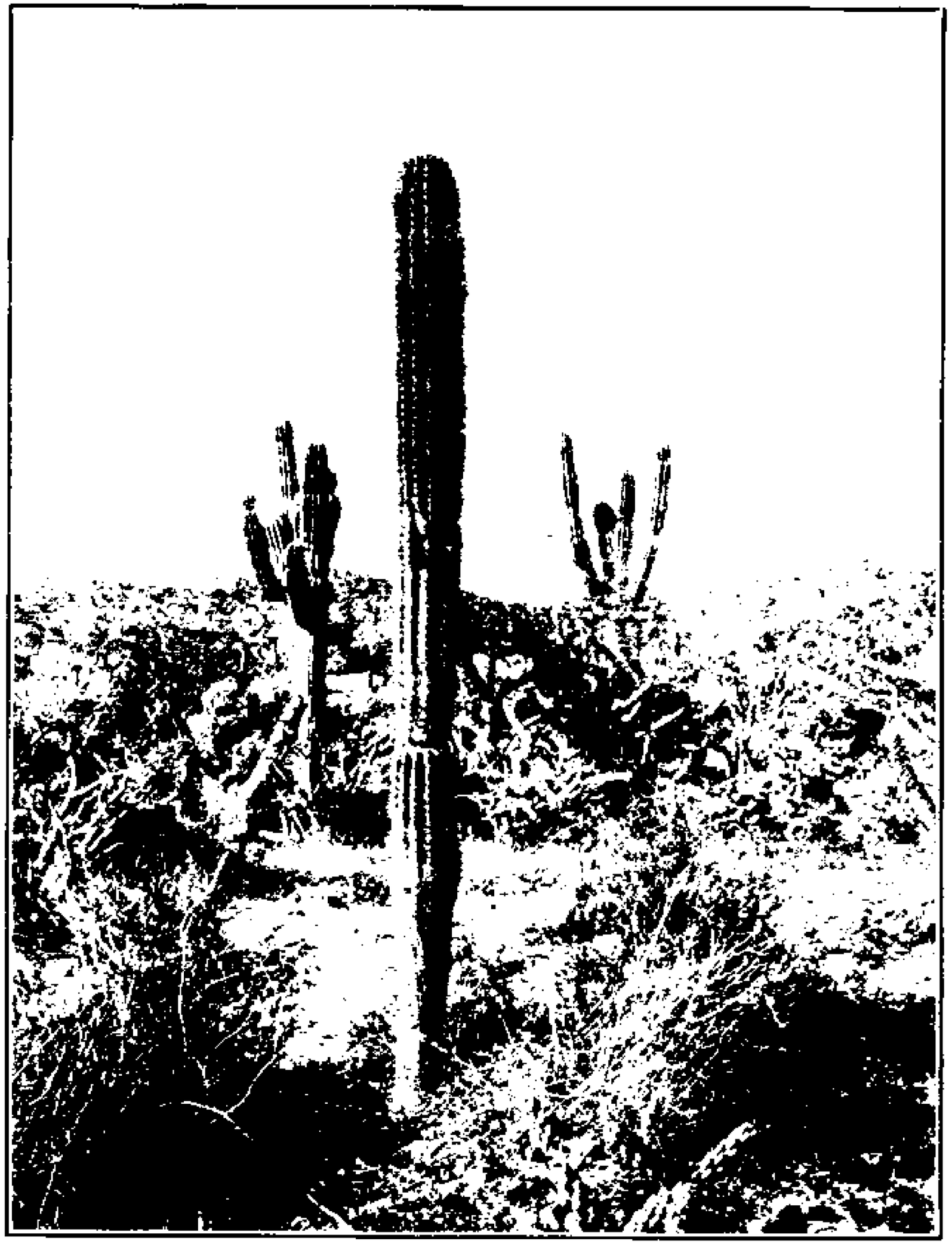
B. Opuntia sp., Agua Dulce.



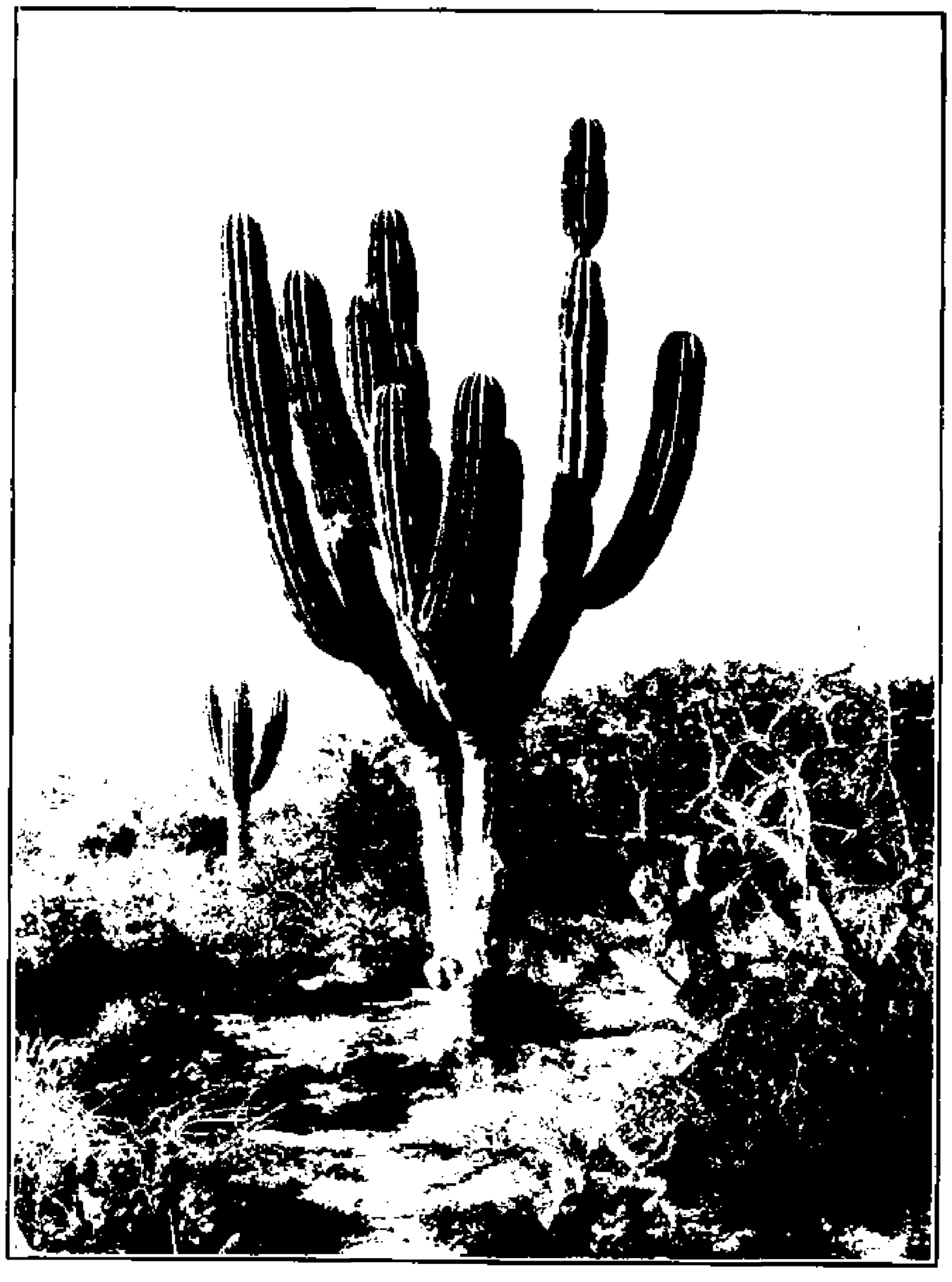
PACHYCEREUS PRINGLEI (S. WATS.) BRITT. & ROSE, EAST BASE OF SAN PEDRO MÁRTIR MOUNTAINS.



