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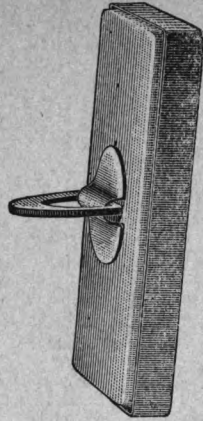
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LABORATORY WORK IN SCHOOLS AND COLLEGES. FROM THE STANDPOINT OF A ZOOLOGIST.

'The system now in use in our high schools is all wrong.' So spoke, recently, a prominent educator in Oregon. 'Parents,' he continued, 'are giving up each year more and more of the oversight they ought to give their child's education and putting the responsibility entirely upon the public schools. As it stands now, if a child leaving our schools is weak mentally, morally or physically, we, the teachers, are blamed, whereas we, in our turn, are obliged to put each and every student through a certain course of study without consideration as to the student's ability, temperament, character, or mental tendencies; they are forced through this public school curriculum, *willy nilly*, at the expense of individuality. Now, since parents are giving up home teaching, so invaluable in bringing out the best points in a child and encouraging him away from his weak points, and since this serious responsibility is placed upon the public schools, where numerous scholars and lack of time prevent proper attention being given to each one, what remedy is there for this individuality-destroying system which we now find in these institutions?'

The writer, overhearing, takes this text and opportunity to try to show the value of laboratory work in high schools as well as in colleges, hoping, however, that some educator in this state will supplement his rather brief treatment of laboratory work in high schools with more complete details of possibilities.

The value of laboratory work has been long appreciated in the universities of Germany and in all the advanced institutions of learning in America. This work means, in the case of zoölogy for instance, that each student taking that course must spend a large proportion of his or her time in the laboratory studying the structure or the physiology, or both, of certain typical, well-known animals. He must see with his own eyes, think with his own brain, do his own theorizing and draw his own conclusions *unaided*, independent of book or fellow scholar, and must show that his work is correct by neat original drawings and original descriptions. One animal finished, another from a different group is given and the student encouraged to describe the differences and resemblances between this animal and the previous one studied, and so on from the lower to the higher forms.

No one but an enthusiastic adherent to this teaching principle can appreciate the phenomena that appear in the cases of different students in this work. Some, so brilliant in recitation that they repeat pages, are almost complete failures; others though slower in committing text, have eyes and minds alert. It is a case where, frequently, 'the last shall be first and the first last.'

For this reason firmness is necessary on the part of the would-

be successful teacher; the weaker students must be obliged to stand on their own ground, they must learn to train their own powers of observation, exercise other mental gifts than that of memorizing, and become as far as possible as proficient in the laboratory as in the class room. We would not, by the above statement, wish to lay ourselves liable to the accusation of being in favor of abolishing text books; on the contrary we believe that the judicious use of good text books and reference books is a valuable adjunct to laboratory work. But, certainly, we only truly learn that which we make our own, part of ourselves, and many a book learned lesson and principle has faded from memory to give place to something actually seen.

A trained biologist in an eastern college, having charge of a zoological laboratory with which we were fortunately connected, rarely looked over his pupils' examination papers, 'for,' said he, 'by almost daily contact with each student, by observing their method of work, their faithfulness or the contrary, the accuracy or inaccuracy of their observations, I become conversant with their mental status and can grade them as they deserve.'

The same principles of laboratory work, as above outlined for zoology, hold in physics, chemistry, geology, botany, household economics and other branches. Independent observation and thought is the keynote in them all.

As previously intimated, a student blind to the beauties of zoology (if the reader will pardon the conceit) profits from work in a zoological laboratory just so far as he acquires there habits of originality and independence in mental and manual work which will help him in after life. It has been the writer's experience and observation that many a student promising little at the beginning of a laboratory course, has, by being held rigidly to the principle at stake, developed into a capable worker, pleasing and astonishing his teacher by bringing to the surface latent gifts not suspected to exist.

Advanced workers in zoology, botany, chemistry, etc., seek and find opportunities in our seaside laboratories and post-graduate universities to carry out their ambitions in the way of original research, but it is only those workers who have learned habits of independence in earlier training that can hope to rank with those from whose efforts come reports of wonderful discoveries which delight scientists and aid humanity.

It would be, indeed, a difficult and radical move to attempt to introduce into our high schools any such system as above outlined, and yet it would seem, to the writer, that a modification of the present system, coupled with laboratory methods to such an extent as to do away with a large proportion of the indiscriminate cramming, for such it is, now present in these institutions, might be possible. Laboratory work as now practiced in the best colleges and universities, is only a very much advanced kindergarten, for children of a larger growth; an oppor-

tunity for a student to develop his individuality under the immediate direction of a capable teacher.

The educational ladder which has its lowest rung in the kindergarten and its higher steps in the universities and among advanced thinkers, includes, not quite a third of the way up, the high school.

Why must there be, at this point, such a complete interruption of a system so well begun? Why can we not substitute charts, relief maps, models and modelling, specimens of anatomy and natural history, manikins and pictures, for a large part of our present text books, placing the work table in place of the desk and the machine-shop in the place of the class-room, and pay, further, more attention to physical culture, more attention to the health, morals and manners of such students than these branches now receive?

In the present state of school education here such a move looks radical, even to an enthusiast; yet a sentiment in this direction is already being felt in the most progressive schools of our older states, lessening, thereby, the desire on the part of well-to-do parents to cut short the high school training of their children and place them where they can get a broader and more just education.

In conclusion let us hope that the time is not far distant when the selfhood within us will get more of a chance to assert itself, when the natural gifts which now lie latent within us may be encouraged to kinetic force and originality may conquer parrotism.

F. L. Washburn.

ON ACCIDENTALLY INTRODUCED FORMS OF ANIMALS.

Illustrations of the way in which exotic species are accidentally introduced into a country, have at various times attracted my attention.

Some years ago one of the local papers, in an interior county of California, contained a paragraph giving an account of the discovery, by a resident of the place, of a small egg in a bunch of bananas. The egg, it was stated, subsequently hatched, and a young *alligator* made its appearance.

Of course the alligator conclusion was altogether absurd, and the mental picture of an alligator climbing a banana or any other kind of tree is highly amusing, unless the bunches of bananas in some parts of the world are considerate enough to come down and await the pleasure of Mrs. Alligator, etc., and afterward return to their proper places. It goes without saying that these large saurians do not climb trees or frequent tree-tops. Again, the eggs of these huge monsters are not small, but are about the size of a goose egg, though more cylindrical or elongated, and

are laid in the sand, as are those of the smaller allied forms generally, where they are hatched by the heat of sun, the same as the eggs of the turtles. The alleged alligator was simply a harmless lizard. I have found these small reptiles in Havana sugar, into which they had crawled, between the time of filling the boxes, in which this sugar is often packed, and the nailing on of the covers.

I remember of reading an item in a New York paper several years ago which gave an account of an Italian fruit vendor having been bitten by a tarantula. He was in the act of cutting a banana from a bunch on his stand when the insect, which was evidently hidden on the stalk of the bunch, stung him on the right thumb.

The peculiar arrangement of the stems of the banana, radiating in several series from a central stalk, and the clusters of the fruit being so compact, make an exceedingly favorable hiding place for small animals.

Not long ago the National Museum received a specimen of the peculiar slug *Veronicella*, which had been found by the giver in a bunch of bananas.

In 1866 or 1867 I received several examples of two different species of land shells belonging to the genera *Bulimulus* and *Orthalicus*, which were brought to San Francisco in a cargo of dyewoods from the Gulf of California. The dyewoods had been hauled from the place where they were cut, and piled up near the embarcadero on the gulf shore, and afterward transferred to the vessel. These snails had crawled into the hollows and crevices of the wood, and were discovered when the cargo was unloaded and put on the wharf in San Francisco. When the sticks were thrown ashore the rough handling shook out the snail shells; many also were found in the hold of the vessel after the cargo was discharged. Though I obtained several specimens none of them were alive.

It may be presumed with some basis of probability that while in the majority of cases forms thus transported and introduced fail to gain a foothold 'and multiply and replenish the earth,' in these new regions, so far from their native haunts, where different environmental conditions exist, etc., yet, sometimes, occasionally, it is otherwise, and the stranger becomes acclimatized and established. That this is not an infrequent result in connection with the distribution of insect life, both in the mature and larval stages, is shown by the phenomenal appearance of some insect whose pestiferous habits forces the knowledge of its presence upon those who are damaged or annoyed by it, and who not only feel the habits or operations of the unwelcome alien deeply in their pockets, but are also stirred to the utmost limits of their wrath, by reason of their nearly fruitless efforts to circumvent its ravages.

An investigation of the effects of the disturbance of what may

be termed the faunal equilibrium that exists in Nature, by the intentional, incidental, or accidental interference of man, would prove to be not only an interesting and curious study in itself, but would show how intimately interwoven are the various forms of animal life, as well as animal and vegetable life, and further demonstrate the necessity of looking ahead to detect if possible what advantage or disadvantage may follow in the train of causes and effects, through the modification of the fauna of any region by the introduction and permanent addition of a new species, an exotic, strange and not to the region born. The rabbit pest in Australia is an appropriate illustration, where failing to look before the leap was made it has, to use an old-fashioned phrase, 'cost a pretty penny,' and conspicuously indicates the practical value of a thorough and philosophical knowledge of natural history as related to 'the affairs of mankind.' The absence of carnivorous, predaceous animals in the faunal species of that region has simply, to use a common expression, made the rabbit 'master of the situation,' and it would seem as if it were likely to remain so.

Robert E. C. Stearns.

THE ORANGE FOR HEALTH, PLEASURE AND PROFIT.

The orange has well been called the Queen of Fruits, and is certainly deserving of that title in southern California. For more than a hundred years the orange has thrived in the genial climate with which we are favored, and throughout historic time this beautiful tree has paid tribute to mankind.

The history of the orange is intimately connected with romance and mythology, and not only has it been prized for its luscious fruit, but for its beauty of form, the fragrance of its blossoms, and other characteristics that commend it to the care of man.

The cultivation of the orange may be made profitable in any clime where the temperature does not fall below forty degrees F. in Winter. Seedlings are as a rule more hardy than grafted or budded stock, and are consequently to be preferred in the colder climates. Some varieties will easily stand a temperature that will prove destructive to others. The orange is now cultivated in most warm countries with success. California and Florida are the two states in the Union where they are most extensively planted, but Arizona and New Mexico give promise of taking a high rank in the production of this fruit. In all the Gulf States the orange is also planted to some extent, but usually more for ornament than for profit.

A deep, rich soil is required by the orange to insure a prolific yield of fruit and a vigorous growth to the tree. A stunted tree will not produce fine fruit. Yet, the orange tree is not very particular in regard to soil, but will grow luxuriantly in sand or very

inferior soils, if well manured and not stinted for water in the summer. The soil which it seems to take to most kindly, in southern California, is a reddish loam, consisting of disintegrated granite, such as forms a good proportion of our mesa lands near the coast. Some varieties will doubtless thrive better in the rich black loam of our larger valleys. The Japanese varieties are said to prefer a sandy or yellow clay loam, richly manured, in open ground or on a hillside, with a southeastern exposure. Valleys are colder and more liable to damaging frosts than the uplands, and therefore less adapted for orange planting. The soil should be kept moist, but not wet, as the tree will stand a considerable drouth.

The orange arrives at maturity at nine years or less from the seed. Seedlings will remain fruitful and profitable for over a hundred years, but grafted or budded trees are supposed to become unprofitable at half that age. The tree has been known to live and bear fruit for four hundred years, and a tree at Nice is said to be over six hundred years old. Some of the trees, planted over a century ago, around the missions of California are still living in spite of the neglect of fifty years. The experience of orange growers at Riverside, California, shows conclusively that an orange orchard may become profitable at four years. The navel orange will bear, under favorable circumstances, on an average two and one-half boxes per tree at four years from the nursery.

An orange grove of selected, carefully cultivated trees will yield a greater income, for the investment and current expenses, than almost any other horticultural industry. Unimproved orange lands, with water, at Riverside, California, are considered worth from \$250 to \$600 per acre, according to location, but in other sections can be bought at lower prices. The same lands improved are valued at \$1,000 to \$3,000 per acre, according to the size of the trees and other circumstances.

One hundred to one hundred and fifty trees may be planted to the acre, fifteen or twenty feet apart. Riverside orange growers generally prefer to plant twenty feet apart, as giving better and more lasting results. The expenses connected with cultivating an old orchard is estimated at not less than \$35 annually, if properly cared for; and to secure the best results an expense of \$25 additional per annum, for fertilizers, should be incurred. At present prices for California fruit an orchard five years old will yield from \$200 to \$400 per acre net. One box to the tree is a moderate estimate of the yield of the navel orange at the end of five years, and at the rate of one hundred trees to the acre the product would sell for \$300 readily. At ten years of age an orchard will net as high as \$1,000 to \$1,500 to the acre. Such returns have actually been realized by more than one California orange grower, but \$300 to \$500 is probably nearer the average return to the producer. The industry, however, is still in its infancy.

The orange tree is commonly propagated in this country from the seed, and by grafting or budding. The tree can also be propagated from cuttings. Seedlings are much more likely to produce fruit of a quality inferior to that of the parent tree, than fruit of an equal or superior quality; but the most of our superior varieties of oranges we owe to this tendency to sport. When a superior variety has been produced it is propagated by grafting or budding onto the roots of other seedlings. The Chinese have a curious method of propagating desirable varieties. 'A branch of the diameter of four or five inches is chosen, around which a circular incision is made. Around this straw matting is wound in the shape of a funnel, and filled with beaten earth. Roots soon begin to push, and by the following season it is provided with sufficient to support it when detached from the parent stem. The young tree thus obtained often bears fruit at the end of two or three years.'

Pruning of the orange tree is denounced by some growers, but the more experienced advocate the intelligent use of the shears, for the shaping of the tree, for the removal of dead wood, or branches growing in the wrong direction, projecting limbs or those touching the ground, and for the removal of the small branches and suckers which choke up the inside of the tree, excluding needed light and air, and forming dangerous places for the multiplying of injurious insects.

An ideal orange tree, at eight years of age, may be described as twelve feet high, symmetrical in shape, with limbs projecting evenly on all sides, about eight feet in diameter; of compact growth, the dense foliage hiding the larger limbs, and the trunk visible for about a foot above the ground. To secure an ideal tree some pruning is necessary at times, but should be very sparingly indulged in and not overdone. Too little is better than too much pruning. The early spring is conceded to be the best season of the year to do the heavy pruning. They may be lightly trimmed at other seasons as they need the attention.

The yield of the orange tree is very great. The usual yield is 600 to 1,000, sometimes, but rarely, as high as 6,000 to the tree. 'In Malta and Naples as many as 15,000 oranges have been picked from a single tree; in the Sandwich Islands a tree was estimated to bear 20,000 fruits; while 33,000 oranges have twice been reported from one tree in southern Europe!' The tree comes into bearing at three to five years of age from the seed, in some places arriving at maturity much earlier than in other countries. The yield at Riverside, California, per tree, in merchantable fruit, has been given as follows: Ninth year from seed, half box; tenth year, one to three boxes; eleventh year, one to five boxes; twelfth year, same; thirteenth year, three to five boxes; fifteenth year, six to eight boxes; with an average increase of a half box thereafter up to the twentieth year. The fruit has sold at from \$1.40 per box on the tree, to \$6 per box, according to quality and season.

The orange was highly esteemed by the ancients for its medicinal qualities—a fact which seems to be lost sight of by the present generation. In cases of fevers and malarial complaints this delicious fruit is more useful than drugs, and is often very helpful in alleviating the ills of mankind. A prominent physician once remarked that were his patients to eat an orange or two every morning, they would require but little medical attention.

In France immense quantities of orange blossoms are annually consumed in distilling orange-flower water. One firm alone is reported as using 350 tons of the flowers for this purpose in a single season. Tons also are candied green. Neroli, so much used by perfumers, is extracted from some varieties. Curacoa is manufactured from dried orange peel. The leaves are frequently used as a substitute for tea, in health as well as in cases of sickness. Thus, it will be seen, that the fruit is not the only useful product of this handsome evergreen tree.

Citrus aurantium is the botanical name of the orange of commerce but there are several other species now known, and hundreds of varieties are in cultivation. Among these varieties the following may be considered as having been received in California with the greatest favor, among growers for profit.

WASHINGTON NAVEL.—Originated in Bahia, Brazil. Generally considered the most profitable orange for the market, ripens early, commences to bear at one year from the bud, prolific, the fruit large, solid, heavy, skin smooth, of very fine texture. Fruit very juicy, highly flavored, with melting pulp, sweet, seedless. The tree is a rapid grower, but does not attain to a large size.

MEDITERRANEAN SWEET.—One of the very best, introduced from the region of the Mediterranean sea, a regular and heavy bearer, ripens late, and generally very evenly. The tree grows to medium size, and thornless. Fruit medium to large, pulp and skin of very fine texture, solid, few seeded, richly colored deep orange. One of the most delicious of fruits, and well worth planting on a large scale.

TAHITI SEEDLING.—A large tree and a good bearer, one of the most profitable oranges grown after it comes into full bearing. Will yield twelve to fifteen boxes per tree when from fifteen to twenty-five years old. Fruit can be shipped the first of February, but can be left on the trees without injury until the first of June.

JOPPA.—A vigorous, thornless tree, from Palestine. Fruit large, firm, nearly seedless, rind thin, pulp very fine, sweet and juicy, of a deep red color. Can be marketed early or late without deterioration in quality. Not generally known. Some call it the Jaffa orange.

TANGERINE OR KID GLOVE.—A dwarf, symmetrical tree, of a weeping habit. Fruit small, deep red, very sweet and aromatic. The rind, when ripe, is very easily separated from the pulp, hence is called the "Kid Glove orange."

ST. MICHAEL.—The 'paper rind', is a small, round orange, very firm and juicy, and with very thin pale-colored skin. Ripens late, keeps well on the tree, and does not drop when mature. This orange is from the Azores. The tree is dwarf, and a prolific bearer. The Azorean St. Michael is a larger tree, a rapid grower and very prolific also. The fruit ripens early, keeps well on the tree, few seeded, larger than the 'paper rind' St. Michael, solid, flattened in shape. The pulp is fine and melting and the rind medium thin.

The Washington Navel, the Mediterranean Sweet, the Tahiti Seedling and the St. Michael are the four varieties which those of widest experience recommend most highly for extensive planting, as sure to be standard varieties in the market for years to come. Other varieties are either little known or more curious and ornamental than profitable.

Among the numerous varieties which have been tried or are being tested, the following are some most worthy of notice or most prominent. The descriptive notes of the above varieties and the following are freely compiled from various reliable sources, as the writer is not personally familiar with them all.

WOLFSKILL'S BEST.—Considered identical with the Tahiti Seedling.

KONAH.—Fruit large, rough and thick skin. Tree very thorny. Ripens early. Raised in California from seed grown in Konah Island, and has few, if any, good qualities to recommend it for cultivation.

KING.—A Chinese monstrosity; highly flavored, medium-sized fruit, with rough rind. Ripens late.

OONSHIU.—This Japanese dwarf is very hardy and ornamental, producing small, flattened fruit, of exceedingly fine texture, sweet and seedless, the rind easily detached. Wrongly called the Satsuma orange. Not likely to prove of any great commercial value. A prolific bearer, of a drooping, willowy habit, and very hardy, as was proved in Florida in the great freeze of 1886. Probably one of the most useful of the many varieties of Japanese oranges.

KUMQUAT.—The very small, oblong or olive-shaped fruit of this bushy tree is peculiar in being edible throughout—rind and all. The rind is thick, yellow, smooth, and sweet-scented. The pulp contains many seeds. Prolific, but more odd than useful, as there is very little pulp about the fruit. Other ornamental varieties are the following:

MANDARIN.—A very ornamental tree. Fruit red, flattened at the ends.

POMELO OR GRAPE FRUIT.—Fruit very large, from two to five pounds each in weight, pale yellow, resembling the citron. Skin smooth, juice sub-acid. A variety of shaddock.

SHADDOCK.—Tree dwarfish, ornamental. Fruit very large,

with smooth skin, pale yellow and very glossy. Rind thick and spongy and very bitter. Ornamental only.

BOUQUET.—The large and fragrant flowers are of commercial value, as also in the following species. Fruit very bitter.

BERGAMOT.—Fruit large and rough, flattened, ornamental only. Grown for the blossoms.

The oils of Neroli and Bergamot are expressed or distilled from orange blossoms. The fragrance of orange blossoms is very agreeable, and is thus utilized by perfumers. In the poetic language of flowers the orange blossom is the emblem of chastity, and is the recognized bridal flower among English speaking people.

The question as to whether there is danger of over-production is always to be heard in connection with any industry, long before the market is nearly supplied. Nearly five million bushels of oranges were imported into the United States in 1884. Southern California exported in 1890 nearly 3,000 carloads of this favorite fruit. The quality of our California oranges is recognized as superior to the product of Florida or of the foreign importations. That there is or ever will be any danger of an over-production of a fine quality of fruit need not be entertained for a moment. The product of the 6,000 acres under cultivation at Riverside, in 1890, realized for citrus fruits (oranges and lemons) one million dollars, and for raisins and other dried fruits half a million dollars—a handsome income for any community. While it cannot be hoped to maintain the present profits of orange culture for all time, yet no diminution need be feared for years to come, and the industry is likely to continue one of the most profitable among horticultural pursuits.

Success requires careful judgment in many directions. Of primary importance is the selection of the site of an orange orchard, with suitable soil. Care in the selection of the best trees is of second importance. The planting requires dexterity and careful management, and May is recommended by some as the best month in southern California for this work. Cultivation, irrigation and fertilizing are other subjects which demand attention—and the details of each of these subjects would each require a volume for their proper presentation. And last but not least is it desirable to be posted on the useful and injurious insects which aid or hinder the horticulturist, as well as a knowledge of fungous or other diseases which may beset the orange. The orange, for health, pleasure and profit, however, can scarcely find a rival among the fruits of the earth.

C. R. Orcutt.

WALDEMAR G. KLEE.

W. G. Klee, late Inspector of the Agricultural Experimental Stations in California, died in the early part of February, of consumption, in his thirty-eighth year. He was born in Copenhagen,

Denmark, where he was educated in horticultural arts, and where his brothers and sisters still reside.

He came to America when about nineteen years of age, and secured employment in a public park in Chicago. About fifteen years ago he came to California. Attending the State University at Berkeley his ability was recognized by Prof. Hilgard, and he was given employment on the experimental grounds of that institution.

Mr. Klee was appointed to collect and arrange the living plants of California at the New Orleans Exposition, and made that feature a credit to the state. In 1886 he was appointed State Inspector of Fruit Pests by the State Board of Horticulture. In 1889 he was appointed Inspector of Experimental Stations in the state, which position he was later compelled to resign on account of his health.

The horticultural writings of W. G. Klee are widely and favorably known, and have mainly appeared in the reports of the University of California, of the State Board of Horticulture, and of the U. S. Department of Agriculture, aside from contributions to the horticultural press of the day.

In 1885 Mr. Klee married Miss Jennie Barry who, with three children, survives. His death occurred at his ranch near Santa Cruz, where he had retired in hopes of regaining his strength through an out-door life.

THE FOREST TREES OF OREGON.—II.

In the firs (*Picea*), the cones are upright, and in the distance they are sometimes mistaken for birds perched on the limbs.

PICEA GRANDIS or Western Balsam Fir, or *Abies Grandis* or Oregon White Fir is found at its best along the shores of the Willamette river and its tributaries, but is widely dispersed along the mountain slopes of both ranges. Its commercial value falls below that of several other trees. It is conspicuous along our river bottoms for height and beauty. It is easily transplanted.

PICEA NOBILIS—Noble Fir. This fine fir is at home in places remote from mills and railroad lines, and therefore does not figure much in commerce. Extensive groves of it may be seen among the Coast mountains where prostrate trees 200 feet in length are not rare. As an ornamental tree it well deserves its name of noble, and it is easily transplanted. It also has a large handsome cone.

PICEA AMABILIS. Cones are dark purple. This, too, is out of the reach of commerce; abundant along the summit of the Cascade mountains. This is a very handsome tree for landscape gardening.

THUYA GIGANTEA—Western Arborvitæ. This is the white-cedar of North Oregon and of Washington. It is a grand forest

tree; is durable, easily worked as finishing lumber and highly prized for its lightness. The northern Indians build their largest canoes of it and use its bark for mats and cordage. In the southern portion of the Willamette valley it is called the smooth-barked cedar, to distinguish it from *Libocedrus*.

LIBOCEDRUS DECURRENS—Rough-barked Cedar or Incense Cedar. As a tree for lumber this is inferior to the *Thuja*. It does not grow farther north than Lane county. It is abundant throughout Douglas and Jackson counties.

THE LAWSON CYPRESS—Port Orford Cedar (*Chamaecyparis lawsoniana*) is not found north of the Umpqua river. It is at its best around Coos Bay and the Coquille river and the north slopes of the Siskiyou. It is called white cedar; is shipped extensively for the California market. So completely marketable is this tree that one may see on the Coquille the finest example of lumber economy: The log is cut into boards and squared timber, the slabs into pieces for broom handles and lath, and the scraps into blocks for matches; and it deserves this fine economy of material. As a tree for landscape gardening it is questionable whether North America has a finer tree than the Port Orford cedar. It is at its best along the northern slopes of the Siskiyou. It is easily transplanted, will grow in a wide range of climate, and will teach any one to love a tree.

JUNIPERUS OCCIDENTALIS. In many of the dryer regions of Central Oregon this juniper, under the name of cedar, furnishes the chief and often the only supply of firewood. It is not abundant enough for extensive commercial demands. It strongly resembles the red cedar of the Eastern States (*Juniperus virginianus*).

JUNIPERUS COMMUNIS. A stranger to this species seeing it for the first time experiences marked surprise. It is entirely prostrate, often growing over a space 100 feet square, the stem five or six inches in thickness. One could readily imagine many situations in landscape gardening in which such a plant would fill a want. It is often met on the coast.

TAXUS BREVIFOLIA. The Oregon yew has a dense, durable wood, often used in western Oregon for fence posts. It is not abundant enough for commercial purposes. It is a handsome tree, pays for transplanting in the beauty it adds to a lawn.

LARIX OCCIDENTALIS.—Oregon or Western Larch. This is a much larger tree than the tamerack of the Eastern States. Its timber is good. It is at home along a belt of foothills from the Upper De Chutes north into Washington, and abundant in the Blue mountains but not in western Oregon. Excepting this larch, all the foregoing trees are evergreen.

We will now consider the deciduous trees that rank as valuable for shade or ornament as for commerce. Oregon has three oaks that are of commercial importance. Of these in abundance and quality, the Oregon white oak ranks first.

QUERCUS GARRYANA (Oregon White Oak). This seems at its best in the Willamette valley and along the Columbia river. For years past a large amount of this timber has been shipped to San Francisco, and well authenticated cases have occurred of its being returned to Oregon as Eastern oak for our wagon builders.

QUERCUS KELLOGGII—Black Oak—Kellogg's Oak. This handsome oak is found no further north than Lane county, but grows abundant in southern Oregon. I have not seen it in central Oregon. It is at its best in Douglas and Jackson counties. It is a much handsomer tree than the white oak, but its timber is not so good.

LIVE OAK—*Quercus chrysolepis*. This tree is often used for wagon timber along the western slopes of the Siskiyou, but is scarcely abundant enough to more than supply home want.

Thomas Condon.

REMARKS UPON THE STENINI OBSERVED IN SAN DIEGO COUNTY, CALIFORNIA.

Among the Microcoleoptera, neglected by the majority of collectors, is that extremely interesting tribe of the Staphylinidæ—the Stenini. The insects of this group are generally minute, varying between 1.7 mm. (*Stenus atomarius*) and 5.5 mm. (*Areus annularis*).

They are to be sought for about the roots of plants; beneath decaying vegetable matter, and debris cast up by the water, along creek and river banks. They are generally abundant about all permanently moist places. Rarely have I taken them on the wing.

They are readily recognized by their dark color, Mantis-like attitude, prominent eyes, abdomen decreasing rapidly in width from base to apex, and by their peculiar movements—running with varying speed in the different species, for short or long distances, then pausing for a time.

They are said to be carnivorous in their habits, and my observations thus far confirm that statement; but not by abundant proof. On one occasion while searching about the roots of a partly broken down shrub, I discovered one with a small green aphid in its jaws, that I had probably dislodged while disturbing the plant.

The species thus far collected in San Diego county are four in number, but they are by no means the sum total of those that can be taken. They can be collected from May to December, but are most abundant during the months of June, July, and August. The species are as follows:

STENUS SCULPTIL, IS Casey.—A distinct form, and varying in length from 3.9 mm. to 5.2 mm. Decidedly robust. Pubescence

on abdomen visible, giving a silvery and fulvous ornamentation. Surface of prothorax and elytra, rough. The transverse tricuspid carinæ of abdomen distinct. This species is readily differentiated from any of its congeneric associates. It is abundant at Poway (elevation 700 feet), and I have not taken this form elsewhere, although its geographical distribution is quite extensive, occurring in Washington, Oregon, Nevada, and northern Lower California.

STENUS PACIFICUS, Casey.—At first glance this species closely resembles *S. arizonæ*, but a careful examination and comparison cannot fail to readily distinguish between the two. In length it varies from 2.2 mm. to 3.0 mm. In form, moderately slender. Pubescence not appreciable. Prothorax is narrower than long, with anterior and posterior margins equal. Prothorax and elytra irregularly and moderately punctured. Surface polished. Taken along the San Diego River in considerable numbers. I have not taken this species at Poway, yet it may occur there. At the present state of our knowledge of its distribution it appears to be peculiar to Southern California.

STENUS ARIZONÆ, Casey.—More robust than the preceding species. Length, 3.0 to 4.2 mm. Prothorax wider with margins strongly arcuate. The traces of channels upon pronotum and elytra aid greatly in separating this species. Abundant along the San Diego River, in company with *S. pacificus*, and is recognized by its darker color—surface not being polished. These two species seem to be the characteristic species of the coast region, not having found them in company with the species of the interior. Probably it is irregularly distributed, for it occurs in Arizona and Texas.

AREUS PINGUIS, Casey.—I have found this species associated with *S. sculptilis* in the Poway region. Very robust in form. Contrasting strongly with its associate species by its fine, closely placed, and evenly distributed punctures. In length this species varies but little, being close to 4.0 mm. in all specimens measured. Distributed over an extensive area; according to Thos. L. Casey, it occurs in British Columbia, Washington, Oregon, Nevada, Colorado, besides California.

The consideration of the local distribution of species that have such an extensive range, may seem unprofitable, but as a species may be very abundant in well defined localities, and entirely absent in an adjoining region, my notes may not be without value in pointing out the possibility of *irregular distribution*.

It is strange that during many years collecting at Poway and vicinity that *S. pacificus* and *S. arizonæ* should have escaped my notice, while *S. sculptilis* and *A. pinguis* were abundant; and that during the past season I should fail to obtain the two latter species in the San Diego River region, where the former species were plentiful. Granting the possibility of *regular distribution*

or error in observation, the question would then be explicable either upon the hypothesis of unfavorable conditions for the maintenance of the species in certain localities at certain periods from deficient food, epidemics, or preponderance of natural enemies; or, in the case of error, time for the correction of the same.

As any one of the causes mentioned is competent to account for the absence of the species from the localities, I shall have to rely upon time to point out the *vera causæ*—be it the natural distribution, absence of proper food, epidemics, influence of natural enemies, or error in observation.

The larvæ of any of the species enumerated are unknown to me. Pupæ of *S. sculptilis* have been observed, but unfortunately I neglected to preserve any of the specimens. In color they were milky white, elongate and but slightly curved. They pass through their transformations in the soil, near the surface. I have not observed any cocoon more than the cavity formed in the soft leaf-mould, beneath the prostrate plants and decaying debris along water-courses.

Frank E. Blaisdell.

CORONADO, February 16, 1891.

THE MORNING GLORY BUSH, IPOMÆA LEPTOPHYLLA.

What brilliantly flowered shrubs! How beautiful! Great masses of them, here and there, glorify the early morning of the Colorado plains. The landscape for miles is, in some places, beautified by these large mounds of crimson flowers amid their bright green leaves.

It is indeed a morning glory that does not twine; but, instead, grows in large shrubby clumps three or four feet in diameter and almost as tall as broad. However, it is an herb and not a shrub; for in winter no trace of it is to be found above ground, except perhaps the dry and withered twigs of the previous summer. Underground, its dimensions are enormous; for it has an immense roundish root that stores up sufficient nourishment so as to enable the plant to make a growth in early summer rivalling that of Jack's famous bean stalk.

The flowers are numerous and larger than an ordinary morning glory; the leaves are long and narrow, glistening in the sunlight. Certainly the plant would well repay cultivation and seems especially adapted to the open lawn where a single plant when well grown would take the place of a whole bed of flowers.

Alice Eastwood.

GEM ARROW POINTS.

(From the *Great Divide*, March, 1890.)

Nearly everyone is more or less familiar with the common flint arrow and spear heads turned up by the plow or dug from the mounds of the ancient red men or aborigines of America; but

comparatively few are acquainted with the tiny arrow heads of certain localities of the west. Thousands of farmers' boys have gathered the flint forms from the soil of the farms over which they roamed, but the little semi-precious stone points are seen in the east only as purchases from some western collector. For delicacy of point and barb, perfection of workmanship and beauty of material, few of the flints compare favorably with these chalcedony, agate, jasper and obsidian gems of the west. Archæologists well versed in the study of this science profess to tell us in the manner in which these stone instruments were made. Of all the weapons made from stone these delicately formed arrows have created in my mind more grave doubts regarding the correctness of some of the advanced theories of the great students of American archæology than all of the coarser material that has come under my observation.

I have seen hundreds of Oregon gem arrow points so delicately constructed that they seemed to preclude the idea that they could have been struck the gentlest blow with any chipping tool of stone, antler, or what not, and have preserved the sharp and slender points and barbs that gave them uniqueness or variety. I am more and more impressed with the thought that the mode of making these small arrow heads is a lost art. None of the oldest Indians of the western coast can give any information upon the subject.

The most noted localities for these small arrow points are Oregon, Washington, New Mexico and Nevada. A few small points are occasionally found in Arizona, Colorado and Montana. A greater number have been found upon the east bank of the Willamette river, Oregon, from one-half mile above to one-half mile below the falls of the same name, upon an area of about five acres—one acre being at the south extreme and the other four acres at the north extreme of this one mile of river bank.

From the vast quantity of flakings found upon the former area we are led to the conclusion that the Indians had 'ancient arrow makers' stationed there. The favorite dwelling places of the red men were on the rivers near their mouths, or where natural obstructions made good fishing points. It is estimated by an old collector who has personally collected 35,000 of these gem arrow heads and purchased nearly as many more since 1878, that 20,000 have been gathered from the one-acre spot and over 100,000 from the four acres of ground above mentioned. At the latter place is found a stratum of dark soil two and a half feet in thickness, composed of charcoal animal bones, fresh water clams, shells, etc. Above the dark stratum is a layer of wash sand two feet thick, indicating one or more higher floods than we have any record of. From these facts, and from the fact that there is nothing on the ground to indicate a burial place, I draw the conclusion that a very ancient village of these aborigines existed here and remained a long time. The tribes living near the locality in

question are said to have been the Molalla, Clackamas and Klamath Indians.

What may seem stranger still, the fine material from which these arrows were made does not exist at or near the site of this village. Excepting petrified and agatized wood, the stones to make these arrow points were brought a considerable distance, and obsidian is not found nearer than 325 miles distant. Few large points worthy the name of spear are found here. The majority of arrow heads found are of the little, delicate points. The most prolific successes of the arrow seekers have been in the spring when the freshets have washed the sand loose upon the overflowed banks of the Willamette and upon recedence left in sight many new prizes to gladden the eye of the relic hunter.

L. W. Stitwell.

BRODIÆAS.

(From *Garden and Forest*, III, 636.)

The range of this genus is almost as wide as that of *Calochortus*. California has most of the species; Oregon, Nevada and Utah have some representatives; northern California is the home of the greater number. A few of the *Brodiaëas* are sometimes found in sandy soil. *B. terrestris* always is, *B. ixioides* occasionally and *B. laxa* in depauperate specimens. I have also received bulbs of some *Brodiaëas* unknown to me from the Sage-brush sand of Nevada and Utah. *B. capitata* and *Brevortia coccinea* luxuriate in the debris of loose rock and mould on the hill-sides, and the remaining species are natives of clay soils from light to heavy; *B. stellaris*, *B. congesta*, *B. multiflora* in lighter, and *B. grandiflora*, *B. minor*, *B. laxa*, *B. ixioides* and *B. lactea* on rich clay or wash soils. *B. peduncularis* is found in the sand and mould in the beds and along the sides of living streams. All *Brodiaëas* are lovers of water, while the last named species grows in situations where water is standing or dropping continually during the winter. The finest growth of *B. grandiflora* or *B. ixioides* I have ever seen was where winter streams broke over ledges of large loose rocks. The bulbs were in the rich mould in the interstices and catches, and subject to a drip of water until the blooming season, and after that became dry. On the sunny sides of the deep precipitous cañons, where the loose soil rock and leaves have slid down to the bottom of the slope, often growing on low underbrush, which its flower-stalks overtop, *B. coccinea*, the Vegetable Fire Cracker, grows most luxuriantly. In such situations stalks five feet high, and bearing from fifteen to thirty blossoms, are not unusual. *B. capitata* delights in similar soil, but in a sunny exposure. *Stropholirion californicum*, or *B. volubilis*, a singular species in which the flower-stalks twine around any supporting object, delights in a soil like that suited to *B. capitata* in underbrush.

So much for natural conditions. I have perfect success with

Brodiaeas in shallow boxes, the same as described for Calochortus. For a covering I use clay and chip soil. With *B. grandiflora*, *B. capitata*, *B. coccinea* and *B. stellaris* rich soil scraped from a wood-yard proves excellent covering. With others clay loam, with various mixtures, with chip soil, have been tried, and the bulbs thrive in all of them. In boxes one will hardly use too much water until the blooming season, when moderate moisture only is required, after which the plants should be dried off. They should be planted shallow—four inches is deep enough—and they need abundant sunlight. Here all are perfectly hardy, and I am satisfied that with slight winter protection they will prove so in the Eastern States. *Carl Purdy.*

THE YELLOW-HAIRED PORCUPINE.

A very large and fine specimen of *Erethizon epizanthus*, one of some eight or ten individuals which have been taken in Lane county, Oregon, during the past decade, has recently been brought to me for preparation. The animal was covered on the upper parts and sides with a dense growth of short spines, becoming thinner and merging through thickened spinous hairs to coarse bristles on the sides, and especially on the inferior caudal surface. On the under portions of the limbs, as well as the medial portion of the belly and the muzzle there were no spines.

Under fur rather soft, dark sooty-brown, almost concealed by the spines and bristles, which latter are in some parts six or even eight inches long. The bristles in this specimen seem to differ from Brandt's type by being penultimately tipped instead of extremely tipped with greenish yellow, the yellow in this individual being displaced at the tips by the prevailing color of dark brown in nearly all the bristles. The spines are greenish yellow tipped with dark brown. Brandt described the extreme bases of the bristles as yellowish, while in this specimen the yellow extended at least one-fourth the entire length of the spines, or in some of them two inches from the base.

This porcupine lives in burrows formed in the ground by itself, is nocturnal in habits, and strictly herbivorous, the teeth being admirably formed for a vegetable diet. Formula of the teeth: incisors, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{4-4}=20$.

They are reputed to be quite destructive in gardens in some places, but are too few in numbers in this region probably to become greatly noted in this particular. The ruthless war waged upon them by man—almost their only foe after reaching maturity—reduces their number every year. *Aurelius Todd.*

Miss Alice Eastwood, of Denver, Colorado, the present Secretary of the Colorado Biological Association, has been extending her acquaintance with flowers by a botanical excursion through southern California.

C. LUTEUS Dougl. Plant low, with clear lemon yellow flowers.

C. MACROCARPUS Dougl. Stout and tall, the lilac flowers banded with purple.

C. NUTTALLII T. & G. Tall, flowers large, of a creamy whiteness, banded with green on the back of the petals. A strong growing plant.

C. LEICHTLINII Hook. A low mountain form of the last.

C. PALMERI Watson. Rose purple flowers, with maroon purple spots at base of petals.*

C. SPLENDENS Dougl. Lustrous rose purple, with often a maroon purple spot at base of petal*. Greatly admired.

C. VENUSTUS Benth. Regarding this species, considerable confusion exists relative to the nomenclature of the numerous beautiful varieties. The following are the leading varieties known in cultivation, the first being considered the type of the species.

1—*Roseus.* Creamy white inside, with rose-colored blotch at top of petal, a beautiful tinted eye in center, and silky gland at base; rich carmine on back. A perfect gem.

2—*Citrinus.* Citron yellow.

3—*Oculus.* White inside, with richly colored eye-like spots.

4—*Purpurascens.* Rich purplish lilac, with eye-like spots.

C. WEEDII Wood. This is one of the finest of the Mariposa Tulips, two or three feet high, producing several large and brilliant orange yellow flowers, delicately dotted with brown and covered with silky hairs. Peculiar to Southern California.

II.—STAR TULIPS.

The Celestial or Star Tulips differ from the Mariposa Tulips in the slender drooping stems, bearing many bell-shaped or globular flowers. A single long glossy leaf is characteristic of both sections of the genus.

C. ALBUS Dougl. A strong growing plant, with pearly white globular flowers, often an inch in diameter, lined with silky hairs. Very beautiful.

C. BENTHAMII Baker. Bearing two to six delicate nearly erect open bells, yellow, lined with silky hairs.

C. FLEXUOSUS Watson. Petals clear lilac.

C. LILACINUS Kell. Erect cup-shaped flowers, light lilac.

C. MAWEANUS Leichlin. Delicate open bells, white lined with silky blue hairs.

C. NITIDUS Dougl. A foot high, white or purplish flowers.

C. NUDUS Watson. Low and often slender, white or pale lilac, wholly without hairs.

C. PULCHELLUS Dougl. One of the hardiest and most beautiful species, resembling *C. albus*, but with rich yellow flowers.

C. UNIFLORUS H. & A. Large white flowers.

CALYCANTHUS.

C. OCCIDENTALIS *H. & A.* Sweet-scented shrub. An erect shrub, ten feet high, dark green foliage and purplish-red or white flowers. Deciduous.

CAMASSIA.

The Camass furnished to the Californian aborigine one of his most valued articles of food, and to the white man it contributes a handsome flower. The Camassias are perfectly hardy in the eastern states. They thrive best in a porous soil.

C. CUSICKII *Watson.* The flowers of this species, borne in a long raceme, when first expanded are white, changing to pale blue after they have been open a few days. Nearly a yard high at maturity; bulbs large. 'Finest of the genus.'

C. ESCULENTA *Lindl.* The Indian Kamass grows from ten to twenty inches high, has long grass-like leaves, and bears a loose spike of violet-blue flowers, five inches long. The flowers are an inch or more wide, ten to twenty in a spike, and useful for cutting.

CARPENTERIA.

C. CALIFORNICA *Torrey.* An ornamental shrub related to the syringa, with fragrant white flowers.

CASTILLEIA.

C. AFFINIS *H. & A.* Painter's brush. A stout annual one to three feet high, abundant along moist banks of streams in Southern California, where the yellowish flowers tipped with red, in a leafy spike, and with bright red floral bracts, renders the plant very striking and conspicuous.

C. FOLIOLOSA *H. & A.* A perennial, one or two feet high, shrubby at base, clothed with a matted white wool. The inconspicuous yellowish or red tipped flowers outshone by the brilliant red of the floral bracts. Flourishes on dry hillsides.

CEANOTHUS.

The Wild Lilacs of the Pacific Coast are in endless variety. They are mostly graceful evergreen shrubs or small trees, bearing dense showy racemes of either blue or white flowers.

C. HIRSUTUS *Nuttall.* This is one of the most graceful of our Californian shrubs, with glossy foliage and bearing a profusion of campanula-blue flowers which fade to flax-flower and pearl blue.*

C. DIVARICATUS *Nutt.* Pale glaucous leaves, and light blue to white flowers. Very ornamental.

C. INTEGERRIMUS *H. & A.* Bears large open terminal racemes of white fragrant flowers.

C. ORCUTTI *Parry.* Flowers unknown. Native of the high mountains, of San Diego county.

C. THYRSIFLORUS *Esch.* Sometimes a small tree, with bright blue flowers. One of the best known in cultivation.

CEREUS.

Cereus includes over 200 species of the most beautiful cacti, the most of them producing an abundance of brilliant colored or exquisitely tinted flowers. Some are delicate trailing plants, others are erect and rigid, in the giant cactus attaining a height of sixty feet. Many of the species are beautiful and curious in themselves, not needing to blossom to repay the attention bestowed upon them.

C. EMORYI Engelm. The Velvet Cactus is a cylindrical species covered with slender yellow spines, when young so soft and flexible as to suggest its popular name. The flowers are greenish yellow, not showy. In the United States only found near San Diego.

C. ENGELMANNI Parry. One of the most beautiful of the Cushion Cacti, with long white or rich brown spines, growing in clusters of few to many cylindrical heads a few inches tall, and bearing numerous large and bright magenta colored flowers. The fruit is edible, an inch in diameter, possessing the flavor of the strawberry.

C. GIGANTEUS Engelm. The Giant Cactus is the largest species known. Attains to a height of sixty feet, bearing large flowers and edible fruit.

CHAENACTIS.

C. ARTEMISIAEFOLIA Grav. A viscid-pubescent annual, one to five feet tall, bushy, with white or flesh-colored heads of composite flowers, an inch in diameter.

C. TENUIFOLIA Nuttall. An erect or decumbent annual, a span to a foot high with composite heads of flowers an inch across, of a lemon yellow approaching orange in the center.* A coarse but rather showy plant, like the preceding, remaining long in flower.

CHAMAECYPARIS.

C. LAWSONIANA Parlat. The Lawson Cypress is one of the most beautiful of the many native trees of the Pacific Coast, and is highly valued for its ornamental qualities. It sometimes attain a height of 150 feet.

CHILOPSIS.

C. SALIGNA Don. The Desert Willow is a graceful willow-like shrub, related to the Catalpa, with showy white flowers two inches long, veined with purple.

CHLOROGALUM.

C. ANGUSTIFOLIUM Kellogg. Flowers white with yellowish-green lines.

C. PARVIFLORUM Watson. Flowering stems from six inches to six feet tall. Flowers not showy.

C. POMERIDIANUM *Kunth*. The common Soap plant or *Amole* produces a large, spreading panicle of rather inconspicuous white purplish-veined flowers from an immense fibrous-coated bulb which is sometimes used as a substitute for soap.

CLARKIA.

C. ELEGANS *Dougl.* A showy, profuse flowering annual, six inches to several feet high, of rich purple and other colors. The following varieties have been produced by cultivation.

- 1—Alba. With pure white flowers.
- 2—Alba flore pleno. Double white flowers.
- 3—Rosea. Rose-colored flowers.
- 4—Rosea flore pleno. Double rose-colored flowers.

CLAYTONIA.

C. PERFOLIATA *Don.* A succulent annual, with small white or rose-colored flowers. In England it is considered very fine for salad, while in California it is known as Spanish Lettuce.

COBAEA.

C. SCANDENS *Cav.* A Mexican climber of the phlox family, highly valued as a rapid grower and for its large bell-shaped flowers, of an apple green color when first opened, changing to lavender and violet and finally to a rich prune purple.* A tall climber.

COLLINSIA

Tender annuals, commonly two-colored in their wild state, very pretty.

C. BARTSIAEFOLIA *Benth.* Purplish or pale violet flowers.

C. BARTSIAEFOLIA ALBA. A cultivated white variety, rarely found wild.

C. BICOLOR *Benth.* The most showy species, with purple and white flowers, three-quarters of an inch long, in large whorls. The following are the leading cultivated varieties.

- 1.—Alba. Lovely white whorls.
- 2.—Atrorubens. A pretty purplish-red variety.
- 3.—Candidissima. A very pretty dwarf white form.
- 4.—Carnea.
- 5.—Rosea.

COLLOMIA.

C. GRANDIFLORA *Dougl.* An erect annual related to the Gilias, a foot or two high with large showy salmon-colored flowers.

CUPRESSUS.

The California species of Cypress are among the most widely planted of evergreen trees or shrubs, and are very ornamental. The Monterey Cypress is especially useful for hedges. (The Lawson Cypress belongs to the genus *Chamaecyparis*.)

C. GOVENIANA *Gordan*. Usually a low bushy shrub or tree.

C. GUADALUPENSIS *Watson*. The Blue Cypress is one of the most ornamental species in the genus. Tall and graceful with fine glaucous foliage, and of a dense compact growth.

C. MACNABIANA *Murr*. A graceful little tree, rarely over ten feet high.

C. MACROCARPA *Hurtw*. The Monterey Cypress. Said to resemble the Cedar of Lebanon in habit, with dense far-spreading branches.



DARLINGTONIA.
kindly reception.

DARLINGTONIA.

D. CALIFORNICA *Torrey*. A striking perennial plant of curious aspect. Of greenish yellow hue, bearing a nodding purplish flower. One of the Pitcher plants, noted for its alluring insects to their destruction.

DATURA.

D. METELOIDES *DC*. A rank growing plant, with large white flowers delicately shaded with violet. Very handsome in cultivation, but a common weed in California.

DELPHINIUM.

The larkspurs scarcely need an introduction, so many species having met with kindly reception. California, however, has the honor of having contributed several of the finest species yet introduced into general cultivation.

D. CARDINALE *Hook*. A stout perennial, five to seven feet tall, producing magnificent panicles of bright, handsome scarlet flowers with a yellowish center. Quite hardy.

D. DECORUM *F. & M*. A foot high, with a long spike of brilliant indigo blue flowers. Very fine.

D. NUDICAULE *T. & G*. Flowers in spikes a foot long, light scarlet to crimson.

DICENTRA.

Glabrous perennials, usually showy, with pinnately divided leaves and racemes or panicles of brilliant flowers.

D. CHRYSANTHA *H. & A*. A most generous plant, continuously in bloom from May until October. The small rich lemon yellow* flowers borne in a terminal panicle a foot or two long; the plant two to four feet high, very effective for grouping in borders; the finely divided foliage resembling some ferns, of a very pale bluish-green and very beautiful. Roots easily transplanted in the fall or winter, or the plant may be grown from seed. Grows wild on dry hills, but thrives in rich garden soil.

DODECATHEON.

The Giant Cyclamen, *Dodecatheon Clevelandi*, is one of the most charming of the many lovely spring flowers of Southern California. Every child in springtime is sure to gather large handfuls of the fragrant flowers, and each has some pretty name for them such as Rabbit-ears, Shooting-stars, or Mad Violets. The flowering stem is usually a foot high, bearing an umbel of six to twenty-five of the large brilliant flowers. The center of the flower is of a rich prune purple bordered with bright lemon yellow, the reflexed divisions of the corolla pure white or tipped with lavender or phlox purple. Several varieties have been introduced as follows.

D. CLEVELANDI *Greene*. As above described, with lavender colored divisions of the corolla. The varieties:

1—Alba. Divisions of a pure white.

2—Splendens. Divisions of a deep brilliant phlox purple.

ECHINOCACTUS.

This genus includes over 200 species of depressed-globose or cylindrical cacti, some of very large size. They are remarkable for their beauty and symmetry of growth, armed with strong spines as a rule.

E. CYLINDRACEUS *Engelm.* Noted for its beautiful flexuous spines, frequently of an ivory whiteness. I have measured one plant that exceeded ten feet in height, and nearly two feet in diameter. Usually under three feet high. Flowers two inches across, of a clear lemon yellow.*

E. EMORYI *Engelm.* Dull red spines and flowers.

E. LECONTEI *Engelm.* Spines of a silvery grey color usually.

E. POLYCEPHALUS *Engelm.* A rare desert species. Very distinct from all others.

E. ORCUTTII *Engelm.* A fine cylindrical form found in Lower California.

E. VIRIDESCENS *Nutt.* A depressed-globose plant, common near San Diego. Known as the Turk's head cactus.

E. WISLIZENI *Engelm.* The Giant Fish-hook cactus; the typical form occurs in New Mexico.

ERYTHEA.

A genus of beautiful palms peculiar to California, related to the genus *Brahea*, with which it has been sometimes included. The leaves are fan-shaped, without filaments. The fruit is edible, with seeds as large as marbles.

E. ARMATA *Watson*. The Blue palm, with bluish-white leaves for which it ranks high among the ornamental palms.

E. EDULIS *Watson*. A larger tree, of more rapid growth, and foliage of a dark green. Considered one of the most desirable of palms.

ERYTHRAEA.

The Canchalaguas are elegant annuals, a span to a foot high, producing a multitude of bright flowers. The following is the largest and handsomest species in the genus.

E. VENUSTA Gray. Flowers an inch across, rotate, with slender tube forming a center of delicate sulphur yellow, the usually five divisions of the corolla of a deep solferino, more rarely lavender or white.* Foliage and stems of light apple green.

ERYTHRONIUM.

The Dog-tooth Violets are distinctively American, with the exception of a single species that is a native of Europe and Asia. The greatest variety of forms thrive in their nativity on the Pacific Coast. They are beautiful lily-like flowers, highly prized in cultivation. They grow in shady places in rock and leaf mold as a rule. The following are the names by which the principal varieties are known in cultivation.

E. CITRINUM. A variety from Oregon.

E. GRANDIFLORUM. The leaves are broad and richly mottled in brown, green and white, with delicate straw-colored flowers, recurved like a lily.

E. GRANDIFLORUM ALBIFLORUM. This sends up from long, narrow corms, broad leaves, conspicuously blotched with purple, and tall, slender racemes of two to six nodding, lily-like, long-pedicelled flowers, which, when fully expanded, are nearly three inches across. The segments are pale yellow, dashed with orange towards the base, with darker orange spots on the interior face.

E. GIGANTEUM. Flowers pure white. Considerable confusion exists in the nomenclature of these plants, which only careful comparisons can straighten. This, *E. albiflorum* and *E. Smithii*, are all mere varieties of *E. grandiflorum*: doubtless, and probably indistinguishable from the above variety.

E. HENDERSONI. Described as the handsomest species of the genus, with bright and strongly colored flowers which are very striking and attractive in their beauty. The petals have a very dark purple and somewhat blotched center, which is surrounded by a band of yellow, and beyond this they are pale purple.

E. HOWELLII. Light cream-colored flowers slightly tinged with red, with a yellow center. Discovered in Oregon by Mr. Thomas Howell, for whom it is named. An interesting species that has been found to thrive in New England in a loamy soil in open sunlight.

E. SMITHII. Flowers described as pure white on opening, often changing to purple.

ESCHSCHOLTZIA.

The Golden Eschscholtzia has aided in no small degree in making California famous as a land of sunny flowers, and has very fitly been selected as the state flower of California. In its wild state it often covers thousands of acres of hill or plain with its intensely brilliant and richly colored flowers, which in the bright sunlight are perfectly dazzling. Some botanists recognize more than a dozen species in this genus. The leading varieties in cultivation are known under the following names.

E. CALIFORNICA *Cham.* Flowers large, varying from deep orange to sulphur yellow or even white. The horticultural varieties are:—

- 1.—Alba. Pure white.
- 2.—Alba flore pleno. Double white. Very choice and beautiful.
- 3.—Aurantiaca.
- 4.—Compacta.
- 5.—Crocea. Bright yellow.
- 6.—Crocea flore pleno. Double yellow, new.
- 7.—Crocea striata.
- 8.—Dentata aurantiaca.
- 9.—Dentata sulphurea.
- 10.—Mandarin. Described as a new and very beautiful variety, of a rich orange or crimson backed with brilliant mandarin scarlet.
- 11.—Rosea. Very delicate rose color.
- 12.—Rosea flore pleno.
- 13.—Rose Cardinal. Bright rose to deep carmine, very pretty and remaining in bloom a long time.
- 14.—Tenuifolia.

EUCALYPTUS.

The Australian Gum trees are so thoroughly at home in California, and so extensively grown, as to almost be considered characteristic of the state. The more popular species are the following.

- E. AMYGDALINA. The Giant Gum.
- E. CORYNOCALYX *Mueller.* The Sugar Gum.
- E. GLOBULUS *La Billardiere.* The Blue Gum, which is more extensively planted than all the others together.
- E. LEUCOXYLON *Mueller.* The Iron-bark tree.
- E. ROSTRATA *Schl.* The Red Gum, now coming into general favor.

FOUQUIERA.

F. SPLENDENS *Engelm.* The Candlewood, or *Hocotillo* of the Mexicans, is a curious, cactus-like plant, five to ten feet high, bearing terminal spikes or racemes of flaming scarlet flowers. It is characteristic of the desert regions, where it blossoms out whenever a shower occurs.

FRASERA.

F. PARRYI *Torrey*. A curious biennial, with a rotate 4-parted white corolla, dotted minutely with prune purple, and with an apple green spot on each division* Flowers nearly an inch across, in a panicle borne on a stout stem one to four feet high.

FRAXINUS.

F. DIPETALA *H. & A.* Flowering Ash, a small shrub found in Lower California, producing in springtime a profusion of lovely white or flesh-colored flowers. A very ornamental shrub.

FREMONTIA.

A beautiful hardy deciduous shrub or small tree, named in honor of the late Gen. Fremont; bearing conspicuous bright yellow flowers, one to three inches across. But a single species in the genus.

F. CALIFORNICA *Torr.* Of graceful and symmetrical growth and greatly prized for its beauty. Thrives in a sandy loam.

FRITILLARIA.

The Fritillarias are all elegant in habit and among the most beautiful of the many members of the lily family. They have broad base leaves and strong leafy stems, bearing from a few to many flowers, like a spray of bells. The Crown Imperial and many other ornamental plants belong to the genus. The bulbs are light and easily sent by mail, and almost rival their flowers in beauty.

F. ATROPURPUREA *Nutt.* A foot high, growing in dry mountain soils, with dark purple, bell-shaped pendant flowers.

F. BIFLORA *Lindl.* The Chocolate Lily, as it is called by many of its younger admirers, is one of the finest species in a large genus of stately and handsome flowers. The strong leafy stem from a few inches to a foot tall, bearing from one to five large and beautiful deep claret brown campanulate flowers,* in a graceful cluster. Flower an inch long, slightly mottled with green.

F. LANCEOLATA *Pursh* A tall stately plant with curiously mottled greenish-yellow flowers.

F. LILIACEA *Linll.* A beautiful low-growing plant with white flowers.

F. PUDICA *Sprengel.* Of low dwarf habit, four to five inches tall, with yellow flowers. Early spring.

F. RECURVA *Benth.* A graceful plant, from eight inches to two feet in height, with crimson or scarlet flowers, brilliant and of long duration, useful for cutting. One of the most attractive of Pacific Coast plants, blooms early in cultivation and is readily grown in a light, loamy soil.

GILIA.

Handsome, low growing, profuse blooming annuals, well known to every cultivator of flowers. The genus is peculiar to West America with a few exceptions. A few species perennial but not yet known in cultivation. The numerous varieties in cultivation mostly originated in California, of which the following are best known.

- G. *ACHILLEAEFOLIA* *Benth.* Light blue clusters of flowers.
 G. *ACHILLEAEFOLIA ALBA.* White variety.
 G. *BICOLOR.*
 G. *CAPITATA Dougl.* Delicate blue, in dense clusters.
 G. *CAPITATA ALBA.* White variety.
 G. *CAPITATA MAJOR.*



GILIA DIANTHOIDES.

G. *DIANTHOIDES Endl* One of the most charming of Californian annuals, producing a profusion of brilliant rose-pink flowers which completely smother the little plant with loveliness. Flowers large, with a light yellow center. Plant seldom exceeds three inches in height, but forms a broad mat. A perfect gem

G. *DIANTHOIDES ALBA* A choice white variety of surpassing beauty.

G. *LACINIATA.*

G. *LINIFLORA Benth.* A finely branching plant, a foot or two high, with large white or pale blue flowers.

- G. *MINIMA CAERULEA.* A dwarf form with lovely blue flowers
 G. *NIVALIS.*

G. *TRICOLOR Benth.* Familiar in cultivation, with several horticultural varieties as follows:

- 1—Alba.
- 2—Rosea—splendens.
- 3—Rubro—violacea.

GODETIA.

G. *QUADRIVULNERA Spach.* A slender annual, with either white or bright phlox-purple flowers, quite showy, a foot or two high.

GREVILLEA.

G. *ROBUSTA Cunningham.* A beautiful tree for the lawn or street, indigenous to eastern Australia, but now extensively planted in California for its beauty. Of rapid growth and resisting drought in a remarkable degree. Grows to a height of 150 feet.

HESPEROCALLIS.

The Day Lily of the Desert is one of the most beautiful and characteristic plants of the desert regions of California. The

large edible bulb produces one or more flower stems which rise from one to two feet above the sand in which they grow, bearing from a few to thirty white fragrant flowers. A single species, *H. undulata*.

HETEROMELES.

H. ARBUTIFOLIA *Roemer*. The California Holly, or Christmas berry, is a handsome dark evergreen shrub, with white flowers and producing clusters of bright scarlet berries, which ripen at Christmas time.

JUNIPERUS.

J. CALIFORNICA *Carr.* Californian Juniper. A small shrub of ornamental value, common in Southern California.

J. OCCIDENTALIS *Hook.* These two are very similar in aspect.

LASTHENIA.

L. GLABRATA *Lindl.* A composite plant, a span to a foot high, producing a multitude of showy yellow flowers. Annual.

LATHYRUS.

L. SPLENDENS *Kellogg*. 'The Pride of California.' A splendid hardy perennial, producing a profusion of its large, brilliant rose red to crimson blossoms,* in clusters of ten or more. The most magnificent of the native climbing plants of West America.

L. VENOSUS *Muhl.* The flowers of this perennial pea are but a little smaller or less beautiful than the last, of a deep magenta. It has often been mistaken for *L. splendens*, but if once seen together they can always be recognized.

L. VESTITUS *Nutt.* Lovely white flowers, veined with rose.

LAYIA.

This genus was named in honor of Thomas Lay, the naturalist in Beechey's voyage. They are hardy annuals, thriving in any ordinary soil.

L. ELEGANS *T. & G.* The California Layia is a beautiful upright bushy plant, about a foot high, and producing in abundance brilliant lemon yellow* single flowers, two inches across, the tips of the rays forming often a scalloped white border. Showy.

LEPTOSYNE.

L. DOUGLASII *DC.* Easily mistaken for *Layia elegans* by those who are not botanists. Equally pretty but more modest and retiring.

L. MARITIMA *Gray.* A striking and showy plant, perennial, the succulent stems a foot or two high, producing large yellow flowers of great beauty, in abundance. Common on ocean beaches.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

DECEMBER 17TH, 1890.

The regular meeting was held at its rooms, 130 Sutter street, with President Wickson in the chair. Besides a good attendance of members, a number of visitors was present.

After the usual routine business had been transacted, the President announced that the lecture of the evening would be by C. H. Eigenmann, Ph. D., on "The Embryology of Viviparous Fishes."

The speaker began by informing his hearers that the waters of the California Coast abounded in viviparous fishes, the perch and the rock cod being well-known representatives of that class. His investigations had been confined to fishes near the shore, where the depth did not exceed one hundred fathoms; but the deep-sea species examined by the naturalists of the Albatross showed the same preponderance of the viviparous class.

The specimens of fishes shown last night were the common "shiner" of our bay, the *Micrometrus aggregatus* of scientists. Every stage of development was shown, either by careful prepared and stained sections of the embryo, or by dissections of the matured forms. The eggs of *Micrometrus* are the smallest fish ova yet described, measuring only a little over one one-hundred-and-fortieth of an inch, or less than those of most mamalia. The average pelagic fish egg has a diameter of one millimeter, or one-thirty-second of an inch, only a very minute portion of which segments and takes part in the formation of the embryo. The egg is deposited by the mother in the water, where it lies or swims unprotected. As the tail of the young fish is formed it begins to move, first feebly and then vigorously, until the membrane surrounding the egg is burst and the young fish swims out.

The development of *Micrometrus* differs from the usual mode in some very essential particulars, as this form belongs to a family of viviparous fishes almost exclusively confined to the west coast of North America. All the members of this family give birth to their young in an advanced stage. At the time the eggs are ripe the ovary is no thicker than a goose-quill, and the oviferous tissues are folded upon themselves. With the growth of the embryos the walls of the ovary become greatly distended, the oviferous sheets unfolding at the same time. In *Micrometrus* the active period begins when the eggs are ripe, and culminates at the time the young are set free. In other words, the eggs become ripe when in ordinary fishes they only begin their most active growth.

Dr. Eigenmann illustrated his lecture with drawings at the black-board, and also by very carefully made drawings in India ink. The latter were made with the camera lucida, and consequently were all drawn to scale. The speaker's remarks were received with marked satisfaction by those present, and he

received a vote of thanks. His investigation in the life-history and generic peculiarities of Pacific Coast fishes has been the means of adding many new facts to science.

JANUARY 21ST, 1891.

The regular fortnightly meeting was held at its rooms with President Wickson in the Chair. There were present in addition to a fair attendance of members, Professor Davidson, an honorary member, and Charles W. Smiley, of Washington, D.C., editor of *The American Monthly Microscopical Journal*.

After the reading of the minutes and the usual routine business a general discussion was had on the motion to amend the constitution of the society, reducing the initiation fee from \$20 to \$5. The sentiment was pretty evenly divided, for and against the motion, but by a bare majority further consideration was postponed for one month.

Some interesting and valuable additions to the society's cabinet were received. Through Henry G. Hanks, John A. Edman, of Meadow Valley, Plumas county, Cal., presented two slides of amalgam crystals, which were both interesting and beautiful. They are original gold crystals, before being carefully treated with cold, strong nitric acid, and have a good deal of free mercury adhering which can only be abstracted by contact with bright gold or silver. In this case, the donor writes, the amalgam crystals are likely to adhere to the metal so as to break when dislodged. At a temperature a little over 70° Fahr. the crystals begin to deliquesce, and become fluid at about 100°.

Colonel C. Mason Kinne donated to the cabinet a small quantity of fresh-water diatomaceous earth he had received from Dr. Arthur M. Edwards, Newark, N. J. Accompanying the specimens there was a note from Dr. Edwards, stating that the deposit was discovered recently at Waverly, N. J. It is interesting as being the first discovered which places the diatoms below the recent and on the glacial deposit. This bed was found last June and is fully eight feet below a deposit of marine diatoms. The discoverer calls it an intra-glacial deposit. The President gave a portion to Mr. Riedy, with the request that he work it up and report at an early meeting of the society.

WILLIAM E. LOY, Rec. Sec.

EDITORIAL.

A timely article is presented to our readers this month by Prof. F. L. Washburn on laboratory work in school and college, which educators will do well to read.

The orange, the cultivation of which is one of the most important industries in southern California, is a subject which we believe all our readers, east or west, will enjoy learning about. One method of propagating this tree is omitted in the article presented this month, that of growing from the *leaves*! The propa-

gation of trees and plants from leaves alone is an interesting subject on which we invite correspondence.

It is the aim of this magazine to present something of interest each month to as many classes of readers as possible. We number among our patrons geologists, botanists, zoologists, and those interested in floriculture and practical horticulture, but we are obliged to omit or but slightly touch upon subjects of great importance, to some of our readers at least, through lack of space. Thirty-two pages will not begin to hold all that we would—but there is always room for the *best*.

NOTES AND NEWS.

G. W. Wright, Karanaghope Rd., Auckland, New Zealand, desires to exchange New Zealand for American shells, and invites correspondence.

Miss Ida M. Shepard, of Long Beach, California, has been making extensive collections of San Diego shells this winter, and intends collecting on the coast of Lower California.

A specimen of diatomaceous earth from the ocean beach near San Diego found by C. R. Orcutt some years ago, has been examined by Clarence Lown. It was very like some samples of the Redondo Beach deposit, and may have been washed from there. The sample contained some of the rarer species of diatoms, and was particularly rich in Aulisci.

The asbestos mines of Skagit county, Oregon, produce a superior quality of asbestos, and the output is rapidly increasing. Large quantities are being shipped to Portland and Tacoma.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the Library of the West American Museum of Nature and Art will be catalogued monthly.

4063. Catalogue of the land and freshwater mollusca of the British Isles, with all the named varieties. By T. D. A. Cockrell. From the author.

4064. U. S. Board on Geographic names. Bulletin No. 1, issued Dec. 31, 1890. Published by the Smithsonian Institution.

4065. Bull. of the Museum of Comparative Zoology, XX, No. 4. *Cristatella*: the origin and development of the individual in the colony. By C. B. Davenport. With eleven plates. November, 1890.

4066. *The American Garden*: an illustrated journal of horticulture. Edited by L. H. Bailey. Vol. XI, 1890. New York. The Rural Publishing Co. 730 pp., Royal 8vo,

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Adm'r of Estate of J. H. Hamilton.

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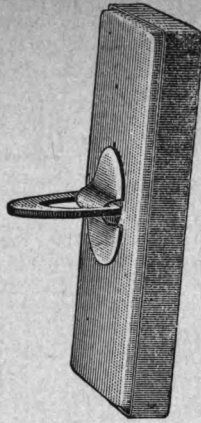
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THE QUICKSILVER MINES OF OREGON.

The quicksilver mines that have been worked in Oregon, are situated in the northeastern part of Douglass county, on the head waters of the Umpqua river.

There are three that have been worked, the Nonpareil, Bonanza, and Elk Head. The former is situated on Calapooia creek, eight miles northeast of Oakland. The main lead, or deposit, is at the juncture of the sandstone on the west and basalt on the east, which is of a hard quality, and in some places partakes of the columnar structure so common in other parts of the state. There are, however, a few places where sedimentary rocks are on both sides of the lead, yet they seem to be only in spots, forming, perhaps, only cap rocks of no great depth. The veins of ore are much distorted, running a little east of north and west of south, of uneven widths, composed of volcanic tufous rock intersected by veins or ribs of jaspery iron ore formed by infiltration through crevices of water containing iron protoxide and silicic acid. The dip of the ledge is from west to east, though it is difficult to follow on account of its sinuosity and its swelling and pinching.

The walls are both volcanic rock. The sandstone on the west not reaching quite to the vein proper, neither does the hard basalt, as a rule, reach the vein on the east, there being a softer tufous rock, of varying character and hardness, composing the walls, gradually emerging into the other rock as they recede farther from the vein, which is from a few inches to many feet in thickness. The cinnabar being in spots, specks and streaks throughout the entire vein, which is richer in some places than others.

A small body of limestone has been found within a few yards of the vein in the sandstone. There is in a few places what appears to be a cap rock of sandstone and conglomerate overlying the basalt to the eastward near this mine, as also the Bonanza. This, however, is not without doubt as to its extent in depth. The trap appears to have pushed the sedimentary rocks out of their original position.

The Bonanza mines are situated some three miles southwest of the Nonpareil. The walls of the Bonanza are the footwalls of the sandstone on the west, but on the east it is usually slate. However, this slate is most likely only a cap on the basalt, which evidently underlies the slate at no great depth. The mountain being several hundred feet high, it has been worked mostly by tunnels instead of shafts. There are many small veins of very rich ore running in various directions through the main vein or lode, which is in places two or three hundred feet wide. Many fine specimens of the sulphides of mercury have been taken from this mine. It contains the mettacinnabarite, found only in this mine and the St. John's mine in California, which ore is more of a mechanical mixture than a chemical compound; but is, however, more or less mixed with the red sulphuret, as its streak is often quite red.

This mine also contains a considerable amount of native mercury, usually in fine particles disseminated throughout the various rocks.

The Elk Head mines are situated thirteen miles north from Bonanza, and differ from the others in having the trap, which in this case is amygdaloid, usually containing natrolite crystals and other zeolites on the west, and the sandstone in large areas on the east. The dip is slightly to the east or southeast. A few fine specimens have been taken from this mine, but the ore, though a splendid working ore from its large vein of soft tufa being easily worked, is not noted for fine specimens.

Somewhat to the south of this mine, cinnabar has been found directly in the trap rock without any apparent vein, but no large amount. All three of these mines agree in having large mountains of volcanic tufa or ocherous rock on the north, all of which usually contains a little cinnabar.

A small deposit of cinnabar ore in the southwestern part of Douglass county on the divide between the southern head waters of the Looking Glass creek, and those of Cow creek, eight miles west of Riddle, differs from the foregoing in having a large deposit of serpentine on the east, taking the place of the traps in the other mines.

Deposits of granite in the serpentine are a leading feature of this locality. All the foregoing agree in having the contiguous sandstones much metamorphosed.

The former three are in formations supposed to be not older than Eocene, probably lower Eocene, but the latter is thought to be much older, and not later than lower cretaceous, as some fine fern leaf impressions in the adjacent shale have been on good authority, pronounced carboniferous. I have now a number of these specimens among my collections.

Small deposits of cinnabar have been found in Baker and Josephine counties, but I am not aware of any other deposits of note.

Aurelius Todd.

IMMIGRANT PLANTS IN LOS ANGELES COUNTY, CALIFORNIA.

To the European visiting California it is cheering to find that though 6000 miles from home some of the flowers so familiar to him in the old country still greet him here. Under such varied conditions of soil and climate, these Old World immigrants have considerably changed; some, like the genus homo, have been improved racially and individually, while others, under the same conditions, have shown little increase, or have even depreciated.

Certain immigrant plants are so identified with the invasion of the Anglo Saxon race that their presence may be considered a proof of commencing colonization. 'Twas the constant association of Plantago major, the broad-leaved plantain, with the homes of the

early pioneer, that led the Indian to call it the "white man's foot." A farther traveled and more constant companion of civilization is the Shepherd's Purse (*Capsella Bursapastoris*), already abundant in California.

This hardy and prolific weed accompanied the Roman legions in their conquest of Gaul and Britain; and, after the lapse of centuries, followed the Anglo Saxon in the peaceful conquest of the West. The more useful European species have, of course, been primarily introduced for agricultural or domestic purposes. Of these the most valuable and most interesting historically is the *Medicago sativa* Lin., the alfalfa of the Spaniard, and Lucern of the French. This has been so long and so commonly cultivated in Spain that it seems but natural they should have introduced it here in the early days of the conquest. Though cultivated before this time by the Greeks and Romans, it is not indigenous to Italy, having been brought from Media at the time of the Persian war, 470 years before the Christian era. The very name (*Alfalfa*) indicates its origin, being the Arabic derivation of the Persian name. The history of *Alfalfa* is but the history of many of our now supposed indigneous plants; they have by accident, or otherwise, followed the path of civilization westward, till it becomes difficult to discriminate between what is indigenous, or otherwise.

Among the other useful fodder plants, abundant around Los Angeles, are: *Erodium cicutarium* and *Erodium moschatum*, or Filaree, better known in Europe as the Stork's bill and *Melilotus parviflora*, the Melilot. Whether these, like *Alfalfa*, were intentionally introduced, I have no means of knowing, but the probability is their introduction was accidental, and once introduced, and their value recognized, their wide-spread distribution is easily accounted for. Around Los Angeles, it seems to me its introduction, useful though it is, is not altogether an unmitigated blessing, as it has crowded out the natural and more enduring native grasses that otherwise would afford grazing supplies long after the filaree has disappeared.

Of grasses, I have observed *Lolium perenne* (rye grass), *Dactylis glomerata* (cock's-foot), *Phleum pratense* (cat's-tail), *Festuca myurus*, *Phalaris canariensis* and *Poa annua*, in the lawns and waste places within the city. *Eragrostis pectinacea* and *Panicum crusgalli* are not infrequently near the river. *Lolium temulentum* exists sparingly at San Pedro; *Bromus racemosus* general, and in many parts common, and seems the only important grass that tends to naturalize and increase.

Of the clovers, *Medicago denticulata*, the Burr clover alone is common, the nature of its fruit ensuring its maintenance and continued extension; *Medicago lupulina* and *Trifolium arvense*, or Dutch clover, are merely casuals, and rare at that.

First cultivated, as useful plants, *Brassica nigra* (wild mustard),

B. campestris, *Mentha piperita* or peppermint, *Marrubium vulgare*, (Hoarhound) and *Nasturtium officinale*, (common watercress), have passed control and become firmly naturalized. The peppermint and watercress, from the lack of water or marshy ground, are not very abundant, but the others have multiplied to such an extent as to become the commonest and most injurious of weeds, covering acres of ground, to the entire exclusion of more useful species.

Malva borealis, the common mallow of the district, like *Brassica nigra*, grows so rank here as to be scarce recognizable as the European species, and springs up annually in most cultivated localities.

Around town, in some of the drier, localities, the field *Convolvulus* (*Convolvulus arvensis*); has secured a foothold. Its creeping habits and extensive rootlets make it one the most noxious and ineradicable of weeds, and should it secure itself in the cultivated districts the farmer's life will be no sinecure.

The Caryophyllaceæ order has three representatives:

Silene gallica, not uncommon in waste ground.

Stellaria meadia, around yards, and *Cerastium triviale*, found occasionally in the lawns.

Anthemis cotula, the May weed, is not uncommon on railway banks. *Silybum Marianum*, the milk thistle, grows along the San Gabriel. *Centaurea meletensis*, *Sonchus oleracea* and *Sonchus asper* are common in the city, the latter, contrary to the usual experience, is as common here as *S. oleracea*.

The common dandelion (*Taraxacum officinale*) may be observed in the lawns among imported grasses, but it does not take kindly to the dry soils.

A few specimens of *Vicia sativa*, the tare of cultivation, *Dipsacus fullonum*, the fuller's teazel, are annually found as escapes from cultivation.

Around the gardens and roadsides *Polygonum aviculare* and *Chenopodium album* are very common. The *Plantago major* may be found in moist ground, near zanjas, while its lesser brother, the *P. lanceolata*, or rib-grass, struggles for a casual existence in the grounds in the city.

Last of all, comes the *Urtica urens*, the lesser nettle, clinging, according to its Old World custom, around the haunts of man.

These, so far as I have observed, comprise all the European immigrants present in and around Los Angeles, but as time rolls on, we shall, no doubt, see the importation of many others.

A. Davidson.

LEUCOCRINUM MONTANUM.

The generic name of this dainty little plant means white lily; translating the entire scientific name it might be called, White Lily of the Mountains. It seems more appropriate, however, to name it White Prairie Lily; for it is the most attractive of the spring flowers of the eastern Colorado plains.

In the vicinity of Denver the plants are quite common during May, and in some localities can be seen for miles; great clumps of snowy flowers nestling in a bed of grass-like leaves. It is not unusual to find many plants in one cluster from which fifty blossoms could be easily gathered.

These six rayed starry lilies spring from ground the surface of which is often as hard as a rock and unfold to the blue sky, breathing forth their adoration in a delicate, exquisite perfume.

They seem to be as hardy and brave as beautiful; for a temperature away below zero does not freeze them, nor do the hot, dry days of summer deprive them of life.

It will be wondered, perhaps, how it is possible for this fragile looking flower to live and bloom in such adverse surroundings. The secret lies buried deep in the ground at its roots. During the spring rains and snows, the warmth and moisture awaken this sleeper from its ten months' repose and soon it shoots up, immediately beginning to form roots for the next year. On one plant can be found three sets of roots. The lowest are ghosts of roots that gave up their life to feed the growth of the previous spring; next are numerous long fleshy roots that are rapidly being exhausted; and uppermost the tender white roots are just beginning to collect the supply for the next year.

Most lilies store their nourishment in bulbs, but this independent prairie flower, has instead a short erect root stock and many long, fleshy roots.

The tube of the perianth extends down among the leaves and bracts for about two inches and its divisions are nearly an inch long, making the expanded flower about two inches in diameter. The seed vessel is at the very bottom of the tube and underground. I know of no other plant that naturally ripens its seeds underground, and have been greatly puzzled to explain this peculiar habit, which would seem to effectually check its distribution.

The only reasonable hypothesis that has occurred to me is this: the plant requires to be some depth below the surface so as to obtain sufficient moisture; it is found where the signs of gophers and prairie dogs abound; so, probably, the underground portions serve as food for these little animals and the seeds are thus properly distributed.

Alice Eastwood.

THE FOREST TREES OF OREGON.—III.

The timber of the following forest trees is specially adapted for cabinet work:

THE OREGON BROAD-LEAVED MAPLE (*Acer Macrophyllum*).—The wood of this tree is dense and handsome, polishing well, with a rich variety of grain. For household furniture it is a valuable material. As a shade tree it is superior. It grows rapidly, transplants easily, and if left to itself forms a handsome head.

ACER CIRCINATUM (the Vine Maple).—As its name indicates, it is too small for anything larger than barrel hoops, for which purpose it is sometimes sent to San Francisco.

OREGON ASH (*Fraxinus Oregona*).—This ash is abundant along the streams of western Oregon, sufficiently so to give it a place as a wood of commerce. Specimens of it may be seen in our cabinet shops that will vindicate this claim. The U. S. custom house at Portland is finished inside with Oregon ash. It loves moist places, and is on this account not suitable for shade or ornament.

OREGON ALDER (*Alnus Oregona*).—The Oregon alder is abundant along stream beds and other damp places. So marked is its love for springs and streams that the presence of a clump of these alders will often reveal to the thirsty explorer a spring of water. Its trunk is often two feet through. Its wood is often used in our cabinet shops, where it is prized for inside work such as drawers.

OREGON MYRTLE or California Laurel (*Oreodaphne Californica*). This handsome, fragrant tree is abundant along the Umpqua river and through Rogue river valley. It is at its best around Coos bay, where it is shipped to San Francisco. As it is so heavy that it will not float in water it is difficult to bring this wood to market. It is durable and susceptible of a fine polish, and in every respect is a wood to be prized in commerce. As an ornamental tree it is highly valued, but is difficult to transplant. Its fruit is fairly abundant and the tree may be raised from the seed.

THE OREGON LAUREL or Madrona (*Arbutus Menziesii*).—The madrona is frequent in Jackson county and occasional in the Willamette valley. For purposes of commerce it is not abundant enough. It is a handsome, dense, close-grained wood that bears a good polish and is durable. As an addition to the lawn or dooryard it is a real ornament, resembling the European laurel.

THE DOGWOOD (*Cornus Nuttallii*).—This tree is ordinarily too small and is too seldom met to be of any importance to commerce. But its wood is a very handsome one for furniture or parts of furniture requiring narrow boards. It often grows to be twelve or fifteen inches through and is capable of a high polish. In all respects it is a fine wood for the turning lathe.

THE COTTONWOOD (*Populus trichocarpa* or *Balsamifera*).—This tree is very abundant along the rivers and smaller streams and often

reaches a large size. Recent experiments in making paper from the fibers of this wood have been so successful that there is but little doubt of its future importance. This wood is soft and its fibers so silky as to insure the best results for paper making.

WILD CHERRY (*Prunus emarginata*, variety *mollis*). In the Willamette valley this tree is often in small groves of slender, straight form, eight to ten inches through; more seldom one finds a single tree twelve to eighteen inches through. Its wood is a handsome smooth material for furniture. In the coast mountains it is often seen in groves of considerable extent of long, straight and slender poles.

Thomas Condon.

PACIFIC COAST WOMAN'S PRESS ASSOCIATION.

This Association formally announced its organization to the public by holding its first semi-annual meeting in San Francisco, on the 16th, 17th and 18th of March. It was organized in September last, and has a membership of about two hundred.

The officers were wisely chosen, and are: President, Mrs. Nellie B. Eyster; first vice-president, Mrs. Jeanne C. Carr; second vice-president, Mrs. Kate Douglas Wiggin; third vice-president, Mrs. Sarah B. Cooper; corresponding secretary, Mrs. E. T. Y. Parkhurst; recording secretary, Mrs. Sam Davis; assistant recording secretary, Mrs. Emily Brown Powell; treasurer, Mrs. Mary O. Stanton; auditor, Mrs. Isabel Raymond; librarian, Mrs. S. E. Reamer.

Only those having cards of admission were allowed to enter the hall where the exercises were held, but of these there were enough to fill the room at each session of the Association. The program was sufficiently varied to give interest to each session, while some of the papers were able and of unusual merit.

Among the notable women participating in its exercises—one of whom has a world-wide fame, and others of more than local honor—were, Mrs. Rose Hartwick Thorpe, Mrs. Charlotte Perkins Stetson—a most worthy descendant of Lyman Beecher and niece of Edward Everett Hale, Mrs. Sarah B. Cooper, Mrs. Wiggin, Mrs. Eyster, the president, Mrs. Parkhurst, the founder of the Association, and others. Madame Modjeska is an honorary member of the Association.

San Diego was represented by three delegates, Mrs. Rose Hartwick Thorpe, Mrs. Evelyn M. Ludlum, Mrs. John R. Berry. Mrs. Thorpe's thoughtful poem, "Progress," deserves a careful reading before its beautiful depths are sounded and the poem fully appreciated.

Mrs. Berry read a short paper upon the topic assigned her, "Woman's Work in San Diego."

There were banquets, excursions, and receptions given to the Association by the cordial citizens of the city.

The next, which will be the annual meeting of the Association, will be held during the third week in September, at Hotel Del Coro-

nado, when it will receive from San Diegans as cordial a reception as that accorded to it by dwellers about the Golden Gate.

Mary S. Berry.

CALIFORNIA TREES AND FLOWERS.—III.

LIBOCEDRUS.

L. DECURRENS Torr. California White Cedar. A tall tree, conical in shape, in foliage and habit resembling *Thuja gigantea*.

LILIUM.

There are about fifty species of lilies in the world, California possessing eight handsome species, which are widely sought for their showy and often fragrant flowers. They are better known in European than in American gardens, but are worthy of greater attention in their native land.

L. WASHINGTONIANUM Kellogg. The Washington Lily is a tall, stately plant, with whorls of dark green leaves and many pure white fragrant flowers. A beautiful species, growing in loose soil on ridges or lightly shaded hillsides.

L. PARRYI Watson. This fine and exceedingly rare lily, named in honor of the late Dr. C. C. Parry, produces lovely clusters of large and very fragrant flowers of a clear lemon yellow.

L. RUBESCENS Watson. A rare form resembling the Washington Lily, except in the color of its exceedingly fragrant flowers, which change from white to dark ruby red after opening.

L. PARVUM Kellogg. A low, slender, graceful plant, bearing from two to fifty or more bell-shaped flowers with light yellow centers dotted with brown, the petals tipped with scarlet or crimson.

L. MARITIMUM Kellogg. The Marine Lily resembles the last, small, with dark green foliage, and usually fewer deep crimson or blood-red flowers, dotted with black.

L. PARDALINUM Kellogg. Hardy and very handsome, preferring a rich moist soil; bearing large and brilliant crimson flowers, dotted with black and with a yellow center. A favorite.

L. HUMBOLTI R. & S. Large and tall, stout, with orange-red flowers, spotted with brown. Thrives in dry open places. The Humboldt Lily is very stately and handsome.

L. COLUMBIANUM Hanson. A graceful miniature of the last.

LOBELIA.

L. SPLENDENS Willd. Two or three feet high, growing in moist situations, producing a many-flowered raceme of intense red blossoms.

LOESELIA.

L. TENUIFOLIA Gray. A showy plant, a span to a foot high, producing abundantly brilliant poppy-red or carmine flowers. Perennial.

L. EFFUSA Gray. An equally beautiful species of the mountains of Lower California, low in habit with light rose purple flowers. Like Phlox and Gilia, Loeselia is a genus of lovely flowers, well worthy of cultivation.

LUPINUS.

Showy annuals or perennials, a few shrubby, bearing conspicuous flowers in terminal racemes. The great majority are indigenous to West America. Many have long been cultivated and grown popular. The California species best known in cultivation are the following:

L. AFFINIS Agard. A foot or two high, often growing very rank, producing large spikes of brilliant blue flowers.

L. DENSIFLORUS Benth. Less than a foot high, with white flowers arranged in umbel like clusters on the terminal spike. Sometimes light sulphur yellow.

L. MICRANTHUS Dougl. Low in habit, with racemes of small light blue and white flowers. The cultivated form is considered quite pretty.

L. NANUS Dougl. A slender plant, with bluish, purple or white flowers.

L. NANUS ALBUS. The white flowered form.

L. ARBOREUS Sims. The Tree Lupin is a shrub four to ten feet high, with lilac colored flowers.

L. ARBOREUS LUTEUS. With sulphur yellow flowers, perhaps the typical form. A very ornamental shrub.

L. ELEGANS. What its name signifies.

L. GRANDIFLORUS. A perennial form, with blue, white or purple flowers.

L. POLYPHYLLUS Lindl. Perennial, similar to *L. grandiflorus* if the two are not identical or forms of the same species.

L. POLYPHYLLUS ALBIFLORUS. The white variety.

MAMILLARIA.

Very general favorites among the lovers of the odd or the beautiful are these unique little plants, most exquisite in form and finish. The scarlet edible berries, which cluster among the spines of our California cacti of this genus add also to the beauty of these plants, though the blossoms are often inconspicuous.

M. DESERTI Engelm. A little gem, from the Mojave Desert, of which we have as yet seen but a single plant. One of the choicest of the genus and we hope to rediscover the beauty soon.

M. GOODRIDGII Scheer. Sometimes called the Strawberry cactus, from the delicious flavor of its clubshaped fruit, but also called the Fish-hook cactus from the hooked central spines produced from the mamillae. The spines are sometimes of an ivory whiteness, but oftener of a rich brown color.

M. PHELLOSPERMA Engelm. A handsome plant, worthy of a place in any lady's parlor.

MIMULUS.

M. CARDINALIS Dougl. A showy perennial species, with brilliant large scarlet flowers.

M. GLUTINOSUS Wendl. A low shrub, with bright evergreen foliage and a profusion of buff or salmon colored showy flowers.

M. MOSCHATUS Dougl. Musk. A low, musk-scented plant, bearing large lemon yellow flowers.

MONARDELLA.

A genus of many beautiful flowers, well worth extended cultivation, showy, often sweet scented, either perennial or annual.

M. MACRANTHA Gray. An evergreen species with dark glossy foliage, a span high, producing showy heads of orange-red flowers.

M. NANA Gray. Almost identical in habit and general aspect with the last, the flowers pure white, sometimes suffused with rose. Very beautiful but less showy than the last.

M. LANCEOLATA Gray. A showy annual, producing masses of bright phlox purple flowers, six to eight inches or a foot high, branching, with a strong but pleasant pennyroyal perfume, similar in aspect with numerous related forms, like *M. Pringlei* and many others, all of which are well worthy of a place in any garden.

NEMOPHILA.

Very pretty annuals, mostly Californian, with tender herbