

California Art & Nature

TOURMALINE.

The tourmaline is one of the most interesting of gems, yet but little known, especially under its true name, its diversity of color having enabled it to pass under a multitude of names.

Black and brown tourmaline are usually opaque, and hence have no value as gems. The transparent stones available for gems are found in Maine, Connecticut and California, and in Brazil, Russia and Ceylon. The colored varieties are known correctly under the following names:

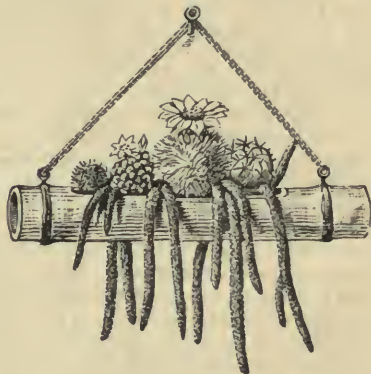
ACHROITE (colorless tourmaline)—Of gem quality, has been discovered in San Diego county, California, associated with other lithia tourmalines.

BRAZILIAN EMERALD—The emblem of the Brazilian clergy, is not an emerald proper, but a green colored tourmaline. A few green tourmalines have been found in San Diego county, in the lithia mine at Pala, and in several other localities, some of them of the finest gem quality. One beautiful specimen showing a perfectly flat termination, is banded green at the end, then a band of achroite shading into rubellite where fractured. Another specimen is green at the center, with a thin outer crust of black.

INDICOLITE—Blue tourmalines are reported as occurring in San Diego county.

RUBELLITE—Beautiful radiations and masses of crystals of pink tourmaline occur in the lepidolite at Pala. A few crystals of gem quality, resembling those from the Isle of Elbe have been found in the county. The largest crystals measure two inches in diameter.

SCHORL—Black tourmaline; quite common in San Diego county and in Baja California, disseminated through quartz or feldspar. Crystals six inches in diameter have been observed.



A BRIGHT IDEA.

Dr. A. C. Hamlin published in 1873 a small book, 'The Tourmaline,' of 107 pages and 4 colored plates, devoted mainly to the beautiful crystals of this mineral as found in Maine. On page 62 he says:—

'It seems as though the light of heaven was required in the production of the gems, as it is for the marvellous and varied hues of the flowers of vegetation. Thus far, nearly all of our precious stones have been found on or near the surface of the earth; and it appears as though the contact of the air or a ray of sunlight was required to build up their forms and perfect lines. Down in the thousand mines along the slope of the Rocky Mountains the amethyst vanishes below the depth

of 20 or 30 feet, while the same quartz crystallizes in its beautiful and definite but colorless forms in the depths of the deepest mines. The diamond and the sapphire belong to superficial terrains; and we find that the rule of shallow deposit relates to most of the gems. The topaz of Brazil, the beryl of Siberia, the chrysoptase of Silesia, the turquoise of Thibet, or the opals of Hungary, all occur near the surface of the earth, and are never found below a certain depth.'

Oliver Cummings Farrington, in *Birds and Nature* for September, 1901, says:—

'The crystals are usually in the form of long, slender prisms; They often have the peculiarity of being differently colored in different portions. Thus a crystal may be green at one end and red at the other, and in cross section may show a blue center, then a colorless zone, then one of red and then one of green. Some of the crystals from Paris, Me., change from white at one termination to emerald green, then light green, then pink, and finally colorless at the other termination. In some crystals again the red passes to blue, the blue to green and the green to black.

Tourmalines of different colors have been known in the mountains near San Diego, California, for many years. At Pala the red crystals in lepidolite have been known since 1876, but not until 1898 was this remarkable deposit of lithia mica of known value, when the writer brought it to the attention of great chemical houses. The beautiful radiations of red tourmaline crystals in the delicate lilac lepidolite are seldom of gem value, but are now to be found in nearly every mineral cabinet in the world.

At Mesa Grande, east of San Diego, one of the most remarkable deposits of tourmalines was brought to my notice in 1899. The locality had been known for nearly 20 years, but had previously failed to attract attention. In 1900 the mine produced hundreds of crystals from 1 to 2 inches in diameter, generally 3 or 4 inches or more long, of nearly every shade and tint of color that the world had yet known, except some shades of blue and yellow.

A vein of feldspathic minerals, mostly decomposed, and lying on a granite foundation, contained masses of coarse, purple lepidolite, angular fragments of crystal quartz, and amblygonite, spodumene, and other minerals. In this matrix were the beautiful vari-colored crystals of tourmalines, and loose in the soil composed of decomposed portions of the ledge, were many of the finest gems ever found.

C. R. ORCUTT.



CACTI AT HOME.

CASSITERITE — Tin stone from Cornwall, England, is composed of 78.6 per cent tin, and 21.4 per cent oxygen. It occurs in the Black Hills, South Dakota, at Temescal, Riverside county, California, and near San Diego. The two latter localities may yield specimens equal to that from Durango, Mexico, which is polished as a gem.

THE MUMFORD MUSEUM



TOURMALINE.

Green Tourmaline (Brazil).
Green Tourmaline (Haddam, Conn.)
Cross Section of Green Tourmaline (Cal.)

Red Tourmaline or Rubellite (Island of Elba).
Brown Tourmaline (Gouverneur, N. Y.)
Red Tourmaline or Rubellite in Lepidolite (Cal.)

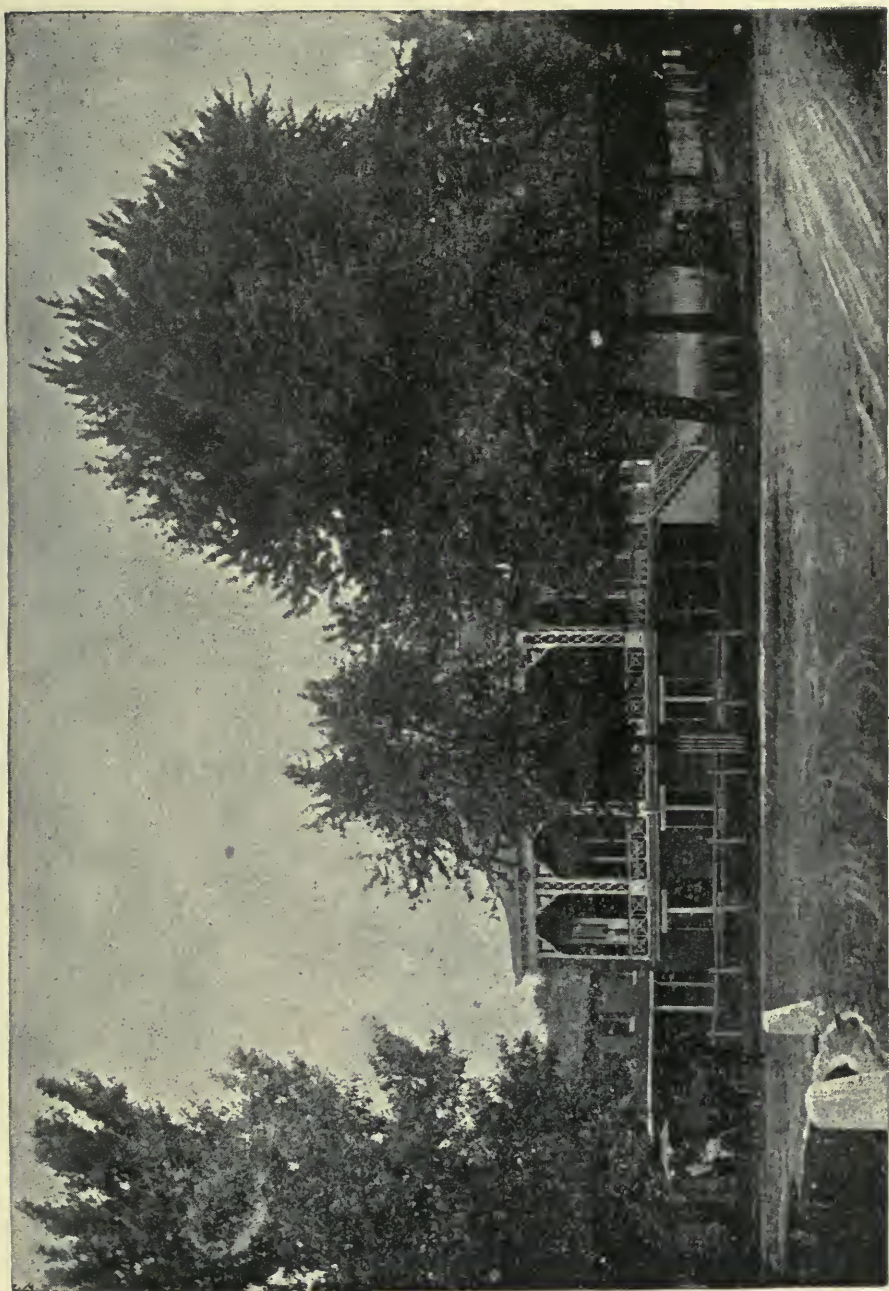



Plate 2.—Lodge for garden pupils, Missouri Botanical Garden.



Plate 3.—*Monstera deliciosa*.



THE COLORADO DESERT.

A vast triangular-depressed plain, below the level of the sea for a large portion of its surface, with an approximate area of twelve million acres (about one-half of which lies in Mexican territory), and comparatively destitute of verdure or of animal life, is the great basin known as the Colorado Desert.

This remarkable region lies between the peninsular range of mountains and the Colorado river of the west, extending from the San Geronio pass, at the base of the San Bernardino mountains, on the north, to the shores of the Gulf of California, on the south, and forms one of the most extensive and important portions of the arid regions of the United States. On the north and northeast it is separated from the more elevated plains of the Mohave desert by a low range of denuded hills, extending from the San Bernardino mountains to near the junction of the Gila and Colorado rivers. Similar arid conditions exist on the eastern borders of the Colorado river, in Arizona, and south in Sonora, and along the Gulf shores.

From their rich chocolate-brown color, the inhospitable barrier between the Colorado and the Mohave deserts is frequently indicated on maps as the Chocolate mountains; but the range is better known to miners as the Chuckawalla (Lizard) mountains, a peculiarly appropriate name, from the great abundance and variety of lizards, but probably given from some fancied resemblance in the outline of these hills to this nimble animal.

The peninsula range of mountains, with a varying altitude of four thousand to eleven thousand feet, rise in precipitous abruptness from the western borders of the plains. The crest of this mountain range forms a sharp and well-defined line of demarcation between the arid region and the rich and fertile western slope. The summit is usually clothed with forests of oak and pine. The western slope is thickly overgrown with a varied vegetation, the valleys supplied in a greater or less degree with tim-

ber and water. Not so on the eastern declivity—the precipitous walls of rock, hundreds, often thousands of feet in height, present small inducements for plant growth, and the less precipitous banks are but slightly less devoid of botanical forms.

In the mighty chasms (or canyons), eroded by the still active, tremendous forces of nature, the botanist finds his richest harvest amid scenery that for beauty and grandeur would rival even the Yosemite. Surrounded by walls three thousand feet or more high, the queenly Washington palm (*Washingtonia filifera*) may be found in groves, growing with tropical luxuriance beside quiet brooklets, rivalling in beauty and novelty the giant Sequoia groves of California.

Despite the large areas totally barren of vegetable life for the larger portion of the year, the absolute lack of rain through long periods, which may extend over three or more years of time, the Colorado desert possesses in seasons of precipitation a flora that in variety and beauty of forms surpasses that of the Atlantic states. In richness of variety and coloring, the flora of California is probably unsurpassed, and the arid regions of the state are not one whit behind the more attractive western slopes. In springtime the stately lily of the desert (*Hesperocallis undulata*) wastes its sweetness on the desert air; every dry and thorny bush produces its quota of beauty, and a wealth of brilliant annuals spring into brief existence.

During June and July, 1838, the writer made his initial exploration in the Colorado desert, the main object being the examination of various prospects of gold, silver, lead and copper, which had been discovered in the Chuckawalla mountains, for a gentleman who was largely interested in their development. A brief report on this region, named the Pacific mining district, appeared in the tenth annual report of the California state mineralogist, 1890 ("The Colorado Desert," by Charles Russell Orcutt, pages 899-919).

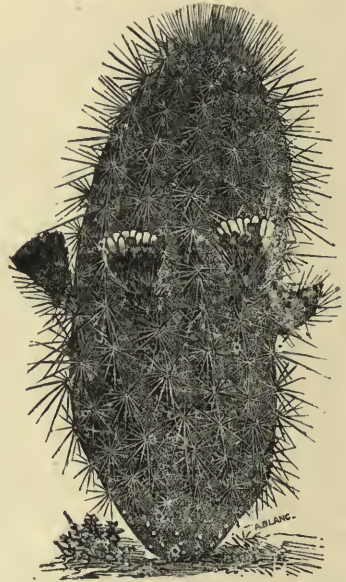
Lyell says:—"Geology is the science which investigates the successive changes that have taken place in the

organic and inorganic kingdoms of nature; it inquires into the causes of these changes, and the influence which they have exerted in modifying the surface and external structure of our planet."

In the decade commencing with 1850 the more depressed part of the Colorado desert seems to have been known as the Cienega Grande, now better known perhaps as the Salton Sea, but more usually designated as the Dry Lake; in 1870 we are told by early emigrants of that period that the Colorado river was in the habit of annually overflowing its banks during the time of summer freshets, when the snows melted in the mountains whence the river has its source. This "annual overflow" (as often omitted as otherwise, it is said) formed a channel through the deep alluvial bottom lands of the great basin, to which the name New River was applied by the earlier pioneers who crossed the desert on the old overland route from Ft. Yuma to San Diego.

Along the course of New River, the Cocopa and other tribes of Indians planted and raised magnificent crops on the overflowed lands. Corn, melons, squashes, and other vegetables, and grain, reached the rankest growth attainable, and some of these early pioneers spoke with wonder of the fertility of the soil and the success attending these Indians in their agricultural labors. These fertile lands were formed of the sediment deposited by the waters of the Colorado river, and as the soil increased in depth the overflow decreased; with the increasing infrequency of these overflows now of more rare occurrence, the Indians were compelled to depart—the Copas retreating to the region of the gulf, the Cahuillas to the mountains around the northern arm of the desert. In 1890 the desert Indian huts might yet be found among the mesquite groves of New river, and in 1892 I found the Indians producing from the untilled soil crops of promise, after an overflow of some of the lands below the United States boundary.

"Approaching Carrizo creek, we saw for the first time in many days, strata of unchanged sedimentary rock. These



CEREUS CHLORANTHUS Engelm.

consist of shales and clays of a light brown or pinkish color, forming hills of considerable magnitude at the base of the mountains. From their soft and yielding texture they have been eroded into a great variety of fantastic and imitative forms. This series of beds have been greatly disturbed, in many places exhibiting lines of fracture and displacement. Where they are cut through in the bed of Carrizo creek, they contain concretions and bands of dark brown ferruginous limestone, which include large numbers of fossils, ostreae and anomias. These have been described by Mr. Conrad, and are considered of Miocene age. In the debris of these shale beds I found fragments of the great oyster (*Ostrea titan*), characteristic of the Miocene beds of the California coast. A few miles north of this point, similar strata, probably of the same age, were noticed by Dr. Le Conte, but there they contain gnathodon, an estuary shell, showing that the portion of the desert where they are now found was once covered by brackish water."—J. S. Newberry.

Dr. J. G. Cooper reports (in bulletin 4, California state mining bureau, pages 58 and 59) the discovery by H. W. Fairbanks, near Carrizo creek of "fossil coral-islands, the coral forming extensive beds about the summits of short isolated ridges detached from the mountains of the western rim, and consisting at their bases of granitic or metamorphic rocks. The ridges appear to have been islands when the desert formed part of the Gulf of California, or of the Pacific ocean, and were at the right depth beneath the surface for coral growth on their summits for a long period. With the coral occurred several fossil shells of forms quite unlike those of the late tertiary of Carrizo creek beds, and apparently unlike those now inhabiting the Gulf of California."

Fragments of fossiliferous rock of the Carboniferous age have been found in the Carrizo creek region by various collectors, but none in place have yet been reported.

The Indians, according to Dr. Stephen Bowers, still preserve the memory of catching fish along the eastern base of the San Jacinto mountains, where the Cahuilla Indians pointed out to him the artificial pools, or "stone fish traps," where their ancestors easily secured the fish on the receding of the tides of the ancient sea. This would seem to indicate that the change from an arm of the gulf is comparatively recent, and a study of the fossils seems to confirm this view. An old Indian in the Cuyamaca mountains pointed out to miners a few years ago points in the hills to the eastward where his great grandfather used to catch fish from the sea.

The cause of the separation of this region from the gulf can be readily understood in the present encroachment of the land that is forming from the sediment and debris of the Colorado river, where it empties into the gulf. With the formation of a barrier separating the basin from the gulf, the imprisoned waters were at once subjected to rapid evaporation.

The presence of fresh water shells in a semi-fossil condition, of a brackish water mollusk, and of marine shells of species now found living at San

Diego, on the Pacific side, would seem to indicate that the great changes which have unquestionably taken place in this remarkable region were the result of natural phenomena of gradual, yet rapid, occurrence. After its isolation from the sea, with rapid evaporation, few years were requisite to transform this basin from an arm of the sea to a barren waste, the salt of the sea water forming the salt mines at Salton.

The Colorado river doubtless hurried past as it does today to the gulf, until breaking down the barrier it had itself erected. With alternate periods of evaporation and influx of fresh water, the great basin changed first to a brackish lagoon, and finally to a vast fresh water lake.

The water of the Colorado river at Yuma is known to carry at high water not less than ten per centum of solid matter. The deposit of this sediment in the great basin doubtless rapidly formed the deep and fertile lands which are now being harnessed into service at Indio and Imperial, and being converted at the latter place, by the utilizing under control of the water from the Colorado river, into fields of agricultural promise.

Dr. Robert Edward Carter Stearns, in a paper read before the California academy of sciences, entitled "Remarks on fossil shells from the Colorado Desert" (published in the American Naturalist, 13:141-154, March, 1879), discussed the occurrence of fresh water shells found in a well at Walter's station at a depth of fifty feet. The surface of the desert where this well was sunk is 195.54 feet below sea level. Dr. Stearns remarks:

"Shall we indulge in a guess as to the depth of the water when these shells were alive? Shall we add the depth of the well to the elevation of bench marks, the ancient levels which form terrace lines in some places along the distant hills, once a part of the shores of an ancient lake, the walls of the basin which once inclosed and held a fresh-water sea? It may have been, however, that the lake was never so deep as the figures thus added would indicate, and that instead of a lake or a series of lakes, there existed only a

lagoon or chain of lagoons, connected or disconnected, according to the volume of water, which probably varied one season as compared with another; a system of shallow reservoirs, receiving the catchment or surplus water in periods or seasons of unusual rainfall, sometimes, after a prolonged and widespread storm of great severity, uniting and forming an extensive expanse a few feet only in depth, as was seen in the valleys of California during the notable winter of 1861-62. The rate of depression may have been such as to continue to keep the lagoons supplied, * * * and that only within a very recent period has this depressed portion of the Colorado basin become bare and dry. Are the phenomena which this vast and remarkable region exhibits * * * the result of catastrophic action, sudden, violent, and widespread, or the result of gradual changes moving slowly through countless centuries?"

At Salton fresh water shells are found in countless myriads, with recent species of marine shells, on the surface of the plain, 250 feet below sea level. Portions of the Dry lake are 300 feet below sea level. These minute fresh water shells are drifted into windrows in places, where they may be scraped up by the quart.

Along the eastern base of the San Jacinto mountains, an old beach line is well defined, and can be easily traced for miles. The rocks are worn and rounded up to this line, sharp and jagged above. This line by actual measurement has been found to be even with the present level of the sea.

Major W. H. Emory, in report of the United States and Mexican boundary survey, gave the following table of distances:

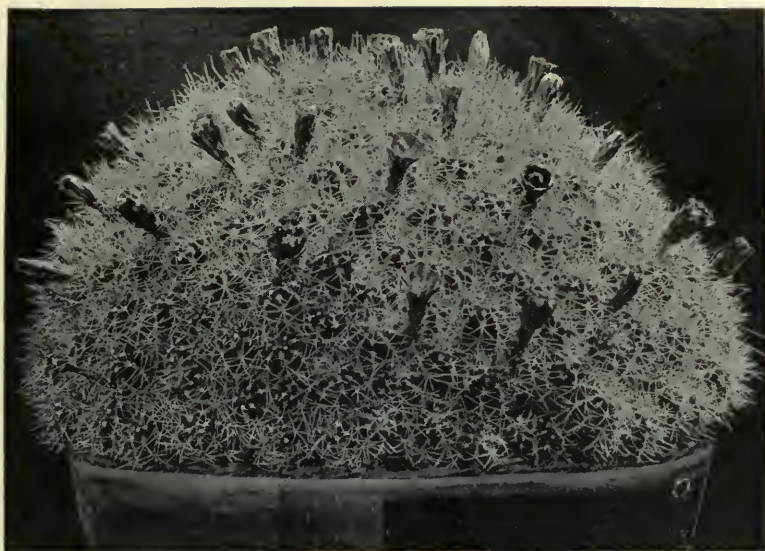
San Felipe to Vallecito, 17.85 miles.
 Vallecito to Carrizo creek, 16.6 miles.
 Carrizo creek to Big laguna, 26.41 miles.
 Big laguna to New river, 5.83 miles.
 New river to Little laguna, 4.5 miles.
 Little laguna to Alamo Mocho, 16.44 miles.
 Alamo Mocho to Cook's well, 21.84 miles.
 Cook's well to Fort Yuma, 20 miles.
 Dr. Charles Christopher Parry, bot-

anist and geologist of the United States boundary commission, in reporting a reconnoissance made in 1849, wrote, concerning this region, as follows:

"On leaving the last rocky exposures to enter on the open desert plain, we pass, some distance down the bed of Carrizo creek; along the course of which are exposed the high bluffs of sand, marl and clay, exhibiting a fine sectional view of the tertiary formation on which the desert plateau is based. At the point where the road leaves the bed of the creek, to mount to the desert tableland, some 150 feet above, fossil marine shells of *Ostrea* are found, and gypsum makes its appearance in extensive beds. The upper layer of the tableland shows a variable thickness, composed of water-worn pebbles, derived from the adjoining mountains. Near the mountain base, this plateau has a height of about 500 feet above the level of the Colorado river. The surface extends in a gentle slope towards the Colorado, or eastward, about the distance of 25 miles, where it reaches its lowest depression at the lagoon or New river basin, which is in fact a part of the extended alluvial tracts belonging to the Colorado river."

The New river region receives the drainage of a large scope of country, which is sometimes visited by heavy showers. "It retains this rain-water, and river overflows, for several months; when both these sources fail, it becomes a perfectly dry bed, or contracts into quaggy saline marshes" (Parry). After a heavy rain or overflow there is a rank growth of grass, and other vegetation, while considerable portions sustain a heavy growth of the mesquite. This affords fine grazing for stock, which cattle men have not been slow to appropriate.

Between the peninsula range and the Colorado river and the gulf lies a high mountain range, to the most northern and western point of which has been given the name of Signal mountain; this consists of a form of syenite, associated with recent lava. "Its surface is bare, and presents a forbidding outline of dark weathered rock, variously marked by furrows, and shows an irregular crest, gradually sloping towards the east." (Parry).



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CEREUS MOJAVENSIS Engelm.



Copyright, 1894, by W. J. Demorest

CEREUS SENILIS Salm-Dyck.



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CEREUS GIGANTEUS Engelm.

The Maricopas (of Arizona), the Cuchanos or Yumas, and the Cocopas are said to have originally formed one tribe. The Cocopa Indians reside within the limits of Mexico and the Yumas in United States territory. Major Heintzelman, in speaking of their agriculture, says: "It is simple; with an old axe, if they are so fortunate as to possess one, knives, and fire, a spot likely to overflow is cleared; after the waters subside, from the annual rise, small holes are dug at proper intervals, a few inches deep, with a sharpened stick, having first removed the surface for an inch or two, as it is apt to cake; the ground is tamped; if salt, rejected and if not the seeds are planted. No further care is required but to remove the weeds, which grow most luxuriantly wherever the water has been. They cultivate watermelons, muskmelons, pumpkins, corn, and beans. The watermelons are small and indifferent, muskmelons large, and pumpkins good; these latter they cut and dry for winter use. Wheat is planted in the same manner, near the lagoons, in December or January, and ripens in May or June. It has a fine, plump grain and well-filled heads. They also grow grass-seed for food; it is prepared by pounding the seed in wooden mortars made of mesquite, or in the ground. With water the meal is kneaded into a mass and then dried in the sun. The mesquite bean is prepared in the same manner, and will keep to the next season. The pod-mesquite begins to ripen the latter part of June; the screw-bean a little later. Both contain a great deal of saccharine matter; the latter is so full, it furnishes, by boiling, a palatable molasses; and from the former, by boiling and fermentation, a tolerably good drink may be made. The great dependence of the Indian for food, besides the product of his fields, is the mesquite bean. Mules form a favorite article of food; but horses are so highly prized, they seldom kill them, unless pressed by hunger, or required by their customs."

Much the same methods are followed by the Cocopas today, as observed by the writer. They also visit the canyons opening on the desert from the west, and gather the sweet and edible palm fruits, there so abundant, and no

doubt seek at times the pinyons or pine nuts in the forests at the summit of the peninsula range.

The townsite of Imperial is situated about 30 miles east of the old stage station on Carrizo creek, and here a new civilization, based on modern agricultural methods, is like to thrive where roamed the nomad in former time.



CEREUS BERLANDIERI Engelm.

Dr. J. Le Conte, gave an interesting account of some volcanic mud springs or solfataras, near the Southern Pacific railroad, on the Colorado desert in Silliman's Journal (2d ser. XIX, Ja. 1855). Arthur Schott mentions a severe earthquake which occurred November 29, 1852, and quotes from manuscripts by Major Heintzelman, as follows: "There exists, about 45 miles below Fort Yuma, in the desert between the western Cordilleras and the Colorado, a pond, considered as an old orifice, which had been closed for several years. The first shock of an earthquake, in 1852, caused a mighty explosion. The steam rose a beautiful snowy jet more than 1,000 feet high into the air, where it spread high above the mountains, gradually disappearing as a white cloud. This phenomenon repeated itself several times in a diminishing scale. Three months later I visited the place; jets took place at irregular intervals, from

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SIZE

15 to 20 minutes. The effect was beautiful, as they rose mingled with the black mud of the pond. The temperature of the water in the principal pond was 118 degrees F., in the smaller one 135, and in one of the mud holes, from which gases escaped, 170. The air which escaped was full of sulphurated hydrogen, and in the crevices crystals of yellow sulphur were found. The ground near about was covered with a white efflorescence, tinged with red and yellow. On the edge of a small pond crystals of sal ammonia, 1 to 5 inches long, were collected."

At the time of this earthquake low grounds near Yuma became full of cracks, many of which spouted out sulphurous water, mud, and sand. Dr. Parry records that the river formed new bends, leaving portions of its old bed so suddenly that thousands of fishes were left lying on the muddy bottom to infect in a few days the air along the river by their putrefaction, and that the frequency of earthquakes occurring here forms also a point in the mythology and traditional tales of the aborigines.

C. R. ORCUTT.

EDITORIAL.

Our aim in journalism is to popularize study, to create a greater interest in the beauties of the world, to increase the number of lives that shall leave a mark on the world's history—lives more worthy of the Creator of the universe.

Our direct aim is a review of our present knowledge, and a record of new discoveries, in natural history and other branches of science. Descriptions of animals and plants, not easily accessible to the young student, notes of economic or geographic significance, bibliography, synonymy, and an interchange of ideas, will be means used to a common end.

BIOGRAPHICAL.

BIRTWELL, FRANCIS J.:

Well and favorably known to ornithologists as a writer on the birds of New Mexico, ascended a lofty pine tree to procure a birds' nest, 29 Je 1901, became entangled in the rope and strangled in the presence of his bride.

DEAN, GEORGE W.:

Born in Ohio 20 Ag. 1820, died 10 Ap 1901. A successful nurseryman and florist, well known to many as an ardent collector of shells.

GOODE, GEORGE BROWN:

Part 2 of the report of the U. S. National Museum for 1897 is a memorial of this eminent naturalist, together with a selection of his papers on museums and on the history of science in America. Portraits of the earlier scientific men, and notice of their work in connection with "the origin of the national scientific and educational institutions of the United States," and "the beginnings of natural history in America," form a volume of great interest, and a worthy monument to one who was great as a man and as a scientist. A list of his published writings occupy 20 pages of the memorial.



Le CONTE, JOSEPH:

One of the most eminent scientists, of the University of California, died July 6, 1901.

He was of Huguenot descent, and was born in Liberty county, Georgia, 26 F 1823. As a teacher he was suggestive, interesting and inspiring, and his naturally kind and genial disposition gained him the affection of his pupils. Geology, optics, aerostatics and physiology were branches upon which he became authority.



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THOMAS MEEHAN.

"Friend after friend departs,
Who hath not 'o't a friend?"

The State Botanist of Pennsylvania and senior editor of Meehan's Monthly of Germantown, passed to the "better land" Nov. 19, 1901, aged 75 years. He was born in London, England, March 21, 1826. He once wrote: "My earliest recollection is of butter-cups in a field of grass tossed into mimic waves by a summer breeze, at three years of age, West London, England."

His early home was the Isle of Wight. There being no schools there his mother taught him to read and write. The "Book of Common Prayer" was his primer, the Bible and Bunyan's Pilgrim's Progress his readers. After the family moved to Ryde he went to school two years. Eager for learning he improved every opportunity, and with his hard earned pocket money bought a Latin Dictionary and Grammar, Logic and some other books and studied nights in his father's greenhouse. And thus became so proficient that before he was 19 he was elected member of the Royal Wernerian Society of Edinburg, on account of his original contributions, one of them being a paper in which a knowledge of Latin was an essential requisite. He also studied Greek the same way, and became so familiar with French as to read it like English. This young man saw Victoria, the then young queen, more than once, while he was a student at Kew gardens. The young man went to America, and at the age of 22 entered Philadelphia, where for more than half a century he has been one of the leading minds of the city, being 20 years on the school board and long a member of the city legislature and being the means of getting up 23 small parks for the benefit of the poor. He became respected and beloved by the large community. He was the friend of the genial Botanist, Dr. Asa Gray, and spoke of him as "one of the kindest of heart among my friends." Prof. Meehan has been for some years an efficient director of the Philadelphia Academy of Natural Science, the collections of which are the third best on this continent, to which he was a lib-

eral contributor. The professor was often asked to write his biography, but said that at his age he would rather be making history than writing it. He was fond of music and said: "When I want a change from science I take my flute and play over some old church tunes. Indeed I sometimes think that when they bury me I would listen with pleasure to "Autumn" if they would sing it over my grave."

MRS. E. E. ORCUTT.

HOUSE HOLD PESTS.

'The Silver Fish' belongs to the lowest order of insects—the Thysanura—is wingless, of very simple structure, worm-like, about 1-3 inch long, tapering from near the head to the extremity of its body, and often one of the most troublesome enemies of books, papers, card tables in museums, starched clothing, and more rarely stored food substances. The entire surface of the body is covered with very minute scales like those of a moth. The head carries 2 prominent antennae, and at the tip of the body are 3 long, bristle-shaped appendages, one pointing directly backward, the other 2 extending out at a considerable angle; 4 shorter appendages are near; 6 legs spring from the thorax, and, while not very long, they are powerful and enable the insect to run with great rapidity.

Heavily glazed paper is very attractive to this insect, while it often causes wall paper to scale off by its feeding on the starch paste. Pyrethrum furnishes the best means of control, wherever it can be applied. C. L. Marlatt describes and figures it in bulletin No. 4, new series, division of entomology, U. S. department of agriculture, from which the above notes are mainly taken. *Lepisma saccharina* L. is the common species of England, now practically cosmopolitan.

EPIDOTE—The United States produced \$250 worth of this semi-precious stone in 1895. Crystals in masses have been obtained by the writer near the Alamo, and associated with crystals of calcite from near the coast south of Santo Tomas, Baja California.

WEST AMERICAN MOLLUSCA.

BINNEYA NOTABILIS J. G. Cooper.

Tryon, Monog T M 32, t 3 f 4.

Depressed, smooth and shining, epidermis extending beyond margin of aperture, translucent when young, but opaquely thickened when old. Nuclear whorl with about 30 delicate transverse ribs. Pale brown. Diameter 12, height 3 mm.

Santa Barbara Island, California; Guadalupe Island, Baja California (G. W. Dunn).

On the mainland near San Quintin, Baja California (Orcutt).

BORNIA PULCHRA Philippi.

Dall, U S Na Mu pr 21: 880, 889.

Kella pulchra Philippi, Zeitschr fur Mol 5: 149 (1848). "Probably a Pythina, but unfigured."—Dall. "West America."

BORNIA RETIFERA Dall.

"Shell thin, white, moderately convex, rounded, trigonal, nearly equilateral; beaks distinct, not high; surface polished, with faint incremental lines and minute close punctations whose interspaces give the effect of a fine netting; hinge normal, delicate; adductor scars rounded, high up; posterior basal margin very slightly crenulate. Lon. 12, alt. 9, diam. 4 mm. One left valve dredged by the U. S. Fish Commission at station 2900, in 13 fathoms, off Santa Rosa Island, California."—Dall, U S Na Mu pr 21: 889, 880, t 87 f 2 (1899).

ANOMIA SUBCOSTATA Conrad.

Obtusely ovate, rather thick; umbo of larger valve ventricose; hinge thickened, surface of the valve obtusely undulated concentrically, and marked with wavy, wrinkled, interrupted ribs, much raised, except towards the base, where they are larger and somewhat tuberculiform; upper valve entire, or with obsolete radii towards the base.

Miocene; Carrizo creek, San Diego county, Calif.

MELAMPUS OLIVACEUS Cpr.

Obconic; spire short, suture indistinct; whorls 7-9, obtusely angulated on the body below the suture; aperture long and narrow, lip covered with sharp laminae within, parietal wall with from 1 to 3 small revolving laminae; there is also a stout fold on the columella. Epidermis olivaceous, below which the color is white with patches or revolving lines of red. Length 13, diameter 8 mm.

Living: San Diego, California to Mazatlan.

Lagoon Head, Baja California (Orcutt 1954); San Diego, Cal. (Orcutt 1929).

PEDIPES LIRATA, W. G. Binney.

Shell globose conical, solid, with regular spiral lines; spire short, with obtuse apex; whorls 3, the upper ones small, the last equalling five-sixths of the total length; aperture semicircular; parietal wall with strong transverse lamina, columella with 2 acute ap-

proximate teeth. White or yellowish. Length 3.3, diameter 2.5 mm.

Living: San Diego, California (Orcutt). Cape San Lucas, Baja California.

SELENITES CAELATA Mazyck.

Shell small, depressed, brownish horn-color, with very coarse, rough, crowded, subequidistant, irregular ribs, which are obsolete at the apex; whorls 4, rounded, somewhat inflated below, gradually increasing, the last not descending at the aperture; suture impressed; umbilicus wide, clearly exhibiting all the volutions; aperture almost circular, slightly oblique; perisome simple, its ends approaching and joined by a very thin, transparent, whitish callus, through which the ribs are distinctly seen. Greater diameter 4, height 1.75 mm. Santa Barbara (Dr. L. G. Yates); Hayward's, Alameda county, California (W. H. Dall).

Mazyck, U S Na Mu pr 9:460-461, f 1886.

SELENITES DURANTI.

Mazyck, U S Na Mu pr 9:460-1 f (1886). Helix durantii Newcomb, Ca ac pr 3:118 (1864).

Patula durantii Tryon, Am J Conch 2:22, t 4 f 53 (1866). Mong, T. M. 51, t 4 f 5.

Hyalina durantii Binney and Bland L-F S 1:37, f 49 (1869).

Macrocyclus durantii W G Binn T M 5:94, 188. Man Am L S 85 f 49 (1885).

"Shell depressed, discoidal, pale corneous, under the lens minutely striated, opaque, broadly and perspectivevely umbilicated; whorls 4, the last shelving but not descending (at the aperture); suture linear; aperture rounded, lunate, lip simple, the external and internal approaching. Santa Barbara Island."—Newcomb.

Tryon says: "spire not at all elevated, perfectly plane above."

Binney says: "with very coarse rough striae."

Diameter 5, height 1.75 mm.

Pilsbry, Phila ac pr 1889, p 196, treats Selenites caelata Mazyck as a variety of this.

SELENITES SPORTELLA Gould.

Tyron, Mong T M 33, t 3 f 7.

Macrocyclus sportella Gould.

Whorls 5, the superior part of the last one flattened upon approaching the aperture, rounded below; very light apple green, dull, very closely and sharply striate, reticulated by slight, revolving lines; suture moderate, umbilicus moderate and deep. Diameter 13 mm. Puget Sound to San Diego, California (Orcutt).

SELENITES VOYANA Newc.

Depressed; whorls 5, convex, the last declining towards the aperture and somewhat flattened or concave above, striate; aperture sinuate above, the lip slightly expanded, its extremities joined by a callus on the body whorl; below broadly umbilicate. Pale horn color. Diameter 12.5 mm. San Diego to Trinity county, California.

Macrocyclus voyana Newcomb.

Tryon, Mong T M 34, t 3 f 9.

SPORTELLA CALIFORNICA Dall.

"Shell small, compressed, ruce, with a yellowish epidermis; slightly arcuate, dorsal margin evenly arched, base concavely arcuate; inequilateral, the anterior part longer, rounded, the posterior end more blunt; teeth normal, the larger right cardinal nearly parallel with the dorsal margin, the ligamentary nymph obscure, the attachment for the resilium thickened and projecting; scar of the mantle wide and somewhat irregular, the anterior adductor scar not well distinguished from it. Lon. 6, alt. 4.2, diam. 1.5 mm. A single rather worn right valve was collected on the beach at Monterey, California, by Dall in 1866."—Dall, U S Na Mu pr 21: 885, 879 (1899), t 88 f 5.

SUCCINEA GABBII Tryon.

Tryon, Monog T M 22, t 2 f 14.
Keep, West Coast shells, 129.
Elongate ovate, thin, subpellucid, coarsely undulately striate; spire long, acute, suture deeply impressed; whorls nearly 4, but slightly oblique, very convex, the last 3-4 of the total length; aperture small, roundly oval, columella well incurved. Light yellowish. Length 9, diameter 5 mm. Binney considers this a variety of *S. oregonensis*.
Living: Southeastern Oregon; northeastern California (W. M. Gabb).

SUCCINEA HAWKINSII Baird.

Tryon, Monog T M 28, t 2 f 31.
Very narrow, sub-cylindrical, thin, rugosely striate; spire very short, apex mamillary; whorls $2\frac{1}{2}$, suture not impressed; body very long and narrow, the sides flattened, sub-parallel; aperture narrow ovate, two-thirds the total length, viewed from the base exhibiting the interior of the whorl to the apex, columella slightly folded above, with a callous deposit. Covered with a rather oblique dark yellow or orange epidermis. Length 1', diameter 5 mm.
Living: Washington; British Columbia.

SUCCINEA HAYDENI W. G. Binney.

Tryon, Monog T M 24, t 2 f 20.
Keep, West Coast shells, 128 f 118.
Elongate-oval, thin, shining; spire short, acute; whorls 3, convex, the last marked with wrinkles of growth, and irregular, heavy, spiral furrows; aperture oblique, oval, five-sevenths the total length, the lower margin considerably expanded. Amber color. Length 21, diameter 9 mm.
Living: Nebraska and north. Utah.

SUCCINEA LINEATA W. G. Binney.

Tryon, Monog T M 23, t 2 f 16.
Oblong ovate, irregularly wrinkled, between which are coarse, remote, revolving lines; spire acute; whorls 3, very convex; aperture $\frac{1}{2}$ the length of the shell, oval; columella folded. Length 12, diameter 6 mm.
Living: Nebraska; British Columbia; northeastern California; Utah.

SUCCINEA NUTTALLIANA Lea.

Tryon, Monog T M 26, t 2 f 26.
Keep, West Coast shells, 129.

Ovate conic, very thin, pellucid, shining, arcuate; spire acute, attenuate; whorls revolving very obliquely; aperture two-thirds the total length, ovate, broadly rounded below, angled above; columella without fold. Light horn color or greyish. Length 15, diameter 8 mm.

Living: Snake river, Oregon; to Clear Lake, California.

SUCCINEA OREGONENSIS Lea.

Tryon, Monog T M 23, t 2 f 18.
Keep, West Coast shells, 129.
Elongated oval, thin, diaphanous, shining, striate; spire acute, suture well impressed; whorls 3, well rounded; body seven-eighths and aperture two-thirds the total length; aperture ovate, one-third longer than broad, columella arcuate. Color deep orange or golden. Length 9, diameter 6 mm.
Living: Vancouver Island to Baja California.

SUCCINEA RUSTICANA Gould.

Tryon, Monog T M 24, t 2 f 19.
Elongate ovate, thin fragile, diaphanous, irregularly striate; spire elevated, acute, suture moderately impressed; whorls 3, not very convex; body long, oval, not inflated; aperture narrowly oval, three-fifths the entire length. Pale greenish or yellowish. Length 14, diameter 7 mm.
Living: Nevada; Vancouver Island, to Baja California.

SUCCINEA SILLIMANI Bland.

Tryon, Monog T M 24-25, t 2 f 21.
Keep, West Coast shells, 129.
Oblong-ovate; thin, coarsely striate, shining; spire short, acute, suture impressed; whorls 3, convex, much flattened superiorly; aperture oblique, elongate oval, angular above, effuse at base, columella slightly arcuate, with a threa-like thickening above. White? Length 26, diameter 8.5 mm.
Living: Humboldt Sink, Nevada, to San Jacquin valley, California; Washington.

TRUNCATELLA CALIFORNICA Pfr.

Cylindrical imperforate, thin, translucent, slightly striate; whorls 6-10, quite convex, last not carinate below; aperture vertical suboval, lip simple, continuous, slightly expanded. Amber colored. Length 4.6, diameter 1.6 mm.
Living: San Diego, California.

TURTONIA MINUTA Fabricius.

"Bering Sea to the Shumagins. Precisely similar to European and New England specimens."—Dall U S Na Mu pr 21: 881 (1899).

TURTONIA OCCIDENTALIS Dall.

"Plover bay, Bering Strait, and northward, in 20 to 40 fathoms."—Dall U S Na Mu pr 21: 881 (1899).
Larger, stouter, and shorter than *T. minuta*.

SERRIDENS OBLONGA Cpr.

Dall U S Na Mu pr 21: 8880 (1899).
San Pedro, California.

PLANORBIS AMMON Gould.

Shell large, discoid, subconic, delicately striate; left side broadly and deeply concave, showing 4 obtusely carinated whorls; right side concave, showing 2½ rounded whorls; aperture ovate triangular, sometimes quite expanded on each side; axis, five-eighths to one; diameter ¼ to ½ inch.

Living: Kiamath lake, Oregon. Honey lake, Lassen county, Calif. Nevada, Colorado river.

Quaternary: Cienega Grande, Colorado Desert.—T. H. Webb; W. P. Blake. Lantontan basin, Lassen county, California.

PLANORBIS ANITENSIS Cp.

"Shell (when held mouth downward) with the right side concavo-convex, the left flat (or slightly concave), the left margin forming a sharp carina expanded beyond the edge of shell, which is marked by a compressed line. Whorls 5, visible on both sides, uniformly flat on the left side, forming a concave umbilicus on the right, where their surface is rounded. Mouth triangular, the right lip arched, the left nearly flat, the extremities joined to outer angle and to obtuse margin of umbilical cavity. Umbilicus half as wide as the shell; flat side of mouth one-fourth of diameter; greatest breadth (at mouth) over one-fifth of same; greater diameter: 0.16, least 0.03 inch."—Cooper, Cal ac pr 2d ser, 3: 341.

Type locality: Laguna at Santa Anita, Baja California, at an elevation of 100 feet, and 10 miles from San Jose del Cabo.

PLANORBIS BINNEYI Tryon.

Living: Oregon; Washington.

PLANORBIS HORNII Tryon.

Shell of three convex volutions; aperture almost orbicular, not oblique, nor extending above or below the plane of the whorls; labrum slightly reflected, thickened within, its ends converging so as nearly to connect on the parietal wall; lines of growth fine and close. Color light horn. Diameter 21, height 7 mm.

Living: Fort Simpson, British America, (George H. Horn). Grant's lake, California (W. M. Gabb).

PLANORBIS OPERCULARIS Gould.

Shell dextral, much depressed, lenticular, with a prominent blunted keel at compressed line; tip sunken; beneath the periphery defined by a marginal, compressed line; tip sunken; beneath umbilicated for about one-third the breadth of the base, showing 3 volutions, convex, surface rather rude and indented, marked with irregular, coarse, much arcuated lines of growth, and here and there a few obscure, raised revolving lines; color dark chestnut brown, a little clouded; whorls above 4, slightly convex; suture well defined, impressed; aperture transversely subrhombic, lip above slightly declining, at periphery acute-angled, beneath arched, lips embracing ¾ of that part of the whorl

which is beneath the carina. Diameter 6, height 1.5 mm.

Living: Common in the waters of California. Vancouver island.



QUEEN CACTUS.

PLANORBIS PARVUS Say.

Living: All British America and United States. Manitoba to New Mexico. Cantillas canyon, Baja California (Orcutt).

PLANORBIS PENINSULARIS Cp.

"Shell with both sides concave, the right with whorls rounded, their edge forming an obtuse margin, and the outer one partly enclosing the others so that it forms two-thirds the greater diameter of shell. Whorls 5, visible on both sides, the rounded (or right) surface showing less of them than the other. Left (or umbilical?) surface nearly flat, deeply concave near middle, the umbilicus being over one-third of diameter. Mouth trapezoidal, very oblique, its lips curved, the right extremity attached near the concave suture, the left to the obtuse periphery of shell. Mouth one-third longer than wide; its breadth over one-third that of shell. Greater diameter 0.16, least 0.05 inch. Color brown, surface smooth."—Cooper, Cal. ac pr 2d ser. 3: 342.

Type locality: "With *P. anitensis*, in same laguna."

PLANORBIS SUBCRENATUS Cpr.

Shell tumid, very thin, horn-colored; whorls 6, rounded, sutures impressed; with sharp radiating, somewhat crowded and occasionally minutely crenulated ridges; aperture rounded, parietal wall small, scarcely touching the penultimate whorl; labrum slightly deflected, fuscous within; umbilicus deep. Diameter 23, height 9 mm.

Living: Oregon (Nuttall). British Columbia to Baja California.

PLANORBIS TUMENS Cpr.

Shell rapidly swelling, horn or reddish smoke-colored; whorls 4 or 5, with light waving striae; sutures deeply impressed; on one side subangulate or subcarinate near the suture, on the other rounded; umbilicus very deep; aperture with a sinuous edge, one side standing out above, flattened below, the other flattened above, produced below, capacious and rounded; labrum very thin. Diameter 15, height 6.5 mm.

Living: Mazatlan; Baja California; San Francisco, Petaluma, and southern California.

PLANORBIS TUMIDUS Pfeiffer.

Shell opaque, pale horn colored or smoky, densely and finely striated, umbilicated above, slightly concave below; whorls 5, convex, subcarinate on each side, rapidly increasing, separated by a deep suture; aperture oblique, lunate-rounded, somewhat kidney-shaped. Diameter 19, height 6 mm.

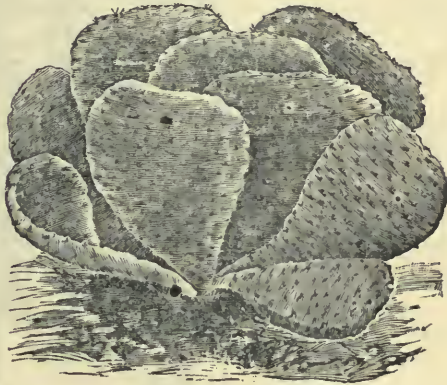
Living: Texas. Los Angeles, California. Nicaragua (T. Brydges). Guatemala.

COCHLICOPA LUBRICA Muell.

Ferrussacia subcylindrica L. Grizzly Peak, Berkeley, Cal. (H. Hemphill); Oregon; Alaska.

PHYLLOCACTUS LATIFRONS Walp.

The Queen cactus is quite the giant among the Phyllocacti, the stout flattened stems 4 to 5 inches broad, deeply crenated and commonly 8 to 10 feet high. The flowers are 7 to 8 inches long, about 6 inches in diameter, the petals of a delicate, clear, creamy white, the sepals and tube of a reddish hue. Native of Mexico.



OPUNTIA BASILARIS Engelm. & Bigelow. Low; joints 5 to 8 inches long, triangular, proliferous from their base, pubescent, unarmed, but beset with numerous dense fascicles of short brownish bristles, as is also the ovary. Flowers large, 2½ to 4 inches in diameter, bright magenta, and very numerous; fruit dry, with large and thick seeds.

Var **RAMOSA** Parish. In cultivation the typical form becomes branched like the variety. One of the most satisfactory cacti that we know for an amateur's collection, flowering profusely and growing readily. In the deserts of California, Arizona, Nevada and Mexico, the whole plant sometimes assumes a brownish red, but in cultivation it seems to maintain a glaucous green color.

CHINESE WEEPING LILAC.

Its gracefulness of form, its curiously arranged leaves, in pairs and set like a bird's wings in flight, its honey-scented clusters of white flowers, makes this a unique shrub among decorative plants. Our figure shows it grafted upon the common lilac, producing a fine tree.



CHINESE WEEPING LILAC.

HEMAN CHANDLER ORCUTT
MEMORIAL COLLECTION.

A catalog of natural history specimens
presented to American schools by Chas.
R. Orcutt in memorium of his father.

I.

- ACMAEA PERSONA Esch.
San Diego, Cal. (Orcutt 1829).
- ACMAEA SCABRA Nutt.
San Diego, Cal. (Orcutt 1823).
- ACMAEA SPECTRUM Nutt.
Todos Santos bay, Baja California (Or-
cutt 1964).
- ANOMIA LAMPE Gray.
Lagoon Head, Baja California (Orcutt
1715).
- ARCA MULTICOSTATA Sby.
Lagoon Head, Baja California (Orcutt
174).
- BARLEEIA SUBTENUIS Cpr.
San Diego, Cal. (Orcutt 1913).
- BULLA NEBULOSA Gld.
San Diego, Cal. (Orcutt 1761).
- CAECUM ORCUTTI Dall.
San Diego, Cal. (Orcutt 1914—co-types).
- CARDITA AFFINIS Brod.
Guaymas, Sonora (Orcutt 1883).
- CARDITA CRASSA Gray.
Guaymas, Sonora (Orcutt 1803).
- CERITHIUM STERCUS-MUSCARUM
Val.
Gulf of California (Orcutt 1957).
- CHITON VIRGULATUS Sby.
Guaymas, Sonora (Orcutt 1797).
- CHLOROSTOMA FUNEBRALE A. Ad.
San Diego, Cal. (Orcutt 1804).
- CHLOROSTOMA GALLINA Fbs.
Todos Santos bay, Baja California (Or-
cutt 1882).
- CHORUS BELCHERI Hinds.
Todos Santos bay, Baja California (Or-
cutt 1914); San Diego, Cal. (Orcutt 1930).
- CLYDIOPHORA PUNCTATA Cpr.
San Diego, Cal. (Orcutt 1919).
- COLUMBELLA CARINATA Hinds.
San Diego, Cal. (Orcutt 1902).
- COLUMBELLA FUSCATA Sby.
Santa Rosalla, Gulf of California (Or-
cutt 1913).
- CREPIDULA EXCAVATA BROD.
San Diego, Cal. (Orcutt 1912).
- CRUCIBULUM IBERICATUM Lam.
Gulf of California (Orcutt 1890).
- CRUCIBULUM SPINOSUM Sby.
San Diego, Cal. (Orcutt 1900).
- DONAX CALIFORNICUS Conr.
San Diego, Cal. (Orcutt 1898).
- DONAX SEMISTRIATA Po'f.
Brest, France (Bavay, Orcutt 1909).
- DRILLIA MOESTA Cpr.
San Diego, Cal. (Orcutt 1911).
- ENGINA CARBONARIA Reeve.
Gulf of California (Orcutt 1886).
- FISSURELLA VOLCANO Rve.
Todos Santos bay, Baja California (Or-
cutt 1819).
- GONIOBASIS CLAVAEFORMIS Lea.
Turkey creek, Knox county, Tenn. (A.
G. Wehrby, Orcutt 1960)
- GONIOBASIS HAYSIANUS Lea.
Alabama (legit E. M. Goodwin, Orcutt
1955).
- GONIOBASIS OLIVULA Conr.
Alabama (legit E. M. Goodwin, Orcutt
1959).
- HALIOTIS SPLENDENS Rve.
Todos Santos bay, Baja California (Or-
cutt 1951).
- HAMINEA VESICULA Gld.
San Quintin bay, Baja California (Or-
cutt 1754).
- HELIASTER MULTIRADIATA Gray.
Gulf of California (Orcutt 1781).
- HELIX ASPERSA Muell.
Mexico City (Orcutt 1892).
- HELIX LAEVIS Pfr.
Abundant among maguey plants (Aga-
ve Shawii), near Rosario mission, Baja
California (Orcutt 1320).
- LEPIDORADSLA MAGDALENSIS Hds.
Monterey, Cal. (Stearns collector, Or-
cutt 1908).
- LITORINA PLANAXIS Phil.
San Diego, Cal. (Orcutt 1807); Todos
Santos bay, Baja California (Orcutt 1969).
- MACOMA INDENTATA Cpr.
San Diego, Cal. (Orcutt 1916).
- MACOMA INQUINATA Desh.
San Diego, Cal. (Orcutt 1917).
- MACONA NASUTA Conr.
Bodega bay, Cal. (Stearns, Orcutt 1955).
- MACOMA SECTA Conr.
San Diego, Cal. (Orcutt 1763).
- MODIOLA CAPAX Conr.
San Diego, Cal. (Orcutt 1915).
- MONOCEROS ENGONATUM Conr.
Todos Santos bay, Baja California (Or-
cutt 1756).
- MONOCEROS LUGUBRE Sby.
Todos Santos bay, Baja California (Or-
cutt 1755).
- MONOCEROS PAUCILIRATUM Stearns.
Todos Santos bay, Baja California (Or-
cutt 1762).
- NASSA TEGULA Reeve.
San Diego, Cal. (Orcutt 1820); Gulf of
California (Orcutt 1773).
- NERITA BERNHARDI Recl.
Guaymas, Sonora (Orcutt 1888).
- NERITINA PICTA Sby.
Corner, Cal ac pr 2d ser, 3:103.
Living: Guaymas (Orcutt), Todos San-
tos creek, Baja California (L. Belding).
Guaymas, Sonora (Orcutt 1812).
- NEVERITA RECLUZIANA Petit.
Lagoon Head, Baja California (Orcutt
1967), San Diego, Cal. (Orcutt 1927).
- NORRISIA NORRISI Sby.
San Diego, Cal. (Orcutt 1970).
- OCINEBRA POULSONII Nutt.
Todos Santos bay, Baja California (Or-
cutt 1759).
- OJIVA CARNEOLA Lam.
Viti Islands (legit Orcutt 1961).
- OJIVA VENULATA Lam.
Gulf of California (Orcutt 1953).
- OLIVELLA BIPPLICATA Sby.
San Diego, Cal. (Orcutt 1906).
- OLIVELLA BOETICA Cpr.
San Diego, Cal. (Orcutt 1905).
- OLIVELLA ZONALIS Lam.
"West Mexico" (Orcutt 1956).
- OMPHALIUS AUREOTINCTUS Fbs.
San Diego, Cal. (Orcutt 1822).



CHINESE NARCISSUS.



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WEST AMERICAN MOLLUSCA.

BUCCINUM ALEUTICUM Dall.

"Shell thin, 6 whorled, covered by a thin sparsely pilose, dehiscent epidermis; of a livid pinkish color with a white pillar and margin to the outer lip and a dark chestnut nucleus; sculpture of extremely fine, regular, close-set grooves with equal or wider interspaces, regularly spaced on the last, but tending to pair on the earlier whorls; spire short rather pointed; whorls full; suture deep but not channelled; aperture moderate; pillar with a white callous ridge incurved upon it; siphonal fasciole distinct, bounded by a groove behind; outer lip slightly thickened, hardly reflected; throat livid brown; operculum small, subcircular with a subcentral nucleus and fan-shaped scar of attachment. Length of shell, 35; maximum diameter, 21 mm."—Dall, U S Na Mu pr 17:706, t 27 f 7 (1894). South of Unimak Island, Aleutians, in 59 fathoms, sand.

B. OVULUM Dall.

"Shell small, thin, of about $4\frac{1}{2}$ or five whorls; surface smooth, or with faint irregular spiral threads mostly obsolete; covered with a vernicose adherent olive-green epidermis; substance of the shell livid pinkish purple, with a white margin to the pillar and aperture; last whorl much the largest; suture deep but not channelled; nucleus eroded in all the sp.; pillar nearly straight, thin, with a deep,

very short, hardly recurved canal; body sometimes with a thin wash of yellowish callus; operculum small, nearly circular, the nucleus subcentral, surface of attachment fan-shaped, reflected by a depression in the concave outer surface. Length of shell, 25; maximum diameter, 20 mm."—Dall l. c. 707 t 30 f 6.

B. STRIGILLATUM Dall.

"Shell with 7 fully rounded whorls, deep suture, and hirsute epidermis sculpture of numerous narrow flattened primary ridges with subequal channelled interspaces; aperture not expanded but with a wide deep sinus near the houlder. Color white; length 42, breadth 27 mm. U.S. Steamer Albatross, station 3170, off Guadelupe Island, Lower California, in 167 fathoms."—Dall l. c. 14:186 (1891); 17:706 t 27 f 9. Off Tahwit Head, Washington, in 178 fathoms; and off Bodega Head, Cal. 167 fm., muddy bottom.

B. TAPHRIUM Dall.

"Shell thin, slender, with polished brown epidermis, with fine spiral striæ and conspicuous zigzag or spiral malleations; 6-whorled, acute; suture deeply channelled; aperture white, with thick reflected lip and continuous thick callus on the concave pillar. Length of shell 40, breadth 18, length of aperture 15 mm. U. S. Steamer Albatross, station 3330, off Akutan Island, Bering Sea, Alaska, in 351 fathoms."—Dall l. c. t 29 f 6.



A MONSTROSITY.

BITITIUM CALIFORNICUM Dall.

"Shell white, broadly elongate-conic; whorls rounded, falling off more abruptly toward the suture than the summit. The earlier whorls increase less rapidly in diameter, and are more evenly rounded. Base short, well rounded; aperture suboval, effuse and subchannelled anteriorly, with the posterior angle rounded; columella somewhat twisted and slightly revolute. The ornamentation consists of about 14-16 broad and low axial folds, which gradually become obsolete on the periphery and base, and on the whorls 3 or 4 impressed spiral lines, which are equally apparent on the ribs and intercostal spaces. This species occurs both recent and fossil in California. Recent shells appear more slender with fewer ribs, 12-14. The type is a fossil specimen from Dead Man's Island, off San Pedro, California, and has eight whorls which measure: long 5.3, diam. 2.2 mm. A recent shell of 10 whorls measured 6, diam. 2.1 mm."—Dall & Bartsch, *Nautilus* 15:58-59 (S 1901).

CUPRITE—Red oxide of copper; red copper; reported from the Colorado desert.

LEUCITE:


The history of leucite is very interesting. Some 30 years ago Humboldt made the general statement that leucite occurred nowhere outside of Europe. Curiously enough, until within a few years this statement held good. In 1874, however, Vogelsang found it in an Asiatic basalt, and in 1876 Zirkel announced its discovery in Wyoming.

'Another extra-European locality for leucite is now announced by Von Chrustschoff, who finds it in a lava in the vicinity of the extinct volcano Cerro de las Virgenes in Baja California. The rock consists of an ash-gray ground mass sprinkled with rounded spots of brownish-black obsidian or glass, and with light specks of leucite. These light specks are shown by a lens to have a rounded octagonal outline.

'The leucite is remarkably clear and fresh, and shows in polarized light the well known twining structure, even better marked than in leucite of the Vesuvian lavas or of the Laacher-See. While generally in rounded masses, the smaller individuals are often clearly octagonal in outline. The microscope shows the leucite to contain many inclusions, among which are augite, apatite, olivine, plagioclase, magnetite, nepheline, and glass inclusions and bubbles.'—H. C. Lewis, reprint in *W. Am. Sci.* ii. 33.

CINNABAR—Composition 86.2 per cent mercury, 13.8 per cent sulphur, weighing 549 pounds per cubic feet per ton. This is the principal ore of quicksilver, and has been reported from Riverside and San Diego counties, but I have seen no specimens in proof. The writer has five specimens from two distinct sources, alleged to have been found in Baja California. The industry in this country is practically confined to California, the product in 1886 being reported worth over \$1,000,000.

RUBIDIUM—One of the rare metals, more precious than gold, occurs as a by-product of the lithia mines.


CACTACEAE.

Many people who have been acquainted only with the prickly pear and the cholla cactus of the plains—perhaps to the detriment of their epidermis, will be surprised to learn that over one thousand valid species exist, to which more than three thousand names have been applied by botanists and horticulturists.

Genus ANHALONIUM Lemaire.
ANHALONIUM FISSURATUM E.

Anhalonium Engelmanni Lemaire Cact 43 (1865).

Living Rock, found in Texas and Mexico. "Upper and exposed part of tubercle triangular in outline, convex, carinate and almost smooth below, convex and variously fissured and thereby verrucose above, sharp and crenate on the edges."—Engelmann.

Genus ASTROPHYTUM Lemaire.
ASTROPHYTUM MYRIOSTIGMA Lem.

The Bishop's Hood; an odd and beautiful spineless plant from Mexico, resembling a piece of carved stone.

Genus CEREUS Haworth.
CEREUS ALAMOSENSIS Coulter.

Sina borbona of Sonora; 2-8 feet high, 2-10 branches from the base with joints 1-4 feet long, flexuous or decumbent, often forming arches and rooting at the joints, and thus spreading over wide areas, sometimes 100 feet in diameter or more; ribs about 7, slightly tuberculated. The bright red flowers slightly resemble those of *C. fagelliformis*.

CEREUS BERLANDIERI E.

Stems 1½-6 inches long, an inch thick, bearing sweet-scented purple flowers 2-4 inches in diameter; a native of southern Texas and Mexico.

CEREUS COLUBRINUS Otto.

An erect growing Cuban plant, night-blooming, the fragrant white flowers 6 inches across.

CEREUS DASYACANTHUS E.

Plant 5-12 inches high, densely covered with numberless delicately colored spines, and bearing large showy orange yellow flowers. El Paso, Texas, and Mexico.

CEREUS EMORYI E.

San Diego's Velvet Cactus. This is one of the best-known of California cacti, the slender, thickly-set yellowish spines giving it a peculiarly beautiful appearance. The spines

on the young joints are shorter, soft and flexuous; the flowers are yellowish, followed by a small edible fruit.

CEREUS FENDLERI E.

A queer irregular caespitose plant of Arizona, New Mexico and Sonora, rarely more than 12 heads in a cluster, stems 3-4 inches in diameter and about 6 inches high, distinguished by the one usually black central spine, which often curves upward. Flowers magenta colored.

CEREUS GIGANTEUS Engelm.

The 'Suwarro' or giant cactus of Arizona and Sonora, 25-60 feet high, 1-2 in diameter; thickest about the lower third where generally the 2 or 3 alternate or sometimes opposite branches start, and from thence slightly taper toward the summit. Stems and branches marked by superficial transverse furrows, indicating, as it seems, the annual periods of growth, forming rings of 4-8 inches in height. Branches unequal, and always of less height than the main stem, mostly 5-6 feet long, with 12-18 ribs.

CEREUS GREGGII Engelm.

Gregg's night blooming cactus occurs in the arid regions of Southern Arizona, New Mexico, Texas, Chihuahua and Sonora, and is notable for its large tuberous root and slender inconspicuous stems, 1 to 3 or 4 feet high, a half inch in diameter. Flower 6 inches long, 2 inches in diameter, with pale, purple petals, followed by the smooth, oval, acuminate, scarlet fruit, succulent, crowned with the remains of the corolla, and supported by a distinct stipe of a bright crimson.

CEREUS PRINGLEI S. Watson.

The Cardon is the giant cactus of Lower California and Sonora, where it forms forests, attaining a height of 20 to 35 feet. The ribs are usually 13, and it differs from the giant cactus of Arizona (*Cereus giganteus*) in that the spine bearing areolae on the ribs are connected by wooly grooves. The trunk is often 3 to 4 feet in diameter; the older portions of the branches usually quite thornless. The dead wood is used for fuel, but otherwise this mammoth production of the desert seems to be without use.

CEREUS PACIFICUS E.

Cereus phoeniceus var. *pacificus* Engelm, MS.

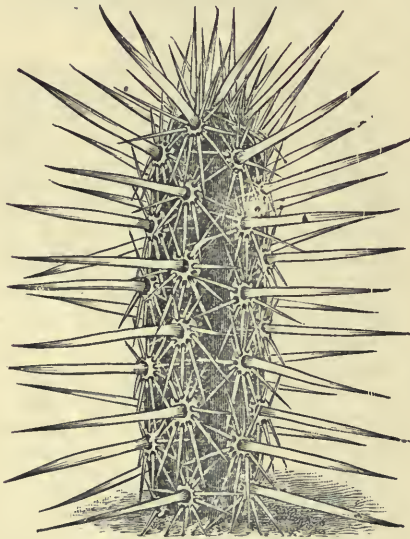
"Plant caespitose, 1-4 feet in diameter, red, pulpy, filled with black seeds. Utah, California, Baja California and Arizona.

"Plant caespitose, 1-4 feet in diameter, red, pulpy, filled with black seeds. Utah, California, Baja California and Arizona.

few to 500 short stems (6-9 inches long and 2-2½ inches in diameter) in each, forming dense oval cushions; stems with 10-12 obtuse ribs, shallow intervals, and an equal number of internal ligneous fibers; radial spines 1-12 and of an average length of one-fourth inch, the 4 central spines larger, three-fourths to 1 inch long, slender, white; flower an inch across, including the ovary 1½ inches long, the oblong spatulate sepals bright red with a broad purplish mid vein; ovary and fruit with 25-30 spiny areolae; fruit fleshy with numerous small seed; stamens slender, as long as sepals; anthers small, red; style three-fourths inch long, stigmata 6-8, greenish."

—Or W 2:46 (Je 1886).

Type locality. near Todos Santos bay, Lower California.



CEREUS PUGIONIFERUS Lem.

CEREUS ENGELMANNI Parry.

Engelmann's cushion cactus. Heads several (sometimes, though rarely, a hundred,) 4 to 12 inches high, cylindric or ovate, with 11 to 13 ribs bearing bunches of about 13 pale radiating spines, and about 4 darker (yellow, brown or black), stout and angular, straight or curved central spines, 1 to 3 inches long. Flowers very numerous, bright magenta, often 4 inches across, followed by delicious fruits, with much the same flavor of a strawberry,



TOMATO GROWN ON TRELLIS.

The accompanying figure shows the yellow plum tomato, growing on a trellis, eight feet high.

CEREUS GUMMOSUS Engelm.

The pitahaya agria, or cord-wood cactus, of Lower California, is noted for its large, bright, scarlet fruit, possessing a delicious flavor, pleasantly acid, like a strawberry, the pulp the color of a ripe watermelon, with the small black seeds scattered throughout. The flowers are 4 to 5 inches long, purple, and quite handsome. The stems are 4 to 10 feet high, 3 to 5 inches in diameter, armed with stout angular, blackish spines.

CEREUS ERUCA Brandegee.

"Prostrate, very rarely branched, 13-ribbed, 3-4 feet long, 3-4 inches in diameter; rooting from the under side of the

older growth, decaying at one end and growing forward at the other, generally in patches of 20-30, probably originating from a common center; areolae 4-6 mm in diameter, separated about the same distance; spines about 20, stout, ash-colored, less than an inch long, the exterior cylindrical, the interior stouter, angular, somewhat and the lower central one much flattened, more than an inch long, angular, strongly reflexed. Common on the sand of Magdalena island and about San Jorge, Baja California. Its local name is 'chilno'a.' The manner of growth, with upright heads and prominent reflexed spines, gives the plants a resemblance to huge caterpillars."—Lrandege, Cal ac pr sr 2, 2:163, t 7.



ECHINOCACTUS SIMPSONI Engelm.

CEREUS RIGIDISSIMUS Engelm.

Cereus pectinatus, var? *rigidissimus* E Am ac pr 2:279; Mexican boundary R, 31; collected writings 136, 195.

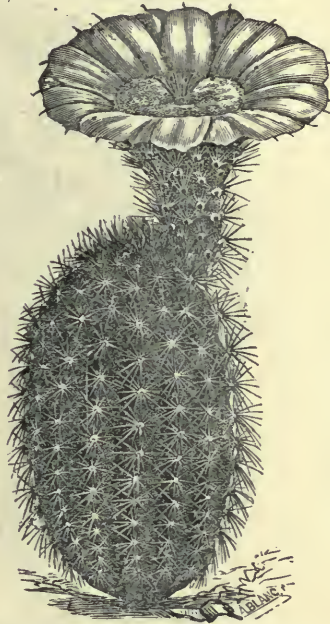
Echinocereus catalogs.

The Rainbow Cactus of Southern Arizona and Sonora is noted for the beautiful and varied coloring of the all radiating and interlocking, extremely rigid and acute spines, the latest ones of each season being rose-colored, and the earliest ones a pale yellowish, thus forming variegated rings around the stems. Flowers $2\frac{1}{4}$ -3 inches high, 2 or 3 in diameter.

CEREUS THURBERI Engelm.

The Pitahaya Duke is an abundant species in Sonora and portions of

Lower California, also said to occur in southern Arizona. It grows from 5 to 20 feet high, many stems 6 to 10 inches in diameter from the same base, bearing greenish or reddish white flowers followed by large luscious fruit, rather too sweet it is said for northern palates. It was named in honor of George Thurber, a widely renowned botanist.



CEREUS DASYACANTHUS Engelm.

PELECYPHORA ASELLIFORMIS Ehrenb.

The Hatchet cactus is a little gem from Mexico, so-called from the shape of the tubercles. It bloomed in San Diego on May day, scarce $\frac{1}{2}$ inch in length and breadth, with thirteen bright magenta colored petals and seven or eight pale lavender sepals, the four stigmata white, style and filaments tinged with purple, and anthers bright orange. The largest plant among a hundred is but little over an inch in height and diameter, and in earlier days they were literally worth their weight in gold. The flowers are open only in sunlight.



VICK'S BRANCHING ASTER.

This when cut so closely resembles the chrysanthemum that only experts can distinguish, and as it flowers about six weeks earlier it is valued greatly by florists.



HIBISCUS SUNSET.

A perpetual blooming shrubby perennial, with deeply cleft leaves, producing bell-shaped flowers 6 to 9 inches in diameter, of a deep cream color, with a velvety maroon center, and a dark maroon blotch at base of petal.



CEREUS COLUBRINUS Otto.

CEREUS VIRIDIFLORUS Engelm.

The Green-flowered Cereus of the Rocky Mountains is especially beautiful on account of the red, purple and white spines with which the plant is covered. Flowers numerous, quite large and showy, light-yellowish-green, very hardy and easily grown.



ANEMONE 'WHIRLWIND.'

A strong, perfectly hardy, double white anemone, 2½ to 3 feet high, flowers 2½-3 inches across. Originated with Jam. S. Vick's sons.

ECHINOCACTUS CHRYSACANTHUS O.

Globose to cylindrical, with about 18 ribs and 10 flexuous annulated central spines 2 inches long, and 4 to many slender white radial spines. Flowers satiny yellow, more rarely crimson. Cedros Island.

ECHINOCACTUS LECONTEI Engelm.

Plant 3-4 feet high, about one-third that in diameter, clavate; flower 2 inches long, lemon yellow. Type locality on the lower parts of the Gila and Colorado rivers, and in Sonora. The Mohave and Colorado Desert plants, usually referred to this species, seem to me distinct. This now seems to me distinct from either *E. Wislizeni* or *E. cylindrica* e.s.

Our colored portrait fairly well represents a young plant from Arizona, but does not show the distinguishing characteristics.

MAMMILLARIA DIOICA K. Brandg.

M. Goodridgii Engelm. n. (not Scheer?), small globular species, closely set with brownish or white spines, the central one curved into a hook. The delicate yellowish white flowers are succeeded by the club-shaped, scarlet berries that possess the flavor of wild-wood strawberries, and are sometimes called "hep-pitallas," the "llavina" of the Mexicans.



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From col. F. M. Woodruff

MOORNING DOVE.

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California Art & Nature

PIGEONS AND DOVES.

These names are clearly synonymous, pigeon being usually applied to the larger and dove to the smaller species of Columbæ. This family is found throughout the tropical and temperate parts of the world; the center of abundance being New Guinea and the Malay Archipelago, where more than one third of the known species occur. More than three hundred species have been described, about eighty of these being found in North and South America, or about the number known from the island of New Guinea alone.

The breeding season of most species is protracted, several broods being reared annually as is necessary from the small number of eggs in a clutch, which is often but one though usually two. The nests are frail affairs and are commonly placed in bushes or trees at a moderate height. Some species occasionally nest on the ground. The young are reared in the nest. Their growth is rapid.

"Gentle as a dove" is an old saw, but the fact is that doves and pigeons are irascible and often pugnacious. The food is seeds, fruits and nuts. The flight is rapid, powerful and sustained, and is often accompanied with a whistling sound. The gait is a walk.

The best known Californian species is the Mourning Dove, sometimes called the Turtle Dove and Carolina Dove. This species is found in nearly all parts of the United States, migrating north in summer to the southern parts of British America, and south in winter to the West Indies and Central America. Mourning Doves are found in greater

or less numbers in the valleys of southern and central California at all times of the year, but leave the cooler parts of the State in winter. Their breeding season is March to September. The nests are sometimes placed on the ground but commonly in trees or shrubbery. As game birds they are shot in quantities in autumn.

Their common name is derived from their cooing notes, which have a mourning sound to most human ears, but doubtless are really a manifestation of the bird's happiness or pleasure.

Another well known Californian species is the Band-tailed Pigeon which is most common in the foothills and mountains, feeding largely on acorns and berries. This is our largest pigeon and is much persecuted by gunners until it has become very wild and wary. Band-tailed Pigeons are irregularly migratory, moving about as the food supply varies and sometimes apparently from mere caprice, being occasionally plentiful in a locality and then scarce for years. They are commonly found in flocks except in the breeding season, these flocks sometimes numbering many hundreds.

Their breeding season is long. I have found their eggs as early as March and as late as August. Their nests are placed on branches in the middle or lower part of deciduous or coniferous trees. Their notes are much hoarser than those of mourning doves.

Two more species are found in the extreme southeastern part of the State in the Colorado valley; these are: The White-winged Dove, intermediate in size between the two preceding species, and

The Mexican Ground Dove, a miniature of the Mourning Dove, being but little larger than a sparrow. These are summer residents only, and are not common on the California side of the Colorado River.

FRANK STEPHENS.

MINERALS.

ANTONITE—A talc-like mineral, recent sulphuric acid.

ACTINOLITE—Abundant in the Colorado desert.

AGATE—Occurs in various forms in Southern California, but not in commercial quantity. The world's supply is principally received from Uruguay and Brazil, which is mainly cut and polished in Germany.

ALABASTER—An abundance of apparently good quality of this form of gypsum occurs on the Colorado desert, and in Baja California.

ALLANITE—Named for T. Allen, who discovered it among minerals from East Greenland, contains the rare metals cerium, didymium, glucinum, lanthanum, and yttrium, together with alumina, silica, lime, and iron, with traces of magnesium, manganese, soda, copper, and water. This occurs in Pennsylvania, New Jersey, and in Southern California.

ALMANDITE—Red garnets are not rare in the California placer mines. Some few crystals of gem value have been produced in San Bernardino county; the finest having been valued as high as \$50 apiece. In the placer mines in Lower California the garnets were formerly saved, and sold for \$5 per pound—being popularly called rubies—like the garnets of Arizona and New Mexico, which are said to be much superior to the "Cape Rubies" by artificial light.

ALUM—See kalinite.

AMAZONSTONE—A beautiful semi-precious stone of the feldspar group; the finest specimens of which come from Pike's Peak, Colorado. Has been reported from Baja California, but I have seen no specimens in proof.

AMBER—See succinite.

AMBLYGONITE—Associated with lepidolite in the lithia mines of the county.

AMETHYST—Deep purple, bluish violet fading almost into pink, crystalline variety of quartz. Colorado yields many fine specimens. May be expected to occur in some of the mines of the Colorado desert.

ANGLESITE—Sulphate of lead has been reported from the Colorado desert in some abundance; composition about 73.6 per cent oxide of lead, and 26.4 per cent discovered in a copper mine at San Antonio, Baja California, not far from Todos Santos bay. It was formerly shipped to New York and used in the manufacture of decorative papers.

ARGENTITE—Silver glance is composed of about 87.7 per cent silver and 12.9 per cent sulphur. One of the most valuable of silver ores.

APATITE—Phosphate of lime has been reported from the property of the San Jacinto tin mining company.

ASBESTOS—A four-foot vein seven miles east of Elsinore, Cal., has been worked to a considerable extent, and the product manufactured into boiler covering, etc. Other deposits exist in the mountains bordering the Colorado desert on the west, but the demand on this coast seems not to justify their development at present.

ASPHALTUM—Occurs native at various points along the coast from San Diego northward. California produced in 1896 nearly 75,000 tons, worth about half a million dollars.

ATACAMITE—A native oxychloride of copper, originally found in the form of sand, in the desert of Atacama, between Chili and Peru. A specimen received of Emiliano Ybarra from a mine near Calmalli, Baja California, is identified as this species.

AZURITE—"Mountain blue" (blue carbonate of copper) occurs sparingly in some of the copper mines of Southern California. One of the most beautiful of copper ores, magnificent specimens of which have been produced by the copper mines of Arizona. Composition about 69.2 per cent copper oxide, 25.6 per cent carbonic acid, and 5.2 per cent water.

BARITE—Barytes or heavy spar is composed of about 65.7 per cent baryta and 34.3 per cent of sulphuric acid. The present supply in the United States is excessive of the demand.

BERYLS—Quite equal to those from the Ural mountains have been produced in Maine and North Carolina.

BIOTITE—Black mica occurs in various localities in Southern California and in Baja California.



CANAIGRE

BOLEITE—A rare mineral described from the copper mines at Santa Rosalia, Baja California, on the west coast of the Gulf of California. Occurs in perfect cubes.

BORAX—Originally obtained from a lake in Thibet; composition about 36.6 per cent boric acid, 16.2 per cent soda, and 47.2 per cent water. Of a white color, sometimes grayish, or with a shade of blue and green. The deserts of California and Nevada produce annually about half a million dollars' worth, the product in 1896 being 13,508,000 pounds, worth \$675,400.

CALCITE—Carbonate of lime, consisting of lime and carbonic ac.d. Rhombohedral in crystallization. In-

cludes marble, limestone, calcareous tufa, etc. The cement rock of San Diego county (notably in Jamul valley) is a form of calcite, especially adapted for the manufacture of cement. Thino is another form.

Limestone occurs abundantly in various places in Southern California, and is mined at Colton and San Jacinto.

Marble occurs in San Diego county in various colors, but the quarries are as yet wholly undeveloped. Some delicate yellow marble—the most highly prized color among the ancients—occurs on the Colorado desert.

Ophiolyte, or Verd-Antique marble, occurs on the Mojave desert, where large quarries of this beautiful and highly prized ornamental stone have been partially developed.

CERARGYRITE — "Horn silver" (chloride of silver), composed of about 75.3 per cent silver, and 24.7 per cent chlorine, weighs 345 pounds per cubic foot, 5.8 cubic feet making a ton.

CHALCEDONY — An uncrystallized translucent or clouded variety of quartz, white, yellow, brown or blue (usually whitish), having a luster nearly like wax. When arranged in stripes or layers of different colors it constitutes agate; and if the stripes are all horizontal, it is called onyx. Portions of the Colorado desert in San Diego county are strewn with water-worn fragments of chalcedony of different colors, acres of the mesa-like formation, near the boundary line between the United States and Mexico, being covered with pebbles of every conceivable color and as smoothly laid as a piece of mosaic work.

CHALCOPYRITE — Copper pyrites exist in large deposits in Baja California, and a mine of this ore is now being developed near Encinitas.

CHRYSOCOLLA—Silicate of copper, composed of 45.2 per cent copper oxide, 34.3 per cent silica, and 20.5 per cent water. Beautiful specimens of this ore occur on the Colorado desert, near the Colorado river, and in Lower California. It is sometimes mistaken for turquoise.

CHRYSOPRASE—The locality near Visalia, Cal., yielded to the value of \$400 in 1896, more than half of it for cutting, the rest for specimens.

Chrysoptase is a translucent, pale bluish-green or yellow-green chalcedony.



MAMMILLARIA ELEPHANTIDENS Lem.

CORUNDUM—Reported from Los Angeles county by Dana.

CYANITE—Large quantities of small crystals occur in the Cargo Muchacha district, on the Colorado desert. None of gem value have been yet discovered.

DENDRITE—"Footprints of the fern"; some beautiful specimens have been collected on the Mojave desert, by Mr. Ira J. Gray.

DIAMOND—A small stone was reported in 1898 as having been found in Baja California, about 50 miles south of Ensenada. Diamonds have not been found in such numbers and size in California as to render the search for them profitable, but no serious prospecting for them has yet been attempted. Itacolumnite or flexible sandstone, are alleged matrix of the diamond has been reported from San Diego county.

DUMORTIERITE: Reported by Durdan as occurring 25 miles from Ogilby, on the Colorado desert.

A beautiful variety is found near San Diego.

ERYTHRITE—Occurs at the Kelsey mine, near Compton, Los Angeles county, Cal., associated with an ore of silver and of cobalt in dark colored

earthy masses in a gangue of heavy spar. This occurrence was noted in 1881, and is described in the report of the state mineralogist for 1882, page 207, and in the fourth report, page 279.

FLUORITE—Colorado desert, in a massive form.

GALENA—Lead sulphide, composed of about 86.6 per cent lead, and 13.4 per cent sulphur, is one of the heaviest known ores, weighing 461 pounds per cubic foot, 4.34 cubic feet making a ton. It occurs in considerable abundance in some portions of the Colorado desert, carrying a greater or less quantity of gold and silver.

GARNET—See Almandine.

GILSONITE—A hydrocarbon, reported from Utah and Southern California.

GRAPHITE—Plumbago or black coal is a carbon like the diamond, with some iron oxide and clay. A good quality of this mineral occurs near the Jacumba valley, in San Diego county, California, in some abundance, but remains undeveloped. It also occurs in other parts of the country, but not in sufficient quantities to be of any commercial importance.

GYPNUM—Sulphate of lime, when pulverized the plaster of paris of commerce; when crystallized known as selenite; the finer granular variety is known as alabaster. Composed of about 32.5 per cent lime, 46.6 per cent sulphuric acid and 20.9 per cent water. Very abundant near Riverside, on the Colorado desert and Baja California.

HALITE—The salt fields of the Colorado desert, of San Quintin bay, and of Scammons Lagoon, Baja California, ensure San Diego an abundant supply aside from her own product, and promise to add considerably to our commerce.

HEMATITE—This iron ore occurs sparingly on the Colorado desert, in greater abundance on the Mojave desert and in Baja California, where the writer obtained some fine specimens of hematite in quartz in the Santo Tomas valley.

HYALITE, or Muller's glass—A variety of opal, is described by T. Beck as occurring in Beaver valley, Utah. A fine quality of this stone occurs near San Diego.

ITACOLUMNITE — Flexible sand-

stone has been reported from the Jacumba valley, but has not been seen by the writer.

JASPER—Baja California.

JET—A fine black jet, evidently in some quantity, is reported from the vicinity of Santa Fe, New Mexico.

KALINITE—Alum occurs in considerable abundance in the sulphur mines of Baja California, especially in the region of the Cocopah mountains.

KAOLINITE—The kaolin found at Cajon mountain, now being independently tested by the owners of the numerous claims, as a tractable and valuable attention, and so far seems to meet with favor. An analysis by H. Boediker & Co., gave the following result: Silica, 62.30 per cent; alumina, 20.50 per cent; iron (trace) .00 per cent; lime, 2.20 per cent; magnesia, .25 per cent; water, 11.60 per cent; moisture, 3.10 per cent. Rational analysis: Clay substance, 67.2 per cent; feldspar, 15.6 per cent; quartz, 17.2 per cent.

LEPIDOLITE—Lithia mica occurs in an immense deposit near the old mission at Pala—probably the largest and richest lithia mine in the world—upon which about \$4,000 were expended in development work during 1899. Lithia of American production—the product of this mine—was for the first time placed upon the market, and thus a new American industry inaugurated at the close of the century.

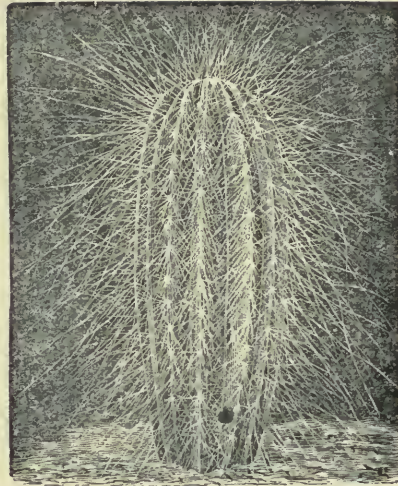
LIGNITE—A vein 4 feet thick, 12 miles north of San Diego, was reported by Dr. Le Conte years ago, but seems to have been since lost sight of and remains undeveloped.

LIMESTONE—About 11.5 cubic feet weigh a ton, or 174 pounds to the cubic foot. See calcite.

LIMONITE—Elsinore, Cal.

MAGNETITE—Occurs eight or nine miles north of Mesquite station, on the Colorado desert. I have also found magnetic iron ore in the mountains north of Salton; in the Encantada mine near Alamo (rich in gold), in the Santo Tomas valley, and at San Ysidro, Baja California.

MALACHITE—Green carbonate of copper, composed of about 71.9 per cent copper oxide, 19.9 per cent carbonic acid and 8.2 per cent water, forms the most beautiful of copper ores, at times becoming a semi-precious stone.



CEREUS HOPPENSTEDTII.

The finest specimens are probably found in the Ural mountains, but magnificent masses have been mined in Arizona and it usually occurs in copper mines where azurite, chrysocolla or cuprite are present, in the Colorado and Mojave deserts, and in Baja California.

MICA—The mica of commerce is a form of muscovite, but no mine in San Diego county has yet become a producer. See biotite, lepidolite, and muscovite.

MOLYBDENITE—Composed of 60 per cent molybdenum and 40 per cent of sulphur; a soft, black lustrous, foliated mineral, often mistaken for graphite. Occurs sparingly in granitic veins near the Jamul and Jacumba valleys and at Campo, in San Diego county, and in Baja California, but not yet known to occur in this region in paying quantity. The United States produced this mineral for the first time commercially in

MUSCOVITE—Common throughout the granitic formations.

ORTHOCLASE—Feldspar is not rare near Ballena, and occurs at Julian and in Baja California in considerable quantity, and of a quality suitable for the manufacture of fine ware.

1898—about 10 tons, worth \$59 per ton.

OSTRIDIAN—Reported to occur in immense quantities near the head of the

Gulf of Cortes, in Baja California. I have found small fragments in San Diego county, evidently brought from a distance by the Indians, who valued volcanic glass for the manufacture of arrow and spear points.

OPAL—Occurs on the Colorado desert, and also credited to the limits of the city of San Diego, but only the inferior varieties are yet known in California. Banded opal has been described as occurring in Beaver valley, Utah, some three miles from Granite Peak. See hyalite.

PECTOLITE—"A silicate of aluminum, calcium, and sodium." Has been reported as occurring in Southern California.

PERIDOT—New Mexico.

PLATINUM—This metal is found only in metallic condition, sometimes alloyed with iridium or osmium. A nugget weighing nearly two pounds (only $2\frac{3}{4} \times 3$ inches in size) from Colombia, South America, has been reported as the largest in America, with an intrinsic value of \$350. It contained 85 per cent pure platinum and 15 per cent of gold, palladium and rhodium, and had a bluish-white lustre. This metal is almost as soft as copper and as ductile as gold. It can be rolled so thin that a thousand sheets in a pile would not exceed an inch in height.

PLUMBAGO—See graphite.

PREHNITE—San Ysidro, Baja California, associated with calcite.

QUARTZ—A cubic foot weighs 162 pounds, 12.34 cubic feet making a ton. Occurs in an endless number of varieties. See agate, carnelian, chalcedony, has been found by the writer near Jasper, etc.
Mesa Grande.

Silicified wood occurs in various parts of San Diego county, but in the greatest abundance and variety on the

Rose quartz in magnificent masses Colorado desert; while Arizona is noted for its Chalcedony park, where an entire forest is preserved in a beautiful agatized form.

Diatomaceous earth occurs on the sea coast near San Diego.

RHODONITE—"Between San Diego and Colton."

RUTILE—This rare mineral was discovered by the writer at Mesa Grande

SALT—See halite.

TALC—A foliated variety occurs at Elsinore, Cal. See antonite.

TOURMALINE—See achroite, Brazilian emerald, indicolite, rubellite and schorl.

The remarkable deposit at Mesa Grande, which developed in 1900 many fine translucent, or even transparent, large, separate crystals with perfect prisms and terminations has not failed to arouse the cupidity of man—as has frequently been the case with discoveries of gems. Litigation has therefore attended its further development this year, but 1901 has seen it produce from \$25,000 to \$120,000 or more in gems and precious stones—according to the various reports that have been circulated—only a small part (as usual) going to those who proved its value. The gangue of Mesa Grande tourmaline is generally white, opaque quartzite, the crystals penetrating it in all directions. Some occur in lepidolite which occurs in larger and more brilliant scales than in the well-known locality at Pala. Owing to the great variety of coloring, size, perfection and beauty, this locality has proved the most important yet found in the United States if not in the

The objects of this association are to further the systematic and scientific exploration of West America, and to foster and promote in every legitimate manner the various branches of the mineral industries. There are hundreds of undeveloped mineral properties in the western United States and Mexico, containing gold, silver, copper, iron, lead, and other metals, or valuable minerals, waiting for some one with capital and business judgment to turn them into paying mines. No investment yields better returns than a good mine. But there are thousands of alleged mines or prospects, and many fortunes have been spent on worthless claims, while valuable properties are often ignored for years, until chance or education reveals their value.

TURQUOISE—Reported from the Colorado desert, but no specimens have as yet been seen by the writer. Certain copper ores are easily mistaken for this stone. Mines of this gem of great extent are being worked in the Mojave desert region northwest of Vanderbilt.

WULFENITE—Very fine crystals of molybdate of lead were obtained by the writer in 1888 from some of the mines north of Salton, in the Colorado desert.

(analysis by Mr. Curry, of Pittsburg, Pa).

C. R. ORCUTT.

MOHAVE DESERT IRON MINES.

About 16 miles due south from a point midway between Newberry and Hazitt stations, 275 miles from San Diego, Cal., and 180 miles from Los Angeles, Cal., by the Santa Fe route, occurs probably the largest deposit of iron ores on the Pacific Coast. It is variously estimated by conservative men that fifty to one hundred million tons of magnetic and hematite ores lie above and convenient to a suitable railway grade, which can be quarried rather than mined—if we restrict the word mining to the English sense of underground workings.

The chief chemist of the U. S. Geological Survey, after an examination of the magnetite, says: "A very high grade of magnetic ore with but a trace of titanium."

Prof. Pierce de P. Ricketts, the well known ex-chief of the school of mines and metallurgy, of Columbia College, New York, secured the following results from an examination made for the following elements only: Metallic iron, 63.48; Manganese, .038; Sulphur, .076; Titanium, .01; Phosphorus, (trace) per centum.

Prof. Woulfe, chemist of the Union Iron Works, San Francisco, Cal., secured the following results from a car load each of the Magnetite (M) and Hematite (H): Sesqui oxide of iron, M 68.8, H 81.94; Proto oxide of iron, M 25.5, H 8.23; Alumina, M 2.843, H 3.24; Manganese oxide, M .52, H .43; Lime, M .72, H .82; Magnesia, M 3.81, H 3.18; Phosphorus anhydride, M .013, H .036; Sulphur, M .033, H .47; Silica, M .845, H .061 per centum.

Samples of surface ores from all the workings, aggregating 50 lbs., gave: Iron, 66.25; Silica, 1.65; Lime, 1.35; Magnesia, 3.3; Sulphur, .031; Phosphoric acid, .554; Tartaric acid, 0; Alumina, .81; Manganese, .25; Iron protoxide, 72.21; Iron proto oxide, 20.13; Manganese oxide, .39; and Phosphorus, .024 per cent.

METALS AND ORES.

ANTIMONY—An ore carrying about 33 to 40 per cent of this metal, and from \$5 to \$30 per ton in gold, occurs near San Diego, and awaits development.

CAESIUM—A rare metal contained in minute quantities in lepidolite. It would prove useful if an available supply existed.

LITHIUM.—Amblygonite, lepidolite, spodumene, and triphylite are the principal ores of this rare metal, the lightest known.



PELECYPHORA ASELLIFORMIS Ehrenb.

The Hatchet cactus is a little gem from Mexico, so-called from the shape of the tubercles. It bloomed in San Diego on May day, scarce ½ inch in length and breadth, with thirteen bright magenta colored petals and seven or eight pale lavender sepals, the four stigmata white, style and filaments tinged with purple, and anthers bright orange. The largest plant among a hundred is but little over an inch in height and diameter, and in earlier days they were literally worth their weight in gold. The flowers are open only in sunlight.

HEMAN CHANDLER ORCUTT
MEMORIAL COLLECTION.

A catalog of natural history specimens
presented to American schools by Chas.
R. Orcutt in memorium of his father.

II.

ACMAEA ASMI Midd.

Shell $\frac{3}{4}$ inch in width and height, $\frac{3}{4}$
in length; interior dark brown, almost
"black", rarely light brown at apex; out-
side dull brown, identical in color with
Chlorostoma funebrale, on which it fre-
quently occurs. San Diego, Cal. (Orcutt
1936); Todos Santos bay (Orcutt 1974), and
San Quintin bay, Baja California (Orcutt
1952).

ACMAEA PATINA Esch.

Var. CUMINGII Rve.

San Diego, Cal. (Orcutt 1933); Todos
Santos bay, Baja California (Orcutt 1973).

ARBACIA STELLATA Gray.

Lagoon Head, Baja California (Orcutt
254^o).

BALANUS LAMERI Asc.

Mediterranean sea (Egitt Orcutt 1839)?

CERITHIDEA CALIFORNICA Held.

Cerithidea sacata Gould.

Cerithidea pullata Gould.

San Diego, Cal. (Orcutt 1806).

CHAETOPLEURA COLUMBIENSIS

Cpr.

San Juan, Gulf of California (Orcutt
1968).

CHAETOPLEURA CONSPICUA Cpr.

San Diego, Cal. (Orcutt 195).

CHITON DENTIENS Gld.

San Diego, Cal. under small stones (Or-
cutt 1824).

CHLOROSTOMA RUGOSA A. Ad.

Guaymas, Sonora (Orcutt 1799).

CORBULA LUTEOLA Cpr.

San Diego, Cal. (Orcutt 191).

CYTHEREA CHINONAEA Uke.

Lagoon Head, Baja California (Orcutt
1750).

ECHINARACHNIUS EXCENTRICUS

Val.

San Diego, Cal. (Orcutt 1934); Lagoon
Head, Baja California (Orcutt 2552). Flat
Sea Urchin; 'sand dollar'.

ENCOPE CALIFORNICA Verrill.

Lagoon Head, Baja California (Orcutt
2551).

FELANIA SERRICATA Rve.

Lagoon Head, Baja California (Orcutt
1747).

LITORINA PHILIPPI Cpr.

Santa Rosalia, Gulf of California (Or-
cutt 1965).

LITORINA SCUTULATA Gld.

Todos Santos bay, Baja California (Or-
cutt 1970); San Diego, Cal. (Orcutt 1923).

LOTTIA GIGANTEA Gray.

'Owl limpet'—so-called from the inter-
ior markings frequently resembling the
outline of an owl; shell 3 inches long, $2\frac{1}{2}$
broad, $1\frac{1}{4}$ high, solid; dark brown mottled
with white, olivaceous when older, inter-
ior white with coffee brown markings,

marginated with very dark brown, 5-15 mm
wide, outer edge usually crenated with
white or light brown.

San Diego, Cal. (Orcutt 1935); Todos
Santos bay, (Orcutt 1881), San Quintin
bay (Orcutt 1980), and Lagoon Head, Baja
California (Orcutt 1985). Monterey, Cal.
(Stearns).

LUTRICOLA ALTA Conr.

San Diego, Cal. (Orcutt 1922).

MYA ARENARIA Linn.

Mya Hemphilli Newcomb.

San Francisco bay, Cal. (Henry Femp-
hill, N 1874). Washington. Accidentally
introduced on the Pacific coast, from the
Atlantic seaboard, and variously known
as the "soft-shelled," "squirt," "long-
necked" clam, and "mananose." An im-
portant food species.

San Francisco bay, Cal. (Stearns, Or-
cutt 1866).

NERITINA RECLIVATA Say.

Tampa bay, Florida (Stearns, Orcutt
1967).

NUTTALLINA CALIFORNICA Rve.

Nuttallina scabra Dall U S Na Mu pr 1'

2 9', 393.

Cr U S Na Mu pr 8: 5'4.

Alaska (?) to Baja California (Orcutt).

Monterey, Cal. (Stearns 1 g t Orcutt
190').

OMPHALIUS FUSCESCENS Phil.

Todos Santos bay, Baja California (Or-
cutt 1778).

OMPHALIUS LIGULATUS Mke.

Guaymas, Sonora (Orcutt 1802).

OMPHALIUS RICHARDI Payr.

Cannes, France (1 g t Orcutt 192).

OSTREA AMARA Cpr.

Guaymas, Sonora (Orcutt 1796).

PECTEN AEGUISULCATUS Cpr.

Livorno; Monterey, Calif. to Santo Do-
mingo, Baja California (Orcutt).

Quaternary: San Diego, Calif. Borre-
go springs, Colorado Desert (Orcutt).

PECTEN MONOTIMERIS Conr.

San Diego, Cal. (Orcutt 1821).

PHASIANELLA COMPTA Gld.

San Diego, Cal. (Orcutt 1918).

PLANORBIS TRIVOLVIS Say.

San Diego, Cal. (Orcutt 1904).

PLEUROTOMA OLIVACEA Sby.

Guaymas Sonora (Orcutt 1970).

POLLICIPES POLYMERUS Sby.

'Goose barnacle'; San Diego, Cal. (Or-
cutt 2547).

PORTUNUS XANTUSI Sm.

San Diego bay, Cal. (Orcutt 1957). Todos
Santos bay, Baja California (Orcutt 1852).

PTERONOTUS FESTIVUS Hinds.

San Diego, Cal. (Orcutt 1760).

PTERORHYTIS NUTTALLI Conr.

Cerostoma nuttalli Conr.

San Diego, Cal. (Orcutt 1768).

PUPA STERKIANA Pils.

Abundant on Rocella trectera, on tide
lands near San Quintin bay, Baja Cali-
fornia (Orcutt 1322—co-types). First dis-
tributed as Pupa chertata Pr

SANGUINOLARIA NUTTALLI Conr.

San Diego, Cal. (Orcutt 1894).

SEPTIMER REURCATIS Rve.

San Diego, Cal. (Orcutt 1865).



Volume I. Number 5. April, 1902. Price 20 cents; \$2 a year.

California

Art & Nature

Art & Nature Company, publishers, No. 868 15th st., San Diego, California.





BRANDT'S CORMORANT.
(*Phalacrocorax penicillatus*).
About $\frac{1}{4}$ Life-size.

California Art & Nature

MEDICINAL PLANTS.

In the Mission days of California the Jesuite and Franciscan fathers and the early settlers found it necessary to rely upon their own resources and to become proficient in many trades and professions which in a more advanced stage of civilization are relegated to specialists. Medicine and surgery were sciences which naturally demanded the attention of every one, especially of the fathers who were virtually entrusted with both the spiritual and physical welfare of these primitive communities. At times, doubtless their limited stock of simple remedies ran low, and with the slow means of communication with other communities, and with Mexico and Spain, whence they drew their earlier supplies, they gladly availed themselves of the traditional knowledge of the virtues of native plants which obtained among the Indian population around them.

Among the Californian aborigines, as among most tribes of Indians, there existed so-called medicine men or doctors, who, by practicing on the superstitions of their fellows, and with the aid of their traditional knowledge of the virtues of certain plants—handed down from generation to generation of medicine men—followed with greater or less success the healing art.

Local remedies, however, are known and used every where in all climes and among all conditions of people, and unquestionably the simple formulae, comprised of harmless vegetable ingredients, as practiced among a normally healthful rural community, are more successful in the average cases, than the complicated combinations of

poisons administered by the old school physician.

WEST AMERICAN MOLLUSCA.

SCALA STEARNSII Dall.

Pliocene: Pacific Beach, San Diego, Calif. (Stearns, 1887).

Stearns, Wagner Free Inst tr III, pt 2:245 t 21 f 4 (1892).

SELENITES HEMPHILLI W. G. Binn.

Eastern Oregon; Washington.

SELENITES VANCOUVERENSIS Lea.

Large, whorls 5, the superior part of the last one flattened upon approaching the aperture, rounded beneath; bright yellowish-green, shining, roughly striate, with very slight revolving lines, suture moderate, umbilicus of moderate width and deep. Diameter 30 mm. Oregon; Washington; Alaska; western Idaho.

Macrocyllis vancouverensis Lea.
Tryon, Mong T M 33, t 3 f 6.

SPORELLA STEARNSII Dall.

"Shell of moderate size for the genus, inequilateral, not very convex, white, with an almost imperceptible yellowish epidermis; anterior dorsal margin nearly straight, the base parallel with it, the ends bluntly rounded; surface nearly smooth with faint incremental lines and microscopic sagrination; teeth normal, strong, the posterior cardinal prominent, vertical; ligament strong, external, on a nymph; resilum well developed, its area of attachment thickened; posterior adductor scar rounded, unusually large. Lon. 13.5, alt. 10, diam. 5 mm. One well-preserved specimen from the Gulf of California, exact locality unknown, is contained in the Stearns collection."—Dall, U S Na Mu pr 21: 885, 879, t 87, f 8, 12 (1899).

SUCCINEA STRETCHIANA Bland.

Keep, West Coast shells, 129.

Tryon, Monog T M 19, t 2 f 5.

Globose-conic, thin, pellucid, shining, striatulate; spire short, obtuse, suture well impressed; whorls 3, convex, last inflated; aperture roundly oval, columella arcuate, slightly thickened. Greenish horn color. Length 6.25, diameter 5 mm.

Sub-alpine Sierra Nevada, California and Nevada, 4,000 to 6,500 feet altitude.

MYSELLA ALEUTICA Dall.

"Shell small, solid, ovate, white, smooth, covered with a polished straw-colored epidermis with usually 3 or 4 concentric darker colored zones; beaks distinct, often eroded, ends and base rounded, valves moderately convex, teeth strong in the right valve, anterior adductor scar narrow and rather irregular, elongated, posterior rounded, pallial scar linear. Lon. 4.3, alt. 3.3, diam. 2 mm. Bering sea, the Aleutians, and east to Sitka bay, Alaska."—Dall, U S Na Mu pr 21: 892-3, 881, t 87 f 6 (1899).

MYSELLA TUMIDA Cpr.

Dall, U S Na Mu pr 21: 881, 892, t 87 f 7 (1899).

Tellimya tumida Cpr., Suppl R Brit Assoc 1863: 88, 97, 129 (1864). Phila ac pr 1865: 58.

Alaska peninsula, south to San Diego, California.

ERYCINA COMPRESSA Dall.

"Shell large, subquadrate, thin, moderately compressed, white, covered with a conspicuous, thin, wrinkled, partly glossy periostracum; nearly equilateral, the posterior end slightly broader, both ends rounded, the basal margin nearly straight; beaks inconspicuous, surface with strong, irregular incremental lines, but no radial sculpture; pallial scar rather wide and irregular, merging into the subequal, rather narrow adductor scars; resilium large, wide, and long, more or less calcareous ventrally, left valve with one obscure cardinal tooth, right valve with the tooth better developed; the right dorsal valve margins overlap those of the left valve a little, but there are no distinct lamellae. Lon. 13, alt. 13, diam. 6 mm. Dredged on muddy bottom in from 4 to 28 fathoms in the eastern part of Bering sea, south of Nunivak Island, the eastern Aleutians, and southward to Sitka, Alaska, by W. H. Dall."—Dall, U S Na Mu pr 21: 888, 883, t 87, f 1, 8 (1890).

ERYCINA RUGIFERA Cpr.

Dall U S Na Mu pr 21: 887, 880, t 87 f 4 (1899).

Pythina rugifera Cpr Supple R Brit Assoc 1863: 602, 643 (1864). Phila ac pr 1865: 57.

Lepton rude (Dall ms) Whiteaves R Progr Geol Surv Canada 1878-79: 198 B, f 2 (1880).

Lives attached to the abdomen of Gebia pugetensis Dane, a burrowing crustacean. Puget Sound.

MYSELLA PEDROANA Dall.

"Shell large, thin, rounded, rather compressed, white, with a concentric rugose pale-brownish epidermis (to which, in the type, adheres a good deal of blackish oxide of iron); beaks inconspicuous; surface with coarse, concentric, incremental lines; inequilateral; the posterior side short, dorsal margins merging roundly into the distal and they into the basal margin, which last is nearly straight; hinge feeble, the right anterior lamella elongated and very slender, the

posterior one shorter and stouter, the resilium subumbonal and very small; adductor scars small, the pallial scar linear. Lon. 9, alt. 7.3, diam. 3 mm. A single shell found on the beach at San Pedro, California."—Dall U S Na Mu pr 21: 893, 881, t 88 f 4 (1899).

MYSELLA PLANATA Dall.

Dall, U S Na Mu pr 881, 892 t 88 f 12 (1899).

Tellimya planata Dall, in Krause; Beitr Moll fauna des Beringsmeers, Arch f Naturg 51 pt 1: 34, t 3 f 6 a-d (1885).

Bering Strait, south to the Aleutians and east to the Shumagin Islands, Alaska.

SCHIZOTHAERUS NUTTALLII Conrad

Tresus maximus Midd.

Lutraria capax Gould.

Puget Sound to San Diego, California. Closely approaching the best oysters in taste, dress and dencacy.

**CACTUS NOTES.**

CEREUS CAESPITOSUS Engelm. The Lace Cactus, a beautiful little species, found in Texas and Mexico, with large magenta colored flowers, blooming when only 2 inches high, the flowers 2 inches across, and lasting 2 days. The plant is enveloped with fine white spines, and can be "handled without gloves."

OPUNTIA OCCIDENTALIS Engelm. A Prickly Pear of luxuriant growth, with stout woody stems and innumerable branches; joints 9 to 12 inches long and 6 to 8 inches across; flower yellowish and orange; fruit 2 inches long, very sour and juicy.

OPUNTIA LEPTOCAULIS D C. This is the widely advertised *O. frutescens*, Engelm., of Texas and Mexico; 2 to 4 feet high, with slender terete joints a fourth of an inch thick; very small yellow flowers; berries scarlet. Quite ornamental and a favorite with cactus fanciers.

OPUNTIA PROLIFERA Engelm. This densely-branching shrub bears a small flower of a pomegranate purple, and once grew in great abundance where the city of San Diego now exists.

CEREUS MAC DONALDIAE Hook. A handsome slender-stemmed species, of Honduras, Central America, and one of the finest of the night-flowering cacti. Flowers 12 to 14 inches across, with creamy white lanceolate petals, with an outer fringe of narrow yellow sepals; with a fragrance like vanilla.

CEREUS TRIANGULARIS Miller. The Strawberry Pear bears most beautiful flowers scarcely less handsome than *C. grandiflorus*, measuring 12 to 14 inches across; the bright scarlet fruit, the size of a goose's egg, has a flavor compared to strawberries; the plant is easily distinguished by its triangular stems, and makes a most luxuriant growth, climbing readily to the top of its support.

OPUNTIA SERPENTINA Engelm. Procumbent, with yellow flowers, comparatively rare in cactus collections.

OPUNTIA SUBULATA Engelm. A beautiful tropical species of rapid and rank growth, with persistent vivid green leaves, and long, straight spines.

BOTANY OF SOUTHERN CALIFORNIA.

FLOWERING PLANTS.

Phanogamous plants, bearing true fl (having stamens and pistils), and producing seeds which contain an embryo.

CLASS I.—DICOTYLEDONS.

Exogenous plants. Stema consisting of a pith in the center, of bark on the outside, and these separated by one or more layers of fibrous or woody tissue, which, when the stem lives from year to year, increases by the addition of new layers to the outside next to the bark. Embryo usually with 2 opposite cotyledons, or rarely with several in a whorl.

SUBCLASS I.—ANGIOSPERMÆ.

Pistil consisting of a closed ovary which contains the ovules and forms the fr.; cotyledons 2.

DIVISION I.—POLYPETALÆ.

Petals distinct, or nearly so (sometimes absent).

RANUNCULACEÆ.

Crowfoot family: herbs or woody vines with colorless usually acid juice, polypetalus, or apetalus with the sepals often colored and petaloid; sepals, petals, stamens & pistils all distinct; short: seed anatropous, embryo minute in firm fleshy albumen: stipules none.

Genus CLEMATIS Linnaeus.

Virgin's Bower: sepals petaloid, colored, valvate in the bud; pistils numerous; akenes many in a head; leaves opposite.

§.—Petals 0; sepals 4; styles becoming long feathery awns in fr.

CLEMATIS LIGUSTICIFOLIA Nuttall.

Nearly glabrous, stems sometimes 30 ft. long, leaves 5-foliate, leaflets broadly ovate to lanceolate, 1½-3 inches long, acute or acuminate, 3-lobed & coarsely toothed, rarely entire or 3 parted, fl dioecious, paniculate, sepals thin, silky, w, 4-6 lines long; akenes pubescent, tails 1-2 inches long. o-m n j Abundant along water courses in the foothills and mt up to 6000 ft. he 52. da 1 V. CALIFORNICA Wat.

Leaves silky-tomentose beneath, often small. z s—the Sacramento. he 52

CLEMATIS LASIANTHA Nutt.

Silky-tomentose, stems stout, elongated; fl dioecious, solitary, on rather stout 1-2-bracted peduncles; sepals obtuse, thickish, 6-10 lines long; akenes pubescent. b—Plumas Co.

CLEMATIS PAUCIFLORA Nuttall.

Silky-pubescent; stem rather slender, short-jointed; leaves short & fascicled; leaflets 3-5, only 3-9 lines long, cuneate-obovate to cordate, mostly 3-toothed or 4-lobed; fl solitary or few & panicled, on slender pedicels: sepals thin, 4-6 lines long; akenes glabrous. sj he 52

Genus THALICTRUM Tournefort.

Meadow rue: sepals 4-7, greenish or petaloid: imbricated in the bud, petals 0, akenes 4-15 in a head, tipped by the stigma or short style, grooved, ribbed, or inflated; ovule suspended; fl in corymbs or panicles; leaves alternate, 2-3-ternately compound; leaflets stalked. ¶
§1.—fl dioecious; anthers linear, acute or acuminate.

THALICTRUM POLYCARPUM S. Wat.

Rather stout, 2-3 ft high, glabrous: leaves with short petioles or the upper sessile: leaflets variable, ¼-1 inch long; lobes acute to acuminate: panicle narrow, often small, the staminate usually crowded on short pedicels: anthers acute, on very slender filaments: fr in dense heads, compressed, broadly oblong-obovate or obovate, abruptly acute, 2¼-3 lines long: seed linear, terete, nearly ¼ inch long. j-o he 54 da 1

THALICTRUM OCCIDENTALE A. Gray

Of similar habit as *T. polycarpum*, leaflets rather larger, panicles more slender and open, the staminate very diffuse with slender elongated pedicels, styles more attenuate: fr 1-6 in each head, narrowly oblong (3-4 lines long) and narrowed at each end: seed nearly ¼ inch long. b-w Parish 1484 b mts. he 54

§2.—fl usually perfect; anthers small, elliptic-oblong, obtuse.

THALICTRUM SPARSIFLORUM Turcz.

Slender, glabrous, 1-3 ft high, leaves sessile or nearly so; leaflets ¼-1¼ inch long, with obtuse often mucronate lobes; panicle loosely few-flowered; pedicels elongated; fring heads nodding, the large divaricate akenes strongly compressed, semi-obovate, shortly pedicellate, slightly nerved. b-Alaska, Siberia, Utah, Col.

Genus MYOSURUS Linnaeus.

Sepals 5, spurred at the base; petals 5, linear, on a slender claw, with a pit at its summit; stamens 5-20; akenes very numerous, crowded on a long and slender spike-like receptacle; seed suspended. Very small herbs, with a tuft of linear or spatulate entire radical leaves, and solitary flowers on simple scapes. @

MYOSURUS MINIMUS Linn.

M. shortii Rafinesque in Sill J 1:379.

Receptacle in fruit slender, 1-2 inches long; akenes blunt. Widely distributed in Europe, Asia, Australia and America; apparently indigenous in California.

Var. *APUS* Greene. Mesas, s.

Var *FILIFORMIS* Greene. Mesas, s.

MYOSURUS APETALUS Gay.

M. aristatus Bth [vide G Torr cl b 13 2].

Receptacle in fruit oblong or linear, 2-8'' long; akenes long-beaked; less than 2' high. Utah; Chili; mesas, s.

Genus RANUNCULUS Linnaeus.

Crowfoot; sepals usually 5; petals 3-15, each with a small scale or pit at the base inside; pistils numerous; akenes in a head, usually flattened, beaked with the persistent style. Herbs, mostly perennial, of somewhat varied habit; fl either solitary or somewhat corymbed.

§ I.—BATRACHIUM.

RANUNCULUS AQUATILIS Linn.

Submerged, finely divided leaves.

The section *Batrachium* is treated as a genus by Darwin in *Bot. studies* 460, the 2 following varieties being referred to *B. trichophyllum* Bossch prod fl bot 5.

Var. **TRICHOPHYLLUS Chaix.**

Stems long, coarsely filiform; peduncles 1-2' long; fl 3-5'' in diameter; akenes numerous in a close globular head, which is 2-3'' in diameter. b-i.

Var. **CÆSPITOSUS DC.**

Stems short, growing in mud; segments of leaves ligulate, 1'' or more long; fl 2-3'' in diameter. j

§ 2—**HALODES Gray.** Like § 3, but mature carpels thin-walled and utricular, the sides nerveose; scapose and flagelliferous.

RANUNCULUS CYMBALARIA Pursh.

Greenland, Asia, North and South America.

§ 3 **EURANUNCULUS Gray.**

Petals (with nectariferous pit and scale, usually yellow) and sepals deciduous, the sides nerveless, not transversely rugose.

* Perennial by rooting from the nodes of creeping or the lower nodes of ascending stems, wholly fibrous rooted.

RANUNCULUS HYDROCHAROIDES G.

Southern California east of the Sierra (Kellogg), z

R. **FLAMMULA L.**

Var. **REPTANS E. Meyer.**

Southern California (Parish 996).

* * Thickened-fibrous and fascicled

roots, terrestrial; stems short, erect or assurgent, not rooting from nodes above ground; mature akenes turgid, and with introrsely apical or subapical rather subulate beak.

RANUNCULUS ALISMAEFOLIUS Gyr.

Idaho—Ca. R. *bolanderi* Ge Ca ac b 2:58 fide G

† Heads of carpels in fruit oblong or cylindrical; akenes more turgid, rounded, or at least obtuse on the back.

RANUNCULUS ESCHSCHOLTZII Schl.

†† Petals only 5; styles uncinately recurved, shorter than the ovary, broad and flat.

RANUNCULUS CANUS Benth.

b mts. (Parish 1542).

‡ Lax or weak stemmed, petals 6-15; herbage hirsute or pubescent.

RANUNCULUS CALIFORNICUS Benth.

Erect or nearly so, 12-18 in. high, more or less pilose; radical leaves commonly pinnately ternate, leaflets laciniately 3-7 lobed; fls 5-10 lines in diam. with 10-14 narrowly obovate petals, & shorter reflexed sepals; akenes much flattened, with sharp edges, nearly 2 lines long; beak short & curved; heads compact, ovate or globular.

This Californian buttercup is the most abundant species of the genus in the state, 'where low grassy hills are often yellow with the shining fls in early spring.' Cuyamaca mountains.

Var. **LATILOBUS Gray.**

The common, coarse-leaved, more robust form.

RANUNCULUS HEBECARPUS Hook. & Arn.

Slender, 3-18 in. high, erect or procumbent; lower leaves ternate or 3-parted, leaflets cuneate at base & 2-3-lobed, upper ones more divided; akenes few, papillose-scabrous, with hooked hairs; fls minute, petals 5, a line or less long.

Var. **PUSILLUS S. Wats., Bot Calif. i, 9, 1880.**

'Stems very slender & filiform, weak & ascending or procumbent, 3-6 in. long; leaves reniform crenately 5-lobed or parted.'—Watson.

R *BONARDI* Ge *Erythraea* 3:54

Var *douglasii* Davis Or d—reported by Rose.

Genus ACTAEA Linnaeus.

'Baneberry. Sepals 4-6, nearly equal, petal-like, falling off early. Petals 4-10, small; Stamens numerous. - Pistils single; stigma sessile, 2-lobed. Fruit a many-seeded berry. Seeds smooth, flattened, packed horizontally in 2 rows. Perennial herbs, with 2-3-ternately compound leaves. Root usually tuberous or thickened. Fls. in a terminal short raceme. Species perhaps 2, belonging to the cooler regions of the Northern Hemisphere.'—Wats. Bot. Calif. i, 12.

ACTAEA SPICATA Linn.

Var. ARGUTA Torrey.

A. arguta Nutt.—Rare in Calif.—Alaska.

Genus **AQUILEGIA** Tournefort.

Columbine: sepals 5, regular, colored and petal-like deciduous. Petals 5, all alike, with a short, spreading lip, and produced backwards into a long tubular spur; stamens numerous, the outer ones long & exserted, the inner ones reduced to thin scales; pistils 5; styles slender; ovaries several-ovuled, becoming pointed several-seeded follicles in fruit. Glabrous perennial branching herbs, with 2-3 ternately compound leaves, the leaflets lobed; fl showy, terminating the branches.

AQUILEGIA TRUNCATA Fisch. & Mey.
Genus **DELPHINIUM** Tournefort.

Larkspur: Cal. species are all perennial with showy fl: sepals 5, colored, petaloid, very irregular, the upper one prolonged backwards at the base into a long spur: petals 2-4, irregular; stamens many, pistils 1-5; fr of 1-5 dehiscent, many seeded follicles. Erect herbs, with palmately-veined, lobed, or dissected leaves, and racemose fl.

*Blue (at least not red) fl.

DELPHINIUM CONSOLIDATA Linn.

DELPHINIUM DECORUM Fisch-Mey.

Very handsome dark indigo blue fl, js north to Mendocino county.

DELPHINIUM PARISHII A. Gray.

DELPHINIUM PARRYI A. Gray.

DELPHINIUM SIMPLEX Dougl.

DELPHINIUM VARIEGATUM T. & G.

**Red flowered.

DELPHINIUM NUDICAULE Torr-Gray.

$\frac{1}{2}$ -2° high or more; Mendocino county
DELPHINIUM CARDINALE Hook.

Few—15 ft. high, stout, nearly glabrous: leaves large, 5-7-lobed nearly to the base, the divisions deeply 3-5-cleft with narrow long-acuminate segments: fls. bright scarlet with yellow center, large, produced in showy panicle Quite hardy.

Genus **PAEONIA** Linnaeus.

PAEONIA CALIFORNICA Nutt

Restricted in its distribution (Greene, Garden and Forest 3:356) to Southern and Lower California. Glabrous but not glaucous, leaves twice or thrice as large as in P. brownii, of rounded and pedate general outline. Grows in dry, rocky soil, from a few hundred, to two or three thousand feet altitude, where it is subjected to a

light fall of snow (Orcutt W 7:215). Without much floral beauty, though the luxuriant foliage makes it useful in some situations.

Paenonia Californica Nutt.—The root of the "Pionia" is considered valuable by the natives for the healing of sores on man or beast.

PAEONIA BROWNII Dougl.

Foothills j d b—usually distributed as brownii—perhaps running together. da 1, cv 4:8

Genus **CROSSOSOMA** Nuttall.

C. BIGELOVII Watson.

Genus **ANEMONE** Linnaeus.

A. MULTIFIDA DC.

BERBERIDACEAE.

Genus **BERBERIS** Linnaeus.

BERBERIS DICTYOTA Jepson.

BERBERIS FREMONTII Torrey.

BERBERIS NEVINII A. Gray.

BERBERIS PINNATA Lagasca.

BERBERIS REPENS Lindl.

SARKACENIACEAE.

DARLINGTONIA CALIFORNICA Torrey

'Calf's head,' a striking perennial of curious aspect, the only representative of the family in Calif. Of a greenish yellow hue, bearing a nodding purplish fl. One of the Pitcher plants, noted for its alluring insects to their death.

PAPAVERACEAE.

PAPAVER CALIFORNICUM Gray.

PAPAVER HETEROPHYLLUM Greene.

PAPAVER LEMMONI Greene.

PAPAVER HETEROPHYLLUM Ge.

Genus **PLATYSTEMON** Bentham.

PLATYSTEMON CRINITUS Ge.

'Subacaulescent, the foliage, scapiform peduncles, & the calyx densely crinite-hirsute with w soft spreading hairs 3 or 4 lines long: fl buds exactly globose: corolla an inch broad, the petals deep greenish yellow, marcescent persistent: stamens innumerable: filaments widely dilated: carpels many, the short torulose pods scarcely longer than the persistent linear stigmas.'—Ge jitt 2 13. Kern county

PLATYSTEMON CALIFORNICUS Benth.

Slender branching annual, 2-12 in high, villous with spreading hairs: leaves 3-4 in. long sessile or clasping, broadly linear, obtuse: peduncles 3-8 in. long, erect: sepals villous: petals delicate sulphur yellow, shading to orange in the center, 3-6 lines long: carpels 6-25, aggregated into an oblong head, smooth or somewhat hairy, 5-1' lines long, beaked with the linear persistent stigmas, the 1-seeded divisions a line long: seeds smooth. Cal'ed 'Cream-cups' by the children Southern Utah, Arizona, Mendocino county to San Diego, & Baja (Calif. (Socorro).

PLATYSTEMON DENTICULATUS Gne.

Genus DENDROMECON Benth.**DENDROMECON FLEXILE Greene.**

Greene Bull. Torrey club, xiii. 216.

—Bull. Calif. Acad. Sci. i. 389:—Santa Cruz Island, on bushy hillsides everywhere; quite plentiful on the northward slope at no great distance from the shore. he 55

DENDROMECON HARFORDII Kellogg.**DENDROMECON RIGIDUM Benth.**

Shrub 2-8 ft. high, numerous slender branches, bark whitish; leaves ovate to linear-lanceolate, 1-3 in. long, very acute or mucronate, sessile or nearly so; twisted upon the base so as to become vertical, reticulately veined, margin rough or denticulate; flowers bright yellow, 1-3 in. in diam. on pedicels 1-4 in. long; capsules curved, attenuate above into the short stout style, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long; seeds $\frac{1}{2}$ lines long.

CANBYA CANDIDA Parry.

Scarcely an inch high, densely branched, the somewhat fleshy leaves & short branches closely crowded, fls w, petals 2 lin s'ons; named in honor of William M. Canby Or mj. G Am ac pr 251 t 1 (27 D 1876) Watson 2 429. he 55

Genus ROMNEYA Harvey.

Romneya coulteri Harv.—“A deadly poison.” “The whole plant is used, bruised and boiled and applied as a poultice or taken in liquor”—my notes do not state whereof its virtue consists. It will naturally be inferred, however, that its properties are similar to those of opium.

Half-hardy shrub, 6-15 ft. high, branching and flexuous, woody at base; leaves glaucous, thickish, petioled, 3-5 in. long, the lower ones pinnatifid, upper ones pinnately toothed; petioles and margins often sparingly ciliate with rigid spinose bristles; the magnificent wax-like fls. 6-9 in. across; petals broadly obovate; filaments $\frac{1}{2}$ in. long, bright yellow; purple at base; capsule oblong, 1-2 in. long, obscurely many angled, hispid with appressed bristles and crowned with the persistent stigmas; seeds black, a line or less long. Matilija poppy, named in honor of Dr. T. Romney Robinson, a noted astronomer. he 55

Genus PLATYSTIGMA Benth.**PLATYSTIGMA CALIFORNICUM B.-H.****PLATYSTIGMA DENTICULATUM Greene.**

Greene Bull. Torrey Club, xiii. 218.

—Bull. Calif. Acad. Sci. i. 389. My. 28, 1887: Santa Cruz Island. he 55

PLATYSTIGMA LINEARE Benth.**Genus MECONOPSIS Viguer.****M. HETEROPHYLLA Benth.****MECONELLA DENTICULATA Greene.**

“3-10' high; radical leaves entire, the laminal portion rhombic-ovate, acutish; cauline spatulate to linear, obtuse, sharply denticulate; petals narrowly oblong, 2" long; stamens 6-9. Temecula Canon, north of San Luis Rey, in San Diego county, Cal., March 27, 1885, by the writer.”—Greene, Bull. Cal. Acad. Sci., ii. 59 (Mar. 6, 1886).

Genus ARGEMONE Linnaeus.**ARGEMONE CORYMBOSA Greene.****ARGEMONE HISPIDA A. Gray.**

Is A platyceras L. & C.

ARGEMONE MEXICANA Linn.**ARGEMONE PLATYCERAS L. & O.****Genus ESCHSCHOLTZIA Cham.****ESCHSCHOLTZIA GLAUCA Ge.****ESCHSCHOLTZIA MARITIMA Ge.****ESCHSCHOLTZIA CAESPITOSA Bth.****ESCHSCHOLTZIA GLYPTOSPERMA Ge.**

“Wholly glabrous and very glaucous; stems very short; leaves much dissected, but short and compact; scape-like peduncles numerous, 6 inches high, terete, and rather stout; corolla as in [E. tenuifolia], but of a deeper yellow; seeds not reticulate, but deeply pitted and of an ash-gray color. A most peculiar species, collected in 1884, by Mrs. Curran, on the Mohave Desert. The seeds are remarkably unlike those of any other known Eschscholtzia.”—Ge Ca ac b 1:70 (7 Mr 1885).

ESCHSCHOLTZIA MEXICANA Greene.

“Annual, smooth and glaucous; foliage less finely dissected [than E. californica and E. peninsularis]; stems short; peduncles numerous, stout and scape-like; petals an inch long, yellow or cream color; torus short, obconical, the outer margin a sub-cartilaginous ring, the inner erect, scarious, with stout nerves; seed globular, apiculate, with coarse but rather faint reticulations.—E. Californica, var. parvula. Gray. Pl. Wright, 2.10. E. Douglasii, Torr. Mex. Bound, 31; Hems. Biol. Cent. Am. This plant ranges from the region of the upper Gila, in New Mexico, far southward into Texas and adjacent Mexico, and is apparently a very good species.”—Ge Ca ac b 1:69 (7 Mr 1885).

A rank-growing Eschscholtzia growing in the San Rafael valley, Lower California, with large reddish-orange colored flowers, was doubtfully referred to this by Prof. Greene.

E. LEMMONI Greene.

“Annual, 6-12' high, with numerous ascending branches, leafy below, hoary pubescent throughout, even to the capsules, with short spreading white hairs; leaves with elongated petioles; pedun-

cles stoutish, quadrangular, the earliest scapiform; torus urceolate, 3-4" long, nearly glabrous, constricted just below the narrow, erect hyaline border; calyptra ovate, long acuminate, very conspicuously hairy; petals orange-color, nearly or quite an inch long."—Greene. West Am Sci. iii, 157, Ag 1887. Mountains of San Luis Obispo county.

ESCHSCHOLTZIA MODESTA Greene.

"Annual, very slender and diffusely branching, a foot high, glabrous and moderately glaucous; leaves small, with few & narrow segments; pedicels axillary, an inch long or more, terete & very slender, nodding in the bud; bud 2 lines long, the permanent portion (torus, with no rim, nearly as long as the broadly ovate calyptra; corolla rotate-spreading, ½ inch broad; petals obovate, not meeting, the rounded apex erose or sinuate-toothed, or, in later flowers, deeply 3 lobed, pale y; stamens 8, in 2 rows on opposite sides of the pistil, or, in late fls, 4 only; anthers ½ line long, on slender filaments a line in length; pod 2 inches long, narrow, the valves thin; seeds globular, minute, reticulate; cotyledons very narrowly oblanceolate, entire. Collected by S. B. Parish in L. J. 1887 (No. 1951)—Ge Pitonia 1:169 (6 Jan 888).

ESCHSCHOLTZIA PARISHII Greene.

"Annual, slender, less than 1° high, glabrous and glaucous; stems simple or sparingly branched; peduncles terete, very slender; torus turbinate, no spreading rim, the 2 margins similar and approximate; petals widely spreading, broad and overlapping each other, apparently light y.; fr. not seen."—Greene, Bull. Cal. Acad. Sci., 1. 183 (Aug. 29, 1885).

ESCHSCHOLTZIA PENINSULARIS Gn.

"Annual, smooth and glaucous, slender, erect, much more branched than E. Californica, with corollas of 1-3 the size and more broadly campanulate; rim of torus broader in proportion, the inner margin a very short, nerveless, hyaline ring; seed slightly elongated and distinctly apiculate at each end, reticulations less regularly favose."—Greene, Bull. Cal. Acad. Sci., 1. 68-9 (Mar. 7, 1885); 1. c. 183.

ESCHSCHOLTZIA CALIFORNICA Chm.

The ♂ form; the ♀ plant is peninsularis.

ESCHSCHOLTZIA MINUTIFLORA S. W

Distinguished by its small fls: e.

ESCHSCHOLTZIA RAMOSA Greene.

Ge Torr el b 13: 217. Ca ac b 2: 389. Santa Cruz & Guadalupe Islands.

FUMARIACEAE.

Tender herbs, with watery and bland juice, dissected compound leaves, & perfect irregular hypogynous fls with the parts in twos, except the diadelphous stamens, which are 6; ovary and capsule 1-celled with 2 parietal placentæ: seeds, etc. as in Papaveraceæ.

Genus DICENTRA Borkh.

Corolla flattened, heart-shaped or 2-spurred at the base.

DICENTRA CHRYSANTHA H. & A.

Dielytra chrysantha H. & A. Bot Beech 320. Bikukulla chrysantha Cv 4:60.

Pale & glaucous, 2-5 feet high: leaves twice pinnate, the larger a foot long or more; the divisions cleft into a few narrow lobes: racemose panicle terminal, 1-2 ft long; sepals caducous: corolla linear-oblong or clavate, bright rich lemon y, over ½ inch long, base slightly cordate: capsule oblong-ovate or narrower—Lake county—j

DICENTRA OCHROLEUCA Engelm
L fl white.

CRUCIFERAE.

Genus ALYSSUM Tournefort.

ALYSSUM MARITIMUM Lam.

Lobularia maritima Desv. 'sweet alyssum' often cultivated for its fragrant fls., a native of the Mediterranean region in Europe, now widely naturalized in California.

Genus DRABA Linnaeus.

DRABA CORRUGATA Wat.

DRABA DOUGLASSII G.

DRABA UNILATERALIS Jones.

DRABA CUNEIFOLIA Nutt.

V. INTEGRIFOLIA Wat.

Genus CARDAMINE Linnaeus.

CARDAMINE INTEGRIFOLIA Gray.

LESQUERELLA PALMERI S. Watson.

"Pubescence dense, stellate-lepidote; caudex simple, apparently biennial, the simple stems 1° high or more; basal leaves narrowly oblanceolate, repand, the cauline narrower and mostly entire; petals spatulate, 3" long; pods pubescent,

ovate-globose to broadly ellipsoidal, erect on long spreading or ascending pedicels; style as long as the pod; cells 2-4-ovuled. Arizona (Palmer, 1872); Lower California (C. R. Orcutt, 1884).—S. Watson, Proc. Am. Acad., xxiii. 255 (May 29, 1888).

Genus ARABIS Linnaeus.

ARABIS ARCUATA G.
V. LONGIPES Wat.
ARABIS BECKWITHII Wat.
ARABIS FILIFOLIA Ge.
ARABIS LUDOVICIANA C. A. Meyer.
ARABIS PARISHII Wat.
ARABIS PERENNANS Wat.
ARABIS PERFOLATA Lam.
ARABIS PLATYSPERMA G.*
ARABIS PULCHRA Jones.
ARABIS REPANDA Wat.
ARABIS HOLBOELII Horn.
APHYSANUS PUSILLUS Ge.

Genus CAULANTHUS Watson.

CAULANTHUS AMPLEXICAULIS Wat.
CAULANTHUS COULTERI Wat.
CAULANTHUS CRASSICAULIS Wat.
CAULANTHUS INFLATUS Wat.
CAULANTHUS PILOSUS Wat.
CAULANTHUS PROCERUS Wat.
CAULANTHUS GLANDULOSUS Hook.

Genus TROPIDOCARPUM Hooker.

T. GRACILE Hook.
T. DUBIUM Dav.

Genus THELYPODIUM Endl.

T. INTEGRIFOLIUM Endl.
T. LASIOCARPUM Greene.
V. inalicium Robinson
T. STENOPE TALUM Watson.
T. WRIGHTII Gray.

Genus NASTURTIUM R. Brown.

N. CURVISILIQUA Nuttall.
V. laevis Watson
V. lyratum Watson
V. filipes G.
N. OFFICINALE R. Br.
N. OBTUSUM Nuttall
V. sphaerocarpum Watson

Genus LEPIDIUM Linnaeus.

L. BIPINNATIFIDUM Desv.
L. DICHYOTUM Gray
V. acutidens Gray.
L. FLAVUM Torrey
L. FREMONTII Watson.
L. LASIOCARPUM Nuttall
V. tenuipes Watson
L. INTERMEDIUM Gray

L. LATIPES Hook.

L. MEDIUM Greene

L. NITIDUM Nuttall

DENTARIA CALIFORNICA Nutt.

DITHYRAEA WISLIZENI E.

Genus CHEIRANTHUS Linnaeus.

CHEIRANTHUS ASPER C. & S.

Genus BARBAREA R. Brown.

BARBAREA VULGARIS R. Br.

V. ARCUATA Fries.

V. GLABRIOR Rob.

BISCUITELLA CALIFORNICA B. & H.
Is Dithyrea wislizeni E

Genus CAPSELLA Moench.

CAPSELLA DIVARICATA Walp.
CAPSELLA BURSA-PASTORIS Medic.
CAPSELLA ELLIPTICA C. A. Meyer.

Genus BRASSICA Linnaeus.

BRASSICA ADDRESSA Boiss.
BRASSICA ALBA Boiss.
BRASSICA CAMPESTRIS L.
BRASSICA NIGRA Koch.

Genus SISYMBRIUM Linnaeus.

SISYMBRIUM CANESCENS Nutt. da 2
SISYMBRIUM incisum E. da 2
V. HARTWEGIANUM Wat.
SISYMBRIUM REFLEXUM Nutt. Ore
SISYMBRIUM ACUTANGULUM D C. da 2
SISYMBRIUM DIFFUSUM G. cv 4 63
SISYMBRIUM OFFICINALE Scap. da 2

Genus ERYSIMUM Linnaeus.

ERYSIMUM ASPERUM DC. da 2 Or d
ERYSIMUM GRANDIFLORUM. Nutt.
ERYSIMUM INSULARE Ge.
STANLEYA PINNATIFIDA Nutt. da 2
E. pinnata Britton N Y ac tr 8:62. Cv 4:64

Genus STREPTANTHUS Nuttall.

STREPTANTHUS CAMPESTRIS Wat.
STREPTANTHUS HETEROPHYLLUS Nutt.
STREPTANTHUS LONGIROSTRIS Wat.
LYROCARPA COULTERI H-H.
LYROCARPA PALMERI S. Watson.
RAPHANUS SATIVUS Linn.
RAPHANUS RAPHANISTRUM L.
THYSANOCARPUS CONCHULIFERUS Ge.
Variety PLANIUSCULUS Robinson.
THYSANOCARPUS CURVIPES Hooker.
T. CURVIPES Hook. Ord
V. elegans Robinson.
V. pulchellus Greene
THYSANOCARPUS PUSILLUS Hooker.
THYSANOCARPUS LACINIATUS Nutt.
V. CRENATUS Br.

CAPPARIDACEAE.

Genus CLEOME Linnaeus.

CLEOME INTEGRIFOLIA Nutt.

Genus *CLEOMELLA* De Candolle.

CLEOMELLA BREVIPES S. Watson.
CLEOMELLA OBTUSIFOLIA T.-G.
CLEOMELLA OCCARPA A. Gray.
CLEOMELLA PARVIFLORA A. Gray.

Genus *ISOMERIS* Nuttall.

ISOMERIS ARBOREA Nuttall.
 Variety *GLOBOSA* Coville.

Genus *WISLIZENIA* Engelmann.

WISLIZENIA REFRACTA Engelmann.
WISLIZENIA PALMERI Gray

RESADACEAE.

Genus *OLIGOMERIS* Cambess.*OLIGOMERIS SUBULATA* Boiss.

CISTACEAE.

Genus *HELIANTHEMUM* Tournefort.

H. ALDERSONI Greene
H. GREENEI Rob.

"*H. occidentale*. Suffrutescent, a ft or more high, stout and much branched; stellate-hirsute throughout except the corymbose inflorescence, which is more densely hirsute, with simple, glandular-viscid hairs; leaves linear-lanceolate, an inch long, their margin more or less revolute; inner sepals 4'' long, ovate, acuminate, outer linear 1/2 as long; petals 5'' long; anthers about 20; capsule equaling the calyx. On a dry summit in the central part of the Island of Santa Cruz, growing there along with *H. scoparium*, which is common all over the island."—Geobot. 2:144.

HELIANTHEMUM SCOPARIUM Nutt.

VIOLACEAE.

Genus *VIOLA* Linnaeus.

VIOLA CHRYSANTHA Hook.
VIOLA PEDUNCULATA T. & G.
VIOLA LOBATA Bentham
 Var. *integrifolia* Watson
VIOLA AUREA Kellogg.
 V. *praemorsa* Dougl. is said to be an older name.
VIOLA BLANDA Willd.
VIOLA PURPURA Kellogg.

POLYGALACEAE.

Genus *POLYGALA* Tournefort.*POLYGALA CALIFORNICA* Nutt.Genus *KRAMERIA* Linnaeus.

KRAMERIA CANESCENS A. Gray.
KRAMERIA PARVIFOLIA Benth.
Krameria parvifolia Benth. *Krameria canescens* Gray.—These small

bushes contain tannin and may be found useful medicinal plants (fide Havard), and are not rare on the borders of the Colorado desert in Southern and Baja California, eastward to Texas, and into Mexico.

FRANKENIACEAE.

Genus *FRANKENIA* Linnaeus.*FRANKENIA GRANDIFOLIA* C. & S.V. *campestris* G.*FRANKENIA PALMERI* S. Watson.

CARYOPHYLLACEAE.

Genus *SILENA* Linnaeus.

SILENA GALLICA Linn.
SILENA CONICA Linn.
SILENA ANTIRRHINA Linn.
SILENA CALIFORNICA Dur.
SILENA LACINIATA Cav.
SILENA MULTINERVA S. Watson.
 "Annual, erect, sparingly branched, glandular-pubescent, about 1' high; leaves linear to linear-oblong, acute, the lowermost narrowly oblanceolate, 1-2' long; inflorescence dichotomously cymose; bracts linear; calyx narrowly ovate, 20-25 nerved, 5-6'' long, the acuminate teeth usually p.-tipped; petals purplish, scarcely equaling the calyx, without appendages or auricles, emarginate; filaments glabrous, included; capsule nearly sessile, oblong-ovate, included; seeds minute, tuberculate, not crested. Found near Jamul, San Diego County, by C. R. Orcutt. In April, 1885, and on the island of Santa Cruz, California, by T. S. Brandegee, in 1888."—S. Watson, Proc. Am. Acad., xxv, 196-7 (Sept. 25 1890).
SILENA PALMERI S. Watson.
SILENA PLATYOTA S. Watson.

Genus *CERASTIUM* Linnaeus.*CERASTIUM NUTANS* Raf.c. *TRIVIALE* Lnk.*CERASTIUM VISCOSUM* Linn.Genus *STELLARIA* Linnaeus.*STELLARIA MEDIA* Linn.*STELLARIA NITENS* Nutt.Genus *ARENARIA* Linnaeus.

ARENARIA ALSINOIDES Willd.
ARENARIA DOUGLASHI T. & G.
ARENARIA MACRADENIA Watson.
ARENARIA MACROPHYLLA Hook.

SAPONARIA VACCARIA Linn.
SAGINA OCCIDENTALIS S. Watson.

Genus *LEPIGONUM* Fries.

LEPIGONUM GRACILE Watson.
LEPIGONUM MACROTHECUM F. & M.
LEPIGONUM MEDIUM Fries.

Genus *POLYCARPON* Linnaeus.*POLYCARPON DEPRESSUM* Nutt.Genus *LOEFLINGIA* Linnaeus.

LOEFLINGIA SQUARROSA Nutt.

ILLECEBRACEAE.

Genus **PENTACAENA** Bartling.

PENTACAENA RAMOSISSIMA H. & A.

Genus **ACHYRONYCHIA** Tor. & Gr.

ACHYRONYCHIA COOPERI T. & G.

PORTULACACEAE.

Genus **PORTULACA** Tournefort.

PORTULACA OLERACEA Linn.

Genus **CALANDRINIA** H. B. K.

CALANDRINIA BREWERI S. Watson.

CALANDRINIA MARITIMA Nutt.

CALANDRINIA MENZIESII Hook.

C. ELEGANS Spach

da 3

Genus **CLAYTONIA** Linnaeus.

CLAYTONIA CHAMISSONIS Esch.

CLAYTONIA EXIGUA T. & G.

CLAYTONIA PARVIFLORA Dougl.

CLAYTONIA PERFOLIATA Don.

(California or Spanish lettuce; ex 4 72, da 3, j

CLAYTONIA SPATHULATA Dougl.

Genus **CALYPTRIDIDIUM** Nuttall.

CALYPTRIDIDIUM MONANDRUM Nutt.

CALYPTRIDIDIUM PARRYI A. Gray.

Genus **LEWISIA** Pursh.

LEWISIA BRACHYCALYX Engelm.

LEWISIA REDIVIVA Pursh.

SPRAGUEA UMBELLATA Torr.

Genus **FOUQUIERA** H. B. K.

FOUQUIERA GIGANTEA Orcutt.

In February, 1899, the writer collected some small plants of the "curio" tree, near the gold mines at Calmali, Lower California; May 2, 1900, the last two were planted in the ground in San Diego, having been in a box during the interim; the longest branchlets on one of these was over a foot long and bearing green foliage when at last planted in the ground. As there is no natural rainfall for two or three years at a time in the region where it grows, it is naturally well adapted to survive a long continued drouth; it is one of the most curious productions of the plant world, forming a tree often over 30 or 40 feet high, resembling a great carrot with its roots in the air. Dr. Albert Kellogg named it *Idria Colamaria*; later it was recognized as belonging to the genus *Fouquieria*. FOUQUIERA SPLENDENS Engelm.

ELATINACEAE.

Genus **ELATINE** Linnaeus.

ELATINE AMERICANA Arn.

ELATINE BRACHYSPERMA Gray.

ELATINE CALIFORNICA A. Gray.

Genus **BERGIA** Linnaeus.

BERGIA TEXANA Seubert.

HYPERICACEAE.

Genus **HYPERICUM** Linnaeus.

HYPERICUM ANAGALLOIDES C.-S.

HYPERICUM SCOULERI Hook.

MALVACEAE.

Genus **MALVA** Linnaeus.

MALVA PARVIFLORA Linn.

Malva borealis Wallm.

MALVA ROTUNDIFOLIUM A. Gray.

Genus **SIDALCEA** A. Gray.

SIDALCEA MALVAEFLORA A. Gray.

SIDALCEA NEOMEXICANA A. Gray.

SIDALCEA PEDATA A. Gray.

SIDALCEA DELPHINIFOLIA Ge.

Variety HUMILIS Greene.

MODIOLA CAROLINIANA Don.

Genus **MALVASTRUM** A. Gray.

MALVASTRUM DENSIFLORUM S. W.

MALVASTRUM EXILE A. Gray.

MALVASTRUM FASCICULATUM Ge.

MALVASTRUM FREMONTII Torr.

MALVASTRUM MARRUBIODES D.-H.

MALVASTRUM ROTUNDIFOLIUM A.G.

MALVASTRUM THURBERI A. Gray.

Genus **SPHAERALCEA** S. N. Hilaire.

SPHAERALCEA AMBIGUA A. Gray.

SPHAERALCEA EMORYI Torr.

SPHAERALCEA FREMONTII Torr.

SPHAERALCEA ORCUTTII Rose.

"Perennial (?), 6-90 cm high, with dense, stellate pubescence throughout; leaves thickish, ovate, entire or somewhat 3-lobed, with slightly cordate or truncate base, obtuse; fls small, in close, glomerate clusters, on short or long racemes; calyx 4 mm long, with ovate lobes; petals 8 mm long brick-red; styles clavate, thickened; carpels 12, reniform, strongly reticulated except the minute terminal portion, 2 mm in diameter, 1-seeded. Collected near Carriso [not Canso] creek, e, 1 N 1890, by Or (No. 2210). This species, although referred to *Sphaeralcea*, can hardly be kept out of *Malveopsis*. The carpel is more like that of the latter genus than of any other known species, & yet very similar to those of *S. couleri* and *S. californica*."—Rose in hb cont 1 289

SPHAERALCEA SULPHUREA S. Wat.

Genus **SIDA** Linnaeus.

SIDA HEDERACEA A. Gray.

Genus **LAVATERA** Linnaeus.

Genus **HIBISCUS** Linnaeus.

HIBISCUS DENUDATUS Benth.

HORSFORDIA NEWBERRYI A. Gray.

HORSFORDIA PALMERI S. Watson.

Genus ABUTILON Tournefort.

ABUTILON AURANTIACUM S. Wats.
 "Woody at base, the herbaceous stems ½-2° high, pubescent and somewhat villous: leaves densely soft-tomentose, velvety and whitish, round-cordate, acute, the rounded basal lobes overlapping, unequally serrate, ½-1½' broad, shorter than the petioles: fl. axillary and solitary, on villous-pubescent pedicels, which are as long as the petioles and mostly jointed near the base or the lower above the middle: calyx-lobes broadly ovate, acute; corolla bright orange, 6-9" long: calyx and fr. villous-pubescent; carpels 10, abruptly short-beaked, 3-seeded, 4" long, about equalling the calyx. On Todos Santos Bay, Lower California, by C. C. Parry, January, 1883, and at Tia Juana, by C. R. Orcutt, in May of the same year."—S. Watson, Proc. Am. Acad., xx. 357 (Feb. 21, 1885).

ABUTILON CRISPUM Sweet.

ABUTILON LEMMONI S. Watson.
 "Perennial, the stout half-woody branching stems 1-2° high, hoary throughout with a very dense short stellate pubescence, its stellate character scarcely perceptible on the calyx: leaves cordate to cordate-lanceolate, acute or slightly acuminate, dentate, the blade usually 1' or less (sometimes 2') long, about equalling or shorter than the slender petioles, slightly greener above: peduncles axillary, solitary, shorter than the leaves, joined near the top: calyx with broadly ovate acute lobes; corolla y. or orange, small (3-4" long): carpels about 9, acute, 4-5" long, finely pubescent, 3-seeded, equalling or a little exceeding the enlarged calyx."—S. Watson, Proc. Am. Acad., xx. 357-8 (Feb. 21, 1885).

STERCULIACEAE.

Genus FREMONTIA Torrey.

FREMONTIA CALIFORNICA Torrey.
 Fremontodendron californicum C. v. 4:74.

AYENIA PUSILLA Linn.

LINACEAE.

Genus LINUM Linnaeus.

LINUM PERENE Linn.

ZYGOPHYLLACEAE.

Genus TRIBULUS Linnaeus.

TRIBULUS GRANDIFLORUS B. & H.
 TRIBULUS MAXIMUS Linn.

Genus FAGONIA Linnaeus.

FAGONIA CALIFORNICA Benth.
Genus LARREA Cav.

LARREA MEXICANA Moric.

GERANIACEAE.

Genus GERANIUM Linnaeus.

GERANIUM CAESPITOSUM James.
 GERANIUM CAROLINIANUM Linn.
Genus ERODIUM L'Herit.

ERODIUM CICUTARIUM L'Herit.

ERODIUM MACROPHYLLUM H. & A.

ERODIUM MOSCHATUM L'Herit.

ERODIUM TEXANUM A. Gray.

Limonanthes douglasii R. Br. (n. 4)
Genus OXALIS Linnaeus.

OXALIS CORNICULATA Linn.

Fls lemon y, veined with crimson, near the center & on back of petals & calyx deeply tinged with carmine. s j

OXALIS OREGANA Nutt.

OXALIS WRIGHTII A. Gray.

RUTACEAE.

Genus PTELEA Linnaeus.

PTELEA APTERA Parry.

Genus THAMNOSMA Torrey.

THAMNOSMA MONTANUM Torr.

Genus CNEORIDIUM Hooker, f.

CNEORIDIUM DUMOSUM Hook. f.

CELASTRACEAE.

Genus EUNONYMUS Tournefort.

EUNONYMUS PARISHII Trelease.

RHAMNACEAE.

Genus ZIZYPHUS Juss.

ZIZYPHUS PARRYI Torr.

Parry's lotus or jujube is found in gravelly ravines near San Felipe and Rock Springs, in San Diego county, south into Lower California, and east of San Bernardino. The fruit is ½-¾ inch long, of a dull brownish cadmium yellow color, mealy and dry. It is an unsymmetrical thorny shrub, 4-15 feet high. Said to make excellent jelly like its near relatives, the classic lotus and jujubes, so well known as the source of jellies and confections of various kinds.

Genus RHAMNUS Linnaeus.

RHAMNUS CALIFORNICA Esch.

RHAMNUS CROCEA Nutt.

Rhamnus tomentella Bth. — This shrub or small tree, evidently restricted in its distribution to the mountains of San Bernardino (Parish) and San Diego counties and of northern Baja

California, is popularly known as the wild coffee bush, or Yerba loso. Dr. Rusby does not consider this to possess any useful properties—at least no virtues worthy of comparison with *R. Purshiana*. Its large black berries are sweet to the taste, but poisonous or at least unwholesome, as children sometimes find to their cost. The seeds are somewhat of the size and shape of coffee berries—whence the common name—and when separated from the pulp and roasted are said to form a fair substitute for coffee, though I should prefer not to experiment with it myself.

The bark of this species is popularly considered efficacious in severe cases of dysentery, and the leaves to possess cathartic properties—though both are conceded to be dangerous remedies. The receipt given me for dysentery is to take one pound of the bark of the root, boil in a quart of water until reduced to a pint.

CONDALIA SPATHULATA A. Gray.

Genus *ADOLPHIA* Meisner.

ADOLPHIA CALIFORNICA S. Watson.

Genus *CEANOTHUS* Linnaeus.

CEANOTHUS CUNEATUS Nutt.
CEANOTHUS DIVARICATUS Nutt.

CEANOTHUS DIVARICATUS Nutt. "Deer-brush," a beautiful flowering shrub, with delicate blue flowers.

CEANOTHUS INTEGERRIMUS H. & A.

CEANOTHUS ORCUTHII Parry.

"Branches flexible, dull reddish, with short, hispid pubescence; leaves petiolate, broadly orbicular to oblong-cordate, usually rounded obtuse, 30-40 mm. in length, often as broad, irregularly glandular-serrate, sparingly hispid above, strongly triple-nerved beneath, with prominent hairy ciliate veins; inflorescence axillary, oval scarcely exceeding the leaves, rather compact, with pubescent rachis, and smooth pedicels; fl. apparently white or light blue (seen only in fallen fragments); fr. glandular-hispid, with corrugated resinous epicarp, and conspicuous crests; seeds light brown."—Parry, Proc. Dav. Acad. Natl. Sci. v. 194 (Aug. 31, 1889).

CEANOTHUS SPINOSA Nutt.

CEANOTHUS OLIGANTHUS Nutt.

CEANOTHUS MEGACARPUS Nutt.

CEANOTHUS CRASSIFOLIUS Nutt.

CEANOTHUS VERRUCOSUS Nutt.

CEANOTHUS HIRsutus Nutt.

CEANOTHUS RIGIDUS Nutt.

CEANOTHUS SOREDIATUS H. & A.

CEANOTHUS VESTITUS Ge.

"Near *C. cuneatus*, & like it in size & habit: leaves & branchlets ashy-tomentulose, the former opposite, coriaceous, subsessile, 4-6 lines long, round-obovate, obtuse or retuse, somewhat concave above, sharply spinulose-dentate all around; fls white; capsule apparently small, the short salient appendages inserted at about the middle."—Ge Pitt 2101 da 4

C oliganthus Nutt da 4

SAPINDACEAE.

Genus *AESCULUS* Linnaeus.

AESCULUS PARRYI A. Gray.

Genus *ACER* Tournefort.

ACER CIRCINNATUM Pursh.

ACER GLABRUM Torr.

ACER MACROPHYLLUM Pursh.

VITACEAE.

Genus *VITIS* Tournefort.

VITIS CALIFORNICA Benth. The wild grapevine of California.

ANACARDIACEAE.

Genus *RHUS* Linnaeus.

RHUS AROMATICA Ait.

RHUS DIVERSILOBA T. & G.

RHUS LAURINA Nutt.

RHUS INTEGRIFOLIA Nuttall. A stout evergreen shrub, at times attaining to the rank of a tree, and a diameter exceeding five feet. The rose colored flowers produced in close panicles one to three inches long, followed by deep brilliant red berries, coated with an icy-looking, wax-like substance that is even more tart than the pleasantly acid berries. These berries make a cooling drink, equal to lemonade (almost indistinguishable in flavor.)

In Southern and Lower California this is often called Mahogany, from the rich and beautiful color of the wood.

RHUS OVATA S. Watson.

"A shrub, 5-10' high, glabrous excepting the finely pubescent branches and the bracts of the inflorescence; leaves coriaceous and shining, ovate, acute or acuminate, entire or rarely sparingly toothed, 2-3' long, on a stout, usually reddish petiole 4-8" long; fl. in dense closely paniced spikes 1/2' long or less, the rounded bracts and sepals purplish; petals light y.; fr. compressed-ovate, 2-3" long, viscid-pubescent."—S. Watson, Proc. Am. Acad., xx. 358-9 (Feb. 21, 1885).

The Sugar-bush is a handsome evergreen shrub, noted for its glossy foliage and graceful, oval form. The small dark red berries make a cooling drink, pleasantly flavored, resembling lemonade, and when dry are covered with a thin, waxy, white substance, that is very sweet, which the Indians are said to have formerly gathered for sugar.



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TOWNSEND'S WARBLER.
(*Dendroica townsendi*)
About Life-size.



LEGUMINOSAE.

Genus *THERMOPSIS* R. Brown.

THERMOPSIS CALIFORNICA S. Wat.
HOFFMANSEGGIA MICROPHYLLA Tr.
HOFFMANSEGGIA STRICTA Benth.

Genus *PICKERINGIA* Nuttall.

PICKERINGIA MONTANA Nutt.

Genus *CERCIS* Linnaeus.

CERCIS OCCIDENTALIS Torrey.

Genus *HOSACKIA* Douglas.

This genus is included in the old world genus *Lotus* by Greene, Coville & others, along with *Syrmatium*; we prefer to retain all under *Hosackia*, though *Syrmatium* may well be treated as a distinct genus.

§1—*Euhosackia*

HOSACKIA OBLONGIFOLIA Bth.
HOSACKIA CRASSIFOLIA Bth.
HOSACKIA GRANDIFOLIA Bth.
HOSACKIA RIGIDA Bth.
 Variety *ARGYREA* S. Watson.
HOSACKIA MARITIMA Nutt.
HOSACKIA STRIGOSA Nutt.

LOTUS HUMILIS Greene pit 2 140—

"*Hosackia maritima* Ge pit 1 288 non Nutt. Habit and texture of *salsuginosus*, but every way smaller, the branches apparently prostrate; leaflets 4 or 5, obovate, obtuse; peduncles shorter than the leaves, 1-3-flowered, naked or bracted; corolla 2' long, reddish, the banner & wings notably shorter than the broad obtuse abruptly inflexed keel; pod nearly terete, less than an inch long, 6-8 seeded; seeds very small, almost spherical, smooth. — e pit 2 140. San Bartolome bay. j

Cy 4 83 mj

LOTUS TOMENTOSUS Ge

"Prostrate, much branched, caespitose tomentulose; leaflets 5 or 7, euneate-obovate or oblong, obtuse; peduncles slender, shorter than the leaves, the lowest bractless & 1-fl'd, the later often braced & 2-fl'd; corolla y, 3' long, twice the length of the calyx; pod narrow, compressed, an inch or more in length, 5-7-seeded; seeds from orbicular to oval, compressed, the surface covered with a minute & low tuberculation."—Ge pit 2 140 j, cv 4 84 mj

§2 *Microlotus*

HOSACKIA PURSHIANA Bth.
HOSACKIA BRACHYCARPA Bth.
Lotus humistratus Greene, Fl'onia 2:139.
HOSACKIA SUBPINNATA T-G.

§3—*Syrmatium*

HOSACKIA GLABRA Torrey.
HOSACKIA PROSTATATA Nutt.
HOSACKIA MICRANTHA Nutt.
HOSACKIA ARGOPHYLLA A. Gray.
HOSACKIA HEERMANNI D-H.
HOSACKIA DECUMBENS Bth.

HOSACKIA HAYDONI Oerenti.

"Suffrutescent, 6-12' high or more, the slender stems woody at base, at first slightly spreading, then recurving inward and slightly intertwining, forming a loosely-compact bush, glabrous or near-

ly so throughout: leaflets 3 or less, oblong, obtuse, 1-2 mm. long; fl. single or more rarely in pairs, short pedunculate, 2 mm long; calyx of equal length, the teeth narrowly subulate, erect, $\frac{1}{4}$ - $\frac{1}{2}$ as long as the tube; pod but slightly incurved, usually twice the length of the persistent calyx, 1-seeded; seed dark olive-green, $2\frac{1}{2}$ mm. long, slightly curved. I take pleasure in dedicating this delicate species to Mr Marion D. Haydon, in return for his hospitality and for his directing my attention to various forage plants whose valuable qualities had previously been unsuspected. Collected in April, 1889, growing among the rocks in a canyon leading into the Colorado desert, on the old stage line from San Diego to Ft. Yuma. With *H. glabra*, Torrey, this plant is commonly known as deer weed, but its smaller growth will render it less valuable for cultivation and it is apparently too limited in its distribution to assume importance as a wild forage plant."—Orcutt, *West American Scientist*, vi, 63, J1 1889. *SYRMATIUM DENDROIDEUM* Greene.

"Shrubby, erect, 4-7' high, with roughish brown stem an inch or 2 in thickness, & many short ascending branches; branchlets angular, their growing parts more or less minutely appressed-silky, the plant otherwise glabrous; leaflets 3, narrowly oblong, obtuse; umbels numerous, on short peduncles, not bracted; calyx 3-4' long, the triangular-subulate teeth $\frac{1}{4}$ as long as the nearly cylindrical tube; corolla 4-6' long; pod $\frac{3}{4}$ ' long, slightly curved, 3-seeded; seeds terete & straight. Hill tops, among other bushes, on the higher parts of Santa Cruz Island. Near *S. glabrum*, but of entirely different habit, with much larger fls & fruit, on short, rigid, crowded branchlets."—Ge pit 2 146—referred to *Hosackia glabra* by Br Ca ac pr II 1 208, who says:—"Some of its forms are exactly the mainland plants."

Genus *SOPHORA* Linnaeus.

SOPHORA ARIZONICA S. Watson.

Genus *LUPINUS* Linnaeus.

LUPINUS AFFINIS Agardh.
LUPINUS ALBICAULIS Dougl.
LUPINUS ARIZONICUS S. Watson.
LUPINUS BREVICAULIS S. Watson.

LUPINUS CHAMISSONIS Esch.
 LUPINUS DENSIFLORUS Benth.
 LUPINUS DOUGLASII Agardh.
 LUPINUS GRACILIS Agardh.
 LUPINUS ALBIFRONS Bth.
 LUPINUS NANUS Dougl.

L burkei Or d
 L arboreus Sim da 5
 L formosus bridgesii Ge da 5
 L cystisoides Agardh da 5, cv 4 82
 L umbellatus Ge da 5

LUPINUS HIRSUTISSIMUS Benth.

LUPINUS LITTORALIS Dougl.

LUPINUS MICRANTHUS Dougl.

LUPINUS ORCUTTII S. Watson.

"Diffusely much branched from the base, low (2-4' high), pubescent throughout with short stiffish spreading hairs: leaflets 5, oblong-spatulate, 3-6" long, shorter than the petioles: racemes numerous, sessile in the axils, 1-2' long, the scattered p. or reddish fl. 3" long; pod oblong, 4" long, 2-3-seeded: seeds 1" in diameter."—S. Watson, Proc. Am. Acad., xx. 359 (Feb. 21, 1885).

LUPINUS SPARSIFLORUS Benth.

LUPINUS TRUNCATUS Nutt.

Genus TRIFOLIUM Linnaeus.

TRIFOLIUM CILIATUM Nutt.
 TRIFOLIUM EXILE Greene.
 TRIFOLIUM FUCATUM Lindl.
 TRIFOLIUM GRACILENTUM T. & G.
 TRIFOLIUM INVOLUCRATUM Willd.
 TRIFOLIUM MACRAEI H. & A.

v albopureum H-A da 4
 T ciliolatum Bth da 4

T bifidum Ge da 4

T repens L da 4

T roseodum Ge da 4

T stenophyllum Nutt da 4

T depauperatum Desv da 4

T cyathiferum Lindl da 5

TRIFOLIUM MONANTHUM A. Gray.

TRIFOLIUM MICROCEPHALUM Pursh

TRIFOLIUM RUSBYI Greene.

TRIFOLIUM TRIDENTATUM Lindl.

Genus MELILOTUS Tournefort.

MELILOTUS ALBA Lam.
 MELILOTUS PARVIFLORA Desf.

Genus AMORPHA Linnaeus.

AMORPHA CALIFORNICA Nutt.

Genus MEDICAGO Linnaeus.

MEDICAGO DENTICULATA Willd.

Bur clover or toothed medick, @ of the Med-

iterranean region, which has become naturalized in most warm countries, valuable forage, but more prominent in our gardens as a weed of rapid growth. da 5 js

MEDICAGO LUPULINA Linn.

Black medick, nonesuch, black grass, hop clover, @ or biennial, widely grown for pasture. Or 60 d

MEDICAGO SATIVA Linn.

Alfalfa is probably the best known & most extensively grown forage plant in America, & is known by many names such as lucern, purple medick, Spanish trefoil, Brazilian clover.

Genus PSORALEA Linnaeus.

PSORALEA CALIFORNICA S. Watson.

PSORALEA MACROSTACHYA D. C.

PSORALEA ORBICULARIS Lindl.

Genus GLYCYRRHIZA Linnaeus.

GLYCYRRHIZA LEPIDOTA Pursh.

Genus DALEA Linnaeus.

DALEA CALIFORNICA S. Watson.

DALEA EMORYI A. Gray.

DALEA MOLLIS Benth.

DALEA ORCUTTII S. Watson.

"Perennial, with numerous short slender herbaceous subprocumbent or ascending stems (3-4' long) from a woody branching rootstock, appressed silky-puberulent: leaves 4-6" long, the folded oblong-obovate leaflets (4-6 pairs) ½" long, glabrous above: peduncles about equalling the leaves; spikes short (¼" long), somewhat crowded, the fl. reflexed or spreading; calyx short-villous, turbinate, the lanceolate acuminate teeth equalling or exceeding the tube; the p. orbicular banner and the wings scarcely exerted, the broad twice-longer keel p. on the inner margin."—S. Watson, Proc. Am. Acad., xx. 359 (Feb. 21, 1885).

DALEA PARRYI Torr. & Gray.

DALEA SCHOTTII Torr.

DALEA SPINOSA A. Gray.

Genus ASTRAGALUS Tournefort.

ASTRAGALUS LIMITUS Sheldon.

A LIMITUS Sheldon Minn bot studies b9 126

"p., robust, bushy but not woody, minutely pubescent with sparse, ascending hairs; stems 3-6 dm high, erect, thick, striate; leaves 10-12 cm in length, numerous, rachis channelled; leaflets 1-3½ cm in length, in 5-9 pairs, orbicular, obovate or oblong, rarely obovate, obtuse or retuse; stipules triangular-ovate, foliaceous, reflexed; peduncles thick, striate, exceeding in length the leaves, loosely subspicate; fls 0-15 mm in length, spreading or reflexed; calyx cylindrical, appressed pubescent with nigrescent hairs, the teeth unequal, much shorter than the tube; corolla magenta colored when fresh, becoming violet when dried; legume 2-2½ cm in length, chartaceous, horizontal or ascending, ovate, with a long,

incurved tip, finely short-pubescent, minutely reticulate-veined, unilocular, many seeded. Near Indian wells & Carriso creek e Or."

ASTRAGALUS ALBATUS Sheld.

"@ or perhaps biennial, whitened throughout with a fine, dense pubescence; stems 9-20 cm high, erect, simple, thick, 1-4 from the y^lsh root, finely striate; leaves 4-6 cm in length, the rachis striate; leaflets 8-15 mm in length, in 4 or 5 pairs, oblong, obtuse; stipules triangular acuminate, free, erect; peduncles 3-5 cm in length, terete, loosely 4-6 fl'ed: fls 5-6 mm in length, erect-spreading, becoming deflexed calyx broadly campanulate, the abruptly pointed triangular teeth $\frac{1}{2}$ - $\frac{2}{3}$ the length of the tube; corolla whitish or ochroleucous; legume 11-12 mm in length, membranaceous-inflated, ovate-oblong, acuminate pointed, the ventral suture straight, the dorsal curved softly white-pubescent, unilocular, with neither suture introflexed, 2-6 seeded. Or e."

ASTRAGALUS ORCUTTIANUS S. Wats.
"Stems numerous, slender, decumbent, 1' long, sparingly strigose-pubescent: leaflets 8-10 pairs, rounded, 1-3" broad; peduncles shorter than the leaves, 2-3' long in fr.; raceme loose, few-fl.: calyx campanulate, 2" long, the teeth mostly equalling the tube: pod linear-falcate, ascending, coriaceous, attenuate to a stipe shorter than the calyx, with a dorsal groove and acute ventral suture, 2-celled by the intrusion of the dorsal suture, 9" long. Allied to *A. Arizonicus*, rather peculiar in habit, the small round leaflets upon an elongated rachis exceeding the raceme. In Cantillas Canon ("Tantillas" of Palmer), Lower California, by C. R. Orcutt, August, 1883."—S. Watson, Proc. Am. Acad., xx, 361 (Feb. 21, 1885).

ASTRAGALUS COULTERI Benth.

ASTRAGALUS CROTALARIAE A. Gray.

ASTRAGALUS DISPERMUS A. Gray.

ASTRAGALUS LEUCOPSIS T. & G.

ASTRAGALUS CIRCUMDATUS Ge.

ASTRAGALUS GAMBELLIANUS Sheldon.

ASTRAGALUS ANTISELLI A. Gray.

ASTRAGALUS TENER A. Gray.

ASTRAGALUS OCCARPUS A. Gray.

ASTRAGALUS PARISHII A. Gray.

ASTRAGALUS SONORAE A. Gray.

ASTRAGALUS STENOPHYLLUS T.-G.

ASTRAGALUS TRICARINATUS A. Gray.

ASTRAGALUS VASEYI S. Watson.

ASTRAGALUS COCCINEUS Parry.

"@ caespitose densely white-hirsute petioles nearly as long as the leaves; leaflets, 12-15 oval to obovate, obtuse, 6-10 mm long; stipules triangular-lanceolate; peduncles considerably surpassing the leaves; fls numerous shortly pedicellate, clustered near the top; calyx cylindrical slender, the linear nearly equal teeth $\frac{1}{2}$ the length of the tube; corolla spreading, bright red, 35-40 mm long, double the length of the calyx; banner lanceolate; the oblong keel equalling it in length, very shallow & little curved not hiding the stamens, which are

free for nearly $\frac{1}{4}$ their length; keel & banner barely emarginate; pods an inch long resembling *A. Parishii*, but not mature & exact shape therefore not determinable." Or j e m j

A. purshii ? coccineus Py W 7 10

A. grandiflorus Wat Am ac pr 18 370 non Pajl-

ASTRAGALUS PYCNOSTACHYUS G.

A. circumdatus e

ASTRAGALUS GAMBELLIANUS Shel.

A. didymocarpus da 5 & non B-A

ASTRAGALUS NUTTALLIANUS D. C.

Genus OLNEYA A. Gray.

OLNEYA TESOTA A. Gray.

Iron wood, palo hierro, una de guto; a beautiful tree, characteristic of the desert regions the wood is of great density, rich, dark color taking an extremely fine polish, when dry an axe makes slight impression. j e z

Genus VICIA Tournefort.

VICIA EXIGUA Nutt.

VICIA AMERICANA Muhl.

VICIA LINEARIS Ge.

VICIA SATIVA L.

VICIA THURBERGII Watson An ac pr 25 129

"@, about 1' high, the young leaves, etc., pubescent, becoming glabrous; leaflet, 4-12 narrowly linear, acute, 3-7 lines long; stipules small, subulate-lanceolate or linear, not at a sagittate, entire; peduncles short (5-6" long bearing 1 or rarely 2 small w or purpleish fl calyx nearly glabrous, the teeth rather short acuminate; pods glabrous, sessile, oblong, obliquely acute at each end, about 9" long by $2\frac{1}{2}$ -3 broad, 5-7 ovuled. From southern Utah & Colorado to z & n"—Watson.

VICIA HASSEI S. Watson.

"Often tall; leaflets 3-6 pairs, linear to narrowly oblong, acute or obtuse and apiculate, or more frequently truncate and emarginate or toothed at the apex; stipules semi-sagittate with the rather broad lower lobe usually 2-4-toothed; peduncles 6-15" long, 1-fl. or sometimes remotely 2-fl.: pod more attenuate at each end and short-stipitate, 5-9-ovuled, 9-16" long. On open grassy hills about Los Angeles, California, growing with *V. exigua*; Dr. H. E. Hasse. Also collected at Santa Cruz by Dr. C. L. Anderson, at Benicia by Dr. Bigelow (*V. exigua* var (?) Californica Torr. in Pac. Railroad Rep. 4.76), and on Guadalupe Island by Dr. Palmer."—S. Watson, Proc. Am. Acad., xxv, 129-130 (Sept. 25, 1890).

Genus ACACIA Willd.

ACACIA GREGGII A. Gray.

ACACIA FARNESIANA Willd.

Acacia Farnesiana Willd.—Dr. Harvard classes this among the medicinal plants of Texas, probably because "a decoction of the pod contains tannin."

Genus CASSIA Linnaeus.

CASSIA COVESII A. Gray.

Genus LATHYRUS Linnaeus.

LATHYRUS WATSONI White.

"Lathyrus californicus. Stem stout, tall & more or less winged; stipules semi-sagittate, dilated & often coarsely toothed, or the upper narrower; leaflets 3-7 pairs, ovate-oblong to linear-lanceolate, $\frac{1}{2}$ -2' long or more, acute or acuminate, softly pubescent on both sides, as also the rachis; peduncles stout, nearly equaling the leaves, many fl'd; calyx teeth short the lower 2" long or less; petals 7-9" long, apparently y'ish or pinkish; pod linear, 2" long by 3" broad, attenuate at base to a stipe."-Wat Am ac pr 20 363, he 73, Or 78 d

L venosus Muhl of former lists.

LATHYRUS SPLENDENS Kellogg.

"Pride of California," distinguished for its profusion of large brilliant rose red to crimson flowers borne in clusters of 10 or more the second year from seed. The most magnificent of the native climbing plants of West America. Described as half-hardy in New Jersey. It stands frost and snows in the mountains of Southern and Lower California, up to 4,000 feet altitude, where it festoons the shrubbery with its wealth of color.

Genus PARKINSONIA Linnaeus.

PARKINSONIA TORREYANA S. Wat.

PARKINSONIA ACULEATA Linn.

Parkinsonia Aculeata L.—Valued by the Mexican Indians as a febrifuge and suborific, and also as a remedy in epilepsy (fide Schott). See Proc. U. S. Nat. Mus. VIII. 501.

Genus PROSOPIS Linnaeus.

PROSOPIS JULIFLORA D. C.

The mesquite is the most abundant desert tree, rarely over 20 feet high, often forming extensive groves miles in extent. The mesa back of San Diego, near the normal school, is its western limit, where it is only a small shrub, but it extends east to Texas and south to the Argentine republic.

PROSOPIS PUBESCENS Benth.

The screw-bean is a characteristic desert tree, slender, 15-20 feet high; not rare from Riverside county southward into Lower California, abundant in Palm valley, not far from San Diego.

ROSACEAE.

Suborder AMYGDALAE

Genus PRUNUS Tournefort.

PRUNUS DEMISSA Walp.

PRUNUS ILICIFOLIA Walp.

PRUNUS ILICIFOLIA Walp. "Islay;" evergreen, or holly-leaved cherry; attractive for the beauty of its shining dark green foliage; fruit dull red, of a delicate flavor, with a

kernel "almost equal in flavor to the almond." A desirable ornamental shrub and useful as a hedge plant.

The holly-leaf cherry is a beautiful dark evergreen shrub, yielding a pleasant edible fruit. Useful for hedges or ornamental planting.

PRUNUS FASCICULATA A. Gray.

PRUNUS FREMONTI S. Watson.

Suborder POMAE

Genus AMELANCHIER Medicus.

AMELANCHIER ALNIFOLIA Nutt.

Shrub 3-8 feet high, glabrous throughout or often more or less woolly-pubescent; leaves broadly ovate or rounded, occasionally oblong-ovate, obtuse at both ends or acute, often somewhat cordate at base, serrate usually only toward the summit $\frac{1}{2}$ -1 $\frac{1}{2}$ inches long; racemes short; calyx usually tomentose within; petals 3-12 lines long, narrowly oblong; fr mostly $\frac{1}{4}$ - $\frac{1}{3}$ inch in diameter.

Cv 4 97, British Columbia-j

Genus HETEROMELES J. Roemer.

HETEROMELES ARBUTIFOLIA Røem.

The California toyon, or tollon, is a handsome evergreen shrub found throughout the state, better known as the Christmas berry, or California holly. The scarlet berries are borne in the greatest profusion, and, ripening at Christmas time, are extensively used in decorating. The berries are said to have formed an important article of food with the Indians, and school children frequently eat them; but, so far as known, they are not otherwise utilized. They are not unpleasant to the palate, having a healthy, bitterish by-taste. The toyon is more useful as a hedge plant, doubtless, than for its fruit. It ranks high as an ornamental evergreen, the dark foliage forming a beautiful setting for the panicles of white flowers. It appears in many horticultural catalogues under the name of Photinia arbutifolia.

Suborder ROSACEE

Genus RUBUS Linnaeus.

RUBUS NUTKANUS. Mocino. Salmon-berry, the West American Mayberry; a singularly beautiful fruit, varying in color from a clear golden yellow to an orange red; delicious when served with sugar and cream.

RUBUS URSINUS C. & S.

R vitifolius C-S Linnaea 2 10, cv 4 92

Genus ALCHEMILLA Tournefort.**ALCHEMILLA ARVENSIS** Scop.**Genus SPIRAEA** Linnaeus.**SPIRAEA DISCOLOR** Pursh.

Holodiscus discolor cv 4 91

Genus ADENOSTOMA Hook & Arn.**ADENOSTOMA FASCICULATUM** H.-G.**ADENOSTOMA SPARSIFOLIUM** Torr.**Genus ROSA** Tournefort.**ROSA CALIFORNICA** C. & S.**ROSA MINUTIFOLIA** Engelm.**Genus IVESIA** Torrey & Gray.**IVESIA BAILEYI** S. Watson.**Genus FRAGARIA** Tournefort.**FRAGARIA CALIFORNICA** C. & S.**Genus CERCOCARPUS** H. B. K.**CERCOCARPUS PARVIFOLIUS** Nutt.**Genus PURSHIA** De Candolle.**PURSHIA TRIDENTATA** DC

Kunzia tridentata Spreng Anleit ed 2, 2 869.

Tigarea tridentata Pursh fl 1 333 (1814).

Genus CHAMAEBATIA Benth.**CHAMAEBATIA FOLIOLOSA** Benth.**Genus CANOTIA** Torrey.**CANOTIA HOLACANTHA** Torr.**Genus POTENTILLA** Linnaeus.**POTENTILLA CALIFORNICA** Greene.**POTENTILLA PUBERULA** Greene.**POTENTILLA SAXOSA** Lemmon.**POTENTILLA CLEVELANDI** Greene.

"Size and habit of [puberula], but more slender, more densely puberulent and not at all viscid; leaflets smaller, euneate- to round obovate, crenate-toothed; calyx half as large filaments only lanceolate-dilated; anthers less than $\frac{1}{2}$ " long & nearly as broad; petals apparently pale; pistils rather few; akenes hardly $\frac{1}{2}$ " long, broadly ovate with a slightly incurved tip, not compressed. Laguna mountains back of San Diego, J1 1885, D. Cleveland; also collected in n j by Or 905."—Ge Pitt 1:102 (8 N 1887).

SAXIFRAGACEAE.**Genus SAXIFRAGA** Linnaeus.**SAXIFRAGA PARRYI** Torr.**SAXIFRAGA REFLEXA** Hook.**Genus TELLIMA** R. Brown.**TELLIMA CYMBALARIA** Walp.**Genus HEUCHERA** Linnaeus.**HEUCHERA RUBESCENS** Torr.**Genus RIBES** Linnaeus.**RIBES MENZIESII** Pursh.**RIBES SANGUINEUM** Pursh.**RIBES SPECIOSUM** Pursh.**RIBES VIBURNIFOLIUM** A. Gray.**RIBES VISCOSISSIMUM** Pursh.**CRASSULACEAE.****Genus TILLAEA** Linnaeus.**TILLAEA ANGUSTIFOLIA** Nuttall.

'Branching from the base, rooting; leaves linear-lanceolate, acute, connate, $1\frac{1}{2}$ " long; fls axillary, solitary, on short pedicels; sepals 4, ovate, not half the length of the oblong white petals; carpels broad, obtuse, 8-seeded; style none, stigma minute; seeds nearly horizontal linear-oblong, minutely tuberculate in longitudinal rows. Stems 1-2' high.'

TILLAEA MINIMA Miers.**Genus SEDUM** Linnaeus.**SEDUM SPATHULIFOLIUM** Hook.**SEDUM VARIEGATUM** S. Watson.**ROCHEA FALCATA** DC. See *Crassula falcata*.**COTYLEDON ATTENUATA** S. Watson.**COTYLEDON EDULIS** Brewer.

'Ladies' Finger Tips,' so-called from the round, slender leaves, said to have been eaten as a salad by the Indians.

COTYLEDON LANCEOLATA B-H.**COTYLEDON LAXA** B-H**COTYLEDON LINEARIS** Greene.**COTYLEDON ORBICULATA** Linn.

A showy, old-time, garden favorite, attaining a height of several feet and of tropical aspect; of rapid growth, producing large pendulous orange colored flowers of rare permanence. South Africa.

COTYLEDON ORCUTII Greene.**COTYLEDON PULVERULENTA** Baker.**COTYLEDON SECUNDA** Baker.

A very beautiful symmetrical plant, a native of Mexico, much used in rockeries and for borders.

COTYLEDON VISCIDA S. Watson.

CRASSULA FALCATA Wendl. A South African plant, grayish in color, producing gorgeous panicles of brilliant red flowers.

LYTHRACEÆ**AMMANIA COCCINEA** R.**A. LATIFOLIA** L.**LYTHRUM ALBUM** HBK.

L. alatum Pursh & v. linearifolium G.

L. californicum Watson.

LYTHRUM HYSSOPIFOLIA L.**ONAGRACEÆ****Epilobium angustifolium** L. cv 4 102**E californicum** Hauss. da 6**E holosericeum** Trel. da 6 cv 4 102**E coloratum** Muhl.**E adenocaulon** v occ'dentale Trel.' da 6**Ludwigia palustris** Ell. da 6**Zauschneria californica** Presl. da 6, cv 4 103.**Genus GODETIA** Spach.**G purpurea** Wat, da 6.**G quadravulnera** Spach. da 6**G botte** Spach da 6 cv 4 106**GODETIA TENELLA** S. Watson.

GODETIA EPILOBIOIDES S. Watson.

Genus **BOISDUVALIA** Spach.

BOISDUVALIA DENSIFLORA S. Wat.

B. CLEISTOGAMA Cur. da 6

Jussiaea repens L. da 6

Gayophytum diffusum T-G da 6

Clarkia elegans Dougl. da 6, cv 4 103

C rhomboldea Dougl. " "

OENOTHERA BIENNIS Linn.

v. hirsutissima Ge da 6

OENOTHERA BISTORTA Nutt.

v. veitchiana Hook. da 6

OENOTHERA BREVIPIES A. Gray.

OE leptocarpa Ge da 6

OE californica Wat da 6

OE virescens Hook. da 6

OE micrantha Horn. da 6

OE strigulosa T-G da 6

OE decorticans Ge da 6

OENOTHERA CARDIOPHYLLA Torr.

OENOTHERA GAURAEFLORA T. & G.

OENOTHERA REFRACTA S. Watson.

LOASACEAE.

Genus **PETALONYX** A. Gray.

PETALONYX LINEARIS Greene.

PETALONYX THURBERI A. Gray.

Genus **MENTZELIA** Linnaeus.

MENTZELIA ALBICAULIS Dougl.

MENTZELIA DISPERSA S. Watson.

MENTZELIA GRACILENTA T-G.

MENTZELIA INVOLUCRATA S. Wat.

MENTZELIA LAEVICAULIS T. & G.

MENTZELIA MICRANTHA T. & G.

MENTZELIA TRICUSPIS A. Gray.

Genus **EUCNIDE** Zuccarini.

EUCNIDE CORDATA Kellogg.

EUCNIDE URENS Parry.

CUCURBITACEAE.

Genus **CUCURBITA** Linnaeus.

CUCURBITA FOETIDISSIMA H B K.

Curcubita perennis A. Gray.

CUCURBITA PALMATA S. Watson.

mock orange and wild pomegranate are names frequently applied to this and other species of the genus cucurbita. The root is very bitter, and a strong and quick emetic, acting "without any disagreeable effect on the nerves." In common with the following species this is known to the Mexicans as "Chili Coyote," or "Calabazilla."

Curcubita Foetidissima, H. B. K.—I do not know that the natives discriminate between these species in favor of either one or the other. "The macerated root is also used as a remedy for piles" (Watson, Bot. Cal., 1:239).

MICRAMPELIS MACROCARPA Ge.

The chilocothe vine, also belonging to the Cucurbitaceae, possesses similar

properties to Cucurbita palmata. The root attains immense size, and is credited with having formed the basis of the once famous "Dr. Walker's Celebrated California Vinegar Bitters."

MICRAMPELIS FABACEA Ge.

Megarrhiza californica Torrey.

Echinocystis fabacea Naudin.

Micrampelis fabacea Ge da 6

MICRAMPELIS LEPTOCARPA Ge.

M LEPTOCARPA Ge pitt 2 282 (1892).

"Habit of M fabacea, but more slender, with smaller & more deeply lobed foliage; leaves very thin, rather sparsely & delicately scabrous; fls w, apparently open-campanulate rather than rotate; the staminate about 8-12 in a simple raceme; pistillate ones twice as large ($\frac{3}{4}$ broad), with oblong prickly ovary $\frac{1}{2}$ long or more; mature fr rather narrowly oblong, acute, about 5' long, less than 2' thick, strongly armed with flattened prickles $\frac{1}{2}$ -1' long; seed-cavities 2, each with perhaps 5 or 6 seeds, but these unknown. h—W G Wright"

MICRAMPELIS GUADALUPENSIS Ge.

Echinocystis guadalupensis Ge.

Genus **MEGARRHIZA** Torrey.

M californica Torrey—see Micrampelis fab.

ECHINOCYSTIS FABACEA Naudin.

See Micrampelis fabacea.

ECHINOCYSTIS GUADALUPENSIS Cn.

Micrampelis guadalupensis fide Ge.

DATISACEAE.

Genus **DATISCA** Linnaeus.

DATISCA GLOMERATA B. & H.

"The root is a bitter tonic known as Durango root" (Mrs. Bingham).

FICOIDEAE.

Genus **MESEMBRIANTHEMUM** Linn.

MESEMBRIANTHEMUM AEQUILATERALE. Haworth. Beach Strawberry or Sea-apple. An Australian and West American creeping plant, spreading readily over saline ground, whether clayey, sandy or rocky. "Sheep are very fond of this succulent plant, and require but little water when browsing on it; or in cold coast districts they will do without any water, even in summer, while thriving well on the foliage." The brilliant red flowers are very fragrant, followed by large, sweet and delicious fruit, faintly suggestive of a strawberry. An ornamental plant, easily grown from cuttings.

The "beach strawberry," "sea apple," or "Hottentot fig," is a stout, prostrate perennial plant, abundant on the sea shore from Santa Cruz, California, to Chili, Tasmania, and Australia, bearing large, solitary brilliant rose-red flowers, that are very fragrant, followed by luscious dull-red berries that are very acceptable to children, large and

small, when enjoying a day on the beach.

MESEMBRIANTHEMUM NODIFLORUM L.
MESEMBRIANTHEMUM CRYSTALLINUM

Genus **SESUVIUM** Linnaeus.

SESUVIUM PORTULACASTRUM Linn.

UMBELLIFERAE.

Genus **HYDROCOTYLE** Tournefort.

HYDROCOTYLE PROLIFERA Kellogg.

HYDROCOTYLE RANUNCULOIDES L.

Genus **BOWLESIA** Ruiz & Pavon.

BOWLESIA LOBATA R. & P.

Genus **ERYNGIUM** Tournefort.

Genus **DEWEYA** Torrey & Gray.

DEWEYA ARGUTA Torr. & Gray.
more long; pedicels about 4" long; calyx-teeth prominent; fr (immature) oblong, glabrous, about 3" long, with prominent ribs; oil-tubes 3 or 4 in the intervals, 4 or 5 on the commissural side.—C-R 121

VELLEA VESITA C-R

Genus **CARUM** Linnaeus.

CARUM GAIRDNERI Benth. & Hook.

Genus **CENANTHE** Linnaeus.

CENANTHE CALIFORNICA S. Watson.

C. sarmentosa Presl v. californica fide c-r 82.

Genus **DAUCUS** Tournefort.

DAUCUS USILLUS Michx.

Daucus Pusillus Michx.—Mrs. R. F. Bingham (S. B. Soc. Nat. Hist., C. 1:2-35) states that this is "very much valued by the natives as a remedy for the bite of the rattlesnake." She cites "one of our oldest physicians" as having "seen a Californian chew the plant, moisten his arm with the saliva, and then permit a rattlesnake to bite his arm, without producing swelling or any bad effect." She says the plant is usually applied in the form of a poultice. It is widely distributed from British Columbia to Mexico and eastward to the Atlantic, but I have not personally known of its use above stated, the "Golondrina" (a species of Euphorbia) possessing the same desirable reputation throughout the section where I have collected.

D. carota L. c-r 33 da 7

Genus **SANICULA** Tournefort.

SANICULA BIPINNATIFIDA Dougl.

SANICULA LANCINIATA Hook. & Arp.

SANICULA MENZIESII Hook. & Arp.

S. tuberosa Torrey da 7 c-r 107

S. nudicaulis H-A da 7 is S. laciniata fide c-r

Genus **PEUCEDANUM** Linnaeus.

PEUCEDANUM DASYCARPUM T. & G.

PEUCEDANUM EURYTERA A. Gray.

P. villosum Nutt. Ord. c-r 64 z n

P. mohavense c-r 62, Curran mj

P. caruifolium T-G, c-r 68, da 7

P. utriculatum Nutt. c-r 67, da 7

P. Hassel. c-r da 7

P. parishii c-r 68, bot gazette 13 209; Parish b

P. vaseyi c-r 67, bot gaz 13 144; Vasey b mts

Sium erectum Huds. da 7

Berula angustifolia Koch. c-r 33; da 7

Cicuta bolanderi Wat. c-r 133; da 7

Pastinica sativa L. c-r 49 da 7

Foeniculum vulgare Gaertn. da 6; c-r 108

Coriandrum sativum L. c-r 3; da 7

Selinum capitellatum B-H. c-r 43

Genus **APIUM** Linnaeus.

APIUM GRAVEOLENS Linn.

Genus **APIASTRUM** Nuttall.

APIASTRUM ANGSTIFOLIUM Nutt.

Genus **CAUCALIS** Linnaeus.

CAUCALIS MICROCARPA H. & A.

ANGELICA TOMENTOSA S. Watson.

ARALIACEAE.

ARALIA CALIFORNICA S. Watson.

HEDERA HELIX Linn.

CORNACEAE.

Genus **CORNUS** Linnaeus.

CORNUS CAPITATA Wall. The Himalayan strawberry-tree, also known as Benthama fragifera, Lindl.

CORNUS NUTTALLII Audubon. A showy tree, or large shrub, the flowers followed by large cluster of crimson berries. "Dogwood."

CORNUS CALIFORNICA C. A. Meyd.

C. pubescens californica C-R da 7

Genus **GARRYA** Douglas.

GARRYA FLAVESCENS S. Watson.

G. flavescens Wat v palmeri Wat. Or dj

CAPRIFOLIACEAE.

Genus **SAMBUCUS** Tournefort.

SAMBUCUS GLAUCA Nutt.

The California elder is considered superior to either the eastern or the European species in the quality of its fruit. Edward J. Wickson says: "It is common throughout the state; and frequently becomes a tree 20 feet or more in height with a trunk 18 inches in diameter. The fruit is very abundant, and largely used."—California Fruits, Ed. 2, p. 65.

Genus **SYMPHORICARPUS** Dill.

SYMPHORICARPUS MOLLIS Nutt.

SYMPHORICARPUS RACEMOSUS Mcx.

Genus LONICERA Linnaeus.

LONICERA HISPIDULA Dougl.

LONICERA SUBSPICATA Hook & Arn.

The "morone!" of the Mexicans is used by them in the form of a tea as a blood purifier; the plant is also used for the healing of sores.

RUBIACEAE.**Genus KELLOGGIA Torrey.**

KELLOGGIA GALIOIDES Torr.

Genus GALIUM Linnaeus.

GALIUM ANDREWSII A. Gray.

GALIUM ANGSTIFOLIUM Nutt.

GALIUM APARINE Linn.

Galium Aparine L.—"Cleavers are regarded as a most valuable cooling diuretic, useful in most diseases of the urinary organs" (Gunn). "Considered as a sovereign remedy in kidney diseases" (Mrs. Bingham). A cold infusion is used, as heat destroys its medicinal virtues. Goose grass, as this plant is sometimes called, is abundant in Southern and Baja California—in fact throughout the west, but our plant differs from the eastern and European form.

GALIUM CALIFORNICUM H-A.

GALIUM SPURIUM Linn.

GALIUM PUBENS A. Gray.

GALIUM ROTHROCKII A. Gray.

GALIUM STELLATUM Kellogg.

VALERIANACEAE.

VALERIANELLA MACROCERA A. Gy.

COMPOSITAE.**Genus BRICKELLIA Ell.**

BRICKELLIA ATRACTYLOIDES A. G.

BRICKELLIA CALIFORNICA A. Gray.

BRICKELLIA NEVINII A. Gray.

BRICKELLIA FRUTESCENS A. Gray.

Genus GUTIERREZIA Lagasea.

GUTIERREZIA CALIFORNICA T. & G.

GUTIERREZIA EUTHAMIAE T. & G.

Variety MICROCEPHALA A. Gray.

GUTIERREZIA LINEARIFOLIA Lag.

Genus ERIGERON Linnaeus.

ERIGERON CANADENSIS Linn.

ERIGERON FOLIOSUS Nutt.

ERIGERON INCOMPTUS A. Gray.

ERIGERON PHILADELPHICUS Linn.

Genus SOLIDAGO Linnaeus.

SOLIDAGO CALIFORNICA Nutt.

Golden Rod, or "Oroja de Leabre" of the Mexicans, is prized above all other herbs for its curative properties in cases of either internal or external injuries of man or beast, the most stubborn of sores being said to quickly heal under its influence.

SOLIDAGO CONFINIS A. Gray.

Genus ASTER Linnaeus.

ASTER CHAMISSONIS A. Gray.

ASTER HESPERIUS A. Gray.

ASTER ADSCENDENS Lindl.

ASTER ANDERSONI A. Gray.

ASTER CANESCENS Pursh.

ASTER EXILIS Linn.

ASTER MODULINUS A. Gray.

ASTER ORCUTII Vasey & Rose.

ASTER PARVIFLORUS A. Gray.

ASTER SPINOSUS Benth.

Genus BACCHARIS Linnaeus.

BACCHARIS DOUGLASII DC.

BACCHARIS PILULARIS DC.

BACCHARIS VIMINEA DC.

BACCHARIS PLUMMERAE A. Gray.

BACCHARIS SERGILOIDES A. Gray.

BACCHARIS EMORYI A. Gray.

BACCHARIS GLUTINOSA Pers.

Probably this is the species commonly known as Mock willow, is held in some repute for the healing of sores. *Pluchea borealis* Gray, also known by the same popular name, perhaps shares in the same virtues and is, I believe, the plant known to the Mexicans as "water-motor"—credited with medicinal virtues without number!

BACCHARIS SAROTHOIDES A. Gray.

Genus PLUCHEA Cass.

PLUCHEA CAMPHORATA DC.

PLUCHEA BOREALIS A. Gray.

Genus TESSARIA Ruiz & Pavon.**Genus MICROPUS Linnaeus.**

MICROPUS CALIFORNICUS F. & M.

Genus PSILOCARPHUS Nuttall.

PSILOCARPHUS OREGONUS Nutt.

PSILOCARPHUS TENELLUS Nutt.

Genus STYLOCLINE Nuttall.

STYLOCLINE GNAPHALIOIDES Nutt.

Genus EVAX Gaertn.

EVAX CAULESCENS A. Gray.

Genus FILAGO Linnaeus.

FILAGO ARIZONICA A. Gray.

Genus GNAPHALIUM Linnaeus.

GNAPHALIUM PALUSTRE Nutt.

GNAPHALIUM PURPUREUM Linn.

GNAPHALIUM SPRENGELII H. & A.

Genus HYMENOCLEA Torrey & Gray.

HYMENOCLEA MONOZYRA T. & G.

HYMENOCLEA SALSOLA T. & G.

Genus IVA Linnaeus.

IVA HAYESIANA A. Gray.

Genus AMBROSIA Tournefort.

AMBROSIA PSILOSTACHYA DC.

AMBROSIA PUMILA A. Gray.

Genus PERITYLE Benth.

PERITYLE CALIFORNICA Benth.

PERITYLE EMORYI Torr.

PERITYLE GRAYI Rose.

PERITYLE GREENEI Rose.

PERITYLE INCANA A. Gray.

PERITYLE MICROGLOSSA Benth.

Genus HETEROTHECA Cass.

HETEROTHECA GRANDIFLORA Nutt.

Genus APLOPAPPUS Cass.APLOPAPPUS BERBERIDIS A. Gray.
APLOPAPPUS JUNCEUS Greene.

"Near *A. spinulosus*, but more slender, sparingly leafy, the stems tufted, and 2' high, from a woody base: leaves linear, the lowest broader and pinnatifid, the upper often only 3-toothed at apex, lobes and teeth all spinulose-tipped: heads few and corymbose, ½' high: involucre turbinate, glandular-scabrous, not at all pubescent; scales setaceous-tipped: rays numerous, light y.: akenes conspicuously nerved."—Greene, Bull. Cal. Acad. Sci., 1, 190 (Aug. 29, 1885).

APLOPAPPUS LINEARIFOLIUS DC

APLOPAPPUS ORCUTTII A. Gray.

APLOPAPPUS PALMERI A. Gray.

"Pasmore" of the Mexicans and Indians is reputed to be invaluable in cases of lockjaw.

APLOPAPPUS SQUARROSUS H. & A.

Genus BIGELOVIA De Candolle.

BIGELOVIA BRACHYLEPIS A. Gray.

BIGELOVIA GRAVEOLENS A. Gray.

BIGELOVIA PANICULATA A. Gray.

BIGELOVIA SPATHULATA A. Gray.

BIGELOVIA TERETIFOLIA A. Gray.

Genus CARPHEPHORUS Cass.**Genus DYSODIA Cav.**

DYSODIA COOPERI A. Gray.

DYSODIA POROPHYLLOIDES A. Gray.

Genus EREMASTRUM Gray.

EREMASTRUM BELLIOIDES A. Gray.

EREMASTRUM ORCUTTII S. Watson.

"Pappus consisting of 5 white oblong-ovate laciniate paleae and as many inner alternate bristles twice as long; in every other respect—habit, foliage, pubescence, involucre, etc.—the nearly exact counterpart of *E. bellioides*."—S. Watson, Proc. Am. Acad., xxv. 132-3 (Sept. 25, 1890). Southwestern part of the Colorado desert, San Diego County, California (C. R. Orcutt, April, 1889).

Genus COLEOGYNE Torrey.**Genus LESSINGIA Cham.**

LESSINGIA GLANDULOSA A. Gray.

Genus HELIANTHUS Linnaeus.

HELIANTHUS CALIFORNICUS DC.

HELIANTHUS DEALBATUS A. Gray.

HELIANTHUS GRACILENTUS A. Gray

HELIANTHUS PETIOLARIS Nutt.

Genus VIGUIERA H. B. K.

VIGUIERA LACINIATA A. Gray.

VIGUIERA PARISHII Greene.

Genus LEPTOSYNE De Candolle.

LEPTOSYNE BIGELOVII A. Gray.

Genus BIDENS Linnaeus.

BIDENS CHRYSANTHEMOIDES Michx

BIDENS PILOSA Linn.

Genus MADIA Molina.

MADIA ELEGANS Don.

MADIA FILIPES A. Gray.

MADIA GLOMERATA Hook.

Genus HEMIZONIA De Candolle.

HEMIZONIA FASCICULATA T. & G.

HEMIZONIA FLORIBUNDA A. Gray.

HEMIZONIA HEERMANNI Greene.

HEMIZONIA PANICULATA A. Gray.

HEMIZONIA TENELLA A. Gray.

HEMIZONIA WRIGHTII A. Gray.

Genus LAYIA Hooker & Arn.

LAYIA CARNOSA T. & G.

LAYIA ELEGANS Torr & Gray.

LAYIA GLANDULOSA Hook & Arn.

LAYIA PLATYGLOSSA A. Gray.

Genus JAUMEA Pers.

JAUMEA CARNOSA A. Gray.

BURRIELIA MICROGLOSSA H. & A.

ERIOPHYLLUM AMBIGUUM A. Gray.

ERIOPHYLLUM CAESPITOSUM Dougl.

ERIOPHYLLUM CONFERTIFLORUM

ERIOPHYLLUM LANOSUM A. Gray.

ERIOPHYLLUM PRINGLEI A. Gray.

ERIOPHYLLUM STAECHEADIFOLIUM

ERIOPHYLLUM WALLACEI A. Gray.

HIERACIUM ARGUTUM Nutt.

HIERACIUM PARISHII A. Gray.

HOFMEISTERIA PLURISETA A. Gray.

HYMENOPAPPUS FILIFOLIUS Hook.

HYMENOTHRIX WRIGHTII A. Gray.

LYGODESMIA EXIGUA A. Gray.

TRICHOPTILIMUM INCISUM A. Gray.

TRIXIS ANGUSTIFOLIA D. C.

Genus WYETHIA Nuttall.

WYETHIA CORIACEA A. Gray.

Genus XANTHIUM Tournefort.

XANTHIUM STRUMARIUM Linn.

Genus BAERIA Fischer & Meyer.

BAERIA AFFINIS A. Gray.

BAERIA ANTHEMOIDES A. Gray.

BAERIA CLEVELANDI A. Gray.

BAERIA CORONARIA A. Gray.

BAERIA GRACILIS A. Gray.

BAERIA MUTICA A. Gray.

BAERIA PALMERI A. Gray.

BAERIA PARISHII S. Watson.

BAERIA TENELLA A. Gray.

BAERIA ULIGINOSA A. Gray.

Genus LASTHENIA Cass.

LASTHENIA GLABRATA Lindl.

Genus BAILEYA A. Gray.

BAILEYA MULTIRADIATA H. & G.

BAILEYA PAUCIRADIATA H. & G.

Genus AMBLYOPAPPUS Hook & Arn.

AMBLYOPAPPUS PUSILLUS H. Arn.

Genus HULSEA Torrey & Gray.

HULSEA CALIFORNICA T. & G.

HULSEA VESTITA A. Gray.

Genus PALAFOXIA Lagasca.

PALAFOXIA LINEARIS Lagasca.

Genus CHAENACTIS De Candolle.

CHAENACTIS ASTEMISIAEFOLIA A. G.

CHAENACTIS CARPHOCLINIA A. Gray.

CHAENACTIS DOUGLASHII Hook & Arn.

CHAENACTIS FREMONTI A. Gray.

CHAENACTIS HETEHOCARPHA A. G.

CHAENACTIS LANOSA D. C.

CHAENACTIS MACRANTHA Eaton.

CHAENACTIS PARISHII A. Gray.

CHAENACTIS SANTALINOIDES Griseb.

CHAENACTIS STEVIOIDES Hook-Arn.

CHAENACTIS SUFFRITESCENS A. G.

CHAENACTIS TENUIFOLIA Nutt.

Genus HELENIUM Linnaeus.

HELENIUM BIGELOVII A. Gray.

HELENIUM PUBERULUM DC.

is common along water courses from San Francisco southward to Santo Tomas, Baja California. Bancroft says this plant is used by the Indians in the same way as we make use of sarsaparilla. Mrs. Bingham (l. c.) says it is "used as a tonic and antiscorbutic, and also in the form of a powder for catarrh." She gives the vernacular name as sneezewood. It is known to the Mexicans as rosea or rosilla (the proper spelling of the word) who inform me that the seed is the part mainly used medicinally.

Genus SYNTRICHOPAPPUS A. Gray.

SYNTRICHOPAPPUS FREMONTI A. G.

Genus GRINDELIA Willd.

GRINDELIA ROBUSTA Nutt.

popular remedy, especially recommended as a remedy for the effects of the poison oak (*Rhus diversiloba* Torr. & Gray), the plant being applied fresh, or a decoction or alcoholic infusion used (Mrs. Bingham). The crude drug sells at about \$5.00 per hundred pounds. A Russian scientist is at present engaged in a study of the medicinal properties of this plant and of the other species of the genus—most of which seem to possess the same valuable properties and some of which are doubtless often substituted for or confused with the typical *G. robusta* of Nuttall. One of these, *G. subsquarrosa*, I have recently supplied to an eastern firm, sending them about fifty pounds of the crude drug, for them to thoroughly test its properties.

Genus PENTACHAETA Nuttall.

PENTACHAETA AUREA Nutt.

PENTACHAETA ORCUTTII A. Gray.

"*P. aurea* subsimilis; capitulis parvulis; involucri villosi-pubescenti, bracteis viridioribus; ligulis brevioribus; pappi setis 8-10 capillaribus basi haud dilatatis caducis!—Vallecito, in the northern part of Lower California, C. R. Orcutt, May 4, 1886."—A. Gray, Proc. Am. Acad., xxii, 309 (March 4, 1887).

PENTACHAETA PALEACEA Greene.

"A span high, with very numerous filiform branches; involucri small, scales in 2 series, pubescent, setaceous-tipped; corollas of ray and disk y.; akenes nearly linear; pappus-bristles 5, slender, with a thin, triangular palea at base."—Greene, Bull. Cal. Acad. Sci., i, 189-190 (Aug. 29, 1885).

Genus FRANSERIA Cav.

FRANSERIA BIPINNATIFIDA Nutt.

FRANSERIA CAMPHORATA Greene.

FRANSERIA CHENOPODIIFOLIA Benth.

FRANSERIA DUMOSA Gray.

FRANSERIA FLEXUOSA A. Gray.

FRANSERIA HOOKERIANA Nutt.

FRANSERIA ILICIFOLIA A. Gray.

FRANSERIA TENUIFOLIA A. Gray.

Genus ENCELIA Adanson.

ENCELIA CALIFORNICA Nutt.

ENCELIA ERIOCEPHALA A. Gray.

ENCELIA FARINOSA A. Gray.

ENCELIA VISCIDA A. Gray.

Genus CENTAUREA Linnaeus.

CENTAUREA MELITENSIS Linn.

CENTAUREA SOLSTITIALIS Linn.

Genus PEREZIA Lagasca.

PEREZIA MICROCEPHALA A. Gray.

Genus SILYBUM Gaertn.

SILYBUM MARIANUM Gaertn.

Genus CNICUS Linnaeus.

CNICUS CALIFORNICUS A. Gray.

CNICUS DRUMMONDII A. Gray.

CNICUS OCCIDENTALIS A. Gray.

Genus CORETHROGYNE De C.

CORETHROGYNE FILAGINIFOLIA Nutt.

Genus STEPHANOMERIA Nuttall.

PTILORIA CICHORIACEA Greene.

PTILORIA EXIGUA Greene.

PTILORIA PANICULATA Greene.

PTILORIA PARRYI Orcutt.

PTILORIA PAUCIFLORA Raf.

PTILORIA PENTACHAETA Greene.

PTILORIA VIRGATA Greene.

Genus RAFINESQUIA Nuttall.

RAFINESQUIA CALIFORNICA Nutt.

RAFINESQUIA NEO-MEXICANA A. G.

Genus ANISOCOMA Torrey & Gray.

ANISOCOMA ACAULE T. & G.

Genus MICROSERIS Don.

MICROSERIS ELEGANS Greene.

Span or more high, slender, head less than $\frac{1}{2}$ ": akenes turbinate, slightly over $\frac{1}{2}$ " long; paleae ovate-deltoid, $\frac{1}{2}$ " long, the

slender awn about 2". Mesas, San Diego, Cal.

MICROSERIS LINDLEYI A. Gray.
MICROSERIS LINEARIFOLIA A. Gray.
MICROSERIS MACROCHAETA A. Gray.

MICROSERIS PARISHII Greene.
 "Rather smaller and more slender than M. Douglasii; akenes slender, strictly columnar, 2" long or more, dark brown; paleae lanceolate, 3" long, very gradually tapering to an awn of 1 or 1½".—Greene, Bull. Cal. Acad. Sci., ii. 46 (Mar. 6, 1886).

MICROSERIS PARRYI A. Gray.
MICROSERIS PLATYCARPHA A. Gray.
 Span or more bracts high, head ½" or less in length; main bracts of involucre about 8, oblong; akenes turbinate, 2" long, tapering abruptly into a very short awn. San Diego county, Cal., southward.

Genus MALACOTHRIX De Candolle.
MALACOTHRIX CALIFORNICA DC.
MALACOTHRIX COULTERI A. Gray.
MALACOTHRIX CLEVELANDI A. Gy.
MALACOTHRIX GLABRATA A. Gray.
MALACOTHRIX INCANA T. & G.
MALACOTHRIX INDECORA Greene.
MALACOTHRIX INSULARIS Greene.
MALACOTHRIX SAXATILIS T. & G.
MALACOTHRIX SQUALIDA Greene.

Genus GLYPTOPLEURA D. C. Eaton.
GLYPTOPLEURA MARGINATA Eaton.
GLYPTOPLEURA SETULOSA A. Gray.

Genus CALYCOSERIS A. Gray.
CALYCOSERIS PARRYI A. Gray.
Genus TROXIMON Nuttall.
TROXIMON GRANDIFLORUM A. Gray.
TROXIMON HETEROPHYLLUM Grn.
TROXIMON RETRORSUM A. Gray.

Genus SONCHUS Linnaeus.
SONCHUS ASPER Willd.
SONCHUS OLERACEUS Linn.
SONCHUS TENERRIMUS Linn.

Genus ACHYRACHAENA Schauer.
ACHYRACHAENA MOLLIS Schauer.

Genus LAGOPHYLLA Nuttall.
LAGOPHYLLA RAMOSISSIMA Nutt.

Genus POROPHYLLUM Vallant.
POROPHYLLUM GRACILE Benth.

Genus ACHILLEA Linnaeus.
ACHILLEA MILLEFOLIUM Linn.

Genus ANTHEMIS Linnaeus.
ANTHEMIS COTULA Linn.

Genus ARTEMISIA Linnaeus.
ARTEMISIA BIENNIS Willd.
ARTEMISIA CALIFORNICA Less.
ARTEMISIA DRACUNCULOIDES Psh.
ARTEMISIA LUDOVICIANA Nutt.
 Bingham says this is "recommended for the effects of poison oak."

ARTEMISIA PALMERI A. Gray.
ARTEMISIA PARISHII A. Gray.
ARTEMISIA TRIDENTATA Nutt.
ARTEMISIA TRIFIDA Nutt.
ARTEMISIA VULGARIS Linn.
 Variety **CALIFORNICA** Besser.

Genus COTULA Linnaeus.
COTULA CORONOPIFOLIA Linn.

Genus SOLIVA Ruiz & Pavon.
SOLIVA SESSILIS R. & P.

Genus TETRADYMIA De Candolle.
TETRADYMIA COMOSA A. Gray.
TETRADYMIA SPINOSA H. & A.
LEPTOSYNE MARITIMA A. Gray.
MATRICARIA DISCOIDEA D. C.
 "Said to be used in California as a domestic remedy for agues and bowel complaints" (Watson, Bot. Cal. i. 401.)

Genus ANTENNARIA Gaertn.
ANTENNARIA DIOICA Gaertn.

Genus ACTINOLEPIS De Candolle.
ACTINOLEPIS MULTICAULIS DC.
ACTINOLEPIS TENELLA A. Gray.

Genus PSATHYROTES A. Gray.
PSATHYROTES RAMOSISSIMUS A. G.
PEUCEPHYLLUM SCHOTTII A. Gray.

Genus SENECIO Linnaeus.
SENECIO AMMOPHILUS Greene.
SENECIO CALIFORNICUS DC.
SENECIO CEDROSENSIS Greene.
SENECIO DOUGLASSII DC.
SENECIO LYONI A. Gray.
SENECIO MOHAVENSIS A. Gray.
SENECIO NEO-MEXICANUS A. Gray.
SENECIO PALMERI A. Gray.
SENECIO LEMMONI A. Gray.
SENECIO EURYCEPHALUS T-G.
SENECIO PARRYI A. Gray.
SENECIO PENINSULARIS Vasey-Rose.
SENECIO SYLVATICUS Linn.
SENECIO VULGARIS Linn.

ACHILLEA MILLEFOLIUM Linn.
 "Used by the natives in the form of a poultice, for healing indolent ulcers. The fresh plant is also used for staunching blood in recent wounds" (Mrs. Bingham).

Genus CHRYSOPSIS Nuttall.
CHRYSOPSIS VILLOSA Nutt.

Genus EUPATORIUM Tournefort.
EUPATORIUM SAGGITATUM A. Gray.

Genus VERBESINA Linnaeus.
VERBESINA DISSITA A. Gray.
VERBESINA ENCELIOIDES B-H.
CONYZA COULTERI A. Gray.
SOLIDAGO OCCIDENTALIS Nutt.
Genus GAILLARDIA Fougeroux.

G arizonica Orz
Genus PUGIOPAPPUS A. Gray.

P bigelovii, breweri & calliopsides Gray
Genus MONOPTILON Torrey & Gray.

M bellidiforme T & G
Genus SERICOCARPUS Nees.

S rigidus Lindl
Genus VENEGASIA De Candolle.
VENEGASIA CARPESIOIDES DC.

Genus **PECTIS** Linnaeus.

PECTIS PAPPOSA A. Gray.

LOBELIACEAE.Genus **NEMACLADUS** Nuttall.

NEMACLADUS CAPILLARIS Greene.
 NEMACLADUS LONGIFLORUS A. Gray.
 NEMACLADUS PINNATIFIDUS Greene
 NEMACLADUS RAMOSISSIMUS Nutt.
 NEMACLADUS RUBESCENS Greene.
 NEMACLADUS TENUISSIMUS Greene.

Genus **DOWNINGIA** Torrey.

DOWNINGIA PULCHELLA Torr.
 LOBELIA SPLENDENS Willd.
 PALMERELLA DEBILIS A. Gray.
 PARISHELLA CALIFORNICA A. Gray.

CAMPANULACEAE.Genus **GITHOPSIS** Nuttall.

GITHOPSIS DIFFUSA A. Gray.
 GITHOPSIS SPECULARIODES Nutt.

Genus **SPECULARIA** Heister.

SPECULARIA BIFLORA A. Gray.
 SPECULARIA PERFOLIATA A./D. C.

ERICACEAE.Genus **ARBUTUS** Tournefort.

ARBUTUS MENZIESII Pursh. Madrono. A surpassingly beautiful tree, with white flowers and orange-colored berries. Sometimes grows 100 feet high.

Genus **ARCTOSTAPHYLOS** Adanson.

♂Uva-ursi G syn fl 2 27; Daphnidostaphylis Klotzsch.

A UVA-URSIL

Bear berry—not reaching So. Calif.

ARCTOSTAPHYLOS TOMENTOSA Lindl.
 Woolly Manzanita.
 da 10

ARCTOSTAPHYLOS MANZANITA Parry. The common Manzanita of California. The berries make excellent sauce, and the finest quality of vinegar; much eaten by Indians.

Manzanita is a Spanish name, the diminutive of manzana (apple), hence means a "little apple." The name is generally applied to all the species of Arctostaphylos, and a writer in Meehan's Monthly (3:85) uses the name Arbutus Menziesii. The manzanita once so common on the mesas back of San Diego, is Arctostaphylos bicolor. The shrub to which the name more especially belongs in California, and which sometimes becomes a small tree, is that named Arctostaphylos manzanita by Dr. Charles Christopher Parry—the A. pungens of the earlier writers on California botany. This manzanita is common from Mexico to Oregon, through the foothills and mountains, in dry, rocky soil. The fruit is a dull red,

mealy, and pleasantly sub-acid, well-named by the Mexicans the "little apple," though botanically a near relative of the cranberry instead of the apple. The Indians gather the fruit in September in great quantities for food, and it is eaten freely by animals and birds. It makes excellent jelly, and the finest flavored vinegar, as clear as water, may be prepared from the fruit. The numerous other varieties of manzanitas all produce more or less similar edible fruit, and are all mostly small, straggly evergreen shrubs, graceful in their own peculiar way, and bearing in earliest spring time a profusion of lovely white blossoms, sometimes blushing a rosy red in a snow-storm.

ARCTOSTAPHYLOS PRINGLEI Parry.

"Young branches, including the petioles and margins of the leaves, copiously ciliate-pubescent, with mixed glandular hairs leaves short, petiolate, glaucous, minutely net-veined, with conspicuous mid-nerves, ovate to broadly subcordate, abruptly short mucronate; inflorescence closely paniculate from a thickened base, intermixed with bud-scales, indicating a late flowering period, racemose branches slender, thickly covered as well as the bracts, pedicels and calyx, with ciliate and glandular hairs, bracts lanceolate membranaceous, petaloid, deciduous, bracteoles linear nearly $\frac{1}{2}$ as long, pedicels slender, divaricate, 4-5 times as long as the bracts, calyx ciliate-glandular, corolla smooth, broadly urceolate; ovary and fr. glandular, hispid, nutlets irregularly coalescent, 5-7-celled."—Parry. Bull. Cal. Acad. Sci. ii. 494 (Nov. 2, 1887).

Variety? drupacea Parry Ca ac b 2 49:—' Differing from the above only in the completely consolidated stone, deeply culptured, & usually with a conspicuous 1-sided furrow. Mts east of San Diego; Or 543; S 1886, distributed as A glauca."

♂Xylococcus G

ARCTOSTAPHYLOS GLAUCA Lindl. The great-berried Manzanita.

Py Dav ac pr 4 34; Ca ac b 2 495; da 10
 ARCTOSTAPHYLOS BICOLOR A. Gray.

Densely branched irregular shrub, 3-5 ft high, with brown shaggy bark; leaves dull green, with whitish tomentose beneath; fls in condensed racemes, w with a pinkish tinge; fr often persistent until 2d fl'ing in F, smooth & shining, deep red, $\frac{1}{2}$ lines in diameter; copious and



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MOUNTAIN SHEEP.

1 ¹⁰ Life-size.

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rather dense granular pulp; putamen smooth externally, solid, 5-celled, 1 or more abortive. Or s j Py Dav ac pr 4 34; *Xylococcus bicolor* Nutt, Py Ca ac b 2 496 *Arc clevelandi* G?

ARCTOSTAPHYLOS PARRYANA Lmn.

"A much branched shrub, 3-5° high: foliage coriaceous, bright green; blade ovate or oblong 1/2-1' long, acute or obtuse, entire, conspicuously impressed veiny; petioles slender, 1/4-1/3' long: inflorescence paniculate corymbose, the pedicels & bracteoles w-tomentose: bracts foliaceous, narrow; bracteoles 2 or 3 lines long, deltoid, with calloustips: segments of the rotate calyx obtuse: fr ovate or globose, 1/4-1/3' long, y'ish; exocarp smooth & glabrous, rather thin; endocarp of from 5-7 firmly united bony carpels, apiculate at each end, & marked with longitudinal ridges corresponding with the back of the carpels: seeds 2 lin. long, incurved, w. Tehachapi mts."—Lemmon pitt 2 68

♂ *Comarostaphylis* G:—fr warty, putamen solid, 5-celled.

ARCTOSTAPHYLUS ARGUTA Zucc.
Variety **DIVERSIFOLIA** Parry.

"Shrub 6-15 ft h'gh; stems 1-3 inches in diameter, with light gray bark slightly furrowed, on the upper branches shreddy, & on the young, growing shoots tomentose; leaves varving greatly in size & form, according to position or season of growth; in young, vigorous offshoots or suckers, broadly lanceolate, 3 1/2' long by 1 1/2' broad, smooth on both sides, reticulate, scarcely at all revolute; on the upper & fl'ing branches, narrowly lanceolate, strongly revolute, & tomentose beneath, in all more or less irregularly serrate, with mucronate cartilaginous teeth & short petioles. Inflorescence racemose, from the axils of the upper terminal leaves, secund & horizontal, rachis, bracts, pedicels, and calyx long tomentose; bracts about 1/2' as long as the pedicels, corolla 3 lines long, stamens 10 (occasionally 8), filaments bearded be-

low, anther appendages about as long as the anthers; style shortly exerted; ovary hairy hispid above. Fr small, 2 lines broad, warty, with a solid 5-celled putamen cells more or less abortive. Needs comparison with the Mexican type, which probably includes several published species."—Parry Dav ac pr 4 35.

Or s j *A. polifolia* B-W non H.P.K.

A colored portrait of this in *Datos para la materia medica Mexicana*, (pt 3 11), well represents our shrub. It enjoys in the names *madronyo borracho*, and *garambullo*—the latter name in j is applied to *Cereus sargentianus*—and is in medicinal repute.

♂ *Micrococcus* Py Dav ac pr 4 36:—Fr with thin pericarp, without mealy pulp, wrinkled at maturity; 4 or 5 nutlets easily separating—in 2 divisions.

*Pericarp persistent, nutlets 2-celled.

ARCTOSTAPHYLOS OPPOSITIFOLIA P.

"Shrub 3-10° high, densely branched above, more or less naked below; stems 1-3' in diameter, with light greenish or gray bark smooth or with loose, shreddy fibers on the upper branches, young shoots minutely tomentose; leaves opposite or ternately whorled, narrowly lanceolate, entire, revolute, 1-2' long, 2-3'' wide, light green above, minutely tomentose beneath, with a prominent midnerve, the narrow blade gradually tapering to a short or obsolete petiole. Inflorescence paniculate, the lower floral branches in the axils of the upper opposite leaves, which higher up pass gradually into deltoid, more or less acuminate bracts, disposed in whorls of 3 or less at regular intervals, each bract subtending a branch or pedicel, & decurrent as a ridge down the rachis; pedicels 3 or 4 times longer than the bract, bibracteolate close to the base; corolla orbicular, 2-2 1/2'' high, shortly urceolate, with broad, reflexed lobes; stamens 10, anthers comparatively large, as long as the appendages filaments short, densely

bearded at base; style about twice the length of the ovary, included, or slightly exsert; ovary densely tomentose at the summit; fr orbicular, 2-3" broad, with a smooth, thin pericarp & scanty pulp, becoming wrinkled at maturity, enclosing 5 easily separated nutlets, nearly equal in size, & 2-celled by a partition from the ventral suture, occasionally both cells fertile or more or less abortive."—Parry Dav ac pr 4 36-37. Or j A salicifolia. BRYANTHUS BREWERI A. Gray.

Genus RHODODENDRON Linnaeus.
RHODODENDRON OCCIDENTALE A. G.
Azalea, 2-6° high, mts above 5000°, d

Genus PYROLA Tournefort.
PYROLA APHYLLA Smith.
PYROLA PICTA Smith.

Genus SARCODES Torrey.
SARCODES SANGUINEA Torr.
PTEROSPERA ANDROMEDEA Nutt.

PLUMBAGINACEAE.

Genus STATICE Linnaeus.
STATICE LIMONIUM Linn.
v californica G da 11

LENNOACEAE

Genus PHOLISMA Nuttall.
PHOLISMA ARENARIUM Nutt.
PHOLISMA DEPRESSUM Greene.

"Stems solitary, completely covered by the rhombic-ovate, or sometimes oblong, closely imbricated scales, fls in a depressed, barely convex head, an inch or 2 broad: sepals 6, linear-filiform, minutely glandular ciliolate: corolla tubular-funnel-form, 6-lobed, lilac-p: stamens shorter & style longer than in P. arenarium."—Ge ca ac b 1 198 j

Genus AMMOBROMA Torrey.
AMMOBROMA SONORAE Torr.

PRIMULACEAE.

Genus DODECATHEON. Linnaeus.
DODECATHEON CLEVELANDI Greene
"A foot or 2 high, pale green & glandular: new roots formed not at the end of the dry season but at its beginning, remaining dormant through the summer, no tubers formed either originally or by root-metamorphosis: leaves scarcely

fleshy, not depressed but ascending or erect, spatulate-obovate, the margins erose: fls 5-merous: corolla bright-p with a y base & some dark-p spots next the andrœcium: andrœcium about 3" long filaments connate, the tube dark-p, the ornate exterior of each filament changing to y at the base of the anther & continued up the back of it nearly to the apex in a lanceolate form & lying in irregular folds; anthers otherwise p, not quite twice the length of the staminal tube, slightly divergent around the moderately exserted pistil, retuse at the rather blunt apex: capsule oblong, circumscissile at top: seeds reddish-brown, somewhat cubical, the testa sinuately reticulate."—Ge pitt 1 214 Or s j

da 11. Or W 7 128 (& v alba & splen dens), giant cyclamen, shooting star. DODECATHEON ELLIPTICUM Nutt.
DODECATHEON HENDERSONI A. G.
DODECATHEON JEFFREYI Moore.

Ge ca ac b 1 406 sz; pitt 1 210, 214

These are mostly considered as forms of one species—the D. Meadia of Linn.

Genus ANAGALLIS Tournefort.
ANAGALLIS ARVENSIS Linn.

Poor man's weather glass da 11, Or j

Genus SAMOLUS Linnaeus.
SAMOLUS VALERANDI Linn.
v americana G da 11 Ge ca ac b 1 406

Genus CENTUNCULUS Linnaeus.
CENTUNCULUS MINIMUS Linn.

Genus GLAUX Linnaeus.
GLAUX MARITIMA Linn.

G. maritima L. Sea-milkwort, in saline soil round the northern hemisphere.

STYRACEAE.

Genus STYRAX Tournefort.
STYRAX CALIFORNICA Torr.

OLEACEAE.

Genus MENODORA Humb. & Bonpl.
MENODORA SCABRA A. Gray.
MENODORA SCOPARIA Engelm.

Genus FRAXINUS Tournefort.
FRAXINUS DIPETALA H. & A.

Flowering ash. j da 11
FRAXINUS OREGANA Nuttall.

APOCYNACEAE.

Genus APOCYNUM Tournefort.**APOCYNUM CANNABINUM L.**

Apocynum Cannabinum L.—Indian hemp possesses diuretic, cathartic, emetic and diaphoretic properties. Of wide distribution, from Oregon to Baja California, eastward to the Atlantic. A very useful remedy in many diseases, sometimes called American Ipecac.

A. ANDROSASEMIFOLIUM Linn.

Apocynum androsasemifolium L.—Of equally wide distribution as the last, with similar medicinal properties.

ASCLEPIADACEAE.**Genus PHILIBERTELLA Vail.**

"Calyx small, 5-parted, the lobes acute; corolla campanulate or rotate, deeply 5-parted, the lobes acute or obtuse, with a shallow entire or undulate ring forming an outer crown in its throat, the inner or staminal crown consisting of 5 turgid fleshy or hard scales, or flattish appendages, attached in a circle at the base of the sessile or slightly stalked gynostegium (column), forming a hollow entire or undulate spreading surface near the level of the conical stigmas; follicles naked, slender, attenuate at both ends or obtuse at the base. Twining herbs, or partly shrubby plants, of warm regions, with opposite glabrous pubescent or woolly leaves & umbellate sometimes fragrant & showy fls."—Anna Murray Vail Torr cl b 24 305 (Je 1897).

P HARTWEGII Vail lc

var heterophylla Vail

P. HIRTELLA Vail**Genus ASCLEPIAS Linnaeus.****ASCLEPIAS SUBULATA Decne.**

Asclepias Subulata Decne.—"Jumete" is a very powerful cathartic, equal in activity to croton oil. The Indians are said to use it in cases of syphilis after all other remedies fail to bring relief; an overdose often resulting in incurable insanity or death. In Mexico the juice of this or a similar plant is said to be often used in cases of enmity, the victim of the insidious drug becoming insane for life if not mercifully relieved at once by death. Tradition says that Maximilian's unfortunate empress, Carlotta, was a victim of this drug,

but the truth of this may never be known.

ASCLEPIAS ALBICANS S. Watson.

Asclepias Albicans Watson.—A larger species of jumete, from the Colorado desert and adjacent regions in Baja California, is credited popularly with the same powerful cathartic properties as the last.

ASCLEPIAS EROCARPA Benth.**ASCLEPIAS EROSA Torr.****ASCLEPIAS MEXICANA Cav.****ASCLEPIAS VESTITA H. & A.****ASTEPIANUS UTAHENSIS Engelm.****Genus GOMPHOCARPUS R. Brown.****GOMPHOCARPUS TOMENTOSUS A. G.****Genus SARCOSTEMMA R. Brown.**

S heterophyllum E is *Philibertia linearis* heterophylla fide G

PHILIBERTIA TORREYI A. Gray.**GENTIANACEAE.****Genus ERYTHRAEA Pers.****ERYTHRAEA DOUGLASHI A. Gray.**

Erythraea Douglasii Gray.—"It contains a bitter, tonic principle, valued for malarial diseases, and known as 'conchalagua,' " (Mrs. Bingham) in common with other plants of the order Gentianaceae.

ERYTHRAEA MUHLENBERGII Griseb.**ERYTHRAEA VENUSTA A. Gray.**

Erythraea venusta Gray.—This is the common "conchalagua" of Southern and Baja California, which grows luxuriantly and abundantly in wet seasons and is usually gathered and kept constantly in store by many Mexican and Indian families. The following letter, published in the West American Scientist (VI. 84) will here be found of interest as giving some reliable information regarding this and other native plants possessing medicinal virtue:

Editor of the West American Scientist—We beg to acknowledge receipt of your favor, and in reply thereto, we beg to state as follows: Conchalagua is, as you mention, the *Erythraea venustia* Gray, but more popularly known as California Centaury, Californian Pink, etc.

Medicinally it possesses valuable antiseptic and febrifuge properties, and is in high repute as a bitter tonic and stomachic, but we see no reason for considering it to be the "August Flower" so extensively advertised. (We

have been informed that such was the case.—Editor.)

In regard to the other plant mentioned by you, Golondrina, we find that several species of Euphorbia, mostly the *E. albomarginata*, Torr. & Gray, and the *E. prostata*, Ait., have acquired a reputation as antidotes for snake poisoning, under the names of "Golondrina" and "Gollindrina." (*E. polycarpa*, Benth., is the common Golondrina of the Mexicans of Southern and Lower California.—Editor.)

The latter name has been applied also to the *Chelidonium majus*, Linne, and the *Euphorbia maculata*, Linne, is known in some districts as Golondrina de Filipinas, or Gatas-Gatas de Filipinas. In the case of these last two plants, however, we find no record of their having been employed as snakebite remedies.

Larrea Mexicana, Moricand, is particularly known as the creosote-bush or stinkweed, and is credited with being possessed of valuable properties for the treatment of rheumatism and syphilitic diseases. Trusting that the above will be of interest, we are, very truly yours,

PARKE, DAVIS & CO.

Genus FRASERA Walter.

FRASERA PARRYI Torr.
FRASERA NITIDA Benth.

EUSTOMA EXALTATUM Griseb.

POLEMONIACEAE.

Genus POLEMONIUM Tournefort.

POLEMONIUM CONFERTUM A. Gray.

Genus PHLOX Linnaeus.

PHLOX DOUGLASSII Hook.
PHLOX LONGIFOLIA Nutt.
PHLOX NANA Nutt.
PHLOX GRACILIS Hooker.
PHLOX DOLICANTHA A. Gray.
PHLOX CANESCENS T.G.
PHLOX SPECIOSA Pursh.

Genus LOESELIA Linnaeus.

LOESELIA EFFUSA A. Gray.
LOESELIA GUTTATA A. Gray.
LOESELIA TENUIFOLIA A. Gray.

Loeselia tenuifolia Gray.—This herb is credited with valuable medicinal properties, being held in high repute by Indians and Mexicans for fevers and in other diseases. Some Mexicans once informed me however, according to my field notes, that it is a virulent poison 'used only in venereal diseases.' Without some actual knowl-

edge of the properties of a plant it should be experimented upon with exceeding caution.

Genus COLLOMIA Nuttall.

COLLOMIA GRACILIS Dougl.
COLLOMIA GRANDIFLORA Dougl.
COLLOMIA HETEROPHYLLA Hook.

Genus GILIA Ruiz & Pavon.

GILIA ACHILLEAEFOLIA Benth.
GILIA ANDROSACEA Stend.
GILIA AUREA Nutt.
GILIA BELLA A. Gray.
GILIA BIGELOVII A. Gray.
GILIA BREVICULA A. Gray.
GILIA CALIFORNICA Benth.
GILIA CAPITATA Dougl.
GILIA CILIATA Benth.
GILIA DEMISSA A. Gray.
GILIA DENSIFOLIA Benth.
GILIA DIANTHOIDES Endl.
GILIA FILIFOLIA Nutt.
GILIA FLOCCOSA A. Gray.
GILIA FLORIBUNDA A. Gray.
GILIA INCONSPICUA Dougl.
GILIA LATIFOLIA S. Watson.
GILIA LATIFLORA A. Gray.
GILIA LAXA Vasey & Rees.
GILIA LEMMONI Gray.
GILIA LINIFLORA Benth.
GILIA MICRANTHA Stend.
GILIA MULTICAULIS Benth.
GILIA NEVINII A. Gray.
GILIA ORCUTTII Parry.

"A span high, slender; leaves only 2 or 3 pairs up to the inflorescence, very small, with filiform divisions; fl. few, in the clusters; tube of the corolla less than 1/2 long, rather thick, dilated at summit, hardly longer than the turbinate campanulate throat and limb, its lobes ovate; stamens and style included."—Parry. Proc. Dav. Acad. Natl. Sci. iv. 40 (1884).

GILIA PARRYAE A. Gray.
GILIA PUNGENS Benth.
GILIA SESSEI Don.
GILIA TENELLA Benth.
GILIA TENIUFLOREA Benth.
GILIA VIRGATA Stend.

NAVARRETIA FOLIACEA Greene.

"Near *N. atractyloides*, but more diffuse and leafy, leaves amber, less coriaceous and of a lighter green, their segments not wholly spinose, but herbaceous below; segments of the calyx very unequal, 2 large, ovate-acuminate spinose tipped and more or less recurved, 3 very small and only broadly subulate; corolla white, small, little surpassing the calyx; herbage scentless."—Greene, Pittonia, i. 138 (N 25, 1887). Potrero, San Diego county, Cal. (D. Cleveland).

NAVARRETIA PENINSULARIS Greene.

"Diffusely branching. 3-10' high, glandular-puberulent and very viscid; leaves all acerose-pinnatifid; fls. rather few, in numerous scattered and mostly pedunculate glomerules; calyx sparsely hirsute,

the segments subulate, entire, very unequal, the shortest fully equalling the tube the longest surpassed by the purplish corolla; capsule 3-celled, many-seeded. Hanson's ranch, in the northern part of Lower California, July 10, 1884, C. R. (Cutt, No. 1113. Related to *N. divaricata*, but sufficiently distinguished by its clamminess and different inflorescence, as well as by its larger corollas."—Greene, *Pittonia*, i. 136.

NAVARRETTIA HAMATA Greene.

"Near *N. atractyloides*, and like it aromatic, but smaller and comparatively slender; leaves not foliaceous-dilated, but with a linear, or nearly linear rachis and few or many spinose-subulate segments of which the terminal one, and sometimes one or all of the lateral pairs are strongly recurved or else abruptly deflexed (forming hooks); calyx-segments all subulate and spinose-tipped, all erect, 2 twice as large as the others; corolla salverform, deep purple, large for the plant, the slender tube well exerted from the calyx. Guadalupe mt., Lower California, June, 1883. C. R. Orcutt. Also at All Saints bay, May, 1885, by the present writer."—Greene, *Pit.* i. 139 (N 25. 1887).

NAVARRETTIA ATRACTYLOIDES Gne.
NAVARRETTIA DIVARICATA Greene.
NAVARRETTIA PROSTRATA Greene.
NAVARRETTIA VISCIDULA Greene.

HYDROPHYLLACEAE.

LEMMONIA CALIFORNICA A. Gray.

Genus *EMMENANTHE* Bentham.

EMMENANTHE PENDULIFLORA Bth.

California yellow bells; a broad bushy annual from a span to 2 feet high, loaded with broadly bell-shaped pendulous flowers, $\frac{1}{2}$ inch long, of a delicate cream color—the persistent corolla drying and retaining its shape until seed ripens. The general effect of a branch is suggestive of a long spike of the lily of the valley, says one writer. Utah; Lake county, Cal. to Lower California; Arizona.

Genus *NEMOPHILA* Nuttall.

NEMOPHILA AURITA Lindl.
NEMOPHILA INSIGNIS Dougl.
NEMOPHILA MENZIESII H. & A.
NEMOPHILA RACEMOSA Nutt.

Genus *ELLISIA* Linnaeus.

ELLISIA CHRYSANTHEMIFOLIA Bth
ELLISIA MEMBRANACEA Benth.

Genus *PHACELIA* Juss.

PHACELIA AFFINIS A. Gray.
PHACELIA CAMPANULARIA A. Gray.
PHACELIA CILIATA Benth.
PHACELIA CIRCINATA Jacq. f.

PHACELIA CORDIFOLIA S. Watson.
PHACELIA CURVIPES Torr.
PHACELIA DAVIDSONII A. Gray.
PHACELIA DISTANS A. Gray.
PHACELIA DOUGLASHII Torr.
PHACELIA FREMONTII Torr.
PHACELIA GRANDIFLORA A. Gray.
PHACELIA HETTEROSPERMA Parish.
PHACELIA HISPIDA A. Gray.
PHACELIA IXODES Kellogg.
PHACELIA IVESIANA Torr.
PHACELIA LEUCANTHA Lemmon.
PHACELIA MICRANTHA Torr.
PHACELIA MOHAVENSIS A. Gray.
PHACELIA ORCUTTIANA A. Gray.
PHACELIA PARRYI Torr.
PHACELIA RAMOSISSIMA Dougl.
PHACELIA RUGULOSA Lemmon.
PHACELIA SUFFRUTESCENS Parry.
PHACELIA TANACETIFOLIA Benth.
PHACELIA VISCIDA Torr.
PHACELIA WHITLAVIA A. Gray.

Genus *TRICARDIA* Torrey.

TRICARDIA WATSONI Torr.

Genus *NAMA* Linnaeus.

NAMA DEMISSUM A. Gray.
NAMA HISPIDUM A. Gray.
NAMA PARRYI A. Gray.
NAMA ROTHROCKII A. Gray.
NAMA STENOCARPUM A. Gray.

Genus *ERIODICTYON* Bentham.

ERIODICTYON ANGUSTIFOLIUM Nt.
ERIODICTYON CRASSIFOLIUM Benth.
 "Densely tomentose-villous, the hairs straight; corolla salver-form, twice as long as the calyx, densely villous outside; seed finely about 10-striate, with innumerable minute transverse lines."—Greene, *Bull. Cal. Acad. Sci.*, i. 201.

ERIODICTYON GLUTINOSUM Benth.
 "Infusion of the balsamic-resiniferous leaves in spirit used as a tonic" (Watson, *Bot.*, Cal., i:518). This and *E. angustifolium* Nuttall are probably identical. The species is very variable. These shrubs are abundant in the hills and mountains of Southern and Baja California, and held in about equal repute as remedial agents by the Mexicans who do not seem to distinguish between them. *E. sessilifolium* Greene, of the vicinity of Todos Santos bay, Lower California, is also known by the same name and credited with the same virtues. This seems to be a form connecting *E. glutinosum* and *E. angustifolium* with *E. crassifolium*.

ERIODICTYON SESSILIFOLIUM Grne.

Ge ca ac b r:201. Br Zoe 4:208 j only.

E. intermedia Parry ined. Or 77 j

ERIODICTYON TOMENTOSUM Benth.

H. C. Ford gives the San Rafael mountains as the habitat of this species. Mrs. Bingham says: "Found on the banks of mountain streams, and used

for lung diseases, but especially for diseases of the mucous membrane of the throat. The Yerba Santa of the Californians." It should be remarked here, that the shrub Mrs. Bingham refers to, is not the beautiful shrub with velvety foliage found around San Diego and referred to *E. tomentosum* by Watson. The San Diego shrub is referred to *E. crassifolium* Benth (fide Greene), and is not known to possess any medicinal properties. The Yerba Santa of the Mexicans commonly referred to as possessing medical properties, is *E. glutinosum*.

Genus HESPEROCHIRON S. Watson.
HESPEROCHIRON NANUS Greene.

BORRAGINACEAE.

Genus COLDENIA Linnaeus.
COLDENIA CANESCENS D. C.
COLDENIA PALMERI A. Gray.

Genus HELIOTROPIUM Tournefort.
HELIOTROPIUM CURASSAVICUM Linn.

Genus AMSINCKIA Lehm.
AM SINCKIA ECHINATA A. Gray.
AM SINCKIA LYCOPSOIDES Lehm.
AM SINCKIA INTERMEDIA F. & M.

Fl chrome y, with orange spots at the base of the divisions of the corolla. sz j
AM SINCKIA TESSELLATA A. Gray.
AM SINCKIA SPECTABILIS F. & M.

PLAGIOBOTHRYIS CANESCENS A. G.
PLAGIOBOTHRYIS NOTHOFULVUS

KRYNITZKIA ANGUSTIFOLIA A. Gray
KRYNITZKIA BARBIGERA A. Gray.
KRYNITZKIA CIRCUMSCISSA A. Gray.
KRYNITZKIA COOPERI A. Gray.
KRYNITZKIA FOLIOSA Greene.
KRYNITZKIA INTERMEDIA A. Gray.
KRYNITZKIA JONESII A. Gray.
KRYNITZKIA LEIOCARPA F. & M.
KRYNITZKIA MARITIMA Greene.
KRYNITZKIA MICROMERIS A. Gray.
KRYNITZKIA MOHAVENSIS Greene.
KRYNITZKIA MURICATA A. Gray.
KRYNITZKIA OXYCARYA A. Gray.
KRYNITZKIA OXYGONA A. Gray.
KRYNITZKIA PTEROCARYA A. Gray
KRYNITZKIA RAMOSISSIMA A. Gray
KRYNITZKIA TORREYANUM A. Gry.

Genus PECTOCARYA De Candolle.
PECTOCARYA LINEARIS D. C.
PECTOCARYA PENICILLATA A. D. C.
PECTOCARYA SETOSA A. Gray.

Genus HARPAGONELLA A. Gray.
HARPAGONELLA PALMERI A. Gray.

ECHINOSPERMUM GREENEI A. Gray.
"Allocarya echinoglochis. Habit, pubescence and inflorescence of *A. trachycarpa*, but a coarser, larger plant; nutlets 1" long, ovate, straight, carinate ventrically down to the nearly basal ovate scar, the back covered with coarse granulations and stout barbed prickles $\frac{1}{4}$ - $\frac{1}{2}$ line high, these distinct at base or more or less confluent into walled reticulations, the latter sometimes strongly developed and the prickles themselves correspondingly reduced or even nearly obsolete. San Diego to Oregon."—Ge.

CONVOLVULACEAE.

Genus CONVULVULUS Linnaeus.
CONVOLVULUS ARVENSIS Linn.
CONVOLVULUS CALIFORNICA Choisy.
CONVOLVULUS LONGIPES S. Watson.
CONVOLVULUS LUTEOLUS A. Gray.
CONVOLVULUS OCCIDENTALIS Gray
CONVOLVULUS PENTAPETALOIDES
CONVOLVULUS SEPIUM Linn.
CONVOLVULUS SOLDANELLA Linn.

Genus CRESSA Linnaeus.
CRESSA CRETICA Linn.

Genus CUSCUTA Tournefort.
CUSCUTA CALIFORNICA Choisy.
CUSCUTA DECORA CHOISY.
CUSCUTA SALINA Engelm.
CUSCUTA SUBINCLUSA D. & H.
DICHONDRA REPENS Forst.

SOLANACEAE.

Genus SOLANUM Tournefort.
SOLANUM DOUGLASHI Dunal.
SOLANUM NIGRUM Linn.
SOLANUM PALMERI Vasey & Rose.
SOLANUM XANTI A. Gray.

Genus PHYSALIS Linnaeus.
PHYSALIS AEUQUATA Jacq. f.
PHYSALIS CRASIFOLIA Benth.
PHYSALIS MURICULATA Greene.
PHYSALIS PEDUNCULATA Greene.
PHYSALIS PUBESCENS Linn.

Genus LYCIUM Linnaeus.
LYCIUM ANDERSONII A. Gray.
LYCIUM CALIFORNICUM Nutt.
LYCIUM HASSEI Greene.
LYCIUM PUBERULUM A. Gray.
LYCIUM RICHI A. Gray.
LYCIUM TORREYI A. Gray.

Genus DATURA Linnaeus.
DATURA METELOIDES DC.
D discolor Or 2190 j

Genus PETUNIA Juss.
PETUNIA PARVIFLORA Juss.

Genus NICOTIANA Tournefort
NICOTIANA BIGELOVII S. Watson.



EMMENANTHE PENDULIFLORA Bth.

NICOTIANA TRIGONOPHYLLA Dunal.
 NICOTIANA ATTENUATA Torrey.
 NICOTIANA CLEVELANDI A. Gray.
 NICOTIANA GLAUCA L.
 Nicotiana Glauca L.—“The large, glaucous, thickish leaves are used as healing and anodine poultices.” (Harvard).

SCROPHULARIACEAE.

Genus LINARIA Tournefort.

LINARIA CANADENSIS Dum.

Genus ANTIRRHINUM Tournefort.

ANTIRRHINUM COULTERIANUM Bth.
 ANTIRRHINUM FILIPES A. Gray.
 ANTIRRHINUM GLANDULOSUM Lnl.
 ANTIRRHINUM JUNCEUM A. Gray.
 ANTIRRHINUM NEVINIANUM A. Gray.
 ANTIRRHINUM NUTTALLIANUM Bth.
 ANTIRRHINUM ORCUTTIANUM A. G.
 ANTIRRHINUM SPECIOSUM A. Gray.
 ANTIRRHINUM STRICTUM A. Gray.

Or d, da 12, Ge ca ac b 1:122, 409; sz.
 ANTIRRHINUM SUBSESSILE A. Gray
 ANTIRRHINUM WATSONI Vasey-Rose

Genus MOHAVEA A. Gray.

MOHAVEA VISCIDA A. Gray.

Genus SCROPHULARIA Tournefort.

SCROPHULARIA CALIFORNICA Chn.

Genus COLLINSIA Nuttall.

COLLINSIA BARTSIAEFOLIA Benth.
 COLLINSIA BREVISFOLIA W. Suks.
 COLLINSIA CHILDSII Parry.

C parviflora Or d

COLLINSIA BICOLOR Benth.

Auridula-p fls, upper divisions of corolla white tinged with rose & auricula-spots at the center. Or d j

COLLINSIA PARRYI A. Gray.

Genus PENTSTEMON Mitchell.

PENTSTEMON AMBIGUUS Torr.
 PENTSTEMON ANTIRRHINOIDES Bth.
 PENTSTEMON AZUREUS Bth.
 PENTSTEMON BARBATUS Nutt.
 Variety LABROSUS A. Gray.
 PENTSTEMON CAESIUS A. Gray.
 PENTSTEMON CENTRANTHIFOLIUS
 PENTSTEMON CERROSENSIS Kelg.
 PENTSTEMON CLEVELANDI A. Gray.
 PENTSTEMON CORDIFOLIUS Benth.
 PENTSTEMON EATONI A. Gray.
 PENTSTEMON GLABER Pursh.
 PENTSTEMON HETEROPHYLLUS Lnl.
 PENTSTEMON LAETUS A. Gray.
 PENTSTEMON PALMERI A. Gray.
 PENTSTEMON PARISHII A. Gray.
 PENTSTEMON PARRYI A. Gray.
 PENTSTEMON PUMILUS Nutt.
 PENTSTEMON ROTHROCKII Gray.
 PENTSTEMON SPECTABILIS Thurber
 PENTSTEMON TERNATUS Torr.

Genus PEDICULARIS Tournefort.

PEDICULARIS DENSIFLORA BENTH.

Lousewort, pomegranate-p fls & bracts with y lips. Or d

PEDICULARIS SEMIBARBATUS A. G.

MIMETANTHA PILOSA Greene.

Genus MIMULUS Linnaeus.

MIMULUS BREVIPES Benth.
 MIMULUS BIGELOVII A. Gray.
 MIMULUS CARDINALIS Dougl.
 MIMULUS CLEVELANDI Brandege.
 “Perennial, suffrutescent at base, 3-6 dm. high, glandular-pubescent throughout; stems many from the base, sparingly branched above; leaves lanceolate, serrate, 3-7 cm. long, narrowing to the clasping base, in age revolute on the margins; flowers shortly pedicellate; calyx 2 cm. long, contracted above the ovary, the upper and longer portion curved and spreading, the lanceolate, somewhat unequal teeth $\frac{1}{2}$ the length of the tube; corolla golden yellow, nearly twice the length of the calyx, with gradually dilated throat and widely spreading nearly equal lips; styles stout, minutely and densely glandular; stigma tubular-peltate; mature capsule 10-12 mm. long, nearly quadrangular, tapering slightly toward the apex, opening to the base by the upper suture, the lower separating for only a short distance from the tip, and each valve splitting at the tip for nearly the same distance as the lower suture; placentae separate, as in *M. glutinosus*; seeds foveolate, apiculate at both ends.”—T. S. Brandege, Garden and Forest, 8:134, f 20 (3 Ap 1895).

South side of Cuyamaca peak, San Diego county, California.

MIMULUS EXIGUUS A. Gray.
 MIMULUS FLORIBUNDUS Dougl.
 MIMULUS FREMONTI A. Gray.
 MIMULUS INCONSPICUUS A. Gray.
 MIMULUS LATIFOLIUS A. Gray.
 MIMULUS LUTEUS Linn.

MIMULUS MOHAVENSIS Lemmon.

MIMULUS MOSCHATUS Dougl.

MIMULUS NANUS Hook & Arn.

MIMULUS NASUTUS Greene.

MIMULUS PALMERI A. Gray.

MIMULUS PARISHII Greene.

“Stout, 2' high, villous and very slimy; leaves ovate-lanceolate, erose-dentate, 1-2' long, the uppermost clasping; pedicels shorter than the leaves; calyx-teeth triangular, acute, nearly equal; corolla pale rose-red, only the small, nearly regular limb exerted from the calyx; seed small oblong, with a loose, wrinkled coat.”—Greene, Bull. Cal. Acad. Sci., i. 108-9 (Mar. 7, 1895).

DIPLACUS GLUTINOSUS Nutt.

Mimulus glutinosus Wendl.—The infusion of the leaves of this and related forms (treated as species of *Diplacus* by some botanists) is considered a specific by some for dysentery.
 DIPLACUS GRANDIFLORUS Greene.
 DIPLACUS LATIFOLIUS Nutt.
 DIPLACUS LINEARIS Greene.

DIPLACUS LONGIFLORUS Nutt.
DIPLACUS PUNICEUS Nutt.
DIPLACUS STELLATUS Kellogg.

Genus STEMODIA Linnaeus.

STEMODIA DURANTIFOLIA Swartz.

Genus LIMOSELLA Linnaeus.

LIMOSELLA AQUATICA Linn.

Genus VERONICA Linnaeus.

VERONICA ALPINA Linn.
VERONICA AMERICANA Schw.
VERONICA PEREGRINA Linn.

Genus CASTILLEIA Linnaeus.

CASTILLEIA CINEREA A. Gray.
CASTILLEIA SESSIFLORA Pursh.
CASTILLEIA AFFINIS Hook & Arn.

Tips of floral bracts brilliant poppy-red.
ff j sz da 13

CASTILLEIA FOLIOLOSA Hook.-Arn.
CASTILLEIA HOLOLEUCA Greene.
CASTILLEIA LINEARIFOLIA Benth.
CASTILLEIA MINIATA Dougl.
CASTILLEIA OBLONGIFOLIA A. Gray.
CASTILLEIA PARVIFOLIA Bong.
CASTILLEIA PLAGIOTOMA A. Gray.
CASTILLEIA STENANTHA A. Gray.

Genus ORTHOCARPUS Nuttall.

ORTHOCARPUS ATTENUATUS A. Gray.
ORTHOCARPUS DENSIFLORUS Bth.

O densiflorus Bentham Ge ca ac b 2:
409 sz

ORTHOCARPUS HISPIDUS Benth.
ORTHOCARPUS PARISHII A. Gray.
ORTHOCARPUS PURPURASCENS Bh.

Genus CORDYLANTHUS Nuttall.

CORDYLANTHUS FILIFOLIUS Nutt.
CORDYLANTHUS NEVINI A. Gray.
CORDYLANTHUS MARITIMUS Nutt.

da 14, ff

Adenostegia maritima Nutt in DC pd
10:598; KBr Zoe 2:368
CORDYLANTHUS ORCUTTIANUS A. G.

OROBANCHACEAE.

Genus APHYLLON Mitchell.

APHYLLON CALIFORNICUM A. Gray.
APHYLLON COMOSUM A. Gray.
APHYLLON COOPERI A. Gray.
APHYLLON FASCICULATUM A. Gray.
APHYLLON LUDOVICIANUM A. Gray.
APHYLLON TUEROSUM A. Gray.
APHYLLON UNIFLORUM A. Gray.

BIGNONIACEAE.

MARTYNIA ALTHEAEFOLIA Benth.

Genus CHILOPSIS Don.

CHILOPSIS SALIGNA Don.

Chilopsis Saligua Don.—Desert willow. "Mexicans use the flowers in fevers and as a stimulant in cardiac diseases." (Harvard).

ACANTHACEAE.

Genus BELEPERONE Nees.

BELEPERONE CALIFORNICA Benth.

LABIATAE.

Genus HYPPTIS Jacq.

HYPPTIS EMORYI Torr.

Genus MENTHA Linnaeus.

MENTHA CANADENSIS Linn.
MENTHA PIPERATA Linn.
MENTHA VIRIDIS Linn.

LYCOPUS SINUATUS Ell.

L lucidus americanus G da 14

Genus PYCNANTHEMUM Mich.

PYCNANTHEMUM CALIFORNICUM T.

Genus MONARDELLA Bentham.

MONARDELLA CANDICANS Benth.
MONARDELLA HYPOLEUCA A. Gray.
MONARDELLA LANCEOLATA A. Gray.

V microcephala G

MONARDELLA LINOIDES Gray.

MONARDELLA MACRATHA A. Gray.

V tenuiflora G

MONARDELLA NANA A. Gray.
MONARDELLA ODORATISSIMA Benth

MONARDELLA PRINGLEI A. Gray.

MONARDELLA TENUIFLORA S. Wat.

MONARDELLA THYMIFOLIA Greene.

MONARDELLA VILLOSA Benth.

CALAMINTHA PALMERI A. Gray.

ACANTHOMINTHA ILICIFOLIA A. G.

Genus POGOYNE Bentham.

POGOYNE NUDIUSCULA A. Gray.

POGOYNE SERPYLLOIDES A. Gray.

POGOYNE TENUIFLORA A. Gray.

Genus SALVIA Linnaeus.

SALVIA BERNARDINA Parish.

SALVIA COLUMBARIAE Benth.

Salvia Columbriæ Bentham.—Mrs. Bingham says this is "the chia of the aborigines, and grows in soil in the foothills of the coast range. The seeds are demulcent, and used in gastro-intestinal disorders. The Indians roasted the seed, ground them between two stones, and used the meal for food. It is said to improve the taste of poor water, and on that account is of use to persons in crossing deserts. It quenches thirst and lessens the quantity of water desired, sometimes in that way preventing serious illness from excessive drinking of bad water. It is valued as a poultice, and the seeds are sometimes placed in the eye to form a mucilage by means of which foreign bodies may be removed from that organ. Quantities of these seeds have been found buried in graves several hundred years old, proving that the use of the seed reaches back into the remote past."

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Prof. Sereno Watson (Bot. Cal. i:599) says, "The seed-like nutlets, infused in water, form a pleasant mucilaginous drink, which is largely used."

SALVIA CARDUACEA Benth.
seed of this and the above species are identical except in size, and both known by the Indian name of "chia," "chio," or "chiüs." As the seed of this is much larger it is the one most largely used among the Indians of Southern and Lower California, and the above remarks of Mrs. Bingham concerning *S. columbaria* may be considered to apply equally well to this species.
SALVIA CEDROSENSIS Greene.

Genus SPHACELE Benth.

SPHACELE CALYCINA Benth.
Variety **WALLACEI** A. Gray.
SPHACELE FRAGRANS Greene.

"Shrub 6' high: leaves ovate-oblong, obtuse, coarsely and irregularly dentate, hastate at base, 2-4' long of thin texture, loosely white-woolly beneath, glabrate above not resinous, agreeably aromatic: calyx open-campanulate, more than an inch long, its lobes triangular-lanceolate, as long as the tube. nutlets large, glabrous."—Ge pit 1:38.

Genus AUDIBERTIA Benth.

AUDIBERTIA CAPITATA A. Gray.
AUDIBERTIA CLEVELANDI A. Gray.
AUDIBERTIA GRANDIFLORA Benth.
AUDIBERTIA INCANA Benth.

V pilosa G

V pachystaceya G j

AUDIBERTIA NIVEA Benth.
AUDIBERTIA PALMERI A. Gray.
AUDIBERTIA POLYSTACHYA Benth.
AUDIBERTIA STACHYOIDES Benth.
AUDIBERTIA VASEYI Porter.
SALIZARIA MEXICANA Torr.

MICROMERIA DOUGLASII Bth.
"Yerba Buena." Valued as a blood purifier.

BRUNELLA VULGARIS Linn.

TEUCRIUM CUBENSE Linn.

Genus MARRUBIUM Linnaeus.

MARRUBIUM VULGARE Linn.
Marrubium Vulgare L.—Hoarhound, widely naturalized in California, is much used for coughs and lung diseases.

Genus STACHYS Linnaeus.

STACHYS ACUMINATA Greene.
STACHYS ADJUGOIDES Bth.
STACHYS ALBENS A. Gray.
STACHYS BULLATA Benth.

STACHYS CALIFORNICA Bth.

Genus TRICHOSTEMA Linnaeus.

TRICHOSTEMA LANATUM Benth.
The black sage is a small shrub found in the coast range from Monterey southward to Baja California(?), "cultivated in gardens of the Californians," and "valued as a stimulant" (Mrs. Bingham).

TRICHOSTEMA LANCEOLATUM Bth.
TRICHOSTEMA MICRANTHUM A. Gray.

TRICHOSTEMA OVATUM Curran.

TRICHOSTEMA PARISHII Vasey.
"romero" of the Mexicans is valued for medicinal properties unknown to the writer. Dr. Edward Palmer, I believe, has published notes on the virtues of this plant in the American Naturalist, and also under the title of "Food Products," in one of the reports of the United States department of agriculture.
IOPHANTHUS URTICIFOLIUS Benth.

Genus SCUTELLARIA Linnaeus.

SCUTELLARIA ANGUSTIFOLIA Psh.
SCUTELLARIA BOLANDERI A. Gray.
SCUTELLARIA TUBEROSA Benth.

VERBENACEAE.

Genus VERBENA Linnaeus.

VERBENA BRACTEOSA M'ch.
VERBENA CANESCENS H. B. K.
VERBENA CILIATA Benth.
VERBENA LILACINA Greene.
VERBENA LITORALIS H. B. K.
VERBENA OFFICINALIS Linn.
VERBENA POLYSTACHYA H. B. K.
VERBENA PROSTRATA R. Br.

Genus LIPPIA Linnaeus.

LIPPIA LANCEOLATA Michx.
LIPPIA NODIFLORA Michx.

PLANTAGINACEAE.

Genus PLANTAGO Linnaeus.

PLANTAGO BIGELOVII A. Gray.
PLANTAGO HIRTELLA H. B. K.
PLANTAGO LANCEOLATA Linn.
PLANTAGO MAJOR Linn.
PLANTAGO MARITIMA Linn.
PLANTAGO PATAGONICA Jacq.
Variety **GNAPHALOIDES** A. Gray.
PLANTAGO PICTA Morris.
Utah, Arizona, Southern California (Parish 2643).
PLANTAGO OBLONGA Morris.
Colorado Desert, California (Orcutt).
PLANTAGO IGNOTA Morris.
Ft. Verde, Arizona (E. A. Mearns 199); northern Baja California.
PLANTAGO SPECIOSA Morr's.
Santa Catalina Island, California (G. B. Grant 2412).
PLANTAGO OBLVERSA Morris.
Del Mar, San Diego County, California (Bello Sumner Ang'er 21).
Plantago erecta Morris in part; Torr bot. cl. b. 27:118 (1930).
PLANTAGO ERECTA Morr's.

Plantago patagonica California, Greene
Man bay reg. 235 (1894).

California; Oregon.
PLANTAGO VIRGINICA Linn.

NYCTAGINACEAE.

Genus *MIRABILIS* Linnaeus.

MIRABILIS CALIFORNICA A. Gray.
MIRABILIS FROEBELII Behr.
MIRABILIS LAEVIS Curran.
MIRABILIS MULTIFLORA A. Gray.
MIRABILIS TENUILOBA S. Watson.

Genus *ALLIONIA* Linnaeus.

ALLIONIA INCARNATA Linn.

Genus *ABRONIA* Jussieu.

ABRONIA LATIFOLIA Esch.

arenari Menzies

ABRONIA MARITIMA Nutt.
ABRONIA TURBINATA Torr.
ABRONIA UMBELLATA Lam.
ABRONIA VILLOSA S. Watson.

"Pubescence more or less densely vil-
lous, subglandular, spreading; stems weak
and slender; leaves $\frac{1}{4}$ -1" long, oblong
or ovate, obtuse or acutish, attenuate into
a slender petiole; heads 5-10-flowered; in-
volucral scales narrowly lanceolate, log-
acuminate, 3-4" long; fl. pink, the lobes
obcordate with a deep sinus; fr. with a
firm body, strongly reticulate-pitted, the
2-5 broad wings consisting of a simple
lamina, usually truncate above. Nearest
to *A. umbellata*, Arizona (Wheeler)."—
S. Watson, Amer. Natl., vol. 6 (May 1873).
OXYBAPHUS NYCTAGINEUS Sweet.

Genus *BOERHAAVIA* Linnaeus.

BOERHAAVIA ERECTA Linn.
BOERHAAVIA VISCOSA A. Gray.

POLYGONACEAE.

Genus *RUMEX* Linnaeus.

RUMEX ACETOSELLA Linn.
RUMEX CONGLOMERATUS Mun.
RUMEX CRISPUS Linn.
RUMEX HYMENOSEPALUS Torr.

"Sandy soils from El Paso to the can-
yons of the Rio Grande; Mr—Ap. Root
white. Stem 2-3° high. 'Foliage intens-
ely bitter,' Thurber. Lower leaves a ft
or more long & 2-3' wide, somewhat un-
dulate on the margin; upper ones nearly
flat. Panicle a ft long, fls crowded. In-
ner sepals of the fructiferous calyx near-
ly $\frac{1}{2}$ ' long, roundish-ovate, strongly cor-
date, of a very thin texture, often rose-
colored, slightly reticulate-veined, twice
as long as the achenium." * * * Torr bot
m boundary 177-8. Or 71 j; d; z; da 14
RUMEX MARITIMUS Linn.
RUMEX SALICIFOLIUS Wain.

Genus *POLYGONUM* Linnaeus.

POLYGONUM ACRE H B K.

POLYGONUM AMPHIBIUM Linn.
POLYGONUM AVICULARE Linn.
POLYGONUM BISTORTA Linn.
POLYGONUM HARTWRIGHTII A. G.
POLYGONUM HYDROPIPEROIDES Mx.
POLYGONUM INCURVATUM Ell.
POLYGONUM NODOSUM Pers.
POLYGONUM TENUE Michx.

Genus *NEMACAULIS* Nuttall.

NEMACAULIS DENUDATA Nutt.

Genus *ERIOGONUM* Michx.

ERIOGONUM CLAVATUM Small.

"Annual, acaulescent. Leaves basal;
blades 5-13 mm. broad, much broader
than long, undulate, strigose-hispid on
both sides, cordate at the base or rarely
truncate; petioles about twice as long as
the blades, hispid; scapes erect, solitary,
glaucous, forked above, the ultimate di-
vision filiform, the lower internodes
more or less swollen above the middle:
bracts scale-like: peduncles hair-like, $\frac{1}{2}$
cm. long, spreading: involucre narrow-
ly turbinate, very small, less than 1 mm.
long; segments obtuse, as broad as long,
shorter than the tube: calices densely
hirsute less than 1 mm. long, the seg-
ments nearly equal, ovate-lanceolate, a-
cutish: filaments glabrous."—Small. j
ERIOGONUM GLAUCUM Small.

"Annual, slender, acaulescent. Leaves
basal; blades ovate or oval-ovate, 5-10
mm long, obtuse, undulate-crested, of-
ten inequilateral, softly hispid on both
surfaces, obtuse or subcordate at the
base; petioles 2-3 times longer than the
blades, hirsute: scapes erect, solitary or
several together, 1-6 cm. tall, glaucous,
forked, the branches ascending or
spreading: peduncles filiform, about one
cm. long, more or less spreading: invo-
lucre glabrous, turbinate, 1 mm. long;
segments oblong, obtuse, about as long
as the tube: calices densely hirsute, 2
mm. long; segments lanceolate, acute,
erect; filaments glabrous."—Small, Bull.
Torr. club, xxv, 51, Ja. 25, 1898. e
ERIOGONUM RUBESCENS Greene.

"Near *E. grande* but low, the depress-
ed leafy caudex only a few inches long:

leaves ovate-cordate, with crisped margins and both surfaces tomentose or the upper glabrate: peduncle stout, erect, a foot high, bearing at summit a compact cymose cluster of many-flowered umbels: perianth glabrous, rose-red, campanulate: filaments villous at base. Island of San Miguel, where it is abundant on low sandstone cliffs near the sea: but first found in a similar locality at the extreme west end of Santa Cruz. A most beautiful species."—Ge pittonia 1:39.

ERIOGONUM GRANDE Greene.

Basal shrubby and leafy part a foot or two high with many branches; peduncles 3-5°, thick and fistulous below, slender and loosely cymose-dichotomous above: leaves ovate-oblong, obtuse, cordate at base, the margins crisped, 2-3' long, on petioles of equal length, lower surface densely white-tomentose, upper glabrate: involucre terminal only: perianth glabrous, white, segments equal, obtuse, rotate-spreading in flower: filaments villous at base. Interior of Santa Cruz Is., very common;***—Ge pit 1:38.

ERIOGONUM APICULATUM S. Watson.

ERIOGONUM ANGULOSUM Benth.

ERIOGONUM LATIFOLIUM Smith.

ERIOGONUM VIRGATUM Bth.

ERIOGONUM DELICATULUM S. Wat.

ERIOGONUM MOLESTUM S. Watson.

ERIOGONUM INSIGNE S. Watson.

ERIOGONUM ARBORESCENS Greene.

ERIOGONUM BAILEYI S. Watson.

ERIOGONUM BRACHYPODUM T. & G.

ERIOGONUM CINEREUM Benth.

ERIOGONUM CRENULATUM Parry.

ERIOGONUM DESERTICOLA S. Wats.

"Apparently an annual of the E. Pusillum group (base and foliage unknown) tall, several times dichotomously branched, white-tomentose, becoming mostly glabrous and yellowish green; bracts all small and deltoid; involucre shortly pedicellate or subsessile toward the end of the branches, erect or spreading, turbinate-campanulate, 1" long; perianth villous, the elliptical segments yellow with greenish or reddish midveins, 1-1 1/2" long. In the southwestern part of the Colorado desert, San Diego Co., California; C. R. Orcutt, November, 1890 (n. 2189)."—S. Watson, Proc. Am. Acad. xxvi, 125-6 (July 31, 1891).

ERIOGONUM ELONGATUM Benth.

ERIOGONUM FASCICULATUM Benth.

ERIOGONUM FOLIOSUM S. Watson.

"Of the E. vimineum group: annual,

branching from the base, floccose-tomentose, the branches sparse and spreading: leaves ovate, cordate or cuneate at base, obtuse or acute, undulate, tomentose beneath, 3-9" long besides the petiole, radical, and in the axils of the subulate bracts: involucre broadly turbinate, cleft nearly to the middle, green, 1" long; fl. 1/2" long, the segments white or pinkish with a green midvein."—S. Watson, Proc. Am. Acad., xx, 371-2 (Feb. 21, 1885); Cantillas, Lower California (Palmer, 1875; Orcutt, 1882).

ERIOGONUM GIGANTEUM S. Watson.

ERIOGONUM GRACILE Benth.

ERIOGONUM INFLATUM Torr.

ERIOGONUM MINUTIFLORUM Wats.

"Of the E. Pusillum group; very slender, 6' high or less, diffusely branching, glabrous, excepting the small ovate rosulate leaves which are densely white-tomentose on both sides, becoming less tomentose above; bracts minute; peduncles filiform, divaricately spreading; 3-8" long; involucre very small (1-3" long), broadly turbinate-campanulate, purplish; perianth yellow, minutely puberulent, very small."—S. Watson, Proc. Am. Acad., xxvi, 125 (July 31, 1891). Colorado desert, San Diego Co., California (Orcutt, April, 1890).

ERIOGONUM NUDUM Dougl.

ERIOGONUM ORCUTTIANUM S. Wats.

"Of the E. Heermannii group; the very short herbaceous leaf stems from a woody base, and the rigid divaricate branches finely subtomentose-pubescent; leaves scattered, thick, nearly glabrous, broadly ovate or obovate, obtuse, shortly petiolate, 3/8" long; bracts ternate, deltoid-subulate, small, subherbaceous; involucre solitary, turbinate-campanulate, subtomentose, nearly 1" long; fl. tomentose, greenish white, 2-3" long, the oblong-obovate lobes of the perianth nearly equal."—S. Watson, Proc. Am. Acad., xx, 371 (Feb. 21, 1885). Shrub, 2' high; Cantillas Canyon, Lower California (H. C. and C. R. Orcutt, August, 1883).

ERIOGONUM PALMERI S. Watson.

ERIOGONUM PARISHII S. Watson.

ERIOGONUM PARRYI A. Gray.

ERIOGONUM PARVIFOLIUM Smith.

ERIOGONUM PLUMATELLA D. & H.

ERIOGONUM PONDII Greene.

ERIOGONUM PUSILLUM T. & G.

ERIOGONUM RENIFORME Torr.

ERIOGONUM SAXATILE S. Watson.

ERIOGONUM STELLATUM Benth.

ERIOGONUM THOMASII Torr.

ERIOGONUM THURBERI Torr.

"Sandy ravines, San Pasqual, Calif., My; Thurber. ** Wallace. Leaves in a subradical cluster, about 1/2' long undulate-rugose, pubescent above, white-tomentose underneath. Stem a scape about a span high, trichotomously subdivided below the middle, with ovate acute ternate bracts at the forks. Pedicels 1' long. Involucre less than a line



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in diameter, cleft nearly to the middle into 6 rather obtuse lobes; exterior segments of the perianth nearly four times broader than the inner. Filaments & ovary smooth. Styles short. Achenium smooth. Embryo strongly curved. No bracteoles were detected; in their place are only woolly hairs." * * * Torr bot m boundary 176-7 Or j; da 14

ERIOGONUM NODOSUM small,

"A white-tomentose shrub, .5-1.5 meters tall, with spreading, forking branches. Leaves small, 2-6 mm. long; blades elliptic or elliptic-ovate, acutish, revolute, narrowed into short petioles: bracts scale-like, acute or acuminate: involucre turbinate-campanulate, 2.5 mm. long, angled, sessile; segments broad, much shorter than the tube; calices glabrous, pink, 3 mm. long; segments rounded at the apex, the 3 outer oblong or obovate-oblong, the 3 inner cuneate: filaments villous below the middle: achenes 3-angled, scabro-pubescent above the middle."—Small, Bull. Torr. club, xxv, 49. Ja 25 1898. e

ERIOGONUM TRICHOPODUM Torr.

ERIOGONUM UMBELLATUM Torr.

ERIOGONUM VIMINEUM Dougl.

ERIOGONUM WRIGHTII Torr.

Genus CHORIZANTHE R. Brown.

CHORIZANTHE BREVICORNUM Torr.

CHORIZANTHE CALIFORNICA A. G.

CHORIZANTHE CORRUGATA T. & G.

CHORIZANTHE FERNANDINA S. Wat.

CHORIZANTHE FIMBRIATA Nutt.

CHORIZANTHE LACINIATA Torr.

CHORIZANTHE LEPTOCEROS S. Wat.

CHORIZANTHE ORCUTTIANA Parry.

"Decumbent, 2-6' broad, appressed pubescent throughout, densely branched from the base; radical leaves narrowly lanceolate, obtuse, tapering to a slender petiole; cauline leaves smaller, sessile, opposite, connate, obtuse; upper involucre bracts broadly triangular, scarious, acuminate; involucre in the lower forks and loosely scattered on the slender branches, sharply triangular, with short chartaceous tube (not corrugated); divisions 3, nearly equal, not conspicuously foliaceous, broadly divergent, with recurved uncinata awns; fl. partly exsert, pedicellate; perianth as long as the pedicel, tube narrowly turbinate, segments equal, narrowly spatulate, with long ciliate hairs externally, extending beyond the segments in an irregular fringe; sta-

mens 9 (or less), with short filaments on the throat; anthers dull reddish, orbicular; stigma short, recurved; akene narrowly triangular; embryo 1" in length, with linear cotyledons and slender radicle."—Parry, Proc. Dav. Acad. Natl. Sci., lv. 54-5 (1884).

CHORIZANTHE PARRYI S. Watson.

CHORIZANTHE PERFOLIATA A. Gray.

CHORIZANTHE POLYGONOIDES T.-G.

CHORIZANTHE PROCUMBENS Nutt.

CHORIZANTHE RIGIDA T. & G.

CHORIZANTHE SPINOSA S. Watson.

CHORIZANTHE STATICOIDES Benth.

CHORIZANTHE THURBERI S. Watson.

CHORIZANTHE WATSONI T. & G.

CHORIZANTHE XANTSI S. Watson.

Genus OXYTHECA Nuttall.

OXYTHECA CARYOPHYLLOIDES Ry.

OXYTHECA INERMIS S. Watson.

OXYTHECA LUTEOLA Parry.

OXYTHECA PARISHII Parry.

OXYTHECA PERFOLIATA T. & G.

OXYTHECA TRILOBATA A. Gray.

Genus LASTARRIAEA Remy.

LASTARRIAEA CHILENSIS Remy.

"Involucral whorls closely adherent, and similar to the external cauline bracts; perianth sharply triangular, coriaceous, segments unequal, with prolonged uncinata awns."—Parry, Proc. Dav. Acad. Natl. Sci., v. 36 (Nov. 1, 1886).

Genus HARFORDIA Parry.

HARFORDIA FRUTICOSA Greene.

HARFORDIA MACROPTERA Parry.

Genus PTEROSTEGIA F. & M.

PTEROSTEGIA DRYMARIOIDES Nutt.

AMARANTACEAE.

Genus AMARANTUS Tournefort.

AMARANTUS ALBUS Linn.

AMARANTUS CALIFORNICUS S. Wat.

AMARANTUS FIMBRIATUS Benth.

AMARANTUS PALMERI S. Watson.

AMARANTUS REFLEXUS Linn.

Genus NITROPHILA S. Watson.

NITROPHILA OCCIDENTALIS S. Wat.

Genus CHLADOTHRIX Nuttall.

CHLADOTHRIX LANUGINOSA Nutt.

CHLADOTHRIX OBLONGIFOLIA Nutt.

CHENAPODIACEAE.

Genus APHANISMA Nuttall.

APHANISMA BLITOIDES Nutt.

Genus CHENOPODIUM Tournefort.

CHENOPODIUM ALBUM Linn.

CHENOPODIUM AMBROSIOIDES Linn.

Chenopodium Ambrosioides L.—"A common weed in many parts of the world, is used as a vermifuge under the name of worm seed." (Mrs. Bingham).

CHENOPODIUM CALIFORNICUM S. W.
CHENOPODIUM FREMONTI S. Watson
CHENOPODIUM MURALE Linn.

Genus MONOLEPIS Schrader.

MONOLEPIS CHENOPODIODES Moq.
MONOLEPIS SPATHULATA A. Gray.

Genus ATRIPLEX Tournefort.

ATRIPLEX BRACTEOSA S. Watson.
ATRIPLEX CANESCENS James.
ATRIPLEX COULTERI Dietr.
ATRIPLEX DILATATA Greene.
ATRIPLEX EXPANSA S. Watson.
ATRIPLEX HYMENELYTRA S. Watson
ATRIPLEX JULACEA S. Watson.
ATRIPLEX LEUCOPHYLLA Dietr.
ATRIPLEX MICROCARPA Dietr.
ATRIPLEX ORBICULARIS S. Watson.
ATRIPLEX PALMERI A. Gray.
ATRIPLEX PARISHII S. Watson.
ATRIPLEX PATULA Linn.

Genus EUROTIA Adanson.

EUROTIA LANATA Moq.
Eurotia Lanata Moquin.—“Of good
 repute as a remedy for intermittents.”
 (Watson, Bot. Cal. II. 56).

GRAYIA POLYGALOIDES Hook-Arn.

Genus SALICORNIA Tournefort.

SALICORNIA AMBIGUA Michx.
SALICORNIA HERBACEA Linn.
SPIROSTACHYS OCCIDENTALIS S. W.

Genus SUAEDA Forskal.

SUAEDA TORREYANA S. Watson.

BATIDEAE.

Genus BATIS P. Browne.

BATIS MARITIMA Linn.

LAURACEAE.

Genus UMBELLULARIA Nuttall.

UMBELLULARIA CALIFORNICA Nutt.

URTICACEAE.

Genus URTICA Tournefort.

URTICA HOLOSERICA Nutt.
URTICA URENS Linn.

Genus HESPEROCNIDE Torrey.

HESPEROCNIDE TENELLA Torr.

Genus PARIETARIA Tournefort.

PARIETARIA DEBILIS Forst.

PLATANACEAE.

Genus PLATANUS Tournefort.

PLATANUS RACEMOSUS Nutt.
 The sycamore is a spreading, lofty
 tree common near water courses from
 the coast to the desert, up to an alti-
 tude of 3,000 or 4,000 feet. “A tree

growing in sandy loam at San Bernar-
 dino measures 9½ feet in circumference
 at 3½ feet from the ground; height
 about 60 feet.”—Parish, Zoe, 4:3.

BUXACEAE.

Genus SIMMONDSIA Nuttall.

SIMMONDSIA CALIFORNICA Nutt.

The goat-nut, or deer-nut, is an
 acorn-like fruit, edible and pleasant to
 the taste, produced by a low, oval-
 formed, rigid shrub, in profusion, un-
 der all conditions of soil from the sea coast
 to the borders of the desert to eastern
 Arizona. The Indians at the Catali-
 na mission, in Lower California, claim
 not to eat them, and I find no record
 of their ever having been utilized for
 food. It occurs on Cedros island, and
 the mainland opposite to the gulf
 shores.

EUPHORBIACEAE.

Genus EUPHORBIA Linnaeus.

EUPHORBIA ALBOMARGINATA T.-G.
EUPHORBIA ERIANTHA Benth.
EUPHORBIA HIRTULA Engelm.
EUPHORBIA MISERA Benth.
EUPHORBIA PALMERI Engelm.
EUPHORBIA PARISHII Greene.

EUPHORBIA POLYCARPA Benth.
 name Golondrina is applied indiscrim-
 inately by Mexicans to various species
 of small prostrate herbs belonging to
 the genus Euphorbia, each of which is
 reputed to be a certain antidote against
 the bite of the rattlesnake or of any of
 the poisonous reptiles or insects. It is
 popularly believed that wherever the
 rattlesnake may occur that some form
 of this rattlesnake weed may be found.
 Some form is sure to be found in any
 portion of the southwest, from Cali-
 fornia to Texas, southward into Mex-
 ico.

Indians are said to chew the plant
 when bitten by a snake, and swallow-
 ing the juice, stuff the cud into the
 wound or apply it as a poultice, or
 sometimes make a weak tea. Said also
 to be useful in cases of internal as well
 as of external poisoning, but I have
 found no evidence to sustain this state-
 ment, and as the plant is in itself poi-
 sonous to some people when the juice
 is externally applied to the skin, it
 should be handled with caution, except
 in dire necessity. It seemingly has no
 effect upon the writer.

v micromera Millsp. Ore

EUPHORBIA SERPYLLIFOLIA Pers.

"Glabrous, prostrate or ascending, dichotomously branching; stems terete, or more or less angled (in the type almost winged); stipules setaceous or lacerate, triangular at the base; leaves short petioled, oblique at the base, blade varying from spatulate to oblong or obovate, apex truncate or retuse and more or less crenulate serrate. Inflorescence solitary or in loose leafy clusters; involucre campanulate, the lobes triangular subulate; glands transverse oblong, more or less cupped in the centre; appendages narrow, 3-4-crenate lobed or nearly entire; stigmas short, bifid. Capsules smooth, carpels carinate; seeds sharply quadrangular, slightly to manifestly rugose between the angles, the rugae sometimes so obtuse as to make the surface appear shallow pitted."—Millsbaugh, Pittoua, 2:83.

Colorado, Oregon, California, Arizona.
 Variety **CONSANGUINEA Boiss.**

Differs from the species in having a more erect growth; in the obuse sharply serrate apex to the leaves; larger lobes to the involucre; darker and more ovate seeds less sharp on the angles; and more or less red coloration in the stems and leaves."—Millsbaugh, Pittoua 2:84.

Northern Lower California (Orcutt); Washington (Sukdorff); Idaho (Greene); Kansas (J. T. Boivin).

Variety **RUGULOSA Engelmann.**

"Differs principally in its thickly matted growth; the prolongation of the teeth down the larger side of the leaf; and the turgid very finely rugulose seeds. The type from San Bernardino, Calif., S. B. & W. F. Parish, 1881."—Millsbaugh, Pittoua 2:85.

Variety **NEO-MEXICANA Millsp.**

"Erect, glabrous, with acutely angled branches. Differs from the species and var. consanguinea, chiefly in its elongated sharply pointed seeds, having the 2 ventral facets concave, and the involucre lobes entire or 2-3 cleft."—Millsbaugh, Pittoua 2:84.

Tyre locality:—plains of the upper Gila River, N. M.

Euphorbia neo-mexicana Greene, Cal ac b 2:55.

Elongatum Schecle. Or

Epeoides Nutt Or

Edietyosperma F.M Or

Eetia Mx Or

Eheterophyllagraminifolia E Or

Etaja californica Millsp. Crj 1331

Eetiba E Or

Ewrightii T.G Or

EUPHORBIA SPLENDENS Boj.

EUPHORBIA TOMENTULOSA S. Wat.

Genus **EREMOCARPUS Bentham.**

EREMOCARPUS SETIGERUS Benth.

Genus **ACALYPHA Linnaeus.**

ACALYPHA CALIFORNICA Benth.

Genus **CROTON Linnaeus.**

CROTON CALIFORNICUS Mull.

CROTON TENUIS S. Watson.

BERNARDIA MYRICAEFOLIA S. Wat.

Genus **STILLINGIA Garden.**

STILLINGIA ANNUA Mull.

STILLINGIA LINEARIFOLIA S. Wat.

Genus **ARGYTHAMNIA P. Browne.**

ARGYTHAMNIA SERICOPHYLLA A. G.

ARGYTHAMNIA SERRATA Mull.

Genus **TETRACOCUS Engelmann.**

TETRACOCUS DIOICUS Parry.

"Shrubby, dioecious; staminate flowers involucre on slender pedicels in the axils of the upper leaves of recent shoots; inflorescence with a prolonged central axis a little shorter than the leaves, and usually 2 or more unequally developed opposite branches, bracteate at base; involucre in a double series, persistent, with 7-9 short, rounded segments; stamens 7-9 long exserted, inserted at the base of the involucre scales, encircling an irregularly lobed, central disk; filaments densely ciliate-pubescent at base, anthers extrorse, broadly 2 celled. Pistillate flowers in the axils of lower leaves on recent shoots single pedicellate, pedicels thickening upwards, and bibracteate near the middle involucre of 7-9 oblong, unequal segments in 2 series with 4 glandular scales on the inner surface, segments fragile at maturity. Ovary 4 lobed, densely tomentose, with 4 long, recurved stigmas. Capsule orbicular, broadly 4 lobed and 4 celled, the thin epicarp separating in valves from rigid cocci which part at maturity, the separate cells dehiscing at both sutures. Ovules 2 to each cell pendant from the upper placental column which persists as a rigid central axis after the rupture of the cells. Seeds by abortion 1 to each cell, smooth, oblong, conspicuously carunculate. Embryo with broad cotyledons and short, straight radicle immersed in copious albumen. Leaves narrowly lanceolate, nearly sessile with a somewhat decurrent midrib, smooth, rather rigid and inclined to curve on the upper face, mostly opposite or in ternate whorles, often fasciculate in the lower axils, and with short reduced branches on the lower shoots."—Parry, West Am. Sci. i. 13. 1885.

RICINIS COMMUNIS Linn.

CALLITRICHACEAE.

Genus **CALLITRICHÉ Linnaeus.**

CALLITRICHÉ LONGIPEDUNCULATA

"With thread-like stems; leaves all spatulate or oblanceolate, 3-8 mm long, the blades 1-2 mm broad, rounded at the apex, and sloping into narrowly margined petioles often longer than themselves, dotted with stellate scales, 3-nerved, the lateral nerves running into each other very near the apical margin. Perigonial sacs longer than the fruit. Styles much longer than the fruit, erect, deciduous. Peduncles lengthening to 10-25 cm at maturity, and frequently 2 or 3 proceeding from the same axil, or a little below it. Fruit thick, nearly orbicular, three-fifths to 1 mm long by about four-fifths mm in breadth, minutely emarginate, the lobes divergent, with a deep intervening groove, obtusely margined, and with or without a very narrow wing."—Morong, Torrey bot cl b 18:236.

Mesas, San Diego, California (Orcutt, 1884), type.

CALLITRICHE MARGINATA Torrey.

Peculiar to the Pacific coast, from Arizona to California. Also attributed to Chili.

CALLITRICHE VERNA Linn.

Canada; nearly all parts of the United States; South America; Europe and Asia.

PIPERACEÆ.

Genus **ANEMOPSIS** Hooker.

YERBA MANSE.

ANEMOPSIS CALIFORNICA B. & H. This is one of the favorite medicinal herbs of the old Spanish Californians, but has won a permanent place in European greenhouses, and should be given the attention it deserves in the land of its birth. It is readily grown in moist soil, the apple-green foliage, frequently blotched with crimson, showing off the rather large white flowers to great advantage.

The "Yerba Manse" of the Mexicans has a "strongly pungent, astringent, aromatic root, valued for the healing of ulcers, both of the mucous membrane and of the outer surface" (Mrs. Bingham). Much used for medicinal purposes by the Indians and Mexicans (Watson, Bot. Cal. ii:78). Widely distributed over Southern and Lower California, in moist, salty ground.

CERATOPHYLLACEÆ.

Genus **CERATOPHYLLUM** Linnaeus.

CERATOPHYLLUM DEMERSUM Linn.

BETULACEÆ.

Genus **ALNUS** Tournefort.

ALNUS OBLONGIFOLIA Torr.

The alder is a slender tree occurring along our perennial streams, from Mission valley to the Cuyamaca mountains in Lower California, and north and eastward. Rarely exceeds 50 feet in height and 2 feet in diameter.

ALNUS RHOMBIFOLIA Nutt.

SALICACEÆ.

Genus **SALIX** Tournefort.

SALIX CAUDATA Muhl.

SALIX LAEVI-GATA Bebb.

SALIX LASIANDRA enth.

SALIX LASIOLEPIS Benth.

SALIX LONGIFOLIA Muhl.

SALIX SESSILIFOLIA Nutt.

Genus **PÖPULUS** Tournefort.

PÖPULUS TRICHOCARPA T. & G.

JUGLANDACEÆ.

Genus **JUGLANS** Linnaeus.

JUGLANS CALIFORNICA S. Watson.

The California black walnut is usually a small tree, growing 20 to 75 feet high, 2 to 4 feet in diameter, bearing a roundish nut, the kernel

sweet and delicate in flavor. Occurs from along the Sacramento river to San Diego county, California; occasionally cultivated, but more as a shade or street tree, than for its excellent nuts.

Genus **CORYLUS** Tournefort.

CORYLUS ROSTRATA Art.

Variety **CALIFORNICA** A. DC.

CUPULIFERÆ.

Genus **CASTANOPSIS** Spach.

CASTANOPSIS CHRYSOPHYLLA A. DC

Genus **QUERCUS** Linnaeus.

QUERCUS AGRIFOLIA Nee.

The California live oak is justly one of the trees described as picturesque, the stout, low trunk 8, to even 20 feet, in circumference, with a spread of branches of 120 feet. Mendocino county appears to be its northern limit, while near La Grulla, south of Ensenada, Lower California, is the most southern recorded station, where its branches sweep the ground. The shining, elongated, tapering, acute-pointed acorn, 1-1½ inches long, and ¼ to 1-3 inch in diameter, characterizes the species and are among the treasured trophies of the average tourist, who often says he "can taste them still"—but generally prefers not to do so—the second time.

QUERCUS ENGELMANNI Greene.

The Englemann, or Post oak, is a small spreading tree, 40 feet high, with a trunk usually under 3 feet in diameter. Not rare near Pala, Fallbrook, the Potrero, and into Lower California, 20 miles or so from the sea.

QUERCUS CHRYSOLEPIS Liebm.

QUERCUS DUMOSA Nutt.

QUERCUS EMORYI Torr.

QUERCUS KELLOGGII Newb.

QUERCUS PALMERI Engelm.

QUERCUS PUNGENS Engelm.

LORANTHACEÆ.

Genus **ARCEUTHOBIUM** Bleb.

ARCEUTHOBIUM DOUGLASHII Engelm.

ARCEUTHOBIUM OCCIDENTALE E.

Genus **PHORADENDRON** Nuttall.

PHORADENDRON BOLLEANUM Eichl.

PHORADENDRON CALIFORNICUM Nt.

PHORADENDRON FLAVESCENS Nutt.

PHORADENDRON JUNIPERINUM Em.

GNETACEÆ.

Genus **EPHEDRA** Tournefort.

EPHEDRA CALIFORNICA S. Watson.

Ephedra californica Watson.—"Canatilla" or Mountain tea, and "tepopote" (fide Havard), are names applied to

several of the genus *Ephedra*. "They are popular remedies among Mexicans and frontiersmen in the treatment of syphilis and gonorrhoea, especially the latter. The decoction or infusion of the stems has an acid reaction and an astringent taste resembling that of tannin. It is used as an injection and internally; some caution should be observed as it has been known to cause strangury." (Dr. V. Havard, vide Proc. U. S. Nat. Mus. VIII. 504.) The species Dr. Havard refers to are *E. antisiphilitica* C. A. Meyer and *E. trifurca* Torrey, but the same remarks seem to apply equally well to our Californian species. It is often used as a substitute for tea, and is scarcely distinguishable in taste, except for an after-flavor, not unpleasant, reminding one slightly of catnip tea. It is in great renown as a blood purifier and many have volunteered to me their opinion that it was "better than sarsaparilla" and without an equal. I have never heard of unpleasant effects following its use. It is a valuable sedative. Experiments and analyses prove it to be not superior to *E. antisiphilitica*—which already has a place among American drugs.

EPHEDRA NEVADENSIS S. Watson.
EPHEDRA OXYCARPA Engelm.
EPHEDRA TRIFURCA Torr.

CONIFERAE.

Genus *JUNIPERUS* Linnaeus.

JUNIPERUS CALIFORNICUS Carr.

Genus *LIBOCEDRUS* Endl.

L. decurrens Torrey. Or 251 d

Genus *PINUS* Tournefort.

PINUS MURICATA Don.

A small pine, growing near San Isidro, in Lower California, not known from San Diego county, is found, only near the coast, as far north as Mendocino—where it grows 50 to 80 or 120 feet high. At San Isidro trees only 3 feet high were perfecting cones, which are said to persist over 30 years on the tree. The leaves are in pairs. The cones are sessile, ovate, about 3 inches long, with stout prickles on the outside. The cones occurring in whorls around the stem, and remaining closed for many years, are one of the curiosities of California botany.

PINUS COULTERI Don.

The big cone pine is a tree 1-2½ feet in diameter and 50 or more feet high, occurring above 5,000 feet usually, from Mount Diablo to the Catalina mountain and on the mountains north-east of Ensenada in Lower California. The cones are long, oval pointed, 10-14 inches long and 4 or 5 inches in diameter, yellowish brown, persistent for many years on the tree, the scales with a very stout, long incurved point (sometimes 2 inches long.)

PINUS PONDEROSA Dougl.

The yellow pine is a noble tree, one of the largest known, 200-300 feet high and 12-15 feet in diameter at times, with leaves in threes, 5 to even 11 inches long. "Throughout the San Bernardino range, the San Jacinto and Cuyamaca mountains, forming the greater part of the coniferous forest," says Parish (Zoe., 4:351.)

PINUS JEFFREYI Murr.

The Jeffrey or black pine is a tree 75 feet high, trunk 3 feet in diameter, usually found in the mountain valleys near small streams, extending into Lower California. Credited to the Cuyamaca mountain.

PINUS LAMBERTIANA Lam.

The sugar pine attains at times a height of 300 feet and a diameter of 8 to 20 feet, with light brown smoothish bark, splitting in small sections. The bright brown cylindrical cones are 1 to 1½ feet long, 3-4 inches wide, on peduncles 3 inches in length, containing smooth, black seeds ½ inch long. "The exudation from the partially burned tree loses its resinous qualities and acquires a sweetness similar to that of sugar or manna, for which it is sometimes used, whence the name of sugar pine." (Watson, Botany of California, 2:123.) The sugar which I have collected from trees in the Cuyamaca mountains was very sweet, fine grained and white as snow.

PINUS MONOPHYLLA T. & G.

PINUS PARRYANA Engelm.

The pinone tree, peculiar to Southern and Lower California, but most abundant on the table lands near the international boundary, is a very graceful and symmetrical tree, 20-30 feet high, 10-18 inches in diameter, distinguished by the 3-5 (mostly 4) leaves in a sheath, 1¼-1½ inches long. The oval seeds, 5-8 lines long, with a thin

light-brown mottled shell, are delicious in flavor, either roasted or fresh, and in a good season are collected in immense quantities by the Indians for food. These nuts in a roasted condition are not rare in San Diego markets, and often exported in quantities, being considered quite a luxury with some. Unlike the other nut pines, the tree is very ornamental when properly grown, and forms a worthy monument to the botanist of the Mexican boundary survey of 1850—Dr. Charles Christopher Parry—in whose honor the specie is named.

PINUS RADIATA Don. (P. insignis, Loudon.) Monterey pine; a popular tree for California planting.

PINUS SABINIANA Dougl. Gray-leaf pine; one of the nut pines, or "Digger Pine," the large seeds of which were formerly used for productive. A vigorous grower. or more, the main stems often with a circumference of 50 feet."

PINUS TORREYANA Parry.

The Soledad pine was for many years believed an exclusive resident of the suburban parts of San Diego, occurring on the hills facing the sea near Del Mar. A second small grove has been discovered on Santa Rosa island. Where most exposed it forms a low, scraggly shrub, 2 or 3 feet high only at times, but spreading over a wide area; at its best estate it forms a small, graceful tree 20 to 30 feet high, a foot or more in diameter. The very stout leaves are 8 by 11 inches long, 5 in a sheath. The edible seeds, 8-11 lines long, with a very hard shell, produced in an ovate cone, 4-5 inches long and nearly as great diameter.

Genus SEQUOIA Endl.

SEQUOIA GIGANTEA Lindl & Gordon. The Giant Redwood, or "Big Tree" of California—the largest tree known in the world.

SEQUOIA SEMPERVIRENS Endl. Redwood, "one of the most colossal trees of the globe."

Genus PSEUDOTSUGA Carriere.

PSEUDOTSUGA MACROCARPA Lem.

Pseudotsuga macrocarpa, so named by Prof Lemmon in the third Cal. For. report, 134, is a "rather irregular tree 150 feet high, 4 feet in trunk diameter. Bears light crops of cones, the reported fecundity perhaps exceptional." It was originally found between Banner and Julian, in San Diego county, where it forms one of the most beautiful of trees, perfect in symmetry and grace. It is nearly allied to the Douglas spruce

of the north, and for many years treated as a variety—as it should probably still be treated.

Genus ABIES Link.

ABIES CONCOLOR Lindl.

Genus CUPRESSUS Tournefort.

CUPRESSUS GUADALUPENSIS S. Wat.

The blue cypress is a handsome, slender tree, 40 to possibly 60 feet high, with beautiful exfoliating reddish bark and glaucous foliage, first discovered on Guadalupe island, and later found in the rocky canyons near Ensenada, on the mainland. It proves not rare in some of the canyons near the international boundary, and Parish records it in "ravines near the Old Mission, San Diego, not abundant" (Zoe., 4:352). Its graceful habit and compact growth makes it one of the most ornamental species in the genus.

CUPRESSUS MACROCARPA Hartweg. Monterey cypress, a familiar hedge-tree in California, cones the largest of the genus, about an inch thick.

Genus THUJA Tournefort.

THUJA GIGANTEA Nutt.

Genus CHAMAECYPARIS Spach.

CHAMAECYPARIS LAWSONIANA Parlat.

Cupressus lawsoniana Andr Murr in Edinb New Phil J n sr, 1:222 t 9 (Jb-Apr 1855).

Genus TSUGA Carriere.

TSUGA MERTENSIANA Carr.

Genus PICEA Link.

PICEA SITCHENSIS Carr.

TAXACEAE.

Genus TORREYA Arnott.

TORREYA CALIFORNICA Torr.

Genus TAXUS Tournefort.

TAXUS BREVIFOLIA Nutt.

ORCEIDACEAE.

Genus EPIPACTIS Haller.

EPIPACTIS GIGANTEA Dougl.

Genus CYPRIPEDIUM Linnaeus.

CYPRIPEDIUM MONTANUM Dougl.

Genus HABENARIA Willd.

HABENARIA COOPERI S. Watson.

HABENARIA ELEGANS B. & Don.

HABENARIA LEUCOSTACHYS S. W.

HABENARIA UNALASCENSIS S. Watson.

IRIDACEAE.

Genus SISYRINCHIUM Linnaeus.

SISYRINCHIUM BELLUM S. Watson.

SISYRINCHIUM CALIFORNICUM Ait.

Genus IRIS Tournefort.

IRIS MACROSIPHON Torr.

AMARYLLIDACEAE.

Genus AGAVE Linnaeus.

AGAVE DESERTI Engelm.

AGAVE PRINGLEI Engelm.

AGAVE SHAWII Engelm. Very compact, dark olive-green leaves, margined with stout spines. Peculiar to the coast region of Southern and Lower California.

LILICEAE.

BEHRIA TENUIFLORA Greene. Grassy leaves about a foot long; flowers tubular, borne in an umbel, the stamens much exerted, brilliant scarlet in color, reminding one somewhat of *Brevortia* *Ida-Maia*. A Mexican bulb nearly allied to *Bessera elegans*.

Genus ALLIUM Linnaeus.

ALLIUM ACUMINATUM Hook.
ALLIUM ATTENUIFOLIUM Kellogg.
ALLIUM CRISPUM Greene.
ALLIUM DICHLAMYDEUM Greene.
ALLIUM FIMBRIATUM S. Watson.

ALLIUM HAEMATOCYTON Watson.
The mesas and hills around San Diego are decked in springtime with the clusters of bright purplish-tinted flowers of this wild onion, which deserves a prettier name at the hands of its friends. It does not prove quite hardy in New England, but will give enough measure for the cost of growing in the house among its more showy cousins.

ALLIUM LACUNOSUM S. Watson.
ALLIUM PARVUM Kellogg.
ALLIUM PENINSULARE Lemmon.
ALLIUM SPERRATUM S. Watson.
ALLIUM UNIFOLIUM Kellogg.

Genus MULLA S. Watson.

MULLA CORONATA Greene.
MULLA MARITIMA S. Watson.

Genus CALOCHORTUS Pursh.

CALOCHORTUS APICULATUS Bak.
CALOCHORTUS ALBUS Dougl.
CALOCHORTUS AUREUS S. Watson.
"Low, 4-6" high, with a single linear earinate radical leaf, 3-4" long; scape short, 1-2-flowered, the single pair of bracts linear, 2" long; sepals greenish-y., with a dark-p. spot near the base, oblong—or ovate-lanceolate; petals broadly cuneate, 15" long, bright-y., with a small, well-defined circular densely hairy gland near the base and a lunate purplish spot above it; young capsule narrowly oblong, not winged. On sand-cliffs, Southern Utah (Mrs. E. P. Thompson); June."—S. Watson, Amer. Natl., vii, 7 (May, 1873).

CALOCHORTUS BARNARDI Dougl.
CALOCHORTUS BENTHAMII Baker.
CALOCHORTUS BONPLANDIANUS Sht
CALOCHORTUS CAERULEUS S. Wat.
CALOCHORTUS CATALINAE S. Wat.
CALOCHORTUS CITRINUS Baker.
CALOCHORTUS CLAVATUS S. Watson
CALOCHORTUS DOUGLASIANUS Sht.
CALOCHORTUS ELEGANS Pursh.

CALOCHORTUS FLAVUS Schult.
CALOCHORTUS FLEXUOSUS S. Wats.
"Branched and flexuous above; bracts alternate 1/2-1 1/4" long, linear-lanceolate, carinate, rather rigid; sepals oblong-lanceolate, greenish with a deep-p. and orange or p. gland above, the glandular cuneate, 12-15" long, purplish, with a deep-p. claw and an ill-defined circular orange or p. gland above, the glandular hairs extending laterally to the margin;

capsule triangular, narrowly oblong. Southern Utah and Northern Arizona (Mrs. E. P. Thompson); April and May. The bulbs, as of other species, are eaten by the Indians."—S. Watson, Amer. Natl., vii, 7 (May, 1873).

CALOCHORTUS FUSCUS Schult.
CALOCHORTUS GREENEI S. Watson.
CALOCHORTUS GUNNISONI S. Watson
CALOCHORTUS KENNEDYI Porter.
CALOCHORTUS LEICHTLINII Hook, J.
CALOCHORTUS LILACINUS Kellogg.
CALOCHORTUS LONGEBARBUS
CALOCHORTUS LUTEUS Dougl.

CALOCHORTUS LYONI S. Watson.
"Near *C. nitidus*; stems branching and somewhat flexuous, 1-2° high, bearing several leaves and 2-4 or more solitary fl.; sepals naked, acute; petals lilac or purplish, with a darker p. sparingly brown-villous spot at base surrounding the short-oblong hairy gland, 12-20" long; anthers oblong-elliptical, obtuse, 1 1/2" long; capsule narrowly elliptical, obtuse, 3-winged, nearly 1' long. Los Angeles County, California; collected on hills near Los Angeles by W. S. Lyon and Dr. Gray, and at Newhall by Dr. Gray, in 1885."—S. Watson, Proc. Am. Acad., xxi, 455 (June 2, 1886).

CALOCHORTUS MACROCARPUS Dougl.
CALOCHORTUS MAWEANUS Leichtl
CALOCHORTUS MONOPHYLLUS Lem.
CALOCHORTUS NITIDUS Dougl.
CALOCHORTUS NUDUS S. Watson.
CALOCHORTUS NUTTALLII Torr-Gray.
CALOCHORTUS OBISPOENSIS Lemn.
CALOCHORTUS PALMERI S. Watson.
CALOCHORTUS PLUMMERAE Greene.
CALOCHORTUS PULCHELLUS Dougl.
CALOCHORTUS PUSILLUS Dougl.
CALOCHORTUS SPLENDENS Dougl.
CALOCHORTUS TOLMIEI Hook-Arn.
CALOCHORTUS UMBELLATUS Wood.
CALOCHORTUS UNIFLORUS Hook-Arn
CALOCHORTUS VENUSTULUS Greene.
CALOCHORTUS VENUSTUS Dougl.
CALOCHORTUS VESTITUS Benth.
CALOCHORTUS WEEDII Wood.

Genus CAMASSIA Lindl.

CAMASSIA ESCULENTA Lindl.
CAMASSIA FRASERI Torr.
CAMASSIA LEICHTLINII S. Watson.

Genus ERYTHRONIUM Linnaeus.

ERYTHRONIUM ALBIDUM Nutt.
ERYTHRONIUM AMERICANUM Kr-Gl
ERYTHRONIUM GIGANTEUM Lindl.
ERYTHRONIUM GRANDIFLORUM
ERYTHRONIUM HARTWEGII S. Wat.
ERYTHRONIUM NUTTALLIANUM
ERYTHRONIUM PROPOLLANS A. Gry
ERYTHRONIUM PURPURASCENS
ERYTHRONIUM REVOLUTUM Baker

Genus FRITILLARIA Linnaeus.

FRITILLARIA ATROPURPUREA Nutt
FRITILLARIA BIFLORA Lindl.
FRITILLARIA LANCEOLATA Pursh
FRITILLARIA LILIACEA Lindl.
FRITILLARIA MULTIFLORA Kellogg.
FRITILLARIA PLURIFLORA Torr.
FRITILLARIA PLURIFLORA Torr.
FRITILLARIA PUDICA Spreng.
FRITILLARIA RECURVA Benth.

Genus BRODIAEA Smith.

- BRODIAEA BRIDGESII S. Watson.
 BRODIAEA CAPITATA Benth.
 BRODIAEA COCCINEA A Gray.
 BRODIAEA CONGESTA Sm.
 BRODIAEA CROCEA S. Watson.
 BRODIAEA DOUGLASSII S. Watson.
 BRODIAEA FILIFOLIA S. Watson.
 BRODIAEA GRACILIS S. Watson.
 BRODIAEA GRANDIFLORA Smith.
 BRODIAEA HOWELLII S. Watson.
 BRODIAEA IXIOIDES S. Watson.
 BRODIAEA LACTEA S. Watson.
 BRODIAEA LAXA S. Watson.
 BRODIAEA LEMMONAE S. Watson.
 BRODIAEA MINOR S. Watson.
 BRODIAEA MULTIFLORA Benth.

HOOKERA, ORCUTTII Greene.

"Scape stout, 1' or more high; leaves linear, flat or conduplicate, not terete; pedicles 5-15 I 1-2' long; perianth-segments oblong-lanceolate, twice the length of the short tube; free portion of the filaments about 2" long, the linear anthers nearly as long; staminodia wanting (?)." —Greene, Bull. Cal. Acad. Sci., il. 138 (Nov. 13, 1886).

- BRODIAEA PEDUNCULARIS S. Wat.
 BRODIAEA STELLARIS S. Watson.
 BRODIAEA TERRESTRIS Kellogg.

Genus TRILLIUM Linnaeus.

- TRILLIUM CALIFORNICUM Kellogg.
 TRILLIUM OVATUM Pursh.
 TRILLIUM PETIOLATUM Pursh.
 TRILLIUM SESSILE Linn.

Genus LILIUM Linnaeus.

- LILIUM BLOOMERIANUM Kellogg.
 LILIUM BOLANDERI S. Watson.
 LILIUM COLUMBIANUM Hort.

LILIUM HUMBOLDTH Roez and Leichtl. Very tall, large golden yellow blossoms, dotted with purple; a very showy and magnificent lily.
 LILIUM MARITIMUM Kellogg.

LILIUM PARDALINUM Kellogg. A beautiful lily that seems to flourish in all soils and climates; a luxuriant grower and a profuse bloomer; the large, glowing yellow flowers spotted with brown, the tips of a fiery crimson, very variable in color, however, occurring in many forms.

Var. BOURGAEI. A surpassingly beautiful lily; lustrous, fiery red, large and drooping.

LILIUM PARRYI Watson. A pretty and exceedingly rare lily, found in the mountains of Southern California and Arizona, named in honor of Dr. C. C. Parry. Produces lovely clusters of large and very fragrant flowers, of a clear lemon yellow, spiced with a delicious perfume.

- LILIUM PARVUM Kellogg.
 LILIUM ROEZLI Regel.
 LILIUM RUBESCENS S. Watson.

LILIUM WASHINGTONIANUM Kellogg. A marvelously beautiful white lily of a waxy juster, and emitting a delightfully spicy perfume.

Genus CHLOROGALUM Kunth.

- CHLOROGALUM ANGUSTIFOLIUM K.
 CHLOROGALUM LEICHTLINII Baker.
 CHLOROGALUM PARVIFLORUM S. W.
 CHLOROGALUM POMERIDIANUM Kt.

Genus ZYGADENUS Michx.

- ZYGADENUS ANGUSTIFOLIUS. S. W.

- ZYGADENUS ELEGANS Pursh.
 ZYGADENUS FREMONTII Torr.
 ZYGADENUS NUTTALLII A. Gray.
 ZYGADENUS PANICULATUS S. Wat.
 ZYGADENUS VENENOSUS S. Watson.

Genus NOLINA Michx.

- NOLINA BIGELOVII S. Watson.
 NOLINA BIGELOVII Watson. Leaves flat, rough margined, an inch or more wide; with age attains a height of eight or ten feet; produces heavy panicles of small whitish flowers.
 NOLINA PALMERI S. Watson.
 NOLINA PARRYI S. Watson.

Genus YUCCA Linnaeus.

- YUCCA ALOIFOLIA Linn.
 YUCCA BREVIFOLIA Engelm.
 YUCCA FILAMENTOSA Linn. "Adam's Needle;" produces tall spikes of snowy white, bell-shaped flowers; very beautiful, and furnishes a fiber of great strength.

YUCCA FILIFERA Chabaud. One of the tallest of the genus; flower stalk over 20 feet high, bearing a panicle of drooping, showy, white flowers.

- YUCCA MACROCARPA Engelm.

- YUCCA MOJAVENSIS Sargent.

The datile, or wild date, of the Mexicans, better known to Americans as the Spanish bayonet, Mexican dagger plant, wild banana, etc., occurs from the Mohave desert to the vicinity of San Quintin, Lower California, extending eastward through the arid regions of Arizona and Sonora, and perhaps to Texas. It attains almost tree-like proportions, and forms extensive forest-like plantations. Such a forest, when in full bloom, is a sight to be remembered. The large, waxy, bell-shaped flowers, of a creamy, sometimes marked with prune purple, are of surpassing beauty. The fruit does not seem to mature well near the coast. It is somewhat of the size and shape of a banana, of a sweetish taste, slightly reminding one of a fig. Near San Diego the plant is commonly under 8 feet in height; in the interior attains to 15 or 18 feet.

- YUCCA VALIDA Brandegee.

- YUCCA WHIPPLEI Torr.

Genus HESPEROCALIS A. Gray.

HESPEROCALIS UNDULATA A. Gray. The Lily of the Desert, growing in sandy washes on the Mohave and Colorado Deserts, in California. The lustrous waxy white flowers, shaded with green, very fragrant.

Genus VERATRUM Tournefort.

- VERATRUM CALIFORNICUM Dur.

Genus BLOOMERIA Kellogg.

- BLOOMERIA AUREA Kellogg.
 BLOOMERIA CLEVELANDI S. Wats.
 "Differing from B. aurea in the several very narrow leaves (1" wide or less), in the stouter scape (3-7' high), in

having the thick and fleshy appendage at the base of the filament smooth instead of papillose, and obtuse at the summit instead of bicuspidate, and in the much shorter style, which is shorter than the ovary. On the mesas near San Diego, California; first collected by D. Cleveland, in 1874, and recently received from him and from C. R. Orcutt."—S. Watson, Proc. Am. Acad., xx. 376 (Feb. 21, 1885).

BLOOMERIA MONTANA Greene.

"Corm 1' broad; leaf solitary; scape 2° high, stout and scabrous; bracts numerous, lanceolate; pedicels 30-50 1-2' long; perianth rotate, 1' in diameter; appendage at base of filament 1" long, its lateral cusps subulate-filiform, ½ as long as the filaments; anthers linear, 1½" long, attached almost at the very base, but versatile."—Greene, Bull. Cal. Acad. Sci., ii. 10-11 (Dec. 14, 1885).

LEUCOCRINUM MONTANUM Nutt.

SMILACACEAE.

SMILAX CALIFORNICA A. Gray.

PONTEDERIACEAE.

SCHOLLERA GRAMINIFOLIA Willd.

ARACEAE.

LYSICHTON KAMECHATCENSIS Sch.

TYPHACEAE.

SPARGANIUM EURYCARPUM E.

Genus **TYPHA** Tournefort.

TYPHA ANGUSTIFOLIA Linn.

TYPHA LATIFOLIA Linn.

LEMNACEAE.

Genus **LEMNA** Linnaeus.

LEMNA MINOR Linn.

LEMNA TRISULCA Linn.

LEMNA VALDIVIANA Phil.

NAIADACEAE.

LILAEA SUBULATA H. B. K.

ZANNICHELLIA PALUSTRIS Linn.

RUPPIA MARITIMA Linn.

ZOSTERA MARINA Linn.

Genus **NAIAS** Linnaeus.

NAIAS FLEXILIS R-S.

NAIAS MAJOR Allione.

Genus **TRIGLOCHIN** Linnaeus.

TRIGLOCHIN MARITIMUM Linn.

Genus **POTAMOGETON** Tournefort.

POTAMOGETON PECTINATUS Linn.

POTAMOGETON LUCENS Linn.

POTAMOGETON NATANS Linn.

POTAMOGETON PUSILLUS Linn.

ALISMACEAE.

ECHINODORUS ROSTRATUS Engelm.

SAGITTARIA CALYCINA E.

CYPERACEAE.

Genus **CYPERUS** Linnaeus.

CYPERUS ARISTATUS Rottb.

CYPERUS DIANDRUS Torrey.

CYPERUS ESCULENTUS Linn.

CYPERUS VIRENS Michx.

CYPERUS LAEVIGATUS Linn.

CYPERUS MICHAUXIANUS Schult.

CYPERUS OCCIDENTALIS Torr.

Genus **ELEOCHARIS** R. Brown

ELEOCHARIS CAPITATA R. Br.
ELEOCHARIS PALUSTRIS R. Br.
ELEOCHARIS ARENICOLA Torrey.
ELEOCHARIS ACICULARIS R. Br.

Genus **SCIRPUS**. Linnaeus.

SCIRPUS LACUSTRIS Linn.

Variety **OCCIDENTALIS** S. Watson.

SCIRPUS MARITIMUS Linn.

SCIRPUS RIPARIUS Spreng.

SCIRPUS OLNEYI A. Gray.

SCIRPUS SYLVATICUS Linn.

Variety **DIGYNEUS** Borch.

SCIRPUS PUNGENS Vahl.

SCIRPUS SETACEUS Linn.

Genus **HEMICARPHA** Nees.

HEMICARPHA SUBSQUARROSA Nees.

Genus **CAREX** Linnaeus.

CAREX PRESCOTTIANA Boott.

Carex *barbarae* Dewey, ex Torr in bot

Mex bound 231.

CAREX STRICTA Good.

Carex *angustata* Boott in Hook Fl Bor

Am 2218.

CAREX FILIFORMIS Linn.

Variety **LATIFOLIA** Boeckl.

CAREX MARCIDA Boott.

CAREX MURICATA Linn.

Variety **AMERICANA** Bailey.

CAREX MULTICAULIS L. Bailey.

CAREX LACINIATA Boott.

CAREX PSEUDOCYPERUS L.

Variety **COMOSA** Boott.

CAREX SICCATA Dewey.

CAREX TRIQUETRA Boott.

JUNCACEAS.

Genus **JUNCUS** Linnaeus.

JUNCUS NUDOSUS Linn.

Variety **MEGACEPHALUS** Torrey.

JUNCUS OXYMERIS Engelm.

JUNCUS PHAEOCEPHALUS Engelm.

Variety **GLOMERATUS** Engelm.

JUNCUS BALTICUS Willd.

JUNCUS BUFONIUS Linn.

JUNCUS DUBIUS Engelm.

JUNCUS LESUERII Boland.

JUNCUS LONGISTYLES Torr.

JUNCUS ROBUSTUS S. Watson.

JUNCUS XIPHIODES Mey.

PALMAE.

Genus **ERYTHEA** S. Watson.

The *Tecos grandes* is the fruit of the beautiful blue palm of Lower California, and forms an important article of food with the Indians, ripening in July and August. The fruit is the size of a common marble, with sweet mealy pulp surrounding the large stone (½ inche in diameter). The tree grows 40 feet high, bearing its fan-shaped glaucous leaves in a very graceful manner. This palm was first found in the Cantillas canyon, Lower California, which opens out onto the Colorado derest, by Dr. Edward Palmer. Dr. J. N. Rose has since found it in Mexico, east of Mazatlan, I believe. The seeds require from six months to

three years in which to germinate—the older seeds germinating more quickly than when fresh from the tree. I have had them germinate readily when over ten years old.

ERYTHEA EDULIS Watson.

ERYTHEA EDULIS Watson. The Guadalupe Island Palm; "of equal decorative value to *Lantania borbonica*, much hardier, and of far more rapid development."

ARENCA SACCHARIFERA Labill. The Sugar Palm, of India; the juice is converted into toddy or sugar; the young kernels made with syrup into preserves. The pitch supplies sago, about 150 lbs. from a tree, according to Roxburgh.

ARTOCARPUS INTEGRIFOLIA Linn. The Jack Fruit, of the Malay Islands; attains a weight of 50 pounds.

CHAMAEROPS EXCELSA Thunb. The hardest of all palms; had stood three degrees above zero F. without protection; beautiful fan-shaped leaves.

CHAMAEROPS HUMILIS Linn. The dwarf fan palm of southern Europe; very ornamental, and eligible for scenic effect; hardy.

JUBAEA SPECTABILIS Humboldt. The tall and stout Coquito Palm of Chili; hardy; yields small edible kernels; a kind of treacle is obtained from the sap; leaves sometimes 10 ft. long.

OREODOXA REGIA Humboldt. The Royal Palm, "the Glory of the Mountains;" the grandest of the pinnate leaved palms.

PHIENIX DACTYLIFERA Linn.

The well known date palm of northern Africa and Arabia, is often planted for quick tropical effect in Southern California, where space permits its luxuriant growth. On the Colorado Desert and in Arizona this palm has been planted more extensively, with a promise of becoming of commercial importance for its fruit.

PTYCHOSPERMA ELEGANS Blume. Leaves 2 to 10 feet in length, widely known under the name of *Scaforthia elegans*, R. Br.

THRINAX ARGENTEA Lodd. One of the most elegant of fan palms, the under part of the leaves shining like satin; native of Panama.

Genus WASHINGTONIA Wendland.

"42. He unites the genus *Myrrhis*, Mx. with *Cherophyllum*; the Ch. claytoni of Persoon is however made a *Scandix* by Muhlenberg! which proves that it belongs to neither genera, but *Myrrhis* happens to be erroneous also, by being similar to *Amyris*, a previous genus, whence several names have been proposed for it, *Washingtonia*, *Osmorhiza*, *Gonathorus*; but these are not yet published; the second is perhaps the best."—"C. S. R[affin.]" in American monthly magazine, ii. 176 (1818). A Review of "Pursh's Flora of North America."

Britton and Brown deemed the above a sufficient publication to justify discarding the established name *Osmorhiza* later adopted by the writer of the above review—necessitating the coining of yet another name for our Californian genus of palms (*Neowashingtonia*).

Prof. C. S. Sargent considered the prior suggestion in a newspaper (Winsl. in California Farmer, Sept. 1854) of the name *Washingtonia* for *Sequoia* as insufficient cause for the abandonment of its use. The action of Britton and Brown seems even less justifiable and would cause the present writer to hesitate about accepting any changes proposed by them until after careful investigation of the need.

WASHINGTONIA SONORAE S. Watson. S. Watson, Am ac pr 24:79 (1889).

"A tree reaching 150 in height & a ft in diam.: leaves 3 or 40 in diam., somewhat glaucous, very finer us upon rather slender petioles which are armed with stout curved spines; sp. d. sled'er, 5 or 6" long; fr about 3" long, the flattened-globose seed 2-2½" in the longest diam.

Neowashingtonia sonorae Rose, Contr U S Na Hb 5:255.

WASHINGTONIA FILIFERA Wendl. The popular Californian fan palm; a hardy and magnificent species of the desert region of Southern California.

The California fan palm, bearing great clusters of small black berries, the clusters weighing 10 to 20 pounds each, furnished the desert Indians with a most important article of food, equal to that of the pinon nuts to the mountain tribes, ranking next in value to the mesquite bean. The berries have a thin, very sweet, and pleasant flavored pulp, which any palate might appreciate.

WASHINGTONIA ROBUSTA Wendl.

A favorite strong-growing variety of filifera.

GRAMINEAE.

Genus ARISTIDA Linnaeus.

A. americana L f

—*arizonica* Vasey

—*scabra* Kunth

—*divaricata* HBK

A. DISPERSA Trin.

A. bromoides HBK.

A. purpurea Nutt. var.

A. orcuttiana Vasey

A. CALIFORNICA Thurber.

2556 Valle de las Tres Virgenes, near Santa Rosalia; one of the common forage grasses. Mar. 13, 1899.

2557 Near Calmalli, not rare, March 3.

2558 Santo Domingo, February 20.

2559 Near Mission Santa Gertrudis Mar. 10

v fugitiva Vasey

v major Vasey

Genus BROMUS Linnaeus.

BROMUS ORCUTTIANUS Vasey.

Var. **GRANDIS** Shear.

BROMUS CILIATUS L.

BROMUS RUBENS L.

BROMUS CARINATUS H-A.

Var. CALIFORNICUS Shear.
Bromus californicus Nutt in Phila. ac. herb.

Todos Santos bay, Baja California (Miss F. E. Fish). Potrero valley and San Diego, California. (Orcutt 511a).

Var. HOOKERIANUS Shear.
Bromus hookerianus Thurber in Wilkes U. S. Exp. Exped 17: 493 (1874).

Ceratichloa grandiflora Hook Fl. Bor. Am. 2: 253 (1830).

Bromus virens Buckl Phila. ac. pr. 1832: 53.

Bromus nitens Nutt in Phila. ac. herb. California, Washington, Idaho.

BROMUS ERECTUS Huds.
 BROMUS HORDEACEUS L.

Bromus mollis L. Sp pl ed 2, 1:112 (1762).
Serrafalcus mollis Parl Fl Ital 1:395 (1848).

Erect or ascending annual or biennial with a rather dense, erect panicle; culms about 2-3 dm high, usually somewhat pubescent at the nodes; sheaths retrorsely soft pilose-pubescent; ligule 1.5-2 mm. long, lacinate; blades linear, pilose-pubescent to nearly smooth, about 5-15 cm long and 2-5 mm broad; panicle contracted, narrow pyramidal, 5-10 cm long, 2-3 broad; branches somewhat spreading in flower; spikelets 5-13 flowered, ovate-lanceolate, becoming obtuse, 12-15 mm long, 4-6 wide, with short pedicels; empty glumes broad, obtuse, coarsely pilose or scabrous-pubescent, the lower 3-5-nerved, 4-6 mm long, the upper 5-7-nerved, 7-8 mm long; flowering glume broad, obtuse, 7-nerved, coarsely pilose or scabrous-pubescent, rather deeply bidentate, margin and apex hyaline, 8-9 mm long; awn rather stout, rough, flattened toward the base straight at first, frequently somewhat twisted when old, about 6-9 mm long; palea a little more than $\frac{3}{4}$ the length of its glume.

Southern Europe; introduced sparingly from Maine to Virginia, abundantly on the Pacific coast, from Washington, to Los Angeles, California.

BROMUS MAXIMUS Desf.

Type from northern Africa. Stanford University (C. Ritter 305), California.

Var. GUSSONI Parl.

Bromus gussoni Parl Rar. Pl. Sic. 2: 8 (84).

Bromus sterilis Gus Fl. Sic. Prod. Suppl. 1: 27 (1832).

Larger than the type, 4-7 dm. tall, larger and more lax panicle, 1-2 dm. long, with the upper part somewhat drooping.

Arizona, California, Washington. In-cutt 1059).

San Diego, California (Or-bromus TRINI Desv.

Trisetum hirtum Trin Linnaea 10:300 (1835).

Trisetum barbatum Steud Syn Pl Gram 229 (1854).

Bromus barbatooides Beal Grass N A 2:614 (1896).

California; Colorado; Chili.

Var. PALLIDIFLORUS Desv.

Bromus barbatooides sulcatus Beal grass N A 2:615 (1896).

Trisetum barbatum major Vasey in herb; Beal Grass N. A. 2:615 (1896).

Robust, 6-12 dm high, panicle much elongated, 2-4 dm long; branches mostly 6-12 at the lower whorls, weak and spreading; leaves broadly linear lanceolate, smooth or somewhat sparsely pilose-pubescent, as are the sheaths.

Type from the Andes of southern Chili, Chollas valley, San Diego (Orcutt 1064), Pasadena (O. D. Allen, in 1885), and San Nicolas Island (Balanche Trask 15), California.

BROMUS UNIOLOIDES HBK.

Annual, or sometimes perennial, 3-4 ft. high, several stems from same base; panicle large and spreading, spikelets about 1 inch long, $\frac{1}{4}$ wide, composed of 7-10 florets overlapping each other; flowering glumes coarse in texture, strongly nerved, usually bearing a short awn about 3 mm. long. Rescue grass. Widely distributed in South and Central America, Mexico, Southern Texas, and naturalized or cultivated in the southern United States, Europe, and Australia. Known also by the names Iverson's, California prairie, Schrader's brome, and Arctic grass, Australian oats, etc.

Shear, cir 26 agr D-A, f.

Genus HORDEUM Linnaeus.

HORDEUM ADSCENDENS H B K.

"A rather slender, erect, leafy annual (?) 2 to 3 feet high, with terminal bearded spikes 3 to 4 inches long. Culms terete, smooth, shining; nodes smooth, or the southern part of San Diego county, Cal. lower ones minutely puberulent; sheaths shorter than the internodes, the lower smooth, striate; ligule membranous, ones densely pubescent, the upper rounded, entire, about 1 line long; leaf blades rather rigid, 3 to 6 inches long, 2 to 3 lines wide, striate, scabrous, gradually narrowed to the pungently tipped apex. Axis of the spike compressed, scabrous or subciliate on the margins, the joints about 1 line long. Empty glumes setaceous, rounded on the back, sulcate on the inner face below, scabrous, those of the central spikelet about 1 inch long, those of the lateral spikelets a little shorter; flowering glume of the central spikelet $4\frac{1}{2}$ to 5 lines long, scabrous; palea about as long as the glume, scabrous on the keel above. Prolongation of the rachilla awn-like, and two-thirds as long as the palea. Lateral spikelets neutral, the pedicellate third glume about 3 to $3\frac{1}{2}$ lines long, scabrous, subulate-pointed.—H B K., Nov. Gen. 1, 180. Distinguished from *H. nodosum* by its taller habit of growth, attenuate and pungently pointed leaves, longer spikelets and longer-awned glumes, the empty ones being flattened or sulcate on the inner face and not terete throughout. Abundant along irrigation ditches near Glendale, Ariz., No. 2522 C. R. Orcutt, April 30, 1896."—Scribner & Smith, b 4, p 24, D-A agr (6 F 1897).

AGROPYRON PARISHII Scribner & Smith.

"Culms 2 to $3\frac{1}{2}$ feet high, with flat leaves and erect or nodding spikes 6 to 12 inches long. Culms cylindrical, glabrous, striate, or smooth and shining below; nodes tumid, retrorsely pubescent; leaf

sheaths striate, pubescent below, and sparingly ciliate along the margins, the basal ones shorter, the upper longer than the internodes; ligule membraneous, very short; leaf blade constricted at the base, smooth on the back, scabrous above and on the margins, 2 to 3 lines wide, linear attenuate to the acute apex, the lower culm leaves 6 to 9 inches, and the uppermost 1 to 2 inches. Spike of 8 to 12 compressed oblanceolate spikelets. Spikelets 5- to 7-flowered, 8 to 10 lines long, shorter than the internodes of the rachis, which is scabrous on the margins; empty glumes two-thirds as long as the spikelets, nearly equal, linear, acute or acuminate, 5-nerved, scarious on the margins; flowering glume lanceolate, acute, $4\frac{1}{2}$ to $5\frac{1}{2}$ lines long, flattened on the back below, prominently 5-nerved above, and scabrous toward the minutely 3-toothed awnless or short-awned apex. Awn, when present, straight, slender, 3 to 4 lines long. Internodes of the rachilla 1 line long, minutely pubescent. Palea as long as the glume, acute or obtuse. Represented in the National Herbarium by specimens collected by S. B. Parish in Waterman's Canon, San Bernardino Mountains, California, at an altitude of 3,000 feet, No. 2,054, June 28, 1888, and No. 2238, June 23, 1891. This species apparently connects *Agropyron* with *Brachypodium*. The habit is similar to that of *A. Arizonicum*. It is the only American species with pubescent culm nodes."—Scribner & Smith, b 4, p 28, D-A agr (6 F 1897).

Variety *LAEVE* Scribner & Smith.
 "With the habit of the species, but the culm nodes and leaf sheaths glabrous; awns as long or longer than the flowering glumes. Type in the Gray herbarium No. 414, Dr. Edward Palmer, collected at Fowley's Cuyamaca Mountains, in the 1875."—Scribner & Smith, C 4, p 28, D-A agr (6 F 1897).

Genus SPOROBOLUS R. Brown.

S. HUMIFERUS HBK.

2579 Batamotal, near Guaymas, Sonora, Mr. 24.

S. ALTISSIMUS Vasey

"Culm 4-5° high, simple; leaves long, slender, becoming involute; panicle 6-8' long, narrow, the branches erect, scattered or partly verticillate, 3-4' long, subdivided and flower-bearing from near the base; spikelets 1-flowered, about 1" long; empty glumes unequal and nearly as in *S. airoides*—from which it differs in its greater height, and closer panicle, as well as in details of the fl. Collected at San Diego by Dr Edward Palmer"—Brandegee, Proc Cal. Acad. II. ii. 212.

v. minor Vasey:—Smaller, 2-3° high; leaves shorter; panicle 4-6' long, purple;

CHAELOCHLOA GLAUCA Scribn.

Setaria glauca Beauv Agrost 51 (1812).

Panicum glaucum L. sp. Pl 56 (1753).

Chamaeraphis glauca Kuntze Rev. Gen.

Pl. 2: 767 (1891).

Ixophorus glaucus Nash Torr bot. cl. b. 22:423 (1895).

HALORACEAE.

Genus HIPPURIS Linnaeus.

HIPPURIS VULGARIS L.

"Springing from a perennial rootstock, with annual, simple, erect stems and whorls of 6-12 or more 1-nerved linear or lanceolate leaves which are more or less decayed (sphacelated) at the tips, and 10-20 mm long by 1-3 mm broad. Stamens with short, thick filaments and comparatively large 2-celled anthers, which dehisce laterally. Fruit oval, or somewhat 4-sided, hollow in the interior, 2 or 3 mm long, stigmas persistent. Common in Arctic America and Canada. It occurs also in Moosehead Lake, Maine (Porte), west to Oregon, and thence to California (Parish) and New Mexico. Mr. Safford sends it from the Straits of Magellan, and it is common in Europe and Central Asia."—Morong, Torr bot cl b 18:231.

OPHIOGLOSSACEAE.

Genus OPHIOGLOSSUM Linnaeus.

OPHIOGLOSSUM NUDICAULE Linn. f.

FILICES.

Genus POLYPODIUM Linnaeus.

POLYPODIUM CALIFORNICUM Kaulf.

Genus GYMNOGRAMME Desv.

GYMNOGRAMME TRIANGULARIS Klf.

Genus NOTHOLAENA R. Brown.

NOTHOLAENA CALIFORNICA Eaton.

NOTHOLAENA NEWBERRYI Eaton.

NOTHOLAENA PARRYI Eaton.

Genus CHEILANTHES Swartz.

CHEILANTHES CALIFORNICA Mett.

CHEILANTHES CLEVELANDI Eaton.

CHEILANTHES COOPERAE Eaton.

CHEILANTHES FIBRILLOSA Davenport.

CHEILANTHES MYRIOPHYLLA Desv.

CHEILANTHES PARISHII Davenport.

CHEILANTHES VISCIDA Davenport.

Genus PELLAEA Link.

PELLAEA ANDROMEDAIFOLIA Fee.

PELLAEA ORNITHOPUS Hook.

PELLAEA WRIGHTIANA Hook.

Genus PTERIS Linnaeus.

PTERIS AQUILINA Linn.

Genus ADIANTUM Linnaeus.

ADIANTUM CAPILLIS-VENERIS Linn.

ADIANTUM EMARGINATUM Hook.

ADIANTUM PEDATUM Linn.

Genus WOODWARDIA Smith.

WOODWARDIA RADICANS Smith.

Chain fern; fronds 4-8° high, not rare along perennial streams.

Genus ASPLENIUM Linnaeus.

ASPLENIUM FILIX-FOEMINA Bernh.

ASPLENIUM TRICHOMANES Linn.

Genus WOODSIA R. Brown.

WOODSIA MEXICANA Fee.

WOODSIA OREGANA Eaton.



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COLLARED LIZARD,
(*Crotaphytus collaris*.)
About $\frac{1}{2}$ Life-size.



CACTACEAE.

Many people who have been acquainted only with the prickly pear and the cholla cactus of the plains—perhaps to the detriment of their epidermis, will be surprised to learn that over one thousand valid species exist, to which more than three thousand names have been applied by botanists and horticulturists.

The following is a nearly complete list of known species, and a few synonyms are also given. Descriptions of all will be published eventually we hope, but this contains much never published, at least in English, and in this form will be useful to many.

Tribe ECHINOCACTEAE.

Calyx tube produced beyond the ovary; stem covered with elongated tubercles or ribs, rarely leafy (except when young).

Karl Schumann, in his monograph, rec-



ognizes 21 genera, including *Cereus*, *Pilocereus*, *Cephalocereus*, *Phyllocactus*, *Epiphyllum*, *Echinopsis*, *Echinocereus*, *Echinocactus*, *Meocactus*, and *Leuchtenbergia* in this tribe, in the order named, making a separate tribe for *Mammillaria*, *Pelecypora*, and *Ariocarpus*. *Pilocereus*, *Cephalocereus*, *Echinopsis*, and *Echinocereus* are better kept as sections of *Cereus*; *Epiphyllum* as a section of *Phyllocactus*; *Ariocarpus* (*Anhalonium*) as a section of *Mammillaria*. His other genera are divided into 3 tribes, *Rhipsalidaceae*, of 3 genera—*Pfeiffera*, *Hariota* and *Rhipsalis* (best treated as one); *Opuntieae*, of 3 genera—*Opuntia*, *Nopalea* and *Pterocac-*

tus (the 2 latter of doubtful value); and *Peireskieae*, including *Peireskia* and *Maihuenia*.

Genus ANHALONIUM Lemaire.

A. AREOLOSUM Lem.

A. ASELLIFORME Web.

A. elongatum S. is prismaticum.

A. fissipedum Monv. is sulcatum.

ANHALONIUM FISSURATUM E.

Anhalonium Engelmanni Lemaire Cact 42 (1868).

Living Rock, found in Texas and Mexico.

"Upper and exposed part of tubercle triangular in outline, convex, carinate and almost smooth below, convex and variously fissured and thereby verrucose above, sharp and crenate on the edges."—Engelmann.

A. furfuraceum Wat. is prismaticum.

A. jurdanianum Reb. is *Echinocactus Williamsii*.

A. kotschoubeyanum Lem. is sulcatum.

A. Lewinii Hennings, is *Echinocactus Williamsii*.

A. PRISMATICUM Lem.

Simple, top flattened or depressed, more rarely hemispherical, center densely tomentose, 4-8 inches in diameter, 1-2 (rarely 4) inches above ground, the large root 4-6 inches below the surface with few coarse fibrous roots; tubercles triangular, acute with a cartilaginous tip, or obtuse, often ending in a minute depression or tomentose areola, spineless, the keel often with a strong shoulder, 1-3 inches long, often as wide, axis with long dense wool, upper surface smooth or often more or less roughened; flowers white to rose, 1 inch long, sepals brownish; fruits clavate, scarlet (how-see the Indians, or peyote (a name more commonly restricted to *Echinocactus Williamsii*). The minute areolae are sometimes placed on the upper surface of the tubercles near the end, or often absent. San Luis Potosi (Orcutt 2807), where numerous specimens exhibit all the variations necessary to connect several alleged species. The type of Watson's *Mammillaria furfuracea* was collected at Carneros Pass, Coahuilla (Pringle 2580).

A. puivilligerum Lem. is prismaticum.

A. retusum S. is prismaticum.

ANHALONIUM RUNGEI Hildm.

Sandy loam, in the foot of high mountains, Coahuilla (C. Runge).

A. SULCATUM S.

A. TRIGONUM Web.

A. turbiniforme Web.

A. williamsii F. is *Echinocactus Williamsii* Lem.

Genus APOROCACTUS Lemaire.

A. Baumannii Lem. is *Cereus Baumannii* Lem fide KS.

A. constrictus Lem. is *Cereus Baumannii* fide KS.

A. flagelliformis Lem. is *Cereus flagelliformis* Mill fide KS.

Genus ARIOCARPUS Scheidw.

Karl Schumann revives this name in his publications, but we prefer to retain the name *Anhalonium*, which has been in universal use, among botanists and horticulturists alike, for more than fifty years.

- A. *aselliformis* Web, is *Anhalonium aselliforme*
 A. *fissuratus* KS, is *Anhalonium fissuratum*.
 A. *Kotschubeyanus* KS, is *Anhalonium sulcatum*.
 A. *retusius* Scheidw, is *Anhalonium prismaticum* Lem.
 A. *sulcatus* KS, is *Anhalonium sulcatum*.
 A. *trigonum* KS, is *Anhalonium trigonum*.
 A. *Willdamsii* Voss, is *Echinocactus Willamsii*.

Genus ASTROPHYTUM Lemaire.

- A. *asterias* Lem Cact 50, based on *Echinocactus asterias*.
 A. *capricorne* Hort, based on *Echinocactus capricornis*.

**ASTROPHYTUM MYRIOSTIGMA Lem.**

The Bishop's Hood; an odd and beautiful spineless plant from Mexico, resembling a piece of carved stone.

- A. *prismaticum* Lem. Cact 50, error for *myriostigma*.

CACTUS ALTERNATUS Coulter.

"Subglobose, 10 cm. in diameter, simple; tubercles long (15-20 mm) and spreading, with woolly axils: radial spines 3, rigid and recurved, 5 mm long; central spines 3, very stout and much recurved, 20-30 mm long, alternating with the radials; all ashy colored and often twisted; flower and fruit unknown: Type, in Herb. Coulter, San Luis Potosi (Eschauzier of 1891)."—Coulter Cont U S Nat Hb 3:95

CACTUS BRUNNEUS Coulter.

"Obovate-cylindrical, 3 by 6 cm, simple, tubercles ovate, grooved to the base, 5-6 mm long, with woolly axils; radial spines 11-15, spreading, rather rigid and brown-

ish (lighter with age), 8-10 mm long; central spine much larger, 20 mm long, hooked; flower and fruit unknown. Type in Herb. Coulter. San Luis Potosi (Eschauzier of 1891)."—Coulter Cont U S Nat Hb 3:117.

CACTUS DENSISPINUS Coulter.

"Globose, 7.5 cm in diameter, simple; tubercles short, with woolly axils; radial spines about 25, erect-spreading, slender, but rigid, yellow (brownish to black with age), unequal, 8-10 mm long; central spines 6, a little longer (10-12 mm) and straight, more rigid and darker, black tipped; seeds obovate, reddish-brown, 1 mm long. Type in Herb. Coulter. San Luis Potosi (Eschauzier of 1891). Very easily distinguished by its dense, erect spines, which so completely cover the plant as to give it the appearance of a large chestnut burr."—Coulter Cont U S Nat Hb 3:96-97.

Mammillaria castanoides, M. Wegneri, M. *densispina*, and M. *fusca*, are probably all identical with this species.

CACTUS ESCHAUZIERI Coulter.

"Depressed-globose, 3 cm in diameter, simple; tubercles broader at base, 6-8 mm long, with naked axils; spines all pubescent; radials 15-20, with dusky tips, the lateral 10-12 mm long, the lower weaker, shorter and curved, the upper shorter, solitary central spine reddish, slender, somewhat twisted, usually hooked upwards, 15-20 mm long; flowers red (?); fruit reddish (?), ovate, about 10 mm long; seeds reddish, oblique-obovate, 1.2 mm long, pitted, with subventral hilum. Type in Herb. Coulter. San Luis Potosi (Eschauzier of 1891)."—Coulter Cont U S Nat Hb 3:104.

CACTUS MACULATUS Coulter.

cm., simple: t

"Obovate-cylindrical, 6 by 8 cm, somewhat cespitose; tubercles ovate, terete, 10 mm long, grooved to the base, with naked axils; radial spines 10 or 11, straight and spreading, rigid, blackish (becoming ashy with age), black-tipped, 12 mm long; central spine large, more or less spotted, erect, 25-35 mm long; flower 13 mm long, pinkish; fruit unknown. Type in Herb. Coulter, San Luis Potosi (Eschauzier of 1891)."—Coulter Cont U S Nat Hb 3:117.

CACTUS PRINGLEI Coulter.

"Globose (?), 5 cm in diameter; tubercles short-conical, about 6 mm long, with very woolly axils; radial spines 18-20, setaceous-bristly and radiant, 5-8 mm long, central spines 5-7 (usually 6), stout and horny, more or less recurved, spreading 20-25 mm long; all straw-colored, but the centrals darker; flowers deep red (darker, even brownish outside), 8-10 mm long; fruit unknown. Type, Pringle of 1891 in Herb. Gray."—Coulter, Cont U S Nat Hb 3:109.

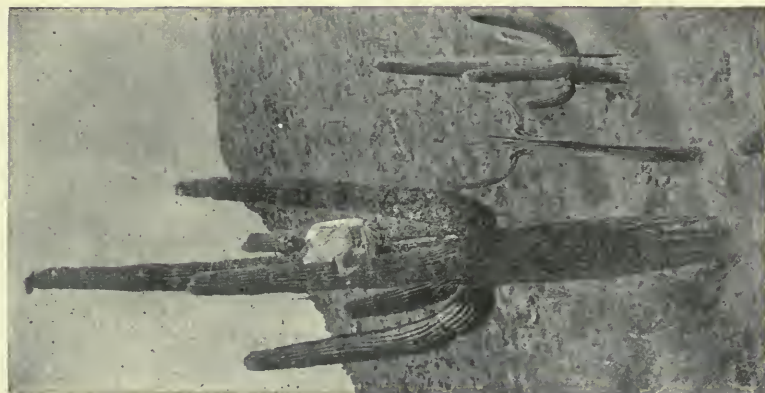
Genus CEPHALOCERUS Pfeiffer.**C. CHRYSOMALLUS KS.**

Erect, branching like a candelabra, 10-15 feet high, stems 3-6 inches in diameter;



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CEREUS TRIANGULARIS Miller.



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CEREUS GIGANTEUS Engelm.



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ECHINOCACTUS GRUSONII Hilg.



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CEREUS MARGINATUS DC.

young plants with 17 obtuse ribs and deep intervals, 12-13 ribs in older plants and more obtuse, areolae $\frac{1}{2}$ inch apart; 10-12 radial spines, slender, straw-colored, centrals 4-5, the lower one the longest, the upper portion of the older or floriferous stems supplied with numerous ciliary white spines, especially abundant on the side where the flowers are produced; flower 2 inches across, 3 inches long (including the ovary); about 25 long narrow scales on ovary with 6-12 fine white hairs $\frac{1}{2}$ -1 inch long in the axis, ovary apple green; petals about 10.8-10 mm broad, nearly 20 long, acute, white; sepals equally numerous, brownish white; style $2\frac{1}{2}$ inches long, whitish, nearly equalling the petals; filaments white, anthers an eighth inch long and pale yellow. Flower deeply embedded in a mass of persistent hairs an inch long and of a snowy white—tinged with yellow occasionally at the tips. Fruit nearly globose, $1\frac{1}{2}$ inches long, dull purple with a bluish bloom; remains of flower persistent; the minute scales and hairs abundant or nearly absent; outer skin $\frac{1}{4}$ inch thick, dull purple, the edible pulp bright magenta, rather insipid, sweetish, seeds black. Vieja, or Old Woman cactus of the Mexicans. States of Puebla and Oaxaca, Mexico (Orcutt 2679, 2679).

C. COLUMNA-TRAJANI KS.

Erect, 15-20 feet high, 2-3 short branches slightly divergent from the main stem a few feet from the ground: 5-7 radial spines; one-fourth to three-fourths inch long, 1 central $\frac{1}{2}$ -2 inches long, rarely a shorter central or radial above; radials laterally disposed except the lowest, all ashy black. Ribs 11-13 in young plants, obtuse with shallow intervals. Te-te-cho of the Mexicans, who describe the fruit as sweet and edible, the flower as red. States of Puebla and Oaxaca, Mexico (Orcutt 2706).

C. Hoppenstedtii KS, is *Philocerus* Hoppenstedtii Web fide KS.

C. MACROCEPHALUS Web.

C. MELOCACTUS KS.

C. SENILIS Pf.

Genus CEREUS Haworth.

"Flowers about as long as wide or elongated. Scales of the ovary distinct, with naked or woolly axils, or almost obsolete and the axils spiny. Berry succulent, covered with spines or scales or almost naked. Seeds black, without albumen. Embryo short and straight or curved or hooked; cotyledons usually contrary to the sides of the seed.—Plants of all sizes, low or climbing or erect, sometimes enormous; spine-bearing areolae on vertical ribs. Flowers from the older or, at least, fully formed parts of the plant, not from any preformed areola, but bursting through the epidermis just above the bunches of spines; some open only in sunlight, others only at night, others again are not thus influenced. Fruit often edible, sometimes of very large size."—E.

Subgenus **EUCEREUS**. "Prismatic or cylindrical, mostly branching; flowers usually longer than wide; stigmas whitish; seeds obovate, usually smooth or pitted;

embryo with foliaceous curved cotyledons."—E.



CEREUS COLUBRINUS Otto.

CEREUS ACULEATUS Otto.

CEREUS ALAMOSENSIS Coulter.

Sina spinosa of Sonora; 2-8 feet high, 2-10 branches from the base with joints 1-4 feet long, flexuous or decumbent, often forming arches and rooting at the joints, and thus spreading over wide areas, sometimes 100 feet in diameter or more; ribs about 7, slightly tuberculated. The bright

red flowers slightly resemble those of *C. flagelliformis*.

CEREUS AMBLYOGONUS G. Don.

CEREUS AMECAENSIS Heese.

CEREUS ANDALGALENSIS Web.

CEREUS AREOLATUS Mueh.

Andes, South America.

CEREUS ARMATUS Otto.

CEREUS ASSURGENS Gris.

West Indies.

CEREUS AUREUS KS.

CEREUS AZUREUS Parm.

CEREUS BARBATUS Otto.

CEREUS BAUMANNII Lem.

Paraguay Republic, South America.

Variety *COLUBRINA* KS.

Variety *FLAVISPINA* KS.

Variety *SMARAGDFLORA* Web.

CEREUS BAXANIENSIS Karw.

Mexico.

CEREUS BENECKII Eh.

Aborescent and branching after the habit of *Cereus geometrizans*, 6-7 ribbed; areolae $\frac{1}{4}$ inch apart, woolly, bearing 8 radial spines $\frac{1}{2}$ inch or less long, and 1 central 1-3 inches long, curved upward, all ash colored; fruit globose, $\frac{1}{2}$ inch in diameter, dull purple; remains of flower usually deciduous leaving a large ash-colored scar; seeds large, 3-8) in each berry. The be-ta-zo-vo of the Indians. In aspect of plant and fruit this closely resembles the garambulo (*Cereus geometrizans*). Near Oaxaca, Mexico (Orcutt 270).

CEREUS BERTINII L'Her.

Paraguay Republic, South America.

CEREUS BLANKII Pos.

CEREUS BOECKMANNII Otto.

West Indies.

CEREUS BONARIENSIS Sw.

CEREUS BONPLANDII Parm.

Paraguay Republic, South America.

CEREUS BRACHIATUS Gal.

Tehuacan, Puebla, Mexico.

Cereus bradtianus C. is *Opuntia cereiformis* Web fide KS.

CEREUS BRANDII H Angl.

CEREUS BRIDGESII S.

Bolivia, South America.

CEREUS CAESIUS Otto.

CEREUS CANDELARIUS Hort.

CEREUS CANDICANS Gill.

Argentine Republic.

CEREUS CAVENDISHII Monv.

CEREUS CHALYBAEUS Otto.

Argentine Republic.

CEREUS CHILENSIS Colla.

Chile, South America.

CEREUS CHIOTILLA Web.

Arborescent, 20 feet high, branching freely a foot or so above the ground, the older branches 6 inches in diameter, the tips of the branches $2\frac{1}{2}$ inches in diameter with densely woolly ovate or shield-shaped areolae, bearing the terminal



CEREUS DASYACANTHUS Engelm.

flowers and fruit. The tree often of an umbrella shape, or the interlocking branches curving or twisting in any other than a symmetrical manner. Ribs 6-8, acute, with sharp intervals; areolae $\frac{1}{4}$ inch across, $\frac{1}{2}$ inch long, nearly or quite contiguous; 1 stout, terete, ash, central spine $\frac{1}{4}$ -2 inches long or less—often 2 or 3 short centrals above $\frac{1}{4}$ inch long, erect; radials about 12, $\frac{1}{4}$ inch long, curved inward, all but the lowest laterally disposed, spines all nearly white when young. Called 'tiotilla' by the Indians, who gather quantities of the fruit for the markets of Tehuacan in June for 1 cent. Fruit $1\frac{1}{4}$ inch diameter, slightly longer, remains of the flower persistent; color dull dark red, with 25-30 thin semi-transparent triangular scales—the base and sides equal—about three-eighths of an inch; pulp dark purple, with numerous black seeds. State of Oaxaca, Mexico (Orcutt 2648, 2666). Flower $1\frac{1}{2}$ inches across, bright lemon yellow (27 Je 1902).

CEREUS CLAVIFORMIS R-K.

CEREUS COERULESCENS S.

Argentine Republic.

CEREUS COLUBRINUS Otto.

An erect-growing Cuban plant, night-blooming, the fragrant white flowers 6 inches across.

CEREUS COLUMNARIS Lodd.

CEREUS COMETES Scheidt.

CEREUS CONCINNUS Hge.



CEREUS ENNEACANTHUS Engelm.

CEREUS COQUIMBANUS KS.
Chile, South America.

CEREUS CORYNE Otto.
Argentine Republic.

CEREUS COSSIRENSIS Tineo.

CEREUS CRENATUS Lab.

Cereus Cumengel Web, is gummosus.

CEREUS CURVISPINUS Bert.

CEREUS DAMARCARO Hge.

CEREUS DECORUS Lodd.

CEREUS DONKELAERI S.

CEREUS DUMORTIERI S.
Mexico.

CEREUS DUSSII KS.

Guadeloupe Island, West Indies.

CEREUS EBURNEUS S.

Jalapa, Vera Cruz, Mexico.

CEREUS EMORYI E.

San Diego's Velvet Cactus. This is one of the best-known of California cacti, the slender, thickly-set yellowish spines giving it a peculiarly beautiful appearance. The spines on the young joints are shorter, soft and flexuous; the flowers are yellowish, followed by a small edible fruit.

CEREUS ERUCA Brandegee.

"Prostrate, very rarely branched, 13-ribbed, 3-4 feet long, 3-4 inches in diameter; rooting from the under side of the older growth, decaying at one end and growing forward at the other, generally in patches of 20-30, probably originating from a common center; areolae 4-6 mm in diameter, separated about the same distance; spines about 20, stout, ash-colored, less than an inch long, the exterior cylindrical, the interior stouter, angular, somewhat and the lower central one much flat-

tened, more than an inch long, angular, strongly reflexed. Common on the sand of Magdalena island and about San Jorge, Baja California. Its local name is 'chitenoa.' The manner of growth, with up-lifted heads and prominent reflexed spines, gives the plants a resemblance to huge caterpillars."—Brandegee, Cal ac pr sr 2, 2:163, t 7.

CEREUS EUCHLORUS Web.
Brazil, South America.

CEREUS EUPHORBIODES Haw.
Brazil, South America.

CEREUS EXTENSUS S.

CEREUS FASCICULARIS Meyen.
Peru, South America.

CEREUS FLAGELLIFORMIS Haworth.

The well-known whp-cord or Rat's-tall Cactus, so useful in hanging baskets or for grafting on columnar species; the bright rose-colored flowers are extremely attractive.

Variety *LEPTOPHIS* KS.

CEREUS FORBESII Otto.
Argentine Republic.

CEREUS FUNKII KS.

CEREUS GEMMATUS

CEREUS GHIESBREGHTII KS.
Mexico.

CEREUS GLAUDESCENS Tweed.

CEREUS GLAZIOVII KS.
Brazil, South America.

CEREUS GLYCIMORPHUS Orcutt.
Echinocereus glycimorphous Foerst.

CEREUS GRANDIFLORUS Haworth.

Miller, Gard Dictionary, ed, n 11. "The night-flowering cereus has gained a fame which entitles it to prominent notice, and plants might well be included in every garden, for its flowering is a source of interest to the least observant persons."—Castle.

CEREUS GRANDIS Haw.

CEREUS GREGGII Engelm.

Gregg's night blooming cactus occurs in the arid regions of Southern Arizona, New Mexico, Texas, Chihuahua and Sonora, and is notable for its large tuberous root and slender inconspicuous stems, 1 to 3 or 4 feet high, a half inch in diameter. Flower 6 inches long, 2 inches in diameter, with pale, purple petals, followed by the smooth, oval, acuminate, scarlet fruit, succulent, crowned with the remains of the corolla, and supported by a distinct stipe of a bright crimson.

CEREUS GUMMOSUS Engelm.

The pitahaya agria, or cord-wood cactus, of Lower California, is noted for its large, bright, scarlet fruit, possessing a delicious flavor, pleasantly

acid, like a strawberry, the pulp the color of a ripe watermelon, with the small black seeds scattered throughout. The flowers are 4 to 5 inches long, purple, and quite handsome. The stems are 4 to 10 feet high, 3 to 5 inches in diameter, armed with stout angular, blackish spines.

CEREUS HAAGEANUS S.

CEREUS HAMATUS Scheidw.
Near Orizaba, Mexico.

CEREUS HANKEANUS Web.

CEREUS HETERACANTHUS Tweed.

CEREUS HILDMANNIANUS KS.
State of Rio de Janeiro, Brazil.

CEREUS HIRSCHTIANUS KS.

CEREUS HOLLIANUS Weber.

"Climbing from base, 4.5 m high and stout, dark-green; ribs 10-12, acute, often oblique, with areolae 2-3 cm apart; radial spines about 12, irregular, 1-1.5 cm long; centrals 3, the lower one 5-10 cm long and deflexed; flowers near the summit, white; 10 cm long; fruit as large as a goose egg, dark purplish-red, bearing wool and spines. Type Weber specimens in hb. Mo bot gard. Common about Tehuacan, Puebla. Important for its wood, which forms long, straight rods used for poles in hedges and vineyards."—Coulter, Cont Na hb 3:41.

CEREUS HORIZONTALIS GRI.

CEREUS HUASCHA Web.
Argentine Republic.

CEREUS HYLACANTHUS KS.
Argentine Republic.

CEREUS HYPAGAEUS Web.

CEREUS INERMIS P DC.
Near La Guayra, Venezuela.

CEREUS INVERSUS Otto.

CEREUS IRRADIANS Lem.

CEREUS ISOGONUS KS.
Andes, South America.

CEREUS JACQUINII Rebut.

CEREUS JAMACARU P DC.
Brazil, South America.

CEREUS JUSBERTII Rebut.

CEREUS KARSTENII S.

CEREUS KARWINSKII Hge.
Cereus KERBII KS.
Colima, Mexico.

CEREUS LAMPROCHLORUS Lem.

Argentine Republic.

CEREUS LANCEANUS Hort.

CEREUS LANICEPS KS.
Bolivia, South America.

CEREUS LEMAIREI Hook.
West Indies.

CEREUS LEPIDOTUS S.
Near La Guayra, Venezuela.

CEREUS LEPTACANTHUS S.

CEREUS LINDBERGIANUS Web.
Paraguay Republic, South America.

CEREUS LINDMANNII Web.

Paraguay Republic, South America.



CEREUS PECTINATUS Engelm.

CEREUS LINKII Hort.

CEREUS LONGIFOLIUS Karw.

CEREUS LORMATUS Griseb.

CEREUS MACDONALDIAE Hook.

CEREUS MACROGONUS S.

State of Rio de Janeiro, Brazil.

CEREUS MALLETTIANUS Cels.

CEREUS MALLISONI Hort.

CEREUS MARTIANUS Zucc.

CEREUS MARTINII Lab.

CEREUS MAYNARDII Paxt.

CEREUS MELANURUS KS.

Brazil, South America.

CEREUS MICRACANTHUS P DC.

CEREUS MONVILLEANUS Web.

CEREUS MULTANGULARIS Haw.

Andes, South America, probably Peru.

CEREUS MULTIPLEX Hort.

CEREUS NAPOLEONIS R. Graham.

West Indies.
Cereus Nickelsi Hort, is Cephalocereus columna-trajani.

CEREUS NYCTICALUS Link.

CEREUS OBTUSANGULUS KS.

State of Rio de Janeiro, Brazil.

CEREUS OCAMPONIS S.

Climbing over trees, fences or houses; joints 3- to commonly 4-sided, 1 or 2 to 8 feet long, young growth even 6-ribbed; areolae 1-1½ inches apart, tomentose, commonly 7 radial and 1 central spines; radials rarely over 1 mm, central rarely 6 mm long, stout, straight or slightly curved.



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CERFUS GEOMETRIZANS Mart.



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CEREUS SARGENTIANUS Orcutt.



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CEREUS SENILIS Salm-Dyck.

Stems dark green, 3 inches thick, the ribs scarcely an eighth inch thick, strongly serrulate, bearing the areolæ at the summit. Flower white, style 7 inches long; stigmata 14, slender, white, nearly $\frac{1}{2}$ inch long; ovary globose, an inch in diameter, covered with about 4 tubercles; surmounted with minute scales (the tomentose axils commonly bearing 2 white spines); tube of corolla 5 inches long, bearing 5 or more similar scales with tomentose and spiny axils; filaments and large anthers apparently white (in dried flower), petals narrow, acuminate, $1\frac{1}{2}$ inches long, extending three-fourths inch beyond the filaments. Nopale, or Nopalita de Cruz, of the Indians; 15-20 feet high; cultivated in gardens for its fruit (?). States of Puebla and Oaxaca, Mexico (Orcutt 2709).

CEREUS PAPILLOSUS A. Lke.

CEREUS PARVIFLORUS KS.

Bolivia, South America.

CEREUS PARVISETUS Otto.

CEREUS PASACANA Web.

Argentine Republic.

CEREUS PAUCISPINUS E.

CEREUS PAXTONIANUS Monv.

CEREUS PERUVIANUS Mill.

Peru, South America.

Variety *MONSTRUOSA* P DC.

CEREUS PITAHAYA P DC.

Brazil, South America.

CEREUS PLATYGONUS Otto.

CEREUS POLYRHIZUS Web.

CEREUS POMANENSIS Web.

Argentine Republic.

CEREUS PTEROGONUS Lem.

CEREUS PULCHELLUS Pf.

CEREUS QUADRICOSTATUS Bello.

West Indies.

CEREUS QUERETARENSIS Weber.

"Tree-like, much branched, 6-8 m high; flowers 10-12 cm long; ovary covered with triangular fleshy scales which arise from a tubercle and bear axillary wool and spines; fruit densely covered with bunches of dark-yellowish or brownish spines bulbous at base. Type, Weber specimens in hb Mo bot gard. In the vicinity of Queretaro, Mexico, and cultivated along roadsides and fence rows."—Coulter, Cont Na hb 3:410.

CEREUS REPANDUS Haw.

CEREUS RIGIDISPINUS Monv.

Probably from the Andes (not Mexico, fide KS).

CEREUS RUFERI Hge.

CEREUS RUSSELLIANUS Forb.

CEREUS SALM-DYCKIANUS Web.

CEREUS SAXICOLA Morong.

CEREUS SCHOMBURGKII Otto.

CEREUS SEPIUM P DC.

CEREUS SERPENTINUS P DC.

Mexico.

CEREUS SETACEUS S.

Brazil, South America.

Cereus simonii Hilldm, is *C. alamosensis* C.



OLD MAN CACTUS.

Cereus sororicnsis Runge, is *C. alamosensis* C.

CEREUS SPACHIANUS Lem.

Argentine Republic

CEREUS SPECIOSISSIMUS DC.

CEREUS SPECIOSUS KS.

Variety *COCCINEA* KS.

CEREUS SPINULOSUS P DC.

Mexico.

CEREUS SPLENDIDUS Paxt.

CEREUS STELLATUS Pf.

CEREUS STELLIGER Otto.

CEREUS STOLONIFER Web.

CEREUS STRIATUS Brandegee.

Cereus digueti Weber, Mu d'hist nat, b, 1895, 319.

Apparently not rare in saline soil near Batamotal, Sonora, where it is known by the name sa-ra-ma-tra-ca; the tubers are produced abundantly like small potatoes.

CEREUS STRIGOSUS Gill.

Argentine Republic.

CEREUS SUBFLAVISPINUS Otto.

CEREUS SUBINERMIS Hem.

CEREUS SUBINTORTUS Otto.

CEREUS TENUISSIMUS G. Don.

CEREUS TEPHRACANTHUS Lab.

Bolivia, South America.

CEREUS TETAZO Weber.

"Stout, branching, 10-15 m high; flowers greenish-white, 6 cm long, in clusters of 10-20 from the youngest areolae and without any wool; fruit irregularly dehiscent, exposing the ripe pulp. Type, Weber specimens in hb Mo bot gard. Zapatalan, Jalisco."—Coulter, Cont Na hb 3:409.

CEREUS TETRAGONUS Haw.

CEREUS TORTUOSUS Forb.

Argentine Republic.

CEREUS TRIGONUS Haw.

West Indies.

CEREUS TRINITATENSIS Lem.

CEREUS TUBEROSUS Pos.

CEREUS UNDULATUS H. Dresd.

CEREUS VERSCHAFFELTII Hge.

CEREUS VIRENS P DC.

Subgenus LEPIDOCEREUS E. Tall cylindrical branching plants with the floriferous and sterile areolae bearing similar spines; flower tube short, stigmas white, embryo curved.

Cereus batusus Web.

Erect, rarely branching, 8-12 or more stems from the same root, 10 or more feet high, 4 inches in diameter; ribs 9, slightly obtuse with sharply defined intervals; areolae an inch apart on the older stems; radial spines 15, $\frac{1}{4}$ - $\frac{1}{2}$ inch long, the lower ones the longer, on the older rows a stout and about $\frac{1}{2}$ inch long; central spines 4-6, the upper one-eighth inch long or more, the lowest often 3 inches long, reflexed, twisted, flattened or carinate. Flower 2 inches across, including the ovary, 4 inches long; petals white, obtuse, $\frac{1}{2}$ inches long, the 16 stamata, style and anthers pale yellow, filaments white; style 2 inches long. Fruit said to be red, 4 inches long, with black seeds; immature fruit with about 120 woolly areolae with capillary spines in the axils of obsolete scales or tubercles. State of Puebla, Mexico (Orcutt 2635). Called 'cardon' by the Indians, perhaps erroneously.

CEREUS CANDELABRUM Web.

Aborescent, 25 feet high, trunk 1-2 feet in diameter, branches freely 3-5 feet from the ground, producing often 50 erect growing stems in candelabra form shading an area greater in diameter than the height of the tree. Branches a foot in diameter, 9-10 obtuse ribs with areolae $\frac{1}{2}$ inch apart, when young, and densely tomentose at the base of spines; the older areolae but slightly tomentose, the bases of the spines often in close contact; spines ashy, bulbous at base, flattened or angular, strong; the central 2 inches long 7-9 radials, usually 3 laterally disposed on each side and one below the central, and more rarely 1-2 shorter radials above; spines mostly deciduous on the trunk and older branches, the persistent areolae often enormously enlarged to a height and diameter of 1-2 inches with 10-20 formidable subulate spines, the longest 3 inches or more long. Flower white, much resembling that of *C. Pringlei*; fruit ripens in the middle of May, dull red, 3 inches long, 2 and $\frac{1}{2}$ in greater and lesser diameter, pulp purplish, sweet, edible, but valued less than the pitilla and other cactus fruits. About 30 triangular scales, bearing in the axils densely woolly areolae with 35 or more slender, bristly, straight, white spines $\frac{1}{4}$ - $\frac{1}{2}$ inch long, form the armament of the fruit—the spiny areolae easily detached (or deciduous?) at maturity. Fruit said to be used in making a pleasant drink and the seeds also utilized. The erect growth of the numerous branches and the bright glaucous color renders this giant cactus everywhere conspicuous. State of Oax-

aca, Mexico (Orcutt 2675). Known to the Indians as the 'cardon'.

CEREUS ORCUTTII K Br.

Stems erect, branching, bright green, reaching a height of 3 m and a diameter of 15 cm, with hard woody center; ribs 11-18, about 1 cm high; areolae round, about 6 mm in diameter and about half that distance apart, densely covered with short, light gray wool; spines all slender, spreading, yellowish brown, irregularly 3-seriate; radials 12-20, about 12 mm long, efficient above; intermediates about 10, one-third to more than twice longer, less spreading, one of the upper spines of this row usually stouter and darker, porrect, often reaching a length of 7 cm; centrals about 5, porrect-spreading a little longer than the intermediates; lowers greenish brown, darker outside, diurnal, about 4 cm entire length; petals short apiculate; ovary densely covered with short scales, almost completely concealed by thick, rounded tufts of yellowish wool, in which are embedded dark brown bristles 4-6 mm long; stamens lining the upper half of the tube; style tips acute; fruit not known.—Katharine Brandegee, Zoe, 5:3 (Je 1909).

Near Rosario, Baja California. Densely covered with bright yellowish brown spines; fruit the size of an orange; called pitilla dulce.

CEREUS PRINGLEI S. Watson.

The Cardon is the giant cactus of Lower California and Sonora, where it forms forests, attaining a height of 20 to 35 feet. The ribs are usually 13, and it differs from the giant cactus of Arizona (*Cereus giganteus*) in that the spine bearing areolae on the ribs are connected by woolly grooves. The trunk is often 3 to 4 feet in diameter; the older portions of the branches usually quite thornless. The dead wood is used for fuel, but otherwise this mammoth production of the desert seems to be without use.

CEREUS THURBERI Engelm.

The Pitahaya Dulce is an abundant species in Sonora and portions of Lower California, also said to occur in southern Arizona. It grows from 5 to 20 feet high, many stems 6 to 10 inches in diameter from the same base, bearing greenish or reddish white white flowers followed by large luscious fruit, rather too sweet it is said for northern palates. It was named in honor of George Thurber, a widely renowned botanist.

Subgenus PILOCEREUS E. "Tall, cylindrical, mostly unbranched; upper flower-bearing portion with more crowded areolae and longer, denser, thinner bristles or hairy spines; flowers short; seeds as in *Eucereus*."—E.

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duces peculiar intoxicating effects similar to those from the use of opium, and the plant enters into certain religious rites of the Indians of the Sierra Madre mountains in Mexico. A powerful drug is prepared from the plant by chemists.

ECHINOCACTUS WIPPERMANNII Mueh.

ECHINOCACTUS WISLIZENI Engelm. Variety **ALBISPINA** Tourmey. Variety **DECIPIENS** Engelmann.

Genus ECHINOCEREUS Engelmann. Included under the genus *Cereus*.

- E. Berlandieri** Lem, is *Cereus Berlandieri* E.
E. Blankii Palm, is *Cereus Blankii* Pos.
Echinocereus conglomeratus F, is *Cereus polyacanthus*.
Echinocereus leeanus Lem, is *Cereus polyacanthus*.
Echinocereus leonensis Maths, is *Cereus leonensis*.
E. Leptacanthus KS, is *Cereus leptacanthus* S.
Echinocereus Merkeri Hildm, is *Cereus Merkeri*.
Echinocereus paucispinus Lem, is *Cereus polyacanthus*.
E. procumbens Lem, is *Cereus procumbens* E.
E. pulchellus KS, is *Cereus pulchellus* Pf.
E. Saalm-Dyckianus Scheer, is *Cereus Saalm-Dyckianus* Web.
E. Scheeri Lem, is *Cereus Scheeri* S.
E. subinermis 3, is *Cereus subinermis*.
E. tuberosus Rumpf, is *Cereus tuberosus* Pos.

Genus ECHINOPSIS Zuccarini. Included under the genus *Cereus*.

- ECHINOPSIS AMOENISSIMA** Wend.
ECHINOPSIS CATAMARCENSIS Web.
ECHINOPSIS CINNABARINA Lab. Bolivia, South America.
ECHINOPSIS DROEGEANA Berge.
ECHINOPSIS D'ARIS-PAULI F.
ECHINOPSIS EYRIESII Zucc.
ECHINOPSIS FORMOSA Jac.
ECHINOPSIS GEMMATA KS. Brazil, South America.
ECHINOPSIS HUOTTHI Lab.
ECHINOPSIS KUOTTHI Schumb.
ECHINOPSIS LAGEMANNII D.etr.
ECHINOPSIS LLUCANTHA Walp.
ECHINOPSIS MULLERI. A hybrid, of rapid growth, blooming early, and with its large satiny rose-colored flowers is justly called the finest of its class.
ECHINOPSIS MULTIPLEX Zucc. Brazil, South America.
ECHINOPSIS NIGRICANS Link.
ECHINOPSIS OBREPANDA KS. Bolivia, South America.
ECHINOPSIS OXYGONA Zucc. Brazil, South America.
ECHINOPSIS PENTLANDII S. Peru, South America.
ECHINOPSIS PUDANTII Hort.
ECHINOPSIS RHODACANTHA S.
ECHINOPSIS SALMIANA Hort.
ECHINOPSIS SALMIANA Web. Variety **BRIDGESII** KS.
ECHINOPSIS SCHICKENDANTZII Web.

ECHINOPSIS SIMPLEX Niedt.
ECHINOPSIS TOUGARDII L'Her.
ECHINOPSIS TUBIFLORA Zucc. Variety **NIGRISPINA** KS.
Echinopsis turbinata Zucc, is *gemmata* fide KS.

ECHINOPSIS VALIDA Monv. Paraguay Republic, South America. Variety **FORBESII** R. Mey.
ECHINOPSIS WILKENSII Hort.
Echinopsis zuccarini (*zuccarini*) Pf, is *tubiflora* fide KS.
Epithelantha micromeris Web, is *Mammillaria micromeris* Engelmann.

Genus EPIPHYLLUM Pfeiffer.

- EPIPHYLLUM ALTENSTEINII** Pfr.
EPIPHYLLUM GUEDNEYRI Houl.
EPIPHYLLUM MACKOYANUM Hort.
EPIPHYLLUM OBOVATUM E.
EP. PHYLLUM RUSSELLIANUM Hook.
EPIPHYLLUM TRUNCATUM Haw. Inch, Crab, or Lobster Cactus; a native of Brazil, popular as a house plant.
GRUSONIA CEREIFORMIS F. Rehb, is *Opuntia cereiformis* Web fide KS.
Genus GYMNOCALYCIUM Pfeiffer.
G. gibbosum Pf, is *Echinocactus monvillei*.
G. reductum Pf, is *Echinocactus gibbosus*.
G. villosum F, is *Echinocactus villosus*.

Genus LEPISMIUM Pfeiffer.

The published species, as far as known, are considered as synonyms of *Rhipsalis*.

Genus LEUCHTENBERGIA Fisch.

LEUCHTENBERGIA PRINCIPIS Fisch. Near Zimapan, Mexico.

Genus LOPHOPHORA Coulter.

LOPHOPHORA WILLIAMSII Coulter. See *Echinocactus williamsii*.

Genus MALACOCARPUS Salm.

Nearly all the published species are considered as synonyms of *Echinocactus*, of the same specific names.

The identity of *M. Martini* Labour, (ex Foerster, Handb Cact ed 2, 1:454) and habitus are unknown.

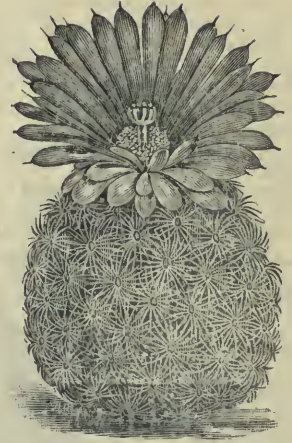
Genus MAMMILLARIA Haworth.

'Flowers about as long as wide; the tube campanulate or funnel-shaped. Ovary often hidden between the bases of the tubercles, as well as the exsert succulent berry, naked. Seeds yellowish-brown to black, exaluminous or nearly so. Embryo mostly short and straight, with extremely short cotyledons parallel to the sides of the seed.—Small, more or less globose or oval simple or cespitose plants, the spine-bearing areolae borne on cylindrical, oval, conic, or angular tubercles, which cover the body of the plant. Flowers form a distinct woolly or bristly areola at the base of these tubercles, fully open in sunlight, mostly only for a few hours.'—E.

Subgenus **COCHEMIEA**. Plants cylindrical, usually much elongated, with watery juice, and grooved tubercles. Flowers mostly in a ring near the vertex, several times longer than broad,



MAMMILLARIA MEIACANTHA Engelm.



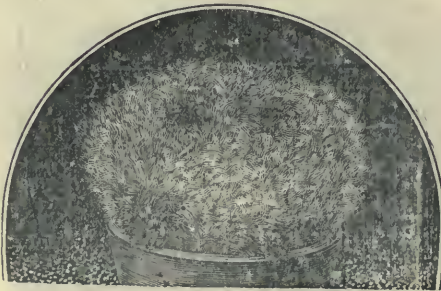
MAMMILLARIA PECTINATA Engelm.



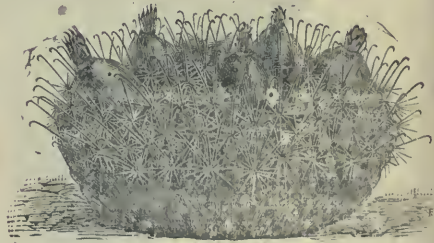
MAMMILLARIA MACROMERIS Engelm.



MAMMILLARIA BOCASANA Poselg.



MAMMILLARIA LASIACANTHA Engelm.



MAMMILLARIA WRIGHTII Engelm.

scarlet, tubular, slender, somewhat curved, and oblique with spreading, unequal, petaloid sepals, so making the flower apparently double as in *Cereus flagelliformis*. Stamens and style red, exerted.

MAMMILLARIA HALEI Brandegee.

"Caespitose, stems 8-10, about a foot high, 2-3 inches in diameter, straight, covered with dark-colored straight spines; tubercles short, rounded, woolly in the axils; spines 15-25, ½ inch long, with 3-4 of the interior ones stouter and an inch long; flowers an inch long, vertical from the axils of young tubercles, scarlet; sepals all scarlet, petaloid; anthers scarlet, filaments exerted, yellowish, stigma scarlet; fruit red, clavate, ½ inch long; seeds smooth. A handsome species, seen only upon Magdalena and Santa Margarita Islands, where it is very abundant."—Brandegee *Calacprsr* 2:161, t. 6.

MAMMILLARIA PONDII Greene.

"From a few inches to a foot high, simple or with a few oval or cylindrically elongated branches; growing parts tomentose; radial spines 20-30, white, slender; central 4 or 5, the longest more than an inch in length, rigid and strongly hooked, dark brown above the middle; flowers nearly 2 inches long, bright scarlet. Near *M. Goodrii* Gill, and differing from it in its large size and brilliantly colored large flowers. The plants were in flower in February. The species comes from the southwestern part of Cedros Island."—Greene *Pittoria* 1:268 (20 Mr 1889).

Fruit 20 mm long, 10 m in greater diameter, greenish, base imbedded in wool, remains of flower persistent, pulp slightly acid, greenish (May 6, 1897); seeds 0.5 mm in diameter.

MAMMILLARIA ROSEANA Bndg.

"Stems numerous from the root, spreading, curved, ascending, one-third to 2 mm long, 4 cm thick; mamillae arranged in quincunxial order, 15 mm apart, cylindrical, 12 mm long, white-woolly in the upper axils; pulvinae finely pubescent; radial spines 9 in number, 8-12 mm long, brown or straw colored, the single central spine 25 mm long, curved, hooked at the tip; flowers from the axils of the upper mamillae, 3 cm long; sepals and petals bright scarlet, fitted into a tube, spreading at their tips, in several series; stamens and style scarlet; style branches 5-7; fruit scarlet, pyriform, 6-8 mm long; seeds black, pitted; cotyledons unfitted, only a depressed line at their tips; albumen none.—Throughout the lower elevations of the Cape Region and northward to Calmall. This cactus is one of the most showy of Lower California. Dr. Palmer collected it at La Paz and it is No. 139 of the list from that place in *Contr. U. S. Herb. No. 3*, catalogued by Mr. Pose, for whom it is appropriately named. The stems pendent from rocks at Comordu are sometimes 6 feet long. This species and *M. Halei* of Magdalena and Santa Margarita Islands have similar flowers, fruit and seeds. The seeds of *M. Halei* were wrongly described as smooth; they are pitted in the same manner as those of this species."—Br *Zoe* 2:19 (Ap 1891).

MAMMILLARIA SENILIS Lodd.

Stem columnar, 2 dm high, 5 cm diameter, profliferous at base in age, axils naked, brilliant green; areoles tomentose, tomentum & spines white; radials very numerous, flexible, criniform, 4-6 centrais stronger, the upper hooked. "Grows on palms, San Luis Potosi."

Variety **HASSELOFII** S [M hasselofii Eh].

Spines more numerous, all criniform.

Variety **LINKEI** S [M linkel Eb].

Central spines all hooked.

MAMMILLARIA SETISPINA E.

"Cactus setispinus: fasciculate and ascending, simple or branched at base, the stems about 10 cm high and 3-6 cm in diameter, densely covered with remarkably long stout spines: tubercles short and broadly conical, with axillary wool; spines white, with black tips; radials 10-12, widely spreading, very unequal, 10-34 mm long, slender and flexuous; central spines 1-4, more rigid and much longer (20.5 mm), the upper ones straight, the lowest one longest and hooked (usually upwards) and often variously curved and twisted; fruit obovate and scarlet, 30 mm long; seeds black and pitted. Type, Gabb 15 in *Herb. Mo. Bot. Gard. Rocky or gravelly soil*, San Julio canyon, and in the vicinity of San Borgia, Lower California."—Coulter *Cont U S Nat Hb* 3: 106 (10 Je 1894).

Subgenus **CORYPHANTHA**. Plants globose or elongated, often robust, with watery juice. Tubercles (in age) grooved on the upper side. Flowers as in *Eumammillaria*, but some at the extremity of the groove in the axils of young tubercles, usually near the vertex of the plant.

MAMMILLARIA ALVERSONI Hort.

The Fox-tail cactus is of robust branching habit, densely covered with long stout straight spines, usually tipped with black or black half way down, shading into red, but often pure ivory white throughout. The large rose purple flowers are quite showy. The largest of some fifty plants was a cluster of six heads measuring 3 inches in diameter and about 8 inches high.

See *radiosa*.

MAMMILLARIA ARIZONICA Engelm.

See *radiosa*.

MAMMILLARIA COMPACTA E.

Depressed-globose, 5-10 cm diam, simple; tubercles short-conical, crowded, 8 mm long; radials 13-16, rigid, recurved & appressed, interwoven with adjacent clusters, whitish or horny, 10-20 mm long; central erect, often wanting; fls 3-3.5 cm long and broad, yellow; fruit oval, green; seeds 1.4 mm long, smooth, yellow. Chihuahua.

MAMMILLARIA CONOIDEA P DC.

Ovate-conical, simple, 3.5-10 cm high, 4-7 in diameter below with densely woolly vertex; tubercles close, ovate, 12 mm long, axils at first woolly; radials 10-16, ashy to white, straight, stout, 6-10 mm long; centrals 3-5, 10-16 mm

long, the lower one more rigid, 15-20 mm long, brownish-black; fls deep purple, 2-3 cm long & wide. San Luis Potosi; Coahuila; Nuevo-Leon.

MAMMILLARIA CORNIFERA P DC.

MAMMILLARIA DASYACANTHA E.

Mammillaria echinus E. is radians.

MAMMILLARIA ELEPHANTIDENS Lem.

MAMMILLARIA MACROMERIS E.

MAMMILLARIA MISSOURIENSIS

Sweet hort Brit 171 [1827].

M simplex T-G Fl N Am 1:553 [1840].

M nuttallii E pl Fend 49 [1849].

M notesteinii Britton Torr cl b 18:367 [1891].

Cactus mamillaris Nutt Gen 1:295 [1818] non L.

Globose, 3.5 cm diam., simple; mammae ovate, 12-14 mm long, slightly grooved; radials 13-17, straight, whitish, unequal, setaceous, 8-10 mm long; central more robust, longer, puberulent, or wanting; fls 2.5 cm long, stigmas 2-5; fruit globose, scarlet, 6-8 mm diam., seeds globose, black, pitted, 1.1 mm diam. Montana, Kansas, Colorado, Nebraska, South Dakota.

Star Cactus; dwarf; flowers yellow or salmon color.

MAMMILLARIA NICKELSAE K Br.

"Soon and densely caespitose, glaucous and often purplish, 4-6 cm high, hemispherical or globose; tubercles 10-12 mm long, becoming quite as broad and umbellicated; spines 14-18 all radial, slender, at first yellowish with darker tips, later all gray; lower spines 8-10 mm long, the upper one-third longer, stouter, extending into the groove and forming a fascicle, the clustered fascicles making an upright tuft at the vertex; flowers 5-7 cm in full expansion, said to be bright yellow with red center; fruit unknown. Southward from Laredo, Texas. Named for the collector, Mrs. Anna B. Nickels, and offered in catalogues as M. Nickelsii. Evidently closely related to M. sulcata Engelm."—Kather n Brandegee, Zoc, 5: 31 (ag 1900).

Mammillaria pectinata E. is radians.

M. POTTSII Scheer ex Salm HD ed 2, 04.

Cylindrical, 3-35 cm high, 2.5-3 diam, somewhat branching; tubercles ovate, obtuse, lightly grooved, axillary woolly, radials slender, white, very numerous, rigid; centrals 6-12, stouter; fls pinkish; scarlet, clavate fruit. Texas; Chihuahua; Durango.

Cactus pottsii OK rev gen pl 261; Coulter 113.

Mleona Pos AGZ 1853, 94:—"stelligera M. caule cylindraceo interdum prolifero diametro pollicari 4-5 poll. alto glauco, mamillis brevibus confertis; axillis lanatis, areolis nudis, aculeis exterioribus permultis intertexti-albidis, centralibus 8-12, exterioribus superantibus flavescens, summo subcurvato albo subpurpurascens." Nuevo Leon

MAMMILLARIA RADIANS P DC.

MAMMILLARIA RADIOSA E.

M. alversoni, arizonica, chloantha, deserti.

MAMMILLARIA RECURVATA E.

MAMMILLARIA STROBILIFORMIS Shr.

MAMMILLARIA SULCOLANATA Lem.

MAMMILLARIA VIVIPARA Haw.

Purple and white spines cover the en-

tire plant; flowers bright purple, 3.5 cm long and broader when fully expanded, showy. Montana, Nebraska, Colorado, Idaho, Washington and British America—consequently one of the most hardy species known.

MAMMILLARIA WISSMANNII Hildm.

Section G' ANDULIFERAE. Cylindrical; mammae cylindrical, long, or oval and more or less globose; grooves bearing more or less conspicuous glands, the grooves often absent in young plants, the glands sometimes in the axils or at the base of the tubercles.

MAMMILLARIA ASTERIAS Cels.

MAMMILLARIA BREVI-MAMMA Zucc.

Near Zimipan. M xico.

MAMMILLARIA CLAVA Pf.

"Clavato-columnaris, intense viridis; axillis tomento denso albo et glandula simpliciteriella instructis, mox planissimis, nudis; mamillis elongatis erectis, dorso sulcatis, basi oblique tetragonis; areolis albo-villosis infraapicalibus; aculeis rectis, corneis, subaequalibus, radiantibus 7, centrali 1, paulo longiore, crassiore."—Pfr AGZ 1840, 282. Mexico—Fhrenberg.

Bot magt 4358 Otto & Dietr AGZ 1845, 234-5.

M dolicho-centra Lem.

MAMMILLARIA DOLICHOCENTRA Lem

Two distinct species have been figured under this name by Foerster, Schumann, & Lem. See clava.

MAMMILLARIA ERECTA Lem.

MAMMILLARIA GLANDULIGERA

Otto ex Dietr AGZ 1848, 298:—"obovata, subglaucens axillis nudis; mamillis brevibus, pyramidatis, subteretibus, albidopunctatis, dorso glandulari roseo albo instructis; areolis subnudis; aculeis exterioribus stellatis dispositis numerosis flavescens demum albidis, centralibus ternis vel quaternis subulatis fuscis, unico patente, ceteris erectis. Mexico."

Is Ottonis fide KS.

MAMMILLARIA MACROTHELE Mart.

Near Zimipan, Mexico.

MAMMILLARIA OTTONIS Pf.

"Globosa simplex obscure griseo-virens; axillis fasciculo lanæ albidæ et glandula rubra tomento albo cincta instructis; mamillis crassis mammaeformibus, basi interdum confluentibus, dorso usque ad glandulam sulcatis; areolis junioribus albo-villosis; aculeis radiantibus 11-12 subaequalibus rigidis rectis, 2 summis gracillioribus suberectis, flavescens, apice fusc., tandem fusco-cinereis, centralibus 3 rariis 4, (summo plerumque deficiente) subdecussatis, rigidioribus, corneis, infimo longissimo patente recurvulo."—Pfr AGZ 1838, 274. Mineral del Monte, Mexico—Ehrenberg.

MAMMILLARIA SALMDYCKIANA

Scheer ex Salm HD ed 2, 134 [1850].

M Scheerii Muchpf AGZ 1947, 97, non 1845.

M robustipina Schott ex E.

M [Caetus] brownii Toumey bot gaz 2:253

See Orcutt rev 77-78 for descriptions; it is the name Scheerii here dropped for this race

plant of Sonora, New Mexico, Chihuahua, Texas and Arizona: the plants from San Luis Potosi is a distinct species.

MAMMILLARIA SCHEERII Muehlpf.

"Globosa multiplex: mammillis subglobosis superne sulcatis; aculeis radiantibus 20-22 albis adpressis subdistichis, centralibus 4 rectis fuscis, infimo valde elongato 8-10 lin. longo."—AGZ 1845, 346; 1846, 373, is polymorpha [conoidea].

See salmdyckiana.

Subgenus **DOLICHOTHELE** KS.

MAMMILLARIA LONGIMAMMA P. SC.

MAMMILLARIA SPHAERICA S.

Subgenus **LACTESCENTES**. Plants depressed-globose, rarely a little elongated; juice milky; tubercles usually angular and somewhat leathery. Flowers as in Eumamularia, but mostly small.

MAMMILLARIA ANGULARIS L.-O.

MAMMILLARIA CAPUT-MEDUSAE Ctto.

Near Zimipan, Mexico.

M. DIACENTRA Jacobi AGZ 1856, 91.

"Angulosa tetragona. Caule sphaerico, subumbilicato saturate viridi lactescente. Mammillis ad basin rhomboideis obvie pyramidalibus apice late aliter applanatis; pulvillis ovalibus glab. fissis bapicalibus; axillis junioribus nudis, dein fuscose albo-lanatis, serius cuncto nudis. Setibus radialibus 5-6, diaphane albidis, apice subsphecalatis serius ubique abidi- subulatis vix patulis, subans et inferne recurvulis radianter positis, 2 ant 3 superioribus brevissimis, 3 inferioribus altero tanto longioribus; aculeis centralibus 2, multo validioribus longioribusque, junioribus cinereo-bunneis apice nigris, dein curvo cinereis apice nigrescentibus, superioribus erecto sensim recurvato, inferiore recte patente inferne recurvato, utroque eorum basin semi terete, apice rotundato, inferiore ferè altero autum longiore. Flores parvulleribendi, tubo brevissimo, circa ovarium ventricose dilatato, superne concavato, petalis lanceolatis breviter recurvatis, roseis cum linea media purpurea. Stamina filamenta rosea antheraeque sordide flavæ stylus staminibus longior rosens, stigmatibus 6 coloribus. Floret mensibus Julio."—Planta descripta altitudinetri pollicari diametroque poll. 3½. Aculeorum radialium 2 ant 3 superiorum lin. 1, cetera 3, lin. 2 longi; aculeorum centralium superiorum lin. 6-8 longis, inferiorum pollicum set utra."

MAMMILLARIA FORMOSA Scheidw.

M. FUNKII Scheidw AGZ 1841, 43.—

"Lactescens, robusta, umbilicata, laeve viridiss; axillis nudis, tandem criniferis; crinibus albis apice nigrescentibus ex mox unicoloribus; mammillis pyramidato-tetraedris; areolis infra axillis cum mammillarum immersis, nudis, junioribus vix tomentosis; aculeis 8 maxime inaequalibus, centrali longissimo incurvulo, nascentibus fuscis, tandem griseis. Truncus 3 poll 10 lin altus, diametro 6 pollicari; aculei exteriores ¼-2 in. longi, centralis ½-6 lin. longus."

Mexico.

MAMMILLARIA GABBII Engelm.

Cactus gabbii Coulter, U S Na Hb cont 310:—"Globose, 5-10 cm in diameter, sim-

ple, tubercles cylindrical, slender, 12-14 mm long, with woolly axils; radial spines about 13, 5-8 mm long, lower ones longer and stouter, especially the latest ones pectinate; the central shorter, straight and robust; flowers small, yellowish-red; fruit unknown.—Type in Herb. Mo. Bot. Gard. Among rocks, from San Ignacio to Mission San Fernando, Lower California."

Near San Quintin bay, Baja Cal. (Orcutt).

Cactus brandegei Coulter, U S Na Hb cont 376.

MAMMILLARIA GEMINATA Scheidw.

"Lactescens, truncus geminato; vertice umbilicato; axillis lanatis; mammillis tetragono-polyedris, viridibus; areolis junioribus lanatis, dein nudis; aculeis exterioribus 6 rectis, stellatis, apice nigrescentibus; centrali 1 validiore curvula nigro. Mammilae 4 lin. longae; aculei exteriores 2½ lin. longi centralis longitudine 3 lin."—AGZ 1841, 42. 5000 ft alt near Oaxaca, Mex.

MAMMILLARIA GIGANTEA Hildm.

MAMMILLARIA GUMMIFERA E.

MAMMILLARIA HEESEANA Mac Dow.

MAMMILLARIA HEYDERI Muehlenpf.

"Globosa, viridis, vertice impresso, axillis junioribus lanatis, mammillis conicis, elongatis, 6 lineas longis, 3 lineas latia, areolis junioribus albo-tomentosis apice mammillarum dispositis; aculeis radiantibus 20-22 albis setaceis, inferioribus robustioribus paululum elongato, centrali 1, erecto corneo basi apiceque fusco 2½-3 lineas longo."—Muehlenpf AGZ 1848, 20. Texas.

Reel Gartenflora 1889, 52, f.

Scheele. Roem Texas, 435 (1849).

M. KRAMERI Muehlpf AGZ 1815, 347:

"Globosa, basi tandem prolifera: axillis lanatis; mammillis angulosis pyramidalis, junioribus lanatis; aculeis exterioribus 4-5 rigidis, centrali 1 elongato 1½-2 poll. longo, omnibus albis apice nigris Die pflanze ist aus Mexico, und erhielt ich dieselbe vom Kramer in Hamburg, unter den Namen M. macrantha."

Range sent under this name from San Luis Potosi, which bore flowers ¼ inch long, ½ inch across, 12 maroon purple sepals, 16 white petals with maroon midvein; 6 stigmata, style, filaments and anthers white

M Schmidtii (schmittii) Ske.

M. LEUCOTRICHA Scheidw AGZ 1840, 338:

"M. lactescens, simplex vel caespitosa, cylindrica, vertice umbilicato; mammillis pyramidalis quadrangularibus; axillis primo nudis, tandem lana abundant; aculeis ciliiformibus, albis munitis; areolis rotundis lana alba instructis; aculeis exterioribus 6, centrali 1, omnibus rigidis subaequalibus fuscis, tandem carneis apice sphaelatis. Fructus pyriformis; flores adhuc ignoti." Mexico.

Jacobi AGZ 1841, 11

See maschalacantha.

- M. MASCHALACANTHA Cels.
 M. mutabilis laevior Salm, HD ed 2, 120.
 Cactus mutabilis OK
 M. leucotricha (leucocarpa) Scheidw.
 Variety LEUCOTRICHA Monv.
 M. mutabilis et funkii Schdw.
 M. Senkei Foerst.
 Variety XANTHOTRICHA Monv.
 M. xanthotricha Schdp. Cactus xanthotrichus OK. M mutabilis xanthotricha S.
 M PALLESCENS Scheidw AGZ 1841, 42.
 "Lactescens, cylindrica aut ovata; vertice umbilicato subacu eis abscondito; axillis maxime lanatis, lana aculeis adherente et mammillis involvente; areolis tomentosus, tandem nudis; mammillis polyaedris, laete viridibus, mox pallescentibus; aculeis 4 cruciatim dispositis, angulatis, recurvis, supremo maximo subtorto, omnibus rigidis, carneis." 5500 ft alt Tehuacan.
 MAMMILLARIA MELACANTHA E.
 MAMMILLARIA SEMPERVIVI P DC.
 Near Zimipan, Mexico.
 MAMMILLARIA TROHARTII Hilldm.
 MAMMILLARIA UNCINATA Zucc.
 Schumann includes the following in this group, but as known to us all are not milky.
 M. CELSIANA Lem.
 M. PRAELII Muehlenpf.
 M. PYRRHOCEPHALA Scheidw.
 M. ZEYERIANA F Haage jr.
 M. CENTRICIRRHA Lemaire.
 M. CROCIADIATA Lemaire.
 M. KARWINSKIANA Karw.
 MAMMILLARIA BICOLOR Lehm.
 Near Zimipan, Mexico.
 Variety NIVEA KS.
 MAMMILLARIA CARNEA Zucc.
 Near Zimipan, Mexico.
 MAMMILLARIA ELEGANS DC.
 MAMMILLARIA LAVOVIRENS S.
 MAMMILLARIA HAAGEANA Pf.
 MAMMILLARIA MELALEUCA Karw.
 MAMMILLARIA MELANOCENTRA Pos.
 MAMMILLARIA MUTABILIS Scheidw.
 MAMMILLARIA NIVOSA Link.
 MAMMILLARIA OBSCURA Hilldm.
 MAMMILLARIA PARKINSONII Eh.
 MAMMILLARIA PERBELLA Hilldm.
 MAMMILLARIA PHYMATOTHELE Berg.
 MAMMILLARIA POLYEDRA Mart.
 MAMMILLARIA SEITZIANA Mart.
 Near Zimipan, Mexico.
 MAMMILLARIA SIMPLEX Haw.

Subgenus EUMAMILLARIA. Plants globose or elongated, with watery juice, and cylindrical or conical grooveless tubercles. Flowers borne usually in a ring near the top of the plant, cup-shaped or

expanded, as broad or broader than long. Sepals appressed. Stamens and styles shorter than the corolla.

- MAMMILLARIA ACICULARIS Lem.
 MAMMILLARIA ANTINOPLEA Eh.
 MAMMILLARIA ALPINA Mart.
 MAMMILLARIA AMABILIS Eh.
 MAMMILLARIA AMBIGUA G. Don.
 MAMMILLARIA AMOENA Hopff.
 MAMMILLARIA ANCISTRATA Sehelh.
 MAMMILLARIA ANCISTRIA Walp.
 MAMMILLARIA ANDREAE Pf.
 MAMMILLARIA ARGENTEA Fenn.
 MAMMILLARIA ARICITINA Lem.
 MAMMILLARIA ARMILLATA K Br.
 "Stems somewhat attenuate, reaching 3 dm in height, 4-5 cm in diameter, usually in clusters of 3-12, from the base, often branching above; tubercles somewhat leathery in texture; conical, somewhat angled; axils setose and sparsely woolly; radial spines 9-15, 7-12 mm long, the inner half whitish or grayish; centrals 1-4, 10-20 mm long, the lower one hooked and longer, all, and the outer part of the radials dark brown, yellowish or gray; flowers 1-2 cm long, scarcely spreading, flesh color; fruit red, clavate, 1½-3 cm long; seeds coriaceous, dull black, about 1 mm long, obliquely obovate, constricted above the more slender basal portion; surface covered with minute, not closely contiguous pits, the intervening spaces minutely wrinkled; hilum basal, narrow. San Jose del Cabo, Baja California. The name is in allusion to the dark bands which encircle the plant, giving it much the appearance of a raccoon's tail."—Katharine Brandegee, Zoe, 5:7 (Je 1900).
 MAMMILLARIA ATORRUBRA Eh.
 MAMMILLARIA ATROSANGUINEA Eh.
 MAMMILLARIA AULACANTHA P DC.
 MAMMILLARIA BADISPINA F.
 MAMMILLARIA BARBATA Engelm.
 MAMMILLARIA BARLOWII R-K.
 MAMMILLARIA BELLATULA F.
 MAMMILLARIA BERGENII Eh.
 MAMMILLARIA BERGHII Mig.
 MAMMILLARIA BIFURCA Dietr.
 MAMMILLARIA BINOPSIS Hge.
 MAMMILLARIA BOCASANA Pos.
 This beautiful plant is covered with the finest tender hair like spines.
 Near San Luis Potosi, Mexico.
 MAMMILLARIA CANDIDA Scheidw.
 MAMMILLARIA CARRETHI Rebut.
 Is Pringlei.
 MAMMILLARIA CONICA Haw.
 MAMMILLARIA DECIPIENS Schw.
 Loose tubercled small growing species with delicate & pretty yellow fls.

MAMMILLARIA DIOICA K. Brandg.
 M. Goodridgii Engelmann (not Scheer?). small globular species, closely set with brownish or white spines, the central one curved

into a hook. The delicate yellowish white flowers are succeeded by the club-shaped, scarlet berries that possess the flavor of wild-wood strawberries, and are sometimes called "hep-pitallas," the "llavina" of the Mexicans.

MAMMILLARIA ELONGATA P DC.

MAMMILLARIA FLAVA E.

MAMMILLARIA FORDII Orcutt.

Ovate, 2 inches in diameter, and about 3 high, rarely branching at base; tubercles obtuse, $\frac{1}{4}$ inch across, short, 12 radial spines either $\frac{1}{2}$ or $\frac{3}{4}$ inch long, the solitary central black and hooked, $\frac{1}{4}$ inch long; flower an inch long, white with about 9 petals and 9 sepals—the latter with purplish midvein on the back, 6 stigmata of a brownish green style greenish, filaments white and anthers orange yellow; flowers in July; Baja California on the west coast, collected for L. M. Ford, 1899. Near M. Goodridgii.

MAMMILLARIA GLOCHIDIATA Mart.

MAMMILLARIA GOODRIDGII Scheer.

MAMMILLARIA GRACILIS Ff.

MAMMILLARIA GRAHAMII E.

1 to 3 inches high, subglobose, simple or branching from the base; tubercles ovate, axils naked; radial spines in one series, 20 to 30 in number, 3 to 6 lines long, rigid and whitish, surrounding a stouter and longer hooked brown one. Flowers small, nearly 1 inch wide, reddish; berry oval, green, with small pitted seeds. The well-known "Arizona Strawberry" or small Fishhook Cactus of N. M., Arizona and Utah, rare in California.

MAMMILLARIA GRACILIS Runge.

MAMMILLARIA HUMBOLDTII Eh.

MAMMILLARIA INCURVA Scheidw.

MAMMILLARIA INTRICATA Otto.

MAMMILLARIA LASIACANTHA E.

Variety **DENDRATA** Engelmann.

Mammillaria kona Pos, is Potts f.

MAMMILLARIA LESAUNERI Rebut.

MAMMILLARIA MAELENII S.

MAMMILLARIA MAELENII S.

MAMMILLARIA MAINAE Dr.

Spherical to ovate, simple, or sparingly branched from the base, reaching a height of 10 cm; tubercles glaucous, somewhat incurved, cylindrical, becoming conical, 1-1 $\frac{1}{2}$ cm long, often bright red in the naked axils, radial spines, 10-15, yellowish, becoming white, slender, scarcely pungent, 6-10 mm long, the upper rather the shorter; centrals 1-2, both hooked, rarely an additional upper one; lower central, usually the only one, nearly twice as long as the radials, stout and strongly hooked, porrect, brown below, blackish above, somewhat twisted; the second central when present, widely divaricate, ascending, weaker and shorter; flowers in crown at upper part of stem, pinkish-white or flesh-color, 1-1 $\frac{1}{2}$ cm in length, including the ovary; style whitish, deeply, few-lobed; fruit red, globular, to obovate, shorter than the tubercles; seeds dull-black, punctate, a little more than 1 mm long, obovate, with narrowly-linear basal hilum. Named for the collector, Mrs. F. M. Main, who found it in Sonora, south of Nogales. It has been

offered by dealers as *M. Galeoteii* Scheid, to which it is not at all related.—Katherine Brandegee, Zoe 5 1 (ag 1900).?

MAMMILLARIA MICROMERIS E.

mushroom cactus, found in Texas, resembles a silk-covered button, and can be handled without gloves. The delicate, starry net work of snowy-white spines over the green plant gives it a very beautiful appearance.

Variety **GREGGII** Engelmann.

MAMMILLARIA MINIMA R. Ichb.

Mexican species, cylindrical, forming numerous heads around the base, which readily take root when detached. About 20 slender white spines radiate from the center of each hemispherical tubercle, enveloping the plant like a bit of delicate lace; no central spine.

MAMMILLARIA NICHOLSONII Mac Dow.

Mammillaria nogaensis Runge cat, is *recurvata* E.

MAMMILLARIA OLIVIAE Orcutt.

Globose to ovate, 2 $\frac{1}{2}$ inches in diameter, 3 inches high, simple or rarely branched or cespitose; tubercles ovate, $\frac{1}{4}$ inch long, axils naked; radials 25-36, snowy white, slender, rigid, $\frac{1}{4}$ inch long, upper ones shorter; centrals 1-3, the lower one only an eighth of an inch long, erect, rigid, white or tipped with chocolate brown; the two upper centrals slender white or rarely tipped with brown, 3 times as long, closely resembling the radials; lower central rarely longer, but occasionally even $\frac{1}{2}$ inch long, slender or flexuous, brownish and hooked upward—more frequently seen on the lower outer tubercles of young plants; fruit scarlet, clavate, with small seeds. Type, Orcutt, No. 2902.—Of snowy whiteness from its numerous interlacing spines; dedicated to the author's life partner, who has accompanied him in thought on the mountains and deserts of Arizona, where this beautiful plant occurs.

Mammillaria petersonii Hldm, is *Heesiana*

Mammillaria psiffieri Booth, is *rhodantha*.

MAMMILLARIA PHELLOSPERMA E.

MAMMILLARIA PLUMOSA Web.

MAMMILLARIA PRINGLEI K Br

Katherine Brandegee Zee, 5:7, publishes this name (based on *Cactus Pringlei* Coulter), and states that it seems to scarcely differ from *M. Carrettii*.

MAMMILLARIA PUSILLA Sweet.

MAMMILLARIA RHODANTHA L-O.

Oblong or subcylindrical, 30 cm high, 7.5-10 in diameter, often bifurcate; tubercles conical, 12 mm long, 8 in diameter; with woolly axils; radial spines 16-20, bristle-like, white, the lower 8-10 mm long; central spines 6 or 7, rigid, whitish with black tip, 12 mm long; flowers rose-color, 12 mm broad; fruit 2.5 cm long, cylindrical. Mexico.

MAMMILLARIA SPHACELATA Mart.

MAMMILLARIA SPINAUREA S.

MAMMILLARIA SPINOSSIMA Lem.

MAMMILLARIA STELLA-AURATA Mt.

MAMMILLARIA THORNBERI Orcutt.

Cylindrical, $\frac{1}{4}$ inch in diameter, usually 2-3 inches high, erect, with 8 or 9 spiral rows of tubercles, axils naked; 13-18 slender white or brown tipped radials $\frac{1}{4}$ inch long; usually 1 slender flexuous hooked central one-fourth to three-fourths of an inch long, tipped with brown; fruit clavate, scarlet, containing minute black seeds. Tips of tubercles olive green, base and axils and sunken portion of plant tinged with purple; radials usually 13, the upper sometimes the longest, often brown nearly to the base; central occasionally brown, usually the lower half white or yellowish, often hooked upward, but often twisted and turning in every direction. Plant proliferous at base, forming numerous offsets in the axils of the buried or lower tubercles; these quickly take root and usually soon sever connection with the parent, thus forming dense compact masses of old and young plants, usually 10-50—but in one, perhaps not exceptional case, I counted 110 distinct plants, in a cluster—all apparently originating from the tallest individual in the group. Occasionally a plant, from injuries sustained, becomes bifurcate or forms a number of aerial heads which remain permanently attached—but which usually form roots of their own and eventually survive the death of the parent. More than 1 central spine appears very rare, but 2 or three sometimes appear from the same small woolly areola, one or all hooked, of equal or varying length. The largest plant among over 1,000 was $1\frac{1}{2}$ inch in diameter and nearly a foot high! Type, Orcutt, No. 2533.—Arizona. Curiously the same plant was found a few days earlier than by the author by Prof. J. J. Thornber, and planted in the cactus garden of the University of Arizona, and this interesting addition to the cactus flora of the United States may therefore appropriately bear his name.

MAMMILLARIA TOALDOAE Lehm.**MAMMILLARIA UMBRINA** Eh.**MAMMILLARIA VALIDA** Web.**MAMMILLARIA VENUSTA** K Br.

"Simple, becoming caespitose in clusters of, in extreme cases, as many as 40; heads 2-4, very rarely, in center of large clusters, 6 cm high, a little less in diameter; tubercles thick and short, concave at the end, greenish, purplish to nearly white, glaucous; axils only slightly woolly, soon marked; radial spines, 9-15, stout, 6-12 mm long; centrals typically solitary, 10-15 mm, sometimes 2 or 3, in a single specimen 4, prorect-spreading, the 3 upper very short; flowers about 4 cm in diameter, rose-color, widely spreading, tube very short; petals lanceolate acute, recurved-spreading; style-branches 5, apparently rosy brown; fruit $1\frac{1}{2}$ -12 cm long, scarlet, linear, circumscissile some distance above the base, nearly dry; seeds oblong-obovate, rather less than one mm long, constricted above the basal portion, which is half as long and nearly as wide as the upper; surface dull, minutely pitted, the pits much obscured by delicate intervening striae; hilum basal, large and triangular.

"Collected by Mr. T. S. Brandegee in the vicinity of San Jose del Cabo, Baja California, in Sept. 1890. (No. 240, M. Goodrichii, in 'Flora of the Cape Region'); again Sept. 1893, and for the third time last year in numerous living specimens. The spines are from pure white, barely tipped with brown, to dark brown, whitish only near the base. The flowers, which appear in September, hide the whole plant, and it is of such low growth as to look like a beautiful cluster of flowers springing from the sand. The fruit appearing in winter is nearly dry and falls very readily when ripe, leaving most of the seeds in the axillary cup. It is the only circumscissile Mammillaria known to me."—Katherine Brandegee, Zoe, 5:8 (Je 1900).

MAMMILLARIA VETULA Mart.**MAMMILLARIA WILCOXI** Tourmey.

Usually simple, depressed-globose; 14-16 slender, subulate whitish radials 10 mm long; solitary hooked central brownish; axils naked. Fruit (16 O 1896) flesh color faintly tinged with carmine, the black seeds showing through the transparent epidermis. Near Congress and Benson, Arizona (Orcutt).

MAMMILLARIA WILDII Dietr.**MAMMILLARIA WRIGHTII** E.**MAMMILLARIA ZEPHYRANTHOIDES** Scheldw.

Mamillopsis senilis Web, is Mammillaria senilis Lodd.

Genus MELOCACTUS De Candolle.

Globose fleshy plants 1-3 feet in diameter, regularly ribbed, ribs bearing clusters of spines, surmounted with a woolly cylindrical cap closely set with softer spines, upon which the small tubular red or rose-colored flowers are borne. Of little value horticulturally and rarely cultivated with success. Generally found in rocky or sandy dry situations in tropical America and West Indies.

MELOCACTUS VIRIDESCENS Nutt.

Nuttall ex Teschem in J Bost Soc Nat Hist 5:293 (1845).—A synonym of Echinocactus viridescens.

The Melocacti are natives of the West Indies, and tropical America.

Genus MYRTILLOCACTUS Console.**MYRTILLOCACTUS GEOMETRIZANS** C

Cereus geometrizans Mart.

Cereus cochal Orcutt.

Genus PELECYPHORA Ehrenb.**PELECYPHORA ASELLIFORMIS** Ehrenb.

The Hatchet cactus is a little gem from Mexico, so-called from the shape of the tubercles. It bloomed in San Diego on May day, scarce $\frac{1}{2}$ inch in length and breadth, with thirteen bright magenta colored petals and seven or eight pale lavender sepals, the four stigmata white, style and filaments tinged with purple, and anthers bright orange. The largest plant



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ARKANSAS KING-BIRD.
 $\frac{3}{4}$ Life-size.

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PILOCEREUS ALBISPINUS Rumpl.
 Foerster, handb cact, ed 2, 649.
 KS nat pflzf III (6a) 180; Mon 187.
Cereus albispinus S obs bot 5 (1822); HD ed 2,
 45, Pf en 85. Foerster 385, Lab 341.
Cereus crenulatus S HD ed 2, 45. Pf en 85 F
 382. S obs bot 6 (1822).
Cereus crenatus Lab 341.
Cereus octagonus et *decaagonus* Hort, Pf en 85.
Cereus acromelas Otto Ind cact hort Berol 1833
 fide Pf en 84 Curacao.
 Variety **CRENATUS** Hort

PILOCEREUS COERULESCENS Lem.
Pilocereus andryanus Cels
Cereus aethiops Haw phil mag 1830, 109.
Cereus mendory Hort fide Pf en 85.
Cereus coerulescens S HD 335. Pf en 85.
Pilocereus glaucescens Lab in part.
PILOCEREUS CELSIANUS Lem.
 Lem cat Cels; Rev hortie 1862, 428.
 Salm-Dyck cact HD ed 2, 43, 185
 Foerster handb cact ed 2, 653
 Labouret Monograph 276.
 K Schumann nat pflzf III (6a) 186; Mon 179.
Pilocereus fossulatus Lab rev hort iv sr 4, 25
 (1855). Lem rev hort 1862, 418. F 660.
 Croucher Gard chron 1873, 983 f.
Pilocereus foveolatus Lab cat Cels 1858, non
 Lemaire.

Pilocereus Williamsii Lem rev hort, 1862, 428.
Pilocereus Bruennowii et Kanglerl Haage Jr
 ex Foerster handb cact ed 2, 651, 671.
 Variety **LANCEOLATUS** Salm

BRUENNOWII Karl Schumann.
GRACHLOR KS.
WILLIAMSI KS All Bolivia.

PILOCEREUS CHRYSACANTHUS Web.
 Teahuacan, Puebla, Mexico.
Pilocereus chrysomallus Lem, is *Cephalo-*
ocereus chrysomallus de KS.
Pilocereus columna-trianii F, is *Cephalo-*
ocereus columna-trianii fide KS.

PILOCEREUS COMETES Mittl.
 Foerster handb cact ed 2, 357.
 KS nat pflzf III (6a) 180; Mon 190.
Cereus cometes Schied AGZ 8:339.
Pilocereus jubatus S 1842, 24; cd 2, 40, 183.
 Foerster 356; ed 2, 6 1. Lab 28
 Lem rev hort 1862, 427.
Cereus flavicomus Sed 2, 46, 202. F 387.
 Labouret, Monogr 347 (1853).
Pilocereus flavicomus Rumpl, F ed 2, 657.
Pilocereus auratus Lab Gruson cat.
 "San Louis Potosi."

PILOCEREUS DANTWITZII Hge.
 Haage, Gard chron 1873 17 f 1.
 Van Houtte in Flore des Serr 13:33 t 2163.
 Foerster handb cact ed 2, 657 f.
 KS nat pflzf III (6a) 180; Mon 194.
 Seitz?

?*Cactus lanatus* HBK nov gen et sp 6:68
 ?*Cereus lanatus* DC prodr 3:464.
Pilocereus haagei Poselger ms. Peru
PILOCEREUS DIVARICATUS Lem.
PILOCEREUS ERYTHROCEPHALUS
 KS.
 KS Mon 195. Argentine Republic.
PILOCEREUS EXERENS KS.
 KS nat pflzf III (6a) 181; MfK 4:65; Mon 184 f 39.
Cereus exerens Linke ex Pf en 99; Web dict
 280.

Cereus virens Pf en 99:—"C. crectus simplex
 5 angu aris; sinibus acutis, tandem planis; costis
 rotundatis; areolis subremotis, tulvis, vix
 prominentibus, lanuginosis; aculeis 4-5 subulatis
 fulvis brevissimis deorsum spectantibus,
 centrali 1 horizontali fusco rigido."
 Foerster 387. S 47. Lab 359 (non DC).
Cereus affinis Hort Berol, Pf en 99.
Cereus warmingii K S F1 Br 204.
Cereus articulatus Hort non Pfeiffer.
Cereus tilophorus Pf AGZ 3:380; en 100.
Cereus sublanatus S 333; Pf en 100; Lab 360.
 Foerster handb cact 401, ed 2, 687.
Pilocereus Houlettianus Lem non houletii.
Pilocereus oligogonus Foerster cat Sencke;
 handb cact ed 2, 677. Lem rev hort 1862, 428.
Pilocereus virens Lem III hort 1866, misc 20.
 Mathss MfK 2:39 f.

We quote Schumann in above synonymy who
 calls it a Brazilian, while Pfeiffer says Mexico!

PILOCEREUS FIMBRIATUS Lem.
PILOCEREUS FULVICEPS Web.
 KS Mon 176.

Pilocereus Hoppenstedtii Web in part fide KS.
 Tehuacan, Puebla, Mexico.

PILOCEREUS GOUNELLEI Web.
PILOCEREUS HERMENTIANUS L-C.
 Lem et Cons III hort XIII t 469.
 Foerster handb cact ed 2, 666.
 KS Mon 186.

Cereus hermentianus Monv III hort VI misc
 1850. Lem Rev hort 186, 410.

PILOCEREUS HOPPENSTEDTII Web.
 Weber in cat Pfersdorff 1864.
 Foerster handb cact ed 2, 667.
 KS MfK 4:80; Mon 177.

Cephalocereus hoppenstedtii KS nat pflzf III
 (6a) 181.

Pilocereus hogendorpii Reg in Gartenflora,
 1859, 220 (non hogendorpii).
Pilocereus lateralis Weber.

Viejo is the Mexican name for this
 unique plant, the name signifying an old
 man, while *Pilocereus Houletii* is called
 vieja—the old woman—the one bearing an
 edible fruit, the other said by the natives
 to bear no fruit. El Viejo grows
 15 to 20 feet high, rarely branching except
 from the top and bottom but of equal
 size at the top and bottom but of an enlarged
 diameter between. Ribs 19-25, ob-

tuse, intervals very shallow, the number of ribs increasing with age by bifurcation and new ones appearing above the forks. Areolae one-quarter inch apart, small, young parts bearing 30 or more slender flexuous white spines 4-9 inch long; spines at length deciduous or nearly so, the ribs often with a continuous woody ridge enclosing the areolae. Our illustration well shows the beauty of a young plant, but in no way depicts the mature growth; especially the top slightly bent, and ornamented with a mass of whitish wool which continues on one side a third of the way down—the lower portion yellow from age. States of Oaxaca and Puebla, Mexico (Orcutt 2705).



CEREUS HOPPENSTEDTI.

PILOCERUS LANUGINOSUS Rumpl.
Pilocereus lateribarbatulus Rumpl. is
Cephalocereus columna-trajani fide KS.
Pilocereus militaris Hort. is chrysolmalus.

PILOCERUS MORITZIANUS L.-C.
PILOCERUS PALMERI Engelm.

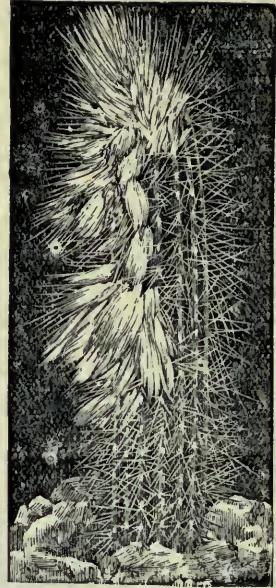
"Stems branching, 3 or 4 angled, 12-15 dm high; spines in greenish-brown bunches; fruit greenish-yellow, its areolae bearing 5-8 stout spines. Type, Palmer 70 of 1869 in hb Mo bot gard. Sonora."—Coulter, Cont Na hb 3:401.

PILOCERUS PENTAEDROPHORUS Cons.

PILOCERUS POLYGONUS KS.
PILOCERUS POLYLOPHUS S.
PILOCERUS ROYENII Rumpl.
PILOCERUS RUSSELLIANUS Rumpl.
CEREUS SARGENTIANUS Orcutt.
PILOCERUS SARGENTIANUS Orcutt
PILOCERUS SCHLUMBERGERI Web.

PILOCERUS SCHOTTII Lem.
CEREUS SCHOTTII Engelm.

Stems 8-10 from the same base, 4-10 feet high, 4-5 inches in diameter, ribs 4-7, areo-



PILOCERUS HOULETTII Lem.

line distant; spines on sterile part short, stout, 4-6 radials and 1 central; the spines on fertile part 1-4 inches long, pendulous, forming a reddish-gray beard, in which the flowers and small fruit are nearly hidden. Seeds large, with hooked cotyledons. Sonora.

Variety **AUSTRALIS** K. Brandegee.

"Stems more slender and upright than the northern forms; ribs in the fertile ends, often as many as 10; areolae smaller, and more distant, and the long spines commonly fewer and stouter; abortive spine or gland (?) below the acute base of areolae more conspicuous."—Katharine Brandegee, Zoe, 5:4.

Near Guaymas, Sonora (Orcutt).

PILOCERUS SCOPARIUS Pos.

PILOCERUS SENILIS Lem.

CEREUS SENILIIS Salm.

Is *Cephalocereus senilis* Pf.

PILOCERUS STRICTUS Rumpl.

PILOCERUS TETETZO Web.

PILOCERUS URBANIANUS KS.

Pilocereus Vellozoi Lem. is *Cephalocereus melocactus* fide KS.

PILOCERUS VERHEINEI Rumpl.

CEREUS WEBERI Coulter.

"Plant about 10 m high, with a regular candelabra form of branching (2 main branches each producing near the base 2 other branches, all ascending), branches and main stem of same diameter, angled and glaucous; areolae 3-5 cm apart; spines stout, bulbous at base; radials 10 or 11, 2-5 cm long; central solitary, 6-10 cm long, laterally compressed, sometimes a little deflexed; flowers lateral, white, 1-1

cm long; fruit 'as large as a small orange,' covered with small scales bearing axillary wool and spines. Type, Weber, material in hb Mo bot gard. 'A few miles south of Tehuacan', Puebla, Mexico."—Coulter, Cont Na hb 3:410.

PILOCEREUS SCOPARIUS Pos.

"A. borescens ramosus 20-25 pedes altus, trunci diametro 2-3 pollicari. Ramis junioribus nondum florentes 12-15 costati, costis obtusis crenulatis, areolis 8-12 lin. inter se distantibus nudis subprominentibus, aculeis radiantibus 5, centrali uno valido pollicari. Ramise iores flores producentes tenuiores 20-25 costati, costis humilioribus obtusioribus et multo magis confertis, areolis confertissimis, aculeis exterioribus 5-7; 10-12 lin. longis setiformibus brunneis, centrali uno. Flores rari-simi parvi subcampanulati rubicundi. Prope la Soledad.—AGZ 1853, 126.

Subgenus **ECHINOCEREUS** E. "Low and usually caespitose plants, mostly with numerous oval or cylindrical heads, short flowers, green stigmas, and spiny fruit; seeds subglobose, covered with confluent tubercles; embryo straight, with very short cotyledons.

CEREUS ACIFER Otto.

Echinocereus acifer (em cact) 57.

Echinocereus durangensis Pos ex F ed 2, 799.

Variety **BREVISPINULUS** Jac.

Variety **DU ANGENSIS** Hort.

Variety **TENISSPINUS** Jac.

C. adustus E, is *pectinatus* var?

C. BLANCKII Pos AGZ 1853, 131:—

"*C. e viridi nigrescens 5-8 poll altus diametro sesquipollicari apice attenuatus, costis 8-10 verticaliter decurrentibus, areolis gibbis mammæformibus insertis, nudis, aculeis exterioribus 8-10 semipollicaribus fuscis, summis minimis, centrali uno pollicari. Prope Camargo"*

CEREUS BERLANDIERI E.

Echinocereus berlandieri Lem cact 56.

KS nat 185: Mon 256.

Stems 1½-6 inches long, an inch thick, bearing sweet-scented purple flowers 2-4 inches in diameter; a native of southern Texas and Mexico.

CEREUS BRANDEGEEI Coulter.

Caespitose, often 2 feet or more across, consisting of few to many cylindrical heads mostly 6 or 8 inches high, 1½-2 in diameter, with 8 or 9 interrupted, strongly tuberculate ribs. The young spines frequently tinged with brilliant magenta, the older spines variable in color, often of an ivory white with centrals of a deep magenta—making a very handsome color-effect. "Spines at first variegated, dark and reddish, becoming more or less ashy-black; radials 10-16, rigid, terete, radiant, mostly uniform, 8-12 mm long; centrals almost always 4, very stout and prominent, 3-4 cm long, cruciate, conspicuously angled and compressed, sometimes twist-

ed, the lowest usually the most flattened and sword-like (2-3 mm broad): flowers red, 4-5 cm long, with conspicuous woolly and spine-bearing areolae over the ovary and lower part of the calyx. Type in hb Brandegee, El Campo Allemand and San Gregorio, Baja California."—Coulter, Cont U S Nat hb 3:389 (1 Ap 1896).

This has much the same aspect as *Cereus Engelmanni*, with similar variations in the color of the spines, and bears a similar edible fruit.

CEREUS CAESPITOSUS .

CEREUS CHLORANTHUS E.

CEREUS CINERASCENS P DC.

C. CIRRHIFERUS Lsb mon 311:—

"Tige rameuse, tres-prolifere, caespitose; rameaux a 5 cotes arrondies, subtuberculees, convexes; sillons aigus; areoles rondes; 10 aiguillons extérieurs tres-ouverts, adrimés, ronds, blancs, transparents, noduleux a la base, 4 intérieurs eriges, également noduleux a la base, de memes couleurs que les autres, chamois a la base; tout contournees irregulierement. Rameaux de 5-6 et 10 cent. de long sur 3, 3 et demi de diametre; areoles espaces de 15 mm, nues ou garnies de tomentum court et rare; aiguillons extérieurs, 4 cm de long; aiguillons intérieurs, 4 et demi a 5 cm de long; tous noduleux et chamois a la base, blancs, transparents, contournees, quelques-unes contournees en forme de vrille s'appliquant sur la plant. Fleur tres-belle, grande, rouge cramolsi vif, dit-on. Mexique."

CEREUS CTENOIDES E.

CEREUS DASYACANTHUS E.

Echinocereus degandii Rebut cat.

Echinocereus dasycanthus Lem cact 57.

Plant 5-12 inches high, densely covered with numberless delicately colored spines, and bearing large showy orange yellow flowers. El Paso, Texas, and Mexico.

Variety **NEO MEXICANUS** Coulter.

"Differs in the remote areolae (1.5 cm apart), fewer spines (11 radials and 4 centrals), which are much stouter, 10-12 mm long, radiating, scarcely (if at all) pectinate, and larger seed (1.5 mm in diameter). Type. Wright 36 in hb Mo bot gard. Southeastern New Mexico."—Coulter, Cont Na hb 3:384.

CEREUS DUBIUS E.

Echinocereus dubius Fed 2, 787 KS mon 276.

CEREUS EHRENBERGI Pfeiffer.

Suberect, flaccid, green; 6 obtuse repand-tuberculate ribs, areolae subremote, with short white wool; 8-10 radial spines, 4 longer erect centrals, all slender, rigid, light yellow. Real del Monte, Mexico.—Pf AGZ 1840, 282.

CEREUS ENGELMANNI Parry.

Engelmann's cushion cactus. Heads several (sometimes, though rarely, a hundred,) 4 to 12 inches high, cylindrical or ovate, with 11 to 13 ribs bearing bunches of about 13 pale radiating spines, and about 4 darker (yellow,

brown or black), stout and angular, straight or curved central spines, 1 to 3 inches long. Flowers very numerous, bright magenta, often $\frac{1}{2}$ inches across, followed by delicious fruits, with much the same flavor of a strawberry, red, pulpy, filled with black seeds. Utah, California, Baja California and Arizona.

CEREUS ENNEACANTHUS E.

CEREUS FENDLERI E.

Bot mag t 6533; Weber dict 278.

Echinocereus fendleri F ed 2, 801.

A queer irregular caespitose plant of Arizona, New Mexico and Sonora, rarely more than 12 heads in a cluster, stems 3-4 inches in diameter and about 6 inches high, distinguished by the one usually black central spine, which often curves upward. Flowers magenta colored.

CEREUS GLOMERATUS E., is *C. Maritimus* Jones.

CEREUS KNIPPELIANUS Orcutt.

Echinocereus knippelianus Liebn.

Mfk 5:159, 170; KS mon 223 f 47.

E. liebnerianus 'Carp' Balt cact jour 2:262.

CEREUS LEONENSIS Orcutt.

Echinocereus leonensis Mats.

CEREUS LONGISETUS E.

Echinocereus longisetus Lem cact 57.

Is viridiflorus fide Orcutt rev 32.

CEREUS MAMILLATUS Hge.

CEREUS MARGINATUS DC.

"Stem simple or branching at apex, erect, dark green, 5-7.5 cm in diameter, ribs 5-7, obtuse, with acute intervals, woolly through the whole length on account of the central areolae; spines 7-9, short (4-6 mm) and conical, rigid, grayish (younger ones purplish-black, the central scarcely distinct from the rest); flower brownish purple, slender-tubular, 3-5 cm long; fruit globular and spiny. Type unknown. From San Luis Potosi southwest throughout Mexico. The stem is often covered with a woody crust, and the woolly confluent areolae are often double. It is said to be frequently used for hedges in southern Mexico."—Coulter, Cont Na hb 3:389. *Cereus gemmatus* Zuce ex Pfr Enum 96.

CEREUS MARITIMUS M. E. Jones.

"Caespitose, heads 5-20 in a bunch, which is often 2-3 feet in diameter and a foot high; each plant cylindrical, obovate or in small specimens a most round, $\frac{1}{2}$ -4 inches long, three-fourths to $\frac{1}{2}$ wide; principal spines 4, straight, angled and somewhat twisted at base, $1\frac{1}{2}$ inches long, beneath these are 8-10 very short spines which are either straight or hooked; spines light brown, except when young, then red at base, springing from a very short but copious wool; flowers light yellow, about $\frac{1}{2}$ inches long and wide; perals obconiculate or obovate, rounded, margin irregular; ovary obovate, sessile or short stalked, covered with bunches of white or yellow, often hooked, short spines and crisped wool; fruit not mature. Encenada, Baja Cali-

fornia."—Jones, Am naturalist 17:973 (S 1883).

Cereus glomeratus et flaviflorus E. C. sanborgianus? *C. maritimus* Coulter, in part.

CEREUS MOJAVENSIS Engelm.

CEREUS PACIFICUS E.

Cereus phoeniceus var. *pacificus* Engelm, MS.

"Plant caespitose, 1-4 feet in diameter, few to 500 short stems (6-9 inches long and 2-2 $\frac{1}{2}$ inches in diameter) in each, forming dense oval cushions; stems with 10-12 obtuse ribs, shallow intervals, and an equal number of internal ligneous fibers; radial spines 1-12 and of an average length of one-fourth inch, the 4 central spines larger, three-fourths to 1 inch long, slender, white; flower an inch across, including the ovary $\frac{1}{2}$ inches long, the oblong spatulate sepals bright red with a broad purplish mid vein; ovary and fruit with 25-30 spiny areolae; fruit fleshy with numerous small seed; stamens slender, as long as sepals; anthers small, red; style three-fourths inch long, stigmata 6-8, greenish."—Or W 2:46 (Je 1886).

Type locality. near Todos Santos bay, Lower California.

CEREUS PECTINATUS E.

Variety **CENTRALIS** Coulter.

"Plant 6-8 cm high; centrals usually 4, the lowest very short (3-4 mm) and correct, the upper 2 or 3 as long as the radials (sometimes longer), and recurved upward. Type, Wilcox of 1894 in Na hb. Arizona, near Fort Huachaca."—Coulter, Cont Na hb 3:386.

CEREUS POLYACANTHUS Engelm.

Echinocereus polyacanthus F ed 2, 790 f.

Cereus leeanus Hooker bot mag t 4417; Hems 543; Weber dict 278.

Echinocereus leeanus Lem cact 57; F ed 2, 828.

Cereus multicoctatus Cels cat.

Cereus pleigonus Lab mon 317.

CEREUS POSELGERIANUS A. Lke.

Echinocereus poselgerianus A Lke AGZ 1857, 239; F ed 2, 773; KS nat 185: mon 257 (non pos-ri).

CEREUS PROCUMBENS E.

CEREUS RIGIDISSIMUS Engelm.

Cereus pectinatus, var? *rigidissimus* E Am ac pr 3:279; Mexican boundary R, 31; collected writings 136, 195.

Echinocereus candicans of catalogs.

The Rainbow Cacti of Southern Arizona and Sonora is noted for the beautiful and varied coloring of the all radiating and interlocking, extremely rigid and acute spines, the latest ones of each season being rose-colored, and the earliest ones a pale yellowish, thus forming variegated rings around the stems. Flowers 2 $\frac{1}{2}$ -3 inches high, 2 or 3 in diameter.

CEREUS ROEMERI E.

CEREUS ROEMERI E.

CEREUS STRAMINEUS Engelm.

CEREUS SUBINERMIS Hem.**CEREUS VIRIDIFLORUS** Engelm.

The Green-flowered Cereus of the Rocky Mountains is especially beautiful on account of the red, purple and white spines with which the plant is covered. Flowers numerous, quite large and showy, light-yellowish-green, very hardy and easily grown.

Genus **CLEISTOCACTUS** Lemaire.

C. baumanni Lem in Ill Hort viii Misc 35; Cact 59, based on *Cereus tweedii* Bot Mag t 493.

C. coubrinus Lem in Ill Hort viii Misc 35; Cact 60, is *Cereus coubrinus*.

C. rhocacanthus Lem in Ill Hort viii Misc 35; Cact 61; is *Echinopsis rhodacantha*.

Genus **CONSOLEA** Lemaire.

C. catacantha Lem Rev Hort (1862) 174; Cact 91; is *Opuntia catacantha*.

C. ferox Lem Rev Hort (1862) 174; Cact 91; is *Opuntia ferox*.

C. leucacantha Lem Rev Hort (1862) 174; Cact 91; is *Opuntia leucacantha*.

C. rubescens Lem, Rev Hort ix Misc 26 (18 2); Cact 90; is *Opuntia rubescens*.

C. spinosissima Lem, Rev Hort ix Misc 62; Cact 91; is *Opuntia spinosissima*.

Genus **CORYPHANTHA** Lemaire.

Based on the subgenus *Coryphantha* Engelm. of *Mammillaria*, and 24 species and one variety named, without descriptions, in *Les Cactees*, 34-35. *C. acanthosternis*, *aulacohela*, *carinata*, *clava*, *cornifera*, *elephantides*, *electa*, *Lehmanni*, *loricata*, *macromeris*, *ottobis*, *pycnacantha*, *raphidacantha*, *scheeri*, *schlechtendalii*, and *sulcolanata* are presumably based on species of *Mammillaria* of the same names. *C. daimonoceras* is probably a scolymoides *C. conspicua*, Engelm. *glandulifera*, *hetromorpha*, *Hookeri*, and *subarata* are nomina nuda. *C. bromamma*, *exsulans*, *impexcoma*, and *Nuttallii* are names credited to Lemaire in Foester (Handb ed 2). *C. ancistrocantha* is named by Lemaire as a variety of *raphidacantha*. *C. glandulifera* and *heterophylla* Lem. in *Index Kewensis*, are evident y errors.

Genus **ECHINOCACTUS** Link & Otto.

"Flowers about as long as wide. Ovary covered with sepoid scales naked or woolly in their axils. Fruit succulent or sometimes dry covered with persistent calyx-scales, sometimes enveloped in copious wool, and usually crowned with the persistent remnants of the flower. Seed obliquely obovate, black. Embryo curved over the small albumen cotyledons parallel to the sides of the seed.—Mostly large, sometimes gigantic, globose or depressed, or ovate, or rarely subcylindric, simple or very rarely cespitose; bunches of spines on the more or less vertical ribs. Flowers contiguous to and above the spines, on the latest growth of the plant, often from the nascent woolly areolae and therefore more or less vertical, open only in sunlight."—E.

Echinocactus acutangulus Zucc, is corynodes.

E. abrocentrus Steibn. ?

E. ACANTHION Salm-Dyck.

"Caulis globoso læte viridi, costis numerosissimis (35-40) valde compressis parum undulatis ad pulvillos inflatis, pulvillis conertis junioribus albedo-velutinis, aculeis superioribus 3 appianatis intermedio validissimo, cum centralibus 2 subulatis bifarie patentibus, basi stramineis superne fulvido-brunneis, inferioribus 8 multo gracilioribus patentibus albidis. Caulis robustus, validus, diametro quadripollicari et ultra, aculeis tectus pollicem ad sesquipollicem longis. Unica hucusque species est in hacce Sectione aculeis centralibus duobus Flores ignoti." HD ed 2, 161, 31.

ECHINOCACTUS ACUTISSIMUS O-D.

ECHINOCACTUS ALBATUS Dietr.

ECHINOCACTUS ALTEOLENS KS.

ECHINOCACTUS AMBIGUUS Hildm.

ECHINOCACTUS ANFRACTUOSUS Mart.

ECHINOCACTUS ARRIGENS L-O.

ECHINOCACTUS ASTERIAS Zucc.

Is *Astrophytum mylosigma*.

ECHINOCACTUS BEGUINII Web.

ECHINOCACTUS BICOLOR Gal.

Near San Luis Potosi, Mexico.

Variety **SCHOTTII** Engelm.

Echinocactus bolansis Runge, is bicolor.

ECHINOCACTUS BREVIHAMATUS E.

ECHINOCACTUS CALIFORNICUS Mon.

ECHINOCACTUS CAPRICORNUS Dietr.

ECHINOCACTUS CASTANEO-DES Cels.

Echinocactus castanensis Hort, is bicolor.

ECHINOCACTUS CENTETERIUS Lem.

ECHINOCACTUS CERATITES Otto.

ECHINOCACTUS CHILENSIS Hildm.

ECHINOCACTUS CHRYSACANTHION KS.

ECHINOCACTUS CHRYSACANTHUS O.

Globose to cylindrical, with about 18 ribs and 10 flexuous annulated central spines 2 inches long, and 4 to many slender white radial spines. Flowers satiny yellow, more rarely crimson. Cedros Island.

ECHINOCACTUS CONCINNUS Monv.

ECHINOCACTUS COPTONOGONUS Lm.

Near San Luis Potosi, Mexico.

Variety **MAJOR** Salm-Dyck.

ECHINOCACTUS CORNIGERUS DC.

Near San Luis Potosi, Mexico.

ECHINOCACTUS CORYNODES Otto.

State of Rio Grande do Sul, Brasil.

ECHINOCACTUS COXII KS.

ECHINOCACTUS CRISPATUS DC.

ECHINOCACTUS CUMINGII Hopff.

Bolivia, South America.

ECHINOCACTUS CURVISPINUS Colla.

ECHINOCACTUS CYLINDRACEUS E.

ECHINOCACTUS DENUDATUS L-O.

ECHINOCACTUS DICHROACANTHUS Mart.

ECHINOCACTUS DURANGENSIS Rge.

ECHINOCACTUS EBENACANTHIUS
Monv.

ECHINOCACTUS ECHIDNA P D-C.

ECHINOCACTUS ECHINOIDES Lem.
Bolivia, South America.

ECHINOCACTUS EHRENBERGII Pf.

ECHINOCACTUS ELECTRACANTHUS
Lem.

Echinocactus ellipticus Lem, is bicolor.

ECHINOCACTUS EMORYI Engelm.

Cylindrical, rarely exceeding 2 feet in diameter and 6 feet in height; ribs sharp, usually tuberculate and 21 in number; radials 5 or more, usually 8, stout, annulated, terete, reddish, yellowish, white or ash, commonly straight or curved inward, 1-2 inches long; the 1 central straight or more or less curved downward, 2-3 inches long, otherwise like the radials.

Gila Bend, Arizona, southward to near Guaymas, Sonora (Orcutt 2578, 2605).

Echinocactus equitans Scheldw, is horizontalis.

ECHINOCACTUS ERECTOCENTRUS C.

ECHINOCACTUS ERINA EUS Lem.

State of Rio Grande do Sul, Brasil.

ECHINOCACTUS EXCULPTUS Otto.

ECHINOCACTUS FALCONERI Orcutt.

Plant cylindrical in age, 9-12 inches in diameter, usually under 2 feet high, light apple green in color, with a withered appearance (perhaps not normal); ribs tuberculate, acute, spirally inclined (hence called caracola, "snail", or biznaga caracola), usually 13, to rarely 17, intervals narrow and deep; radial spines 10 or less, grayish white, flattened, flexuous, 1-2½ inches long and laterally disposed; central spines 7, stout, strongly annulated, reddish brown, the 3 upper and 3 lower of about equal length, divergent, 1-3 inches long, terete or slightly angled, straight; the longest central erect, straight, flattened or channelled above, ¼ inch broad or less, varying from 1 to 6 inches in length sometimes on the same plant, uniformly about ½ inch at the tip turned downward at right angles with the main portion of the spine, forming a short hook. Named in honor of William Falconer. Type, Orcutt, No. 2603:—Batamotal, Sonora, Mexico.

Flower and fruit will be described later, but resemble those of E. Wislizeni, with which the plant has perhaps hitherto been confounded.

ECHINOCACTUS FLAVOVIRENS
Scheldw.

Tehuacan, Puebla, Mexico.

ECHINOCACTUS FORDII Orcutt.

Globose, 6 inches or more in diameter, with about 18 tuberculated narrow ribs closely set with clusters of stout ash gray spines. 4 central, annulated, the longest 1¼ inches long, and hooked; 2 slender spines above with about 14 divergent radials; lower an inch across, about 2 rose purple areoles in 2 series, 9 greenish stigmata, style tinged with red, filaments red at top and yellow at base, anthers orange yellow. Near Lagoan Head, Baja California. Named for

Lyman M. Ford, of San Diego, who has taken a great interest in cacti. Apparently the same plant was distributed in 1894, from near San Quintin bay, as a form of E. peninsularis.—Orcutt Rev 81; 56 (nomen).

ECHINOCACTUS GIBBOSUS P DC.
Argentine Republic.

ECHINOCACTUS GLADIATUS S.

ECHINOCACTUS GLAUCUS KS.

ECHINOCACTUS GEISSEI Pos.

ECHINOCACTUS GRANDICORNIS
Lem.

ECHINOCACTUS GRUSONII Hildm.

ECHINOCACTUS HAEMATACANTHUS
Monv.

Tehuacan, Puebla, Mexico.

ECHINOCACTUS HASELBERGII F
Hge sr.

Brazil, South America.

ECHINOCACTUS HASTATUS Hpfrr.

ECHINOCACTUS HAYNEI Otto.

ECHINOCACTUS HETEROCHROMUS
Web.

ECHINOCACTUS HEXAEDROPHO-
RUS Lem.

Near San Luis Potosi, Mexico.

ECHINOCACTUS HILCENSIS Hildm.

ECHINOCACTUS HORIZONTALIUS Lem

Near San Luis Potosi, Mexico.

ECHINOCACTUS HORRIFILUS Lem.

ECHINOCACTUS HUMILIS R A Phil.

ECHINOCACTUS HYPTIACANTHUS
Lem.

ECHINOCACTUS INGENS Zucc.

Plant 2-5 feet high, 1-2 in diameter, simple, or occasionally wolloferous, forming enormous masses as much as 10 feet in diameter! Ribs 25-32, of en bifurcate, acute, tuberculate-interrupted, areolae 1 inch long, an inch apart, or, in old plants, forming a continuous woolly ridge along the ribs, the depressed top densely tomentose, enveloping the flowers and fruit. Spines all stout, annulated, straight, the 4 central of nearly equal length, 1¼ inch long, divergent, the radials three-fourths inch long or less, 3-4 above and 3 below the central—sometimes 2 or more additional radials, laterally disposed. Flower 2 inches across, 1 and three-fourths long; petals about 20, acute, ¼ inch broad, canary yellow, tipped with a tinge of rose; about 30 long narrow acute sepals and scales on the ovary with woolly axils. Anthers, filaments and style rich orange yellow; stigmata 7, ¼ inch long, spreading, style three-fourths inch long; anthers small, filaments short. Flowers deeply imbedded in the dense copious wool an inch long that fills the depressed top of the plant. Plant dark apple green, young plants especially decorated with broad horizontal bands of maroon on the ribs, zebra-like or the areolae on the ribs margined with bands of maroon. This is one of the largest of the biznaga plants, used in making 'dulces.' State of Puebla, Mexico (Orcutt 237). Carloads of these plants are said to be annually used in the native confectionery shops.

Mrs. Anna B. Nickels mentions a single plant sent to Europe that weighed four tons! Dr. C. C. Parry cites the woolly or silk-like substance produced so abundantly at its depressed summit, as col-

lected and employed for stuffing pillows, and Don Louis Eschavz'er complains of having had to pierce spines cut of beds made of this material. Ribs said to vary from 20 to 50 in number. Greatest recorded height 9 feet, diameter $9\frac{1}{2}$ feet.

ECHINOCACTUS INTERTEXTUS Em.

ECHINOCACTUS JOHNSONII Engelm.

Johnson's hedgehog cactus was named for J. E. Johnson, an early Mormon naturalist, who discovered it about S.

George in southern Utah. It is a rare and handsome plant, 4 to 7 inches high, oval, 3 to 5 inches in diameter, densely covered with stout reddish-gray spines—turning deep red when wet. The flower is about $2\frac{1}{4}$ inches broad, of a rose purple normally, but some plants which opened their flowers while packed in a box away from the light leave light yellowish-green petals marked with deep maroon at base. Anthers pale primrose yellow; filaments $\frac{1}{2}$ inch long, the inner ones white, outer ones reddish. Growing in out-of-the-way desert places in Nevada, Arizona, and California, it costs much trouble to secure this beautiful species.

ECHINOCACTUS JUSSIEUI Monv.

ECHINOCACTUS KRAUSEI Hildm.

ECHINOCACTUS KUNZEI F.

ECHINOCACTUS LAMELLOSUM Dietr.

ECHINOCACTUS LECONTEI Engelm.

Plant 3-4 feet high, about one-third that in diameter, clavate; flower 2 inches long, lemon yellow. Type locality on the lower parts of the Gila and Colorado rivers, and in Sonora. The Mohave and Colorado Desert plants, usually referred to this species, seem to me distinct. This now seems to me distinct from either *E. Wislizeni* or *E. cylindraceus*.

Our colored portrait fairly well represents a young plant from Arizona, but does not show the distinguishing characteristics.

ECHINOCACTUS LENINGHAUSII KS.
Brazil, South America.

ECHINOCACTUS LEUCACANTHUS
Zucc.

ECHINOCACTUS LIMITUS Engelm.

ECHINOCACTUS LONGIHAMATUS Gal.

ECHINOCACTUS LOPHOTHELE S.

ECHINOCACTUS McDOWELLII Rebut.

ECHINOCACTUS MACRODISCUS Mart.
Near San Luis Potosi, Mexico.

ECHINOCACTUS MALLETIANUS Lem.

ECHINOCACTUS MARGINATUS S.
Bolivia, South America.

ECHINOCACTUS MATHESONII Berge.

ECHINOCACTUS MEGALOTHELOS
Selcke.

Paraguay Republic, South America.

ECHINOCACTUS MONVILLEI Lem.

Paraguay Republic, South America.

ECHINOCACTUS MICROMERIS Weber.
Weber, Bios dict 804. K Br Zoe 5:5.
Mammillaria micromeris E. Epithelantha micromeris Weber.

ECHINOCACTUS MICROSPERMUS
Web.

Argentine Republic.

ECHINOCACTUS MINUSCULUS Web.

Argentine Republic.

ECHINOCACTUS MITIS R A Phil.

ECHINOCACTUS MULTICOSTATUS
Hildm.

ECHINOCACTUS MULTIFLORUS Hook

ECHINOCACTUS MURICATUS Otto.

Brazil, South America.

ECHINOCACTUS MUTABILIS F.

Peru, South America.

ECHINOCACTUS NAPINUS R A Phil.

ECHINOCACTUS NETRELIANUS
Monv.

ECHINOCACTUS NIGRICANS D'ér.

ECHINOCACTUS OBVALLATUS P DC.

ECHINOCACTUS OCCULTUS R A Phil.
Chile, South America.

ECHINOCACTUS ODIERI Lem.

ECHINOCACTUS OLIGACANTHUS S.

ECHINOCACTUS ORCUTTII Engelm.

"Heads cylindrical, 10-18 inches in bulging in the middle, growing single or amer and 2-3½ feet high, sometimes often caespitose, more rarely proliferous at base, with 13 when young, to usually 20 or 22 obtuse tuberculate ribs and a woolly, spineless, depressed top; spines stout, reddish, straight or recurved, all annulate, usually 9 radiating and 4 stouter central ones; flowers deep dull crimson with greenish or lighter colored margins to the petals, 2 inches long, otherwise as in *E. viridescens*; stigma green, 16-20; fruit pulpy, crimson, scaly, with numerous small seeds"—Or W 2 :46 (Je 1886).

Type locality: Palm valley, Lower California.

ECHINOCACTUS ORNATUS P DC.

ECHINOCACTUS OTTONIS L O.

Brazil, South America.

ECHINOCACTUS PAMPEANUS Speg-
azz.

ECHINOCACTUS PAPYRACANTHUS E.

ECHINOCACTUS PARRYI E.

ECHINOCACTUS PENINSULAE Eng.

Globose to cylindrical, rarely over 18 inches in diameter, rarely attaining a height of 8 feet; the 12-21 compressed tuberculated ribs set with clusters of dull red spines; centra 7, stout, the stoutest not rarely 4-6 inches long and $\frac{1}{4}$ inch broad hooked.

ECHINOCACTUS PENTACANTHUS
Lem.

Near San Luis Potosi, Mexico.

ECHINOCACTUS PEPINIANUS Lem.

ECHINOCACTUS PFEIFFERI Zucc.

ECHINOCACTUS PHILIPPII KS.

ECHINOCACTUS PHYLLACANTHUS
Mart.

ECHINOCACTUS PHYMATOTHELOS
Pos.

ECHINOCACTUS PILOSUS Gal.

Near San Luis Potosi, Mexico.

ECHINOCACTUS PLACENTIFORMIS Ks.**ECHINOCACTUS POLYANCISTRUS** Eb

The Hermit cactus, so-called because it is rare to find more than one in a place, is a strikingly beautiful cactus which I have seen only on the Mohave desert in its wild state. The largest plant I have seen is 18 inches high and 4 inches in diameter; each tubercle bears three to seven hooked, round, brownish-pink spines, with which are interspersed fewer ivory white spines, not hooked, very pleasing in contrast. Flower over 2 inches long, of equal width, petals bright magenta, green at base, filaments and stigmata green, anthers white. They were once catalogued at \$15 apiece, and are still rare in collections, unfortunately seldom long surviving transplanting from their native sands. Too much moisture soon proves fatal.

ECHINOCACTUS POLYCEPHALUS E.

Heads many from a single base, $\frac{1}{2}$ - $2\frac{1}{2}$ feet high, globose to cylindrical, ribs 13-21, acute; circular areolae bearing 8-12 stout compressed annulated curved reddish gray spines, 4-1 radial, or 4 stouter central ones; flowers enveloped in a mass of dense white wool, $1\frac{1}{2}$ inches long, petals about 30, lance-linear, yellow; about 100 rigid dark pointed setae upon the ovary, hidden in the wool, those of the tube similar and equally numerous; stigmas 8-11, linear; fruit dry, full of angular wrinkled and minutely tuberculate seeds 4 mm long. Gravelly soil on the Mohave and Colorado deserts, in California, flowering in F, fruiting in Mr.

ECHINOCACTUS POTTSII S.**ECHINOCACTUS PUMILUS** Lem.**ECHINOCACTUS RECURVUS** L.-O.

Oaxaca, Mexico.

ECHINOCACTUS RINCONADENSIS

Pos.

ECHINOCACTUS ROBUSTUS L-G.

Tehuacan, Puebla, Mexico.

ECHINOCACTUS SAGLIONIS Cels.

Argentine Republic.

ECHINOCACTUS SAUSSIERI Web.**ECHINOCACTUS SCHICKENDANTZII**

Web.

Argentine Republic.

ECHINOCACTUS SCHILINZKYANUS

F Hge jr.

Paraguay Republic, South America.

ECHINOCACTUS SCHUMANNIANUS

Nic.

Paraguay Republic, South America.

ECHINOCACTUS SCHEERII Sm-Dyk.**ECHINOCACTUS SCOPE** L-O.

Brazil, South America.

ECHINOCACTUS SELLOWII L-O.

State of Rio Grande do Sul, Brasil.

ECHINOCACTUS SENILIS R A Phil.

Chile, South America.

ECHINOCACTUS SETISPINUS E.**ECHINOCACTUS SILERI** Engelm.**ECHINOCACTUS SIMPSONI** Engelm.

Hedgehog Cactus of Colorado; the spines, ranging from white through shades of straw, yellow and brown, nearly hide the plant; flowers shell-pink to bright rose in color.

Variety **MINOR** Engelm.

Button or Snake Cactus: spines arranged in beautiful star-shaped clusters; flowers pale rose.

ECHINOCACTUS SINUATUS Dietr.**ECHINOCACTUS SMITHII** Mueh.

Near San Luis Potosi, Mexico

Echinocactus tetraclonus Lem, is Sel-
owii.**ECHINOCACTUS SUBMAMMULUS** S

Lem.

South America.

ECHINOCACTUS SUBNICER Pos.**ECHINOCACTUS TABULARIS** Cels.**ECHINOCACTUS TETRAPLUS** Otto.**ECHINOCACTUS TEXENSIS** Hoepf.

Echinocactus tricolor Hort. is bicolor.

Echinocactus tricornis Monv. is alteoens

ECHINOCACTUS TRICUSPIDATUS

Scheidw.

ECHINOCACTUS TROLLIETI Rebut.

Is unguispinus.

ECHINOCACTUS TULENSIS Pos.**ECHINOCACTUS TURBINIFORMIS** Pf.**ECHINOCACTUS UNCINATUS** Gal.**ECHINOCACTUS UNGUISPINUS** Engm**ECHINOCACTUS VILLOSIUS** Lem.**ECHINOCACTUS VIRIDESCENS** Nutt.

The Turk's Head cactus, that occurs at San Diego, California; very variable, but usually depressed, less than a foot in diameter, with strong, annulated reddish spines; 13 to 21 ribs; fruit greenish or sometimes tinged with magenta, very sour, enclosing numerous black seeds.

ECHINOCACTUS WHIPPLEI E. & B.

Whipple's hedgehog cactus is only 2 to 5 inches high, ovate-globose, characterized by seven compressed white radial spines and four broad hooked central spines. Flower $1\frac{1}{2}$ inch long, petals and filaments pale straw color, the style and seven stigmata green.

ECHINOCACTUS WILLIAMSII Lem.

Anhalonium williamsii oerster bandb 233

Lophophora williamsii et var. lewinii Coulter nat hb cont 3; 131.

The Mescal Button, or Turnip cactus, as it is sometimes called (which forms the type of Coulter's genus Lophophora) is a small spineless plant with pretty rose-colored flowers. The plant rarely exceeds 3 inches in diameter, little appearing above the surface of the ground, but when eaten it pro-



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among a hundred is but little over an inch in height and diameter, and in earlier days they were literally worth their weight in gold. The flowers are open only in sunlight.

Variety PECTINATA KS.

Genus PHYLLOCACTUS Link.

Epiphytal plants with spineless flattened leaf-like branches, with a prominent midrib, mostly with large showy flowers, from creamy white to the richest crimson and scarlet, produced from notches in the margins of the stems.

Readily produced by cuttings or seeds, the phyllocacti are established favorites, and hundreds of varieties have been produced by hybridization. Young growth often cylindrical, then triangular, finally assuming the flattened form.

PHYLLOCACTUS ACKERMANNI Walp.

The King cactus was taken from Mexico to England prior to 1829 by George Ackermann, and bears the most gorgeous flowers, 6 to 8 inches in diameter, the acutely pointed, wavy petals of a deep brilliant crimson, bordered at the base with bright magenta, the interior decorated with a mass of white filaments and antlers, the 11 stigmata and style also white. The plant blooms freely and may be seen in many San Diego gardens. The plant before me is about a foot high and bears one open flower and three buds today (May 3, 1900).

PHYLLOCACTUS ACUMINATUS KS.

State of Rio de Janeiro, Brazil.

PHYLLOCACTUS ANGULIGER Lem.

Honduras, Central America.

PHYLLOCACTUS CRENATUS Walp.

Honduras, Central America.

PHYLLOCACTUS HOOKERI S.

PHYLLOCACTUS KAMPMANNI Hort.

Kampmann's Case-knife cactus is a less robust plant than the King cactus, and the flowers are only about 3 inches in diameter, the petals broader in proportion, of a bright, but lighter, crimson. Filaments white, antlers canary yellow. This is a general favorite in San Diego gardens, also, producing its lovely flowers in the greatest profusion.

PHYLLOCACTUS LATIFRONS Walp.

The Queen cactus is quite the giant among the Phyllocacti, the stout flattened stems 4 to 5 inches broad, deeply crenated and commonly 8 to 10 feet high. The flowers are 7 to 8 inches long, about 6 inches in diameter, the petals of a delicate, clear, creamy white, the

sepals and tube of a reddish hue. Native of Mexico.

PHYLLOCACTUS PHYLLANTHOIDES Link.

PHYLLOCACTUS PHYLLANTHUS Link.

PHYLLOCACTUS RUSSELLIANUS S.

PHYLLOCACTUS STENOPETALUS S.

PHYLLOCACTUS STRICTUS Lem.

PHYLLOCACTUS THOMASIANUS KS.

PHYLLOCACTUS WRAYI Hort.

Genus PILOCEREUS Lemaire.

Included under the genus Cereus.

Tribe OPUNTIEAE.

Calyx tube not extending beyond the ovary; stems branched and jointed.

Genus HARIOTA Adans.

Adans Fam 2:243 (1763).

This genus is generally treated as a synonym of Rhipsalis, to which we refer all the species. Schumann maintains the genus as defined by De Candolle.

H. alternata Lem Hort Univ i t 50, is *R. paradoxa*.

H. cassytha Cels ex Foerst Handb 458, is *R. cassytha*.

H. cribrata Lem III Hort iv Misc 12 (1857), is *R. saglionis*?

H. floccosa Cels, ex Foerst Handb 458, is *R. floccosa*.

H. funalis Cels, ex Foerst Handb 457, is *R. funalis*.

H. mesembrianthemoides Lem Cact Aliq Nov Desc 39, is *R. mesembrianthemoides*.

H. pentaptera Lem ex Foerst Handb 453, is *R. pentaptera*.

H. prismatica Lem III Hort x Misc 84 (1863), is *R. tetragona*?

H. saglionis Lem Cact Aliq Nov Desc 39, is *R. saglionis*.

HARIOTA SALICORNIODES DC.

Rhipsalis salicornioides Haworth, of Brazil.

Variety BAMBUSOIDES Weber.

HARIOTA VILLIGERA KS.

KS Fl Br 266: S Paulo, Brazil.

H. clavata Web U S, is *R. clavata*.

Genus RHIPSALIS Gaertn.

RHIPSALIS CASSYTHA Gaertn.

RHIPSALIS SALICORNIODES Haw.

Schlumbergera epiphyllodes Lem, is *Phyllocactus russellianus*.

Stromatocactus Kotschubeyi Karw, is *Anhalonium sulcatum* S.

Tephrocactus andicolus Lem, is *Opuntia andicola*.

Tephrocactus aoracanthus Lem, is *Opuntia andicola* Pf.

Tephrocactus diadematus Lem, is *Opuntia diademata*.

Tephrocactus platyacanthus Lem, is *Opuntia platyacantha*.

Zygocactus Altenstemii KS, is *Epiphyllum truncatum* fide KS.

Genus PFEIFFERA Salm.

PFEIFFERA CEREIFORMIS Salm.

A synonym of *Rhipsalis cereiformis*.



Genus MAIHUENIA Phil.
M. POEPPIGII Weber.
M. BRACHYDELPHYS KS.
M. PHILIPPII Weber.

PTEROCACTUS KUNTZEI KS.

Rebutia minuscula KS, is *Echinocactus minusculus*.

Genus **PERESKIA** Plum.

PERESKIA ACULEATA Mill.

The Barbadoes gooseberry or Blad-apple; the leaves resemble those of the orange; much used for grafting purposes. West Indies.

PERESKIA BLEO P DC.

PERESKIA LYCHNIDIFLORA P DC.

PERESKIA PANAMENSIS Web.

PERESKIA TAMPICANA Web.

Genus **NOPALEA** Salm.

Erect, branching plants, with flattened elongated joints; flowers red or crimson, petals erect and slightly approaching each other at the apex, stamens longer than the corolla.

NOPALEA AUBERI Salm-Dyck.

Cuba; rapid growth; arborescent in form, and bearing numerous rose-colored flowers with exsert stamens; the branches armed with stout spines; readily grown from cuttings.

NOPALEA COCCINELLIFERA Salm.

The cochineal cactus, a native of Mexico.

NOPALEA DEJECTA Salm.

Salm-Dyck, Hort Dyck ed 2, 64, 233. Cuba.

NOPALEA KARWINSKIANA S.

NOPALEA MONILIFORMIS KS.

Genus **OPUNTIA** Tournefort.

"Tube of the flower very short, cup-shaped; petals spreading or rarely erect; ovary with bristle-bearing areolae in the axils of small terete deciduous sepals; berry succulent or sometimes dry, marked with bristly or spiny areolae, truncate with a wide umbilicus; seeds large, white, compressed, with the embryo coiled round the albumen; cotyledons large, foliaceous.—Articulated, much-branched plants, of various shapes, low and prostrate or erect and shrub-like; young branches with small terete subulate early deciduous leaves, and in their axils an areola with numerous short easily detached bristles, and, usually, stouter spines, all barbed. Flowers on the joints of the previous year, on the same areolae with the spines, mostly large, open only in sunlight. Fruit often edible, often large."—E.

Opuntia auberi Pf, is *Nopalea auberi*.

Opuntia camuessa Web, is *robusta*.

Opuntia decumana Gris, is *monacantha*.

Opuntia flavicans Lem, is *robusta*.

Opuntia maxima Hort (non Web), is *robusta*.

Opuntia stenopetala E, is *glaucescens*.

Subgenus **CYLINDROPUNTIA** E.—
"Joints cylindrical, more or less tubercu-

lated; rhaps usually not prominent, therefore seed not margined; embryo forming less than one circle around the more copious albumen; cotyledons inconstant, contrary, oblique, or parallel to the sides of the seed."—E.

OPUNTIA ACANTHOCARPA E. & B.

"Arborescens; ramis alternis adscendentibus; articulis cylindricis; tuberculis elongatis; aculeis 8-25 stellato-divaricatis; bacca subglobosa tuberculata aculeata; seminibus multangularis. Mountains of Cactus Pass, between Santa Fe and the western Colorado. Stems 5-6° high; branches few, alternate, and separating from the stem at an acute angle. Joints as in [*O. arborescens*] 4-6 or 8' long, about an inch in diameter; tubercles 9-19 lines long; interior spines 1-1¼', exterior ones 4-10 lines long. Spines of fruit on the depressed tubercles 3-6 lin. long. Seeds large, unlike those of any other *Opuntia* seen by me."—E syn 308.

O. californica E Emory's rep 157 f 11.

OPUNTIA ALCAHES Web.

OPUNTIA ANDICOLA Pfeiffer.

OPUNTIA AORACANTHA Lem.

OPUNTIA ARBORESCENS Engelm.

"Caule ligneo erecto, ramis horizontalibus, ramulis cylindricis, tuberculatis, aculeatissimis; areolis oblongis, brevissime tomentosus, aculeos 12-30 corneos stramineo-vaginato teretes undique porrectos gerentibus; ramulis versus apicem floriferis; ovario tuberculato, tuberculis sub-20 apice sepala subulata et areolas tomentosas cum setis paucis albidis gerentibus; sepalis interioribus 10-13 obovatis; petalis obovatis, obtusis s. e marginatis; stigmatibus sub-8 patulis; bacca flavo-sicca, ovato-globosa, tuberculata, profunde umbilicata. Mountains of New Mexico to Chihuahua, Parras and Saltillo; flowers in May and June; fruit, at least about Santa Fe, ripening the 2nd year (Fendler); in the north 5-10, south 20 and more feet high, 5-10' in diam, last branches 2-4' long; spines of the specimens on Waggon-mound 20-30 in each bunch; further south only 12-20, gener-

ally fewer on the under side of the branchlets; spines horn-colored, with straw-colored loose sheaths, from 3-10 lines, generally about 6 lines long. Flowers purple, 3' in diam; stamens red; fruit about 1' long, yellow.

'On Waggon-mound the first (flowerless) specimens of a strange *Opuntia* were found, with an erect, ligneous stem, and cylindrical, horridly spinous horizontal branches. The plant was here only 5 ft high, but grows about Santa Fe to the height of 8 or 10 ft, and continues to be found as far as Chihuahua and Parras. In the latter more favorable climate it grows to be a tree of 20 or 30, and perhaps even 40 feet high, as Dr. Wislizenus informs me, and offers a most beautiful aspect when covered with its large red flowers. It is evidently the plant which Torrey and James doubtfully, though incorrectly, refer to *Cactus Bleo* HBK. It is nearly allied to *Opuntia furiosa*, Willd. but well distinguished from it; * * * the tree cactus, or *Foconoztle*, as called by the Mexicans, according to Dr. Gregg. The stems of the dead plant present a most singular appearance; the soft parts having rotted away, a net-work of woody fibres remains, forming a hollow tube, with very regular rhombic meshes, which correspond with the tubercles of the living plant."—E Wislizenus' report, 90.

OPUNTIA ARBUSCULA E.
OPUNTIA AUSTRALIS Web.
OPUNTIA BERNARDINA Engelm.
OPUNTIA BIGELOVII Engelm.

"*Ramis erectis ascendentes; articulis ovato-cylindricis pallide virescentibus congestis; tuberculis subhemisphaericis depressis confertis: aculeis 6-10 robustioribus et totidem gracilioribus inferioribus; ovario tuberculato; bacca tuberculata subinda (sterili!) aculeolata; seminibus parvis.*

"On William's river of the Californian Colorado. Stem 3-4' thick and 10-12 ft

high, the branches forming a dense contracted head, with joints 2-6' long; tubercles 3-4 lines long; larger spines are about 1' long, smaller ones 4-7 lines long."—E Am ac pr 3:307.

OPUNTIA BRACHYARTHRA E. & B.
OPUNTIA BULBISPINA E.
OPUNTIA CEREFORMIS Web.
OPUNTIA CHOLLA Web.
OPUNTIA CIRIBE E.
OPUNTIA CLAVARIOIDES L-O.
OPUNTIA CLAVATA E.
OPUNTIA CORRUGATA S.
OPUNTIA CURASSAVICA Mill.
OPUNTIA CYLINDRICA DC.
OPUNTIA DARWINII Hensl.
OPUNTIA DAVISII E. & B.
OPUNTIA DIADEMATA Lem.
OPUNTIA ECHINOCARPA E. & B.
OPUNTIA EMORYI Engelm.
OPUNTIA FLOCCOSA S.
OPUNTIA FRAGILIS Haw.
OPUNTIA FULGIDA Engelm.
OPUNTIA GEISSEI R A Phil.
OPUNTIA GRAHAMII Engelm.
OPUNTIA GRATA R A Phil.
OPUNTIA IMBRICATA P DC.
OPUNTIA INVICTA Brandegee.
OPUNTIA KLEINIAE P DC.
OPUNTIA LEONINA H-S.
OPUNTIA LEPTOCAULIS D C.
OPUNTIA LURIDA Hort.
OPUNTIA MAMILLATA Schct.
OPUNTIA MIQUELII Monv.
OPUNTIA MOLESTA Brandegee.
OPUNTIA NIGRISPINA KS.
OPUNTIA OVATA P.
OPUNTIA PARISHII Orcutt.
OPUNTIA PARRYI E.
OPUNTIA PENTLANDII S.
OPUNTIA PLATYACANTHA S.
OPUNTIA PROLIFERA Engelm.
OPUNTIA PULCHELLA E.
OPUNTIA PYCNACANTHA E.
Opuntia ramosissima E, is tessellata.
OPUNTIA ROSEA DC.
OPUNTIA ROSIFLORA KS.
OPUNTIA ROTUNDIFOLIA KS.
OPUNTIA SALMIANA Parm.
OPUNTIA SCHICKENDANTZII Web.
OPUNTIA SCHOTTII E.
OPUNTIA SERPENTINA Engelm.
OPUNTIA SPERGAZZINII Web.
OPUNTIA SPINOSISSIMA Mill.
OPUNTIA STAPELIAE P DC.
OPUNTIA SUBULATA Engelm.
OPUNTIA TARAPACANA R A Phil.
OPUNTIA TERES Cels.
OPUNTIA TESAJO Engelm.
"With very short woody stem, and growing in little clumps 3 dm or less in diameter; joints slender and not distinctly tuberculate; flowers simple, bell-shaped, yellow. Type, Gabb 26 in hb Mo bot gard. 'Among rocks, especially toward the west coast and in the more central portions', Lower California."—Coulter, Cont Na hb 3-448.
OPUNTIA TESSELLATA Engelm.
OPUNTIA THURBERI E.
OPUNTIA TUNICATA L-O.
OPUNTIA VERSCHAFFELTII Cels.
OPUNTIA VERSICOLOR E.
OPUNTIA VESTITA S.

OPUNTIA WHIPPLEI E. & B.

OPUNTIA TETRACANTHA Toumey.

§ *ylindropuntia*. "An irregularly branching shrub 6-15 dm high; primary branches erect or ascending from a stout woody trunk 5-8 cm in diameter, and bearing numerous short, lateral branches at irregular intervals; ultimate branches 12-15 mm in diameter; joints cylindrical, 25-30 cm long, with a reticulated woody skeleton; tubercles at first prominent, 16-22 mm long, but on old stems more or less inconspicuous; pulvini sparingly covered with wool and bearing a small crescent-shaped tuft of light brown bristles at the upper margin; spines usually 4, stout, loosely sheathed, straw-colored, strongly deflexed, flattened, 2-3.5 cm long, occasionally 1 or 2 smaller ones, not increasing in size and number after first season's growth; glands conspicuous, a half dozen or more between the spines and bristles; flowers greenish purple, 1.5-2 cm broad; fruit ovate to subglobose, narrowly but deeply umbilicate, 2-25 cm long, juicy, scarlet, usually nearly smooth, but sometimes some of the pulvini bearing 1-3 strong deflexed spines; seeds irregular, 3-5 mm in diameter, commissure broad, with conspicuous spongy appearance."—Toumey Garden and Forest 9: 432 (28 N 1896).

"An interesting species of *Cylindropuntia* grows in considerable abundance about 5 miles east of Tucson, but, so far as known, only in this one locality. It seems to be nearest related to *Opuntia Thurberi* E., but differs from that plant, so far as one can judge from the incomplete description and examination of type material in the Engelmänn herbarium, in its longer more strongly deflexed spines, smaller and different-colored flowers, etc. It may be known from all related species by its bright scarlet fruit, 4 strongly deflexed spines and peculiar cork-like margin to the seeds. This plant and *O. leptocaulis* are the only *Opuntias* with which I am familiar that produce small lateral branches no larger than the fully developed fruits, the function of which seems to be to drop to the ground and develop into new plants. The fruit matures in Dec., but remains attached to the plant until the following May. It has an agreeable acid flavor and its bright color makes it very conspicuous against the green stems."—Toumey l.c.

This is probably *O. Stanlyi*, of which the following description is all that is known:—'*Opuntia*? Oct. 22, 1846. Abundant on the Del Norte and Gila. A remarkable plant, apparently more like a *Mamillaria* than like an *Opuntia*. The fruit is also represented without areolae or tubercles, exactly like the smooth fruit of a *Mamillaria*; but this may be an oversight of the artist. The habit of the plant suggests the belief that it is an *Opuntia* of the section *Cylindraceae*. Joints or branches ascending, cylindrical, tuberculated, 4-6 inches long, 1-1¼ inches in diameter; tubercles very prominent, with about 8 lines (1-1½ inches) straight spines; fruit obovate, umbilicate, scarlet, towards the top of the branches, about 9 lines long and 6 in diameter. It is a distinct species, which I am gratified to dedicate to the skilful artist who has drawn all these figures,—Mr. J. M. Stanly."—E in Emory r 158 f. 9.

Subgenus *PLATOPUNTIA* E.—"Joints compressed; rhaps forming a prominent bony margin around the seed; embryo completing a little more than one circle around the scanty albumen; cotyledons contrary to the sides of the seed."—E.

OPUNTIA ANGUSTATA E. & B.

OPUNTIA ARENARIA Engelm.

OPUNTIA AURANTIACA Gil.

OPUNTIA BASILARIS Engelm.

Variety *RAMOSA* Parish.

OPUNTIA BECKERIANA Ks.

OPUNTIA CAMANCHICA E-B.

OPUNTIA CANDELABRIFORMIS

OPUNTIA CHLOROTICA Engelm.

OPUNTIA CRASSA Haw.

OPUNTIA CRINIFERA Pf.

OPUNTIA DECUMBENS S.

OPUNTIA DULCIS Engelm.

OPUNTIA ENGELMANNI Sim-Dyck.

OPUNTIA FICUS-INDICA Mill.

OPUNTIA FILIPENDULA E.

OPUNTIA FOLIOSA S.

OPUNTIA FULVISPINA Sim-Dyck.

OPUNTIA FUSCOATRA E.

OPUNTIA GALAPAGEIA Hensl.

OPUNTIA GLAUDESCENS S.

OPUNTIA GLAUCOPHYLLA Wendl.

OPUNTIA GRANDIS Hort.

OPUNTIA HYSTRICINA E-B.

OPUNTIA HYPPTACANTHA Web.

OPUNTIA INAMOENA Ks.

OPUNTIA INERMIS P DC.

OPUNTIA LANCEOLATA Haw.

OPUNTIA LARREYI Weber.

"Plant only 9-12 dm high, with large orbicular glaucous joints; fruit 'as large as a goose egg', juicy, pulpy, and with purple pulp; seeds small 'much like those of *O. ficus indica*'. Type unknown. A Mexican species, found by Dr. Weber about Queretaro, and pronounced by him the most delicious of all the fruits he had tasted. Known as 'camuessa'.—Coulter, Cont Na hb 3:423.

OPUNTIA LEUCOTRICHA P DC.
 Opuntia lindneri E. is Ergelmannii.
 OPUNTIA MACROCENTRA Engelm.
 OPUNTIA MACRORHIZA Engelm.
 OPUNTIA MACULACANTHA F.
 OPUNTIA MICRODASYL Pfreff.
 OPUNTIA MICRODISCA Web.
 OPUNTIA MICO OSCARPA KS.
 OPUNTIA MISSOURIENSIS P DC.
 OPUNTIA MONACANTHA Haw.
 OPUNTIA NIGRICANS Haw.
 OPUNTIA OCCIDENTALIS Engelm.
 OPUNTIA OLIGACANTHA S.
 OPUNTIA PALMERI Engelm.

“Joints oval, smooth (not tuberculated), pale glaucous, 20-25 cm long by 15-20 cm broad; pulvini 2.5-3 cm apart, with pale brownish or gray persistent wool, a few very slender straw-colored bristles, and slender flattened or compressed straw-colored spines 2.5-3 cm long (5-7 cm upper pulvini with some smaller additional ones, 1-3 on lower pulvini), erect or spreading, or the upper ones (from upper part of pulvini) mostly deflexed. Type, Palmer of 1877 in hb Mo bot gard. Near St. George, Utah.”—Coulter, Cont Na hb 3:42.

OPUNTIA PESCICORVI Le Conte.
 OPUNTIA PHAEOCANTHA Engelm.
 OPUNTIA PILIFERA Web.
 OPUNTIA POLYANTHA Haw.
 OPUNTIA PROCUMBENS E-B.
 OPUNTIA PUBERULA Pf.
 OPUNTIA PYRRHACANTHA KS.
 OPUNTIA QUIMILO KS.
 OPUNTIA QUISENSIS Web.
 OPUNTIA RAVINESQUII Engelm.
 OPUNTIA RHODANTHA KS.
 OPUNTIA ROBUSTA Wendl.
 OPUNTIA RULESCENS S.
 OPUNTIA RUBRIFOLIA Engelm.

“Prostrate, with thick ovate joints 12-15 cm long by 10 cm broad, not tuberculated; leaves spreading, somewhat recurved, reddish, 8-10 mm long; pulvini 2-2.5 cm apart, with brownish-gray persistent wool and numerous yellowish bristles (especially on the upper edge); spines often inserted, 2.5-6 cm long, often a few additional smaller ones, all deflexed (almost appressed); flowers and fruit unknown. Type, Palmer in hb Mo bot gard. St. George, Utah.”—Coulter, Cont Na hb 3:424.

OPUNTIA RUFIDA Engelm.
 OPUNTIA RUTILA Nutt.
 OPUNTIA SCHEERI Web.
 OPUNTIA SENILIS Roezli.
 OPUNTIA SETISPINA E.
 OPUNTIA Sphaerocarpa E-B.
 OPUNTIA SPINULIFERA S.
 OPUNTIA STREPTACANTHA Lem.
 OPUNTIA STRIGILIS E.
 OPUNTIA SULPHUREA Gill.
 OPUNTIA TENNISPINA Engelm.
 OPUNTIA TOMENTOSA S.
 OPUNTIA TORTISPINA E-B.
 OPUNTIA TREILEASII Coulter.

“Erect, diffusely branching; joints orbicular to obovate, fl. shy, with terete base, 15-25 cm long; pulvini not depressed, with long (5- cm) dense dirty-yellow bristles; leaves on young shoots 5 mm long, spreading (more than twice as long as those of basilaris and darker-red); flower and fruit not seen.—Type, growing in Mo. Bot Gard. 1893, from collection made by Trelease in 1892. At Callente, in the Te-

hachapi Mountains, California. Specimens examined: California (Trelease of 1892). This species is near *O. basilaris*, but differs in its rounder more fleshy joints (terete below), pulvini not depressed (in *O. basilaris* there is a depression for the pulvini with a furrow on either side in the genera surface), yellowish bristles, and especially in its much larger leaves.”—Coulter (cont Na hb 3:431-435).
 OPUNTIA TRIACANTHA P DC.
 OPUNTIA TUNA Mill.
 OPUNTIA URSINA Weber.

Opuntia ursina is a name given by Albert Weber to a curious and beautiful plant of the Mohave desert, advertised as the Grizzly Bear cactus. The joints are about 3 by 5 inches, densely covered with slender flexuous ivory white spines, the longest over 6 inches long, and completely hiding the plant. A cutting reminds one of the “Old Man” cactus of Mexico, but this belongs among the prickly pears—forming low wide spreading masses of interlacing snow white spines.

OPUNTIA VULGARIS Mill.
 OPUNTIA XANTHOSTEMMA KS.

Subgenus Peireskiopuntia.

OPUNTIA BRANDFEGEEI KS.
 OPUNTIA GOLZIANA KS.
 OPUNTIA PITTACHE Web.

Subgenus Brasilopuntia.

OPUNTIA BRASILIENSIS Haw.

RHIPHALIS LUMBRICOIDES Lem.
 RHIPHALIS MADAGASCARIENSIS Web.
 R. MESEMBRIANHENOIDETS Haw.
 RHIPHALIS MICRANTHA DC.
 RHIPHALIS MINUTIFLORA KS.
 RHIPHALIS MONACANTHA Gris.
 RHIPHALIS MYOSURUS KS.
 RHIPHALIS NEVES-ARMONDII KS.
 RHIPHALIS PACHYPTERA Pf.
 Variety crassior S.
 RHIPHALIS PARADOXA S.
 RHIPHALIS PENDULIFLORA NEBR.
 RHIPHALIS PENTAPTERA Pf.
 RHIPHALIS PLATYCARPA Lem.
 RHIPHALIS PULVINIGERA Lindb.
 RHIPHALIS PUNICEO-DISCUS Lindb.
 RHIPHALIS RAMULOSA Pf.
 RHIPHALIS REGNELII Lindb.
 RHIPHALIS RHOMBEA Pf.

Variety CRISPATA KS.
 RHIPHALIS ACULEATA Weber.
 RHIPHALIS ALATA KS.
 RHIPHALIS ANCEPS Weber.
 RHIPHALIS CAPILLIFORMIS Weber.
 RHIPHALIS CAVERNOSA Lindb.
 RHIPHALIS CLAVATA Weber.
 RHIPHALIS COMORENSIS Weber.
 RHIPHALIS CONFERTA S.
 RHIPHALIS DISSIMILIS KS.
 RHIPHALIS ELLIPTICA Lindb.
 RHIPHALIS ELLIPTICA Lindb.
 RHIPHALIS ERYTHROCARPA KS.
 RHIPHALIS FLOCCOSA S.
 RHIPHALIS GIBBERULA Weber.
 RHIPHALIS GONACARPA Weber.
 RHIPHALIS GRANDIFLORA Haw.
 RHIPHALIS HADROSOMA Lindb.

RHIPSALIS HOULLETTIANA Lem.
 RHIPSALIS LINDBERGIANA KS.
 RHIPSALIS LINEARIS KS.
 RHIPSALIS SAGLIONIS Lem.
 RHIPSALIS SANSIBARICA Weber.
 RHIPSALIS SQUAMULOSA KS.
 HRIPSALIS SUTREZIANA Weber.
 RHIPSALIS TETRAGONA Weber.
 RHIPSALIS TRIGONA Pf.
 RHIP-SALIS TRIGONENSIS Weber.
 RHIPSALIS VIRGATA Weber.
 RHIPSALIS WARMINGIANA KS.
 RHIPSALIS VILLIGERA Orcutt.
 Hariota villigera KS Fl Br 266; mon 613.
 RHIPSALIS CEREFORMIS Pöerst.
 Pfeiffera cereformis S HD 40 (1884); ed 2, 61, 234; ab 2 t 9.
 Pfeiffera lanthothele Weber D'ct 944. KS mon 610.
 CEREUS EXERENS Linke.
 CEREUS HERMENTIANUS Monv.
 Pilocereus hermentianus Lem et Cons III Hort VIII t 469.—Lem cact 63.—Pöerster handb cact ed 2, 266.—KS mon 186.
 CEREUS HOPPENSTEDTII Weber cat Pfersdorff, 1864.—Pöerster handb cact ed 2, 667.—KS Mfk 4:80; mon 177.
 CEREUS HOUTTII Orcutt.
 CEREUS PECTEN-ABORIGINUM E.
 CEREUS PENTAEDROPHILORUS Lab.
 CEREUS LANUGINOSUS Mill.
 CEREUS MONYTIANUS Otto.
 CEREUS POLYOPHUS DC.
 CEREUS ROYENII Haworth.
 CEREUS STRICTUS DC.
 CEREUS RUSSELLIANUS Otto.
 MELOCACTUS CAESIUS Wendl.
 MELOCACTUS COMMUNIS L & O.
 MELOCACTUS DEPRESSUS Hook.
 MELOCACTUS GONIACANTHUS Lem.
 MELOCACTUS LEMAIREI Miq.
 MELOCACTUS MEOCACANTHUS I & O.
 MELOCACTUS MICROCEPHALUS Miq.
 MELOCACTUS MIQUELII Lehm.
 MELOCACTUS OBTUSIPETALUS Lem.
 MELOCACTUS PYRAMIDATUS S.
 MELOCACTUS VIOACEUS Pf.
 MELOCACTUS ALBISPINUS Salm.
 CEREUS CELSIANUS Orcutt.
 Pilocereus celsianus Lem Rev Hort 1862, 428.
 CEREUS CHRYSACANTHUS Orcutt.
 Pilocereus chrysacanthus Weber ex KS mon 178.
 CERESCOMETES Scheidw.
 CEREUS DAUTWITZII Orcutt.
 Pilocereus dautwitzii Hge Gard Chron 1873, 1:7 f 1.
 Rose, Contr U S Na Hb 5: 258 t 62.—
 "This seems to be the 'hikora rosapara' of which Luthaltz writes: 'Rosapara is a white and spiny hikora. * * * It must be touched with clean hands and only by people who are well baptised, for he is a good Christian, say the Christian Tarahumaris and keeps a sharp eye upon the people around him.'"

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CEREUS GEOMETRIZANS Mart.

Arborescent, 20 feet high or more, assuming somewhat an umbrella form from its manner of branching; joints mostly short, thick; ribs 5 or 6, acute when young, with sharply defined intervals—on old plants often very obtuse, bearing large woolly spineless areolæ; stems of young growth 3 inches in diameter, areolæ 1½ inch apart, woolly—in age the enlarged bulbous bases of the spines are in close contact, covering the areolæ completely (or spineless!); radial spines 3-5, ¼-1½ inches long, central spine 1½ inches in maximum length, straight or twisted, all stout, angled, ashy black, woody; central spine sometimes absent, lateral radials usually the longer, very variable. Plant smooth, bright apple green or glaucous, known as the garambullo. Fruit rarely over ½ inch long, half as great in diameter, or globose, attached to a small tomentose areolæ, remains of flower often persistent, when deciduous leaving a small round scar; epidermis usually smooth, with 1-6 tomentose areolæ bearing minute scales (more rarely bearing in their axils a more minute spine), purple (sometimes glaucous) with purple pulp; fruit bursting irregularly at maturity. As many as 14 fruits were seen growing from one areolæ; one rib of 11 areolæ on a joint of 5 ribs bore 36 fruits, only 1 of the areolæ without fruit, and this is frequent on the hundreds of branches—old and young alike, almost to the trunk. Seeds large, black, 63 from one berry. Fruit ripening in June, 1902, in the state of Oaxaca, Mexico (Orcutt 2670); in July near San Luis Potosi (2009), where its growth is smaller, and large

quantities are collected by the inhabitants and eaten fresh, or dried; Tehuacan (2630).

Console made this the type of his genus *Myrtillocactus*. *Cereus cochal* Orcutt, from Lower California, is closely allied, and treated as a variety by some authors.

CEREUS TRIANGULARIS Miller.

Climbing over rocks and trees, joints 3-sided, 1¼ inches in diameter, 1 or 2 to many feet long, curving, the side next to tree or rock nearly flat, the others slightly concave; ribs acute, undulate-tuberculate, bearing in the depressions between the undulations small tomentose areolæ 1¼-2¼ inches apart, with 3-4 stout bulbous brown or blackish spines 1-2 mm long. Flowered (28 Je 1902) in the night; flower a foot long; tube of corolla 5 inches long, light apple green, spineless, with about 10 greenish yellow sepaloid scales, ½ inch wide or less, acuminate, yellowish, about 20; petals snowy white, an inch wide, 5 inches long, acuminate about 20; filaments white, 2 inches shorter than the petals, anthers sulphur yellow; style 9 inches long, ¼ thick, white; 25 spreading slender white stigmata three-fourths inch long; fruit light crimson, 3 inches in diameter, 5 in length, with about 20 sepaloid apple green scales, forming a pretty color-contrast, epidermis an eighth of an inch thick, pulp white, filled with about 3,000 small black seeds (fruit bought in Tehuacan market for 6 cents, 28 Je 1902). Plant rather light green, the acute ribs narrowly margined with brown, 1-2 mm wide or less on either side. *Huachala* or *pitajaya* of the Indians. States of Puebla and Oaxaca, Mexico (Orcutt 2710, 2711).

CEREUS GIGANTEUS Engelm.

The 'Suwarro' or giant cactus of Arizona and Sonora, 25-60 feet high, 1-2 in diameter, thickest about the lower third where generally the 2 or 3 alternate or sometimes opposite branches start, and from thence slightly taper toward the summit. Stems and branches marked by superficial transverse furrows, indicating, as it seems, the annual periods of growth, forming rings of 4-8 inches in height. Branches unequal, and always of less height than the main stem, mostly 5-6 feet long, with 12-18 ribs.

The contents and paging of the *West American Scientist*, volume 13, of *California Art & Nature* volume 2, and of the *Review of the Cactaceæ* volume 3, are identical (issued in order named).