A. PACHYCEREUS CALVUS (ENGELM.) BRITT. & ROSE (YOUNG PLANT), SAN JOSÉ DEL CABO.



B. PACHYCEREUS TITAN (ENGELM.) BRITT. & ROSE (YOUNG PLANT), SAN JOSÉ DEL CABO. (PLANTS OF P. CALVUS IN BACKGROUND.)



A. PACHYCEREUS CALVUS (ENGELM.) BRITT. & ROSE, SAN JOSÉ DEL CABO.

B. PACHYCEREUS PECTEN-ABORIGINUM (ENGELM.) BRITT. & ROSE, CAPE SAN LUCAS.

Opuntia clavellina Engelm. NEEDLE CACTUS. PLATE 129, A.

A cholla cactus which Rose associates with this species was photographed about 5 miles north of San Andrés, between that point and Punta Prieta Ranch, while we were on our way across the Peninsula from Yubay, September 30, 1905. The species was again seen in a few places on the coastal plain between San Andrés and Rosarito. It was more strongly armed than any species previously seen along our route, and owing to the difficulty of carrying such spiny material we neglected to collect specimens during the two days' travel in which it was encountered, fully expecting to find it at some of our camps, where it could be more easily handled. But we looked in vain for the species at San Andrés, Rosarito, and farther southward, and it therefore seems to be one of the rarer cactuses of the region. It is remarkable for the unusual length of the spines. The type came from La Purísima.

Pachycereus pringlei (S. Wats.) Britt. & Rose. CARDÓN. PLATE 130.

Five giant cactuses of the genus Pachycereus are credited by Britton and Rose to Lower California, but their ranges are imperfectly known, partly owing to our inability clearly to distinguish some of them in the field. One or more of them occur in nearly every part of the Peninsula except the higher mountains, the northwest coast region, and the Colorado Desert. *P. pringlei* ranges in Sonora, and from the east base of the San Pedro Mártir Mountains southward along the middle of the Peninsula, probably to beyond Calmallí. Some of the largest cactuses we saw on the Peninsula were near Calmallí, where one had a basal diameter of about a meter. These seemed to be of the *pringlei* type, rather than like *calvus*, with which we later became familiar.

Pachycereus calvus (Engelm.) Britt. & Rose.

CARDÓN. CARDÓN PELÓN. PLATES 131, A; 132, A.

In the Cape District this species is called "cardón pelón" to distinguish it from *P. pecten-aboriginum*, the "cardón barbón" or "cardón hecho," which occurs with it. Farther north it is known simply as "cardón," a name applied by the people to giant cactuses in general. *Pachycereus calvus*, so far as known, is restricted to Lower California. Its range extends northward from the Cape, probably to about latitude 28°. Its northern limit was undetermined, owing to our failure to distinguish it in that region from *pringlei*. Of the 5 giant cactuses of the genus Pachycereus in Lower California, this species is by far the most abundant and generally distributed. In places, especially valleys and canyon bottoms along the backbone of the Peninsula, it forms veritable forests, and it is this species that makes up the greater part of the cactus forest along the road from La Paz to El Triunfo, described by Brandegee[1] and also observed by us. *Pachycereus calvus* has the same general form as *pringlei*, the younger plants having the stem slender near the base and expanding toward the tops, but it is a lower-growing plant, the stems becoming conspicuously bald on top as the name indicates.

Pachycereus titan (Engelm.) Britt. & Rose. PLATE 131, B.

The status of this species is not very clear. The type material was taken by Gabb somewhere in the region "from Cape San Lucas to San Quintín." It may be a tall species confused by us in the field with *P. pecten-aboriginum*, in which case it probably does not range much north of La Paz.

Pachycereus pecten-aboriginum (Engelm.) Britt. & Rose.

CARDÓN BARBÓN. CARDÓN HECHO. PLATE 132, B.

The popular names given are applied to this species in Lower California to distinguish it from *P. calvus*. It is there restricted to the Cape District from near La Paz southward. The species was described from Hacienda San Miguel, near Batopilas,

[1] Zoe 1: 26–27. 1890.

Chihuahua, and occurs also in the hot canyons cutting the west side of the Sierra Madre in adjoining parts of southern Sonora. The species is much less abundant, even within its restricted range in the Peninsula, than *P. calvus*. It differs from *calvus* conspicuously in the stems, being more cylindrical, less contracted near the base, and less expanded toward the tops. It varies in height from 4.5 to 7.5 meters or more. Unlike *calvus*, which is more generally distributed, it is found mainly along arroyos, or on the lower more sandy land. Palmer, who collected the type material, stated that the Indians grind the seed to mix with their meal, and use the bristly covering of the fruit as a hair brush. Specimens were collected by us in fruit on the road from San Pedro to Tres Pachitas, December 24, and in flower near Cape San Lucas, December 29.

Pachycereus orcutti (K. Brandeg.) Britt. & Rose.

Described from a plant obtained by Mr. C. R. Orcutt near Rosario in May, 1886. A few giant cactuses noted by us at 900 meters elevation on warm southwest slopes of the San Pedro Mártir Mountains between Santo Tomás and San Antonio were probably of this species and approach the northern limit of the range of the genus on the western slope. A few others were seen along the road from Socorro to Rosario, very near the type locality. No specimens of this little known species were collected by us, its close resemblance to *P. pringlei* in the field leading us to assume that the two were the same. Giant cactuses of several species range in the area from near Rosario to Cape San Lucas, and the southern limit of *orcutti* has not been determined.

Pereskiopsis brandegei (Schum.) Britt. & Rose. ALCAJER.

The "alcajer," as this peculiar cactus is locally called, was first noted by us near Mantancita and was seen a few times at low elevations between this point and the type locality, Cape San Lucas, and on Espíritu Santo Island. No fruit or flowers were seen until January 30, when a fine plant in fruit was found on the road near El Triunfo. This plant had a somewhat sinuous basal stem, perhaps an inch in diameter, which extended from the ground into the lower branches of a small tree and there subdivided into 6 main branches, which ramified through the top of the tree. The tips of the branches are rather heavy and show a tendency to hang downward. The height of the plant was that of the tree, about 6 meters. The fruit is said to be edible, but very sour. Allied species occur in Sinaloa and other parts of Mexico and in Guatemala.

Wilcoxia striata (T. S. Brandeg.) Britt. & Rose.

JARRAMATRACA. RACAMATRACA.

Under various local names this slender little cactus is well known to the people in southern Lower California. It occurs also in Sonora. We first noticed it on the Vizcaino Desert, near the eastern base of the Santa Clara Mountains, where our men called it "jarramatraca." It was noted in a number of places on the plains near the Pacific coast from this point southward to San José del Cabo, the type locality. At Matancita it was called "racamatraca," and here, during our visit in the middle of November, many of the plants were bearing bright red and fully ripe fruit. The fruit is large for so small a species. North of La Paz this cactus was seen only on the coastal plains, but near the Cape it grows also at the lower elevations on the basal slope of hills. The plants are inconspicuous, the slender stems usually rising from the ground near the base of some shrub and finding partial support upon the branches. Three or four tubers resembling sweet potatoes radiate from the base of each plant 3 or 4 inches below the surface of the ground. In one instance these tubers were examined a few days after a rain, when the soil surrounding them had already become thoroughly dry. Their tenderness made removal difficult without breakage. On being bruised or broken water stored in them flowed very freely. Near San Ignacio we were told that the tubers are sometimes crushed and a cloth saturated with the juice applied to the chest for lung troubles.

Specimens lacking both fruit and flowers were collected near the Santa Clara Mountains, October 14. Fruiting specimens were taken a few miles north of Matancita, November 15, and between El Pescadero and El Cajón, December 27. Material in the U. S. National Herbarium was obtained by Palmer on Carmen Island, November 1–7, 1890. Brandegee, in describing the species, recorded it from Magdalena Island, Margarita Island, and northward to beyond San Ignacio.

RHIZOPHORACEAE. Mangrove Family.

Rhizophora mangle L. MANGROVE. MANGLE.

The mangrove is abundant along parts of the coast of the Cape District and the adjacent islands. It was first seen by us on the east coast between Santa Rosalía and San Bruno, and on the west coast near Matancita. Mangrove lagoons of the familiar type seen along the coasts of southern Mexico occur on the shores of the bays of Magdalena and La Paz and on the islands of Magdalena, Margarita, and Espíritu Santo. Brandegee records the species as covering large areas of shallow water along the lagoons as far north as San Jorge. It is known to the people as "mangle." A specimen in flower was collected at La Paz, February 17.

COMBRETACEAE. Combretum Family.

Conocarpus erecta L.

This tree, widely distributed along the coasts of tropical America, was taken in fruit on the west coast of the Cape District near El Pescadero, December 26. It grows 4.5 to 7.5 meters high with local habitat much like that of *Maytenus phyllanthoides*, but it also thrives on saline soil beyond the reach of the tide. In some low places it forms dense shady groves from which other trees are largely excluded.

ONAGRACEAE. Evening Primrose Family.

Burragea fruticulosa (Benth.) Donn. Sm. & Rose.

This species is the type of a new genus recently described by Capt. John Donnell Smith and Dr. J. N. Rose. It is made a new genus on account of its very remarkable fruit, which is buried in the tissues of the flowering branches. It is a low bushy shrub, 30 to 60 cm. high, and grows on the slopes bordering the bay shore of Magdalena Island, where it was collected in flower November 24. Brandegee records it as a small spreading or decumbent bush 2 or 3 feet high, seen only on Magdalena and Margarita islands.

A second species, *Burragea frutescens* (Curran) Donn. Sm. & Rose, was collected by Rose on the ocean side of Magdalena Island in 1911. This when in flower is one of the most handsome shrubs in Lower California, being covered with a mass of pink.

Xylonagra arborea (Kellogg) Donn. Sm. & Rose.

Xylonagra, based on *Hauya arborea* (Kellogg) Curran, was recently described by Capt. John Donnell Smith and Dr. J. N. Rose. It is not only very different from true Hauya in habit and flowers, but also grows in very different floral zones. Geographically Hauya is restricted to Mexico and Guatemala.

This handsome shrub was discovered by Veatch on Cedros Island, growing in open, sterile, rocky, and clayey soils, at an elevation of from 180 to 600 meters. It was described and figured as an Oenothera by Kellogg in 1860.[1] The flowering season is irregular or considerably prolonged, perhaps depending on the occurrence of rain.

[1] Hesperian 4: 1, 2. 1860.

Like some other shrubs of the region, it may produce flowers and fruit at a time when the plants are nearly or quite leafless. Specimens in the National Herbarium from Cedros Island were taken by A. W. Anthony, July–October, 1896, and March–June, 1897. On the adjacent coast of the Peninsula it was collected at San Bartolomé Bay by Lieut. Charles F. Pond, U. S. N., April 27, 1889, and by Anthony again at Santa Rosalía Bay, July–October, 1896. Specimens from the mountainous interior at San Pablo were referred to this species by Brandegee, although they appeared to differ in some respects.[1] We found this species in a few places along the sandy coast near San Andres. It grew 60 to 120 cm. high, and at the time of our visit (September 21) was entirely leafless but bearing fruit and handsome flowers. The latter are dark red and conspicuous. Specimens were taken.

Zauschneria californica Presl. CALIFORNIA FUCHSIA.

Noted in a number of places along the west side of the San Pedro Mártir Mountains. The species is recorded by Brandegee from Santa María, east of San Fernando. It is here a shrubby plant 1.2 to 1.5 meters high growing on gravelly slopes bordering small valleys in overlapping portions of the Upper and Lower Sonoran zones. A specimen in flower and fruit was taken at 1,020 meters altitude near Rancho San Antonio, August 1.

ARALIACEAE. Ginseng Family.

Aralia scopulorum T. S. Brandeg.

A fruiting specimen was taken at Tinaja de Santana, 35 miles north of San Ignacio, October 4. The plant was a shrub 4.5 meters high, growing near a spring in the hills at 1,020 meters. Brandegee found the species common on the rocks of Comandú Canyon, where the type material, including flowers and young fruit, were collected in March.

CORNACEAE. Dogwood Family.

Garrya veatchii palmeri Eastw. QUININE BUSH.

This was noted in a few places between 1,350 and 2,100 meters elevation, in the Upper Sonoran Zone, along the western slopes of the Sierra del Pinal and San Pedro Mártir mountains. It grows 1.5 to 2 meters high on dry hillsides where species of Adenostoma and Arctostaphylos are dominant shrubs. A fruiting specimen was taken at 2,100 meters near the Rancho Santo Tomás, in the San Pedro Mártir Mountains, July 26. Since our specimens seem referable to *palmeri* it seems probable that typical *G. veatchii* may be confined to Cedros Island, where the type was collected by Veatch about 1858 or 1859.

Garrya salicifolia Eastw. QUININE BUSH.

A large Garrya, with willow-like leaves, inhabits the Sierra de la Laguna. It is one of a number of Upper Sonoran shrubs which are separated from their congeners to the northward by the long desert section of the Peninsula. It was common in places near our camp at La Laguna, along with Heteromeles and other shrubs, growing to a height of 3.5 to 5.5 meters. A fruiting specimen was taken January 27.

ERICACEAE. Heath Family.

Arbutus peninsularis Rose & Goldm.[2]

This madroño, recently described, was listed by Brandegee in his Flora of the Cape Region as *A. menziesii*, the well-known madroño of California, which probably ex-

[1] Proc. Calif. Acad. II. 2: 157. 1889.

[2] See p. 311.

tends into northern Lower California. It differs from *A. menziesii* in having the leaves tomentose and green beneath instead of glabrous and glaucous and in its more crowded inflorescence and larger calyx lobes. The type was collected by us near La Chuparosa, on the upper slope of the Sierra de la Laguna, January 23, 1906.

The species is rather abundant and generally distributed along with the oaks in the Upper Sonoran Zone from about 1,200 meters elevation to the summit of the Sierra de la Laguna. It occurs disconnectedly here on the mountain tops, like numerous other species whose congeners are absent in the wide desert interval to the northward.

Arctostaphylos sp.

A specimen of an undetermined and perhaps undescribed manzanita bearing ripe fruit was taken at about 1,500 meters altitude along the trail on the west slope of the San Pedro Mártir Mountains between Rancho Santo Tomás and San Antonio, July 28. The species is less abundant than *A. glauca*, with which it occurs. In habit of growth it is similar to *glauca*, reaching a height of 1.8 to 3 meters.

Arctostaphylos bicolor (Nutt.) A. Gray. MANZANITA.

Common in places along the steep Upper Sonoran slopes of the hills fronting the coast near Ensenada and eastward to about 780 meters altitude near Ojos Negros. Beyond this the open plain in San Rafael Valley, largely Lower Sonoran in character, is unsuitable for its growth. It was collected in fruit about 15 miles east of Ensenada, May 31. Brandegee records the species from Rancho Viejo.

Arctostaphylos pringlei Parry. MANZANITA.

Abundant in the Transition Zone on the upper slopes of the Sierra del Pinal and San Pedro Mártir mountains. It is associated with *A. glauca* and the two form dense thickets between 2,100 and 2,250 meters altitude near La Grulla. It was taken in flower at Laguna Hanson, June 7, and in ripe fruit at La Grulla, July 20. Brandegee states that this manzanita blooms later and is more viscous, with redder bracts and flowers, than the other species of the general region.

Arctostaphylos glauca Lindl. MANZANITA.

The most abundant manzanita in the Peninsula. It ranges upward, mainly in the Upper Sonoran Zone, from about 840 meters near La Huerta and Trinidad Valley to near the summit of the Sierra del Pinal and on the warmer slopes to above 2,100 meters altitude in the San Pedro Mártir Mountains. It forms thickets which at the higher levels are largely mixed with *A. pringlei*. Fruiting specimens were collected at La Huerta, June 2; El Piñón, July 5; La Grulla, July 20.

Arctostaphylos oppositifolia Parry. MANZANITA.

This tall, slender-leaved species, so unlike the other manzanitas, is common in places on the Upper Sonoran slopes along the west side of the San Pedro Mártir Mountains. Specimens in fruit were taken at the 1,500 meter level in descending from Rancho Santo Tomás to San Antonio, and at 1,020 meters on a ridge a few miles west of San Antonio, on the trail to San Quintín. It is a larger species than the other manzanitas of the Peninsula, commonly reaching a height of 4.5 meters.

EBENACEAE. Ebony Family.

Brayodendron texanum (Scheele) Small. ZAPOTILLO. GUAYPARIN.

A persimmon tree about 2 meters high, probably of the species listed by Brandegee under this name, but perhaps representing a distinct species, was first noted among the sand dunes at Cape San Lucas, where a specimen was collected. The species

was later found in a similar situation at San José del Cabo and in rocky places on Cerralvo Island. At San José del Cabo the fruit was ripening January 8. Brandegee lists the species as a small tree not uncommon along the base of the mountains, in the Cape District south of La Paz. The fruit he describes as about an inch in diameter, black when ripe, and very pleasant to the taste. He gives "guayparín" as a native name, but it was pointed out to us as "zapotillo."

OLEACEAE. Olive Family.

Fraxinus attenuata Jones. FRESNO. ASH.

Noted as common in the Upper Sonoran Zone along canyons in the hills near Ensenada and eastward as far as Ojos Negros in San Rafael Valley. It is a shrub or small tree 3 to 4.5 meters high. Specimens with ripe fruit were taken at Ensenada, May 20, and at the same locality, in flower and still retaining old fruit, February 28. The species was recorded by its describer from Valley of Palms, Lower California, and Catalina Mountains, Arizona.

APOCYNACEAE. Dogbane Family.

Plumiera mexicana Lodd. CACALOXÓCHITL.

A specimen in fruit, taken between Valle Flojo and El Pescadero, is somewhat doubtfully referred to this species. It represents a genus widely distributed in tropical America and in the Old World. This species was seen in a few places at low elevation south of La Paz. It forms a tree 6 to 9 meters high. According to Brandegee, who also recorded specimens, it is known locally as "cacaloxóchitl," an old Aztec word and the same term which is applied to it in Central America.[1]

Vallesia dichotoma Ruiz & Pav.

This representative of the tropical flora of the Peninsula was first seen in the hills about 20 miles east of San Ignacio, where a flowering specimen was taken October 19. It was more abundant at low elevations south of La Paz, as a small tree 3 to 4.5 meters high. Brandegee records it from San Gregorio and refers to it material collected by Palmer at Mulegé. The flowers are small and nearly hidden in the dense foliage. The species occurs also in about the same latitude along the coast of Sonora and Sinaloa.

ASCLEPIADACEAE. Milkweed Family.

Rothrockia cordifolia A. Gray. TALAYOTE.

Vines of this type were common and in many places conspicuous climbers over other vegetation along our route in the hill country from Comandú southward. Flowering specimens were taken at Comandú, November 6, and between Tres Pachitas and Valle Flojo, December 25. Brandegee records it as a common plant of the Cape District.

CONVOLVULACEAE. Morning-glory Family.

Ipomoea pes-caprae (L.) Sweet. GOAT'S-FOOT MORNING-GLORY.

This morning-glory, so widely distributed on tropical shores, is a very common beach plant in suitable places along the coasts of the Cape District south of La Paz. It spreads in rank profusion over the sand dunes, the prostrate branches reaching a length of 6 to 12 meters. A flowering specimen was taken between Cape San Lucas and San José del Cabo, January 4. Brandegee records the species on the ocean beach at Todos Santos, San José del Cabo, and La Paz.

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[1] Zoe 2: 151. 1891.

Jacquemontia abutiloides Benth.

The beautiful flowers of this shrubby vine were first seen by us near Tinaja de Santana, 25 miles north of San Ignacio, October 5, and a specimen was here taken. It was common in the vicinity and was observed at intervals southward to Cape San Lucas. The species was published in the Botany of the Voyage of the *Sulphur* from material collected at Magdalena Bay and represents in the Peninsula a group of wide distribution in tropical America. In his field notes Brandegee says: "For producing quantity of color, *Jacquemontia abutiloides* far excels any of its near relatives, the *Ipomoeas*. It is usually low but sometimes spreads out over bushes a length of 10 feet, and when in full bloom seems to bear more flowers than leaves; it is then a mass of blue."[1]

HYDROPHYLLACEAE. Waterleaf Family.

Eriodictyon angustifolium Nutt.

Abundant in the Upper Sonoran Zone on chaparral-covered slopes from about 840 meters near Ojos Negros and in Trinidad Valley up to about 1,500 meters altitude near El Piñón on the western slope of the San Pedro Mártir Mountains. Flowering specimens were taken between Ojos Negros and Alamo, June 10, and at Arroyo de León on the way from Trinidad Valley to El Piñón, July 4.

Eriodictyon sessilifolium Greene.

This shrub, 1.2 to 2.5 meters high, was common in places along the sandy coast of San Quintín. It was taken in flower August 2. In a paper on the southern extension of the California flora Brandegee says of this species: "*Eriodictyon sessilifolium* Greene is common in many places in the northern Peninsula. Mr. Greene was mistaken in crediting it to Alta California, for Mr. J. M. Hutchings, the earliest recorded collector, states that the label quoted by Mr. Greene (Bull. Cal. Acad., I, 201) is an error and that the specimen was collected between Ensenada and Tia Juana." [2]

BORAGINACEAE. Borage Family.

Cordia watsoni Rose.

This very handsome species was first noted by us along sandy arroyos near Tinaja de San Esteban and extended thence for a few miles southward toward San Ignacio. It was also seen at intervals along the road from San Ignacio to Santa Rosalía, but was nowhere abundant. It grows as a shrub 1.8 to 2.5 meters high. Specimens bearing the large conspicuous white flowers were collected October 5. *Cordia watsoni* was based on material collected at Guaymas by Palmer.

Bourreria sonorae S. Wats.

This species was found rather sparingly in a few places at low elevations in the Cape District south of La Paz, and on Espíritu Santo Island. It grows on rocky hillsides as a large shrub or small, scrubby tree 3 to 6 meters high, with dense, stiff dark-green foliage. Specimens in fruit were collected along the route from El Sacatón to Cape San Lucas, December 29, and on Espíritu Santo Island, February 7. Brandegee records the species from San José del Cabo and La Paz.

VERBENACEAE. Vervain Family.

Duranta plumieri Jacq.

This species, which is widely dispersed in tropical and subtropical America, includes in its range the Cape District south of La Paz. It is rather common along the basal

[1] Zoe 2: 148. 1891.

[2] Zoe 4: 208. 1893.

slopes of the Victoria Mountains as a thorny shrub 3 to 3.5 meters high. A fruiting specimen was taken at 720 meters near Rancho San Bernardo, January 20. Brandegee found this species in the same vicinity and states that it is common at middle elevations on the west side of the mountains, sometimes forming impenetrable thickets.

Lantana camara L.

A flowering specimen of this Lantana was taken at 1,050 meters between Rancho San Bernardo and El Saúz in the Victoria Mountains, January 21. It was common in the vicinity. This is another of the tropical or subtropical American species with a range extending to southern Lower California.

Lantana involucrata L.

This widely dispersed tropical and subtropical shrub is abundant in the Cape District south of La Paz, where it has an altitudinal range from near sea level to about 1,200 meters on the southern slopes of the Victoria Mountains. Flowering and fruiting specimens were taken between El Cajón and El Sacatón, December 28; between San Bernardo and El Saúz, January 21; and between El Paraíso and El Triunfo, January 30.

Lippia barbata T. S. Brandeg.

The specimens on which Mr. Brandegee based this species were brought by a native of Comandú from La Giganta, a high mountain in the vicinity. A flowering specimen was taken by us on the road from Laguna to El Paraíso in the Cape District south of La Paz, January 29. The plant was a shrub 1.8 to 3.5 meters high, occurring at about 510 meters altitude on the north side of the mountains.

Lippia formosa T. S. Brandeg.

A flowering specimen of this species was taken between San Pedro and Tres Pachitas in crossing the Peninsula south of La Paz, December 24. It was noted in several places in the same vicinity, growing 1.8 to 2.5 meters high along with other shrubby vegetation in the midst of a forest of *Pachycereus calvus*, one of the giant cactuses of the region. Brandegee describes it as a common bush with rather showy flowers, growing on the hills about Todos Santos.

Lippia palmeri S. Wats.

Not uncommon in rocky places among the hills 20 miles east of San Ignacio, where it was taken in flower October 19. It was also collected in flower along the road from Agua Colorada to Cerro Colorado northwest of La Paz, December 15. Brandegee records it from Miraflores in the Cape District south of La Paz. *Lippia palmeri* was described from specimens taken at Guaymas and therefore includes in its range subtropical areas on both sides of the Gulf of California. It is a small bush 0.5 to 1.8 meters high.

MENTHACEAE. Mint Family.

Mesosphaerum insulare Standl. & Goldm.[1]

On Espíritu Santo Island this shrub was observed to be common along the basal slopes of the rugged hills which form the high interior of the island, where it was collected February 7, 1906. It is one of the plants recently described from material obtained by our expedition.

Mesosphaerum emoryi (Torr.) Kuntze.

This Lower Sonoran shrub of Arizona and California seems to enter the Peninsula through the desert region east of the Sierra del Pinal and the San Pedro Mártir Moun-

[1] See p. 311.

tains and may extend far southward. It was rather common in the rocky and gravelly deposit where La Providencia Canyon opens on the desert at the east base of the high mountains and was taken in flower there June 26. A specimen in the U. S. National Herbarium, also in flower, was collected at Santa Rosalía Bay by A. W. Anthony, July-October, 1896. *Mesosphaerum emoryi* is a northern representative of a group mainly tropical in distribution.

Mesosphaerum laniflorum (Benth.) Kuntze.

This species is abundant at the lower elevations in the Cape District from La Paz southward. It was published in the Botany of the Voyage of the *Sulphur* from material taken at Cape San Lucas. Flowering specimens in the U. S. National Herbarium were collected at the type locality by Xantus, between August, 1859, and January, 1860; at La Paz by Palmer, January 20–February 5, 1890; at Todos Santos by Brandegee, January 29, 1890; and at Las Animas by Purpus in 1901.

Mesosphaerum palmeri (S. Wats.) Goldman.

The range of this shrub includes the coast of southern Sonora and the Cape District of the Peninsula. It is common in the subtropical belt on the lower slopes of the Victoria Mountains. Flowering specimens were taken between Miraflores and Rancho San Bernardo, January 20, and at 750 meters altitude between La Laguna and El Paraíso, January 29.

Monardella linoides A. Gray.

This little undershrub, perhaps representing the subspecies *stricta* of Parish, was common in the open pine forest at 2,400 meters altitude in the Transition Zone of the San Pedro Mártir Mountains. It was taken in flower at Vallecitos, July 15.

Monardella macrantha A. Gray.

A very small shrub or woody herb growing abundantly in the open pine forest at 2,400 meters altitude in the upper part of the Transition Zone in the San Pedro Mártir Mountains. The large, handsome flowers were quite conspicuous near Vallecitos, where specimens were taken July 15.

Ramona incana pachystachya (A. Gray) Heller.

In many parts of the open pine forest in the San Pedro Mártir Mountains this sage was the most common shrub. It was noted from about 1,500 meters on north slopes near El Piñón up to near the summit of the range, but was most abundant in the upper part of the Transition Zone. Flowering specimens were taken at El Piñón, July 7, and at Rancho Santo Tomás, July 26.

Ramona polystachya (Benth.) Greene.

This sage was rather common along the basal slopes of hills bordering Trinidad Valley, where it was taken in flower, at about 780 meters, June 16. The species appears to belong to the Upper Sonoran Zone.

Salvia californica T. S. Brandeg.

This Salvia was described from Calmallí, where Brandegee collected it while on his overland journey from Magdalena Bay to San Quintín. We found it abundant at about 300 meters along canyons in the hills near San Pablo, not far to the southward of Calmallí. It is a shrub about a meter high, associated here with both Lower Sonoran and tropical or subtropical species. Flowering specimens were taken October 3.

Salvia similis T. S. Brandeg.

A common shrub growing 1.8 to 3 meters high along small streams and in shaded canyons in the Upper Sonoran Zone on the upper slopes of the Sierra de la Laguna. It was taken in flower at 1,350 meters on the road from Rancho San Bernardo to El Saúz, January 21. This species is restricted, so far as known, to these mountains.

SOLANACEAE. Nightshade Family.

Lycium richii A. Gray. FRUTILLA.

Species of the genus Lycium, growing as shrubs 1.8 to 2.5 meters high, form an important element in the desert flora nearly throughout the Peninsula and on many of the islands, but they are not well known, and most of our specimens are still undetermined. The berries are eaten by small desert rodents and by some of the birds. At San Felipe Bay the holes of *Citellus tereticaudus* were numerous under shelter of a dense thicket made up almost entirely of Lycium bushes (perhaps *L. torreyi*), and the animals were carrying the ripening berries in their cheek pouches. In these species the fruiting season is much prolonged, and it is not unusual to find flowers with fruit at all stages of development on the plant at the same time. Specimens referred by Brandegee to *L. richii* were collected in flower and fruit at Comandú, November 7, and in fruit along the road between Tres Pachitas and Valle Flojo, December 25. Brandegee records *L. richii* from La Paz. The native name "frutilla" is applied indiscriminately to several species.

Solanum hindsianum Benth.

This species was common in many places along the route from San Francisquito southward to San Ignacio and thence eastward to Santa Rosalía. It is well distributed, but more abundant in soft soil along arroyos, growing as a shrub 1.5 to 3 meters high. Some plants are entirely thornless, while others have a few thorns distributed irregularly along the branches. Flowering specimens were collected at San Francisquito, September 11, and at Tinaja de San Esteban, 25 miles north of San Ignacio, October 5.

SCROPHULARIACEAE. Figwort Family.

Diplacus arachnoideus Greene.

Found rather common on the same hill slopes with *Diplacus puniceus* in the Upper Sonoran Zone along the road from near sea level at Ensenada to about 900 meters near Ojos Negros. It grows here as a shrub 1 to 1.5 meters high, with large, handsome flowers. A specimen was taken east of Ensenada, May 31.

Diplacus puniceus Nutt.

Noted as rather common along with *D. arachnoideus* and other chaparral on steep Upper Sonoran hill slopes from near sea level at Ensenada to about 900 meters near Ojos Negros, in San Rafael Valley. It is a handsome shrub growing 0.5 to 1.2 meters high. A flowering specimen was collected a few miles east of Ensenada on the road to Ojos Negros, May 31.

Galvesia juncea (Benth.) A. Gray.

Originally discovered on the voyage of the *Sulphur* from San Diego to Magdalena Bay. Specimens in flower and fruit were obtained by us at the mouth of the San Simón River, a few miles south of San Quintín, August 29. The species grows here as a shrub 1.8 to 2.5 meters high. Specimens in the U. S. National Herbarium were collected on Cedros Island by Lieut. Charles F. Pond, Dr. Edward Palmer, and A. W. Anthony, and on San Quintín Bay by Palmer.

Pentstemon antirrhinoides Benth.

Of the several species of Pentstemon noted by us this was the largest and most conspicuous. It was a rather common shrub growing 1 to 1.5 meters high and associated with Adenostoma and Arctostaphylos on dry Upper Sonoran hill slopes along our route from near sea level at Ensenada to about 1,500 meters near El Piñón on the western side of the Sierra del Pinal and San Pedro Mártir mountains. Flowering specimens were taken east of Ensenada, May 31, and at El Piñón, July 5.

Pentstemon centranthifolius Benth.

A common species growing 1 to 1.2 meters high, at about 810 meters altitude, along the sloping borders of Trinidad Valley, where it was collected in flower July 4.

Pentstemon palmeri A. Gray.

This widely ranging species of the southwestern United States was collected at 1,140 meters altitude in San Matías Pass, June 17. Brandegee records it from Agua Dulce and San Luis.

Pentstemon linarioides A. Gray.

Common from 1,500 meters altitude near El Piñón upward in the Transition Zone to at least 2,400 meters near Vallecitos on the west slope of the San Pedro Mártir Mountains. It grows here as a shrub 30 to 45 cm. high, and was usually seen in the open pine forest on dry, rocky hillsides. A flowering specimen was taken near El Piñón, July 7.

BIGNONIACEAE. Bignonia Family.

Chilopsis linearis (Cav.) Sweet. DESERT WILLOW.

Seen in the vicinity of San Matías Pass, where, like *Covillea glutinosa* and *Simmondsia californica*, it forms a part of the Lower Sonoran flora which extends through the pass from the desert side into Trinidad Valley. It was rather common along dry arroyos near San Matías Spring and was scattered over the south slopes of the ridge on the north side of Trinidad Valley. Specimens were collected in flower June 17 and in fruit and flower June 28.

Crescentia cujete L. JÍCARA.

A jícara tree, probably introduced from the Mexican mainland, was noted by us at San José del Cabo. Brandegee says: "*Crescentia alata*, a queer looking garden tree, is planted for the gourdlike fruit, which is credited with medicinal properties. This fruit is about 4 inches in diameter and when used is filled with 'mescal' through a hole made at one end, then persons imagining themselves affected with chest diseases drink out the liquor from time to time expecting to become cured."

MARTYNIACEAE. Martynia Family.

Martynia altheaefolia Benth. ESPUELA DEL DIABLO.

This species was published in the Botany of the Voyage of the *Sulphur*, from Magdalena Bay. We found it abundant on the coast plain from San Jorge to Llano de Yrais, and along the sandy shores at Cape San Lucas and San José del Cabo. The local name of this queer plant is derived from the spreading, hooked arms of the dry fruit, which seem always ready to clasp everything within reach. Five or six of these fruits sometimes become entangled and roll together before the wind over the plain. Specimens in flower and nearly ripe fruit were taken a few miles north of Matancita, November 15.

The species probably ranges in suitable situations nearly throughout the Lower Sonoran Zone in Lower California. It has been recorded by Parish as far north as Vallecito, in southern California.[1]

ACANTHACEAE. Acanthus Family.

Beloperone purpusi T. S. Brandeg.

At the time of our visit this was a common flowering species in places along the basal slopes of the Victoria Mountains. The plant is a shrub about a meter high. A specimen was taken between Santa Anita and Miraflores, January 19.

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[1] Zoe 4: 165. 1893.

Beloperone californica Benth.

This handsome species was taken in flower on Cerralvo Island, February 12. It was common there as a shrub 1.2 to 1.8 meters high. It was originally described from material taken at Cape San Lucas on the voyage of the *Sulphur*. Brandegee says its red blossoms may be seen at most localities south of Magdalena Bay.

Justicia insolita T. S. Brandeg.

A flowering specimen of this species was taken at an altitude between 360 and 600 meters in the hills 20 miles east of San Ignacio, October 19. A few shrubs 1.2 to 1.8 meters high were seen. The species was originally described from material collected at San Gregorio by Brandegee on his overland journey from Magdalena Bay to San Quintín. He records it also from Todos Santos and La Paz in the Cape District.

Justicia palmeri Rose.

This species was common along the basal slopes of the Victoria Mountains. It grows as a shrub 1.2 to 1.8 meters high. A flowering specimen was taken on the road from San Pedro to Tres Pachitas, December 24. Brandegee records it from La Paz and San José del Cabo.

Ruellia sp.

An undetermined Ruellia was noted near San Pablo and was seen at intervals from that point southward to near Cape San Lucas, mainly on the warmer slopes of canyons in the hill country along the backbone of the Peninsula. It is a shrub about a meter high with purple flowers, and with a peculiar fragrance which I had learned to associate with a similar plant of the arid Tropical Zone in western Mexico. Specimens were collected at Tinaja de San Esteban, 25 miles north of San Ignacio.

RUBIACEAE. Madder Family.

Chiococca racemosa Jacq.

A specimen of this shrub in fruit was taken at about 750 meters on the road between San Bernardo and El Saúz in the Victoria Mountains. It was a rather common species on the mountain side, growing 1.8 to 3.5 meters high. The species has a very wide range in tropical America and evidently belongs to the tropical element of the flora of the Peninsula. Brandegee records it from the foothills of the Sierra San Francisquito.

CAPRIFOLIACEAE. Honeysuckle Family.

Lonicera interrupta Benth.

Common in the Upper Sonoran Zone on the west slope of the Sierra del Pinal and San Pedro Mártir mountains, from near the coast at Ensenada to at least 1,560 meters near El Rayo and above San Antonio. Collected in flower in a canyon a few miles east of Ensenada, May 31.

Sambucus glauca Nutt. BLUE ELDERBERRY.

Elders, provisionally referred to this species, were noted in a number of places along the road from Ensenada northward to the international boundary at Tijuana and from sea level upward through the Upper Sonoran Zone to above 1,500 meters. The only specimens were taken May 20, at Ensenada, where the species was then flowering. Brandegee records *S. glauca* as "not common on San Pedro Mártir."

IBERVILLEA SONORAE (S. WATS.) GREENE, CERRALVO ISLAND.

Symphoricarpos parishii Rydb.

A common shrub 1 to 1.5 meters high, confined mainly to the limited Canadiar Zone areas on northerly slopes in the San Pedro Mártir Mountains, but descending along cold streams to at least 2,400 meters in the upper part of the Transition Zone. Taken in flower at Vallecitos, July 15.

CUCURBITACEAE. Gourd Family.

Ibervillea sonorae (S. Wats.) Greene. PLATE 133.

This remarkable species has a wide range in the lower part of the Lower Sonoran or Subtropical zone on both sides of the Gulf of California. It is a desert plant, growing in sandy places as a slender vine 1 to 1.5 meters long from an enormously enlarged woody, base, which may or may not project above the surface of the ground. It was first noted by us at Pozo Altamirano, 30 miles south of Calmallí, October 3, specimens in fruit and flower being then taken. It is common on the low sandy plains throughout the southern part of the Peninsula and on Cerralvo Island, where the largest individual seen had a basal diameter of over 60 cm. The average diameter, however, is perhaps not more than 15 cm. As the bulbous basal part projects but little, if at all, above the surface, these plants are usually inconspicuous, especially during the long dry season when growth is interrupted and the slender terminal parts wither back to the persistent base.

AMBROSIACEAE. Ragweed Family.

Hymenoclea monogyra Torr. & Gray. ROMERILLO.

The "romerillo," as it is locally known, occurs in suitable situations nearly throughout the Peninsula. From a center of abundance in the Lower Sonoran Zone it ranges along the Pacific coast, in the vicinity of Ensenada, a short distance into the Upper Sonoran Zone and both in the Cape District and along the coast of Sinaloa enters the subtropical belt. It is limited locally to sandy bottoms along stream beds, in many places forming thickets in the deep sand, from which most other shrubs are excluded. It was taken in flower or fruit at Rosarito, September 25; El Potrero, 25 miles southwest of Mulegé, October 31; San Pedro, 18 miles south of La Paz, December 23. Brandegee records the species in the Cape District from San José del Cabo to La Paz.

ASTERACEAE. Aster Family.

Alvordia fruticosa T. S. Brandeg.

Known only from the Cape District. This species is common at low elevations, growing as a much branched shrub 3 to 4.5 meters in height. It was taken in flower on the road between El Cajón and El Sacatón, December 28.

Artemisia californica Less. CALIFORNIA SAGEBRUSH.

Recorded by Brandegee from "Las Huevitas, [Las Cuevas?], near Rosario." This point is probably near the southern limit of its range in Lower California. It was noted at a number of places on the west slope in the San Pedro Mártir Mountain region. The species belongs to the Upper Sonoran Zone.

Artemisia tridentata Nutt. SAGEBRUSH.

This species was found sparingly in the Upper Sonoran Zone at about 750 meters near the western rim of San Rafael Valley, about 20 miles east of Ensenada. A specimen with leaves only was taken May 31.

Baccharis sarothroides A. Gray.

This species ranges mainly in the Lower Sonoran Zone from southern California southward on both sides of the Gulf of California. Specimens were taken by us on wet soil at San Fernando, September 4. Recorded by Brandegee from the Sierra San Lázaro in the Cape District south of La Paz and from San Gregorio.

Baccharis glutinosa Pers.

This species or a plant referred to it ranges from California south in wet places at low elevations throughout Lower California and is widely dispersed on the Mexican mainland from the Sonoran to the Tropical zones. It was taken by us at Rosarito and San José del Cabo. Recorded by Brandegee from San Gregorio and Comandú.

Baccharis viminea DC.

This species ranges southward from California throughout the greater part of the Peninsula. It was taken by us along a small stream in the hills between La Purísima and Comandú and has been recorded by Brandegee from San José del Cabo.

Bebbia atriplicifolia (A. Gray) Greene.

This shrub seems to be known only from the southern part of the Peninsula, where it is associated with many subtropical species. It grows 1 to 3 meters high in sandy soil. Flowering specimens were taken by us in the vicinity of the type locality near Cape San Lucas, January 4, and at Santo Domingo, September 26. Brandegee records this species from San Gregorio and Comandú and agrees with Dr. Gray that it is probably the same as *B. juncea* of Magdalena Island.

Chrysoma diffusa (Benth.) Greene.

This shrub was described in the Botany of the Voyage of the *Sulphur*, from Magdalena Bay. It appears to belong in the subtropical areas on both sides of the Gulf of California. A few miles north of Matancita, and therefore near the type locality, we found it common on the coast plain and flowering November 15. At Cape San Lucas it was still flowering December 30.

Chrysoma palmeri (A. Gray) Greene.

This species ranges southward from southern California in the Lower Sonoran Zone. Flowering specimens were taken on the sandy coast at Santo Domingo, September 26. The species forms a round-topped bush 0.5 to 1.2 meters high.

Coleosanthus atractyloides (A. Gray) Kuntze.

This species, widely distributed in the southwestern United States, was taken in the Upper Sonoran Zone near Alamo, where it was flowering June 11.

Coreocarpus involutus Greene.

In the original description of this species, from material taken at San Bartolomé Bay by Lieut. Pond in March, 1889, it is represented to be an annual, 15 cm. high. Doctor Greene has referred to this species a shrub 1.2 to 1.5 meters high, collected by us on the coastal plain between Matancita and La Cruz. In the light of this additional material, *C. involutus* is evidently a much larger plant than was at first supposed. It appears to belong to the subtropical flora of the Peninsula. It was bearing flowers and fruit December 9.

Encelia farinosa A. Gray. INCIENSO. WHITE BRITTLE BUSH.

This handsome and widely dispersed shrub seems to belong mainly to the Lower Sonoran Zone, but reaches in places into the Upper Sonoran and in the Cape District

enters the subtropical area. It is abundant at low elevations nearly throughout the Peninsula, but favors dry hillsides, growing to a height of 1 to 2.5 meters, with a rounded top. The long, naked flower stems project above the dome of dense foliage and become dry and brittle after the seeds have ripened. Flowering specimens were collected by us at San Pablo, October 3, and between Tres Pachitas and Valle Flojo, December 25. According to Brandegee [1] the local name of the plant in the southern part of the Peninsula is "incienso," derived from a resinous exudation which is collected and burned as an incense in the churches. Hornaday [2] mentioned its occurrence in Sonora, where he formally named it "white brittle bush."

Eupatorium peninsulare T. S. Brandeg.

This shrub is common along the lower slopes of the mountains from near Mulegé throughout the southern part of the Peninsula. It appears to belong with the subtropical flora of the region. A flowering specimen was taken about 5 miles southwest of El Potrero, October 31.

Franseria bryanti Curran. STAR THORN.

First seen between San Andrés and Rosarito, near the west coast. It was noted at intervals along the route southward to the Llano de Yrais, growing 0.5 to 1 meter high. On dry, stony hills between San Ignacio and Santa Rosalía it was one of the more abundant plants. Flowering specimens were collected at 360 meters near Tinaja de San Esteban, 25 miles north of San Ignacio, October 5. The species was described from material collected by Bryant at Magdalena Bay. It is conspicuous from the armament of long whitish thorns which stand out from the branches and radiate in clusters near the tops. From these thorn clusters the pladt was given the name "star thorn" in my field notes.

Franseria carduacea Greene.[3]

This species was based on material collected by us at 1,020 meters altitude near Tinaja de Santana, 35 miles north of San Ignacio. It is common as a shrub 2.5 to 3.5 meters high.

Isocoma venata (H. B. K.) Greene.

This species, or one of its forms, is abundant in the vicinity of the mouth of the San Simón River, near San Quintín. It grows here as a shrub 1.2 to 1.8 meters in height. Flowering specimens were taken August 29.

Lepidospartum squamatum A. Gray.

A common shrub, 1.5 to 2 meters high, along the sandy wash at Calamahué. This species ranges in the Lower Sonoran Zone from southern California southward. At Calamahué the flowers were fading September 15.

Palafoxia arenaria T. S. Brandeg.

This species is known only from the southern part of the Peninsula. It was described from material taken between the lagoon and the ocean near Boca de Las Animas, near San Jorge. Along the shore of the bay near La Paz, where we collected the species in flower February 17, it seemed to prefer sandy situations, as suggested in the original description.

Peucephyllum schottii A. Gray.

This shrub ranges in the Lower Sonoran Zone in Sonora and northeastern Lower California. It was common along the broad wash at Calamahué, growing 1.8 to 3.5 meters high, with a dense bushy top. The ripe seeds were falling September 15.

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[1] Zoe 1: 83. 1890.

[2] Camp-Fires on Desert and Lava, pp. 182–183. 1908.

[3] See p. 311.

Pluchea sericea (Nutt.) Coville. ARROWWEED.

A very abundant Lower Sonoran species in the delta of the Colorado, noted along the gulf coast at San Felipe and Calamahué. On the Pacific coast it was seen sparingly in moist places at intervals from near Ensenada to a short distance south of San Andrés. It was taken in flower at San Felipe, on the gulf coast, June 20, and at the mouth of Sán Simón River, a few miles south of San Quintín, August 29. On the low lands in the delta of the Colorado extensive areas are covered with a dense pure growth of arrowweed.

Porophyllum gracile Benth. YERBA DEL VENADO.

The "yerba del venado," as it is known in the Cape District, is one of the numerous species discovered at Magdalena Bay on the voyage of the *Sulphur*. It is common in places and generally distributed mainly in the Lower Sonoran Zone, from the southwestern United States southward nearly throughout Lower California. Flowering specimens were taken by us at Pozo Altamirano, October 3; near Matancita, November 15; at Cape San Lucas, December 30; and between San Bernardo and El Saúz, January 21. Brandegee records the species from Magdalena Island, San Jorge, Todos Santos, and San José del Cabo. It has been taken by other collectors at various localities, including Cedros Island. It grows 30 to 100 cm. high and is said to have several economic uses. The local name is derived from the supposed fondness of deer for the plant, which is said also to be a favorite forage with cattle. Tea made of the leaves and flowers has astringent properties and is therefore believed to be useful in certain intestinal troubles.

Porophyllum confertum Greene.[1]

The type of this recently described species was collected by us on Cerralvo Island, where it was flowering February 12. It is a shrub or woody herb, 1.2 to 1.8 meters high.

Senecio goldmanii Greene.[1]

This species was based on specimens collected by us at about 105 meters elevation near Rosarito, where the plant was flowering September 25. The plant is a shrub about a meter high.

Tagetes lacera T. S. Brandeg.

A specimen of this species was taken in flower at 1,650 meters on the upper slope of the Sierra de Laguna, January 27. It is a shrub or woody herb, 1 to 1.5 meters high, apparently confined to the Upper Sonoran Zone in these mountains, where it is associated with oaks, the pinyon, and *Nolina beldingi*.

Tumionella monactis (A. Gray) Greene.

The zonal position of this shrub seems to be mainly the overlapping area between the Upper and Lower Sonoran zones from southern California south into northern Lower California. It was abundant at 1,110 meters on the plain near Alamo, there in flower June 11.

Viguiera tomentosa A. Gray.

This shrub seems to be known only from southern Lower California, where it was recorded by Brandegee as ranging from the coast up to the summits of the highest mountains. We found it flowering along the road from El Cajón to El Sacatón, December 28. It grows 3 to 3.5 meters high.

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[1] See p. 311.

Viguiera deltoidea A. Gray.

Typical *V. deltoidea* seems to be restricted to the southern or south-central part of the Peninsula, passing farther north into *V. parishii*. A form from the Sierra El Taste in the Cape District south of La Paz has been described by Brandegee under the subspecific name *tastensis*. The species is a common shrub 1.5 to 3 meters or more in height and is rather generally distributed, but most abundant on stony mesas and along dry arroyos. It was collected in flower at San Andrés, September 21, and at Rosarito, September 25. Brandegee records the species from Todos Santos, La Paz, and San José del Cabo. It is associated with many subtropical species.

Viguiera chenopodina Greene.[1]

The type of this recently published species was collected by us between Santo Domingo and Matancita, November 14. It grows on the coastal plain as a shrub 1.8 to 3 meters high.

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[1] See p. 311.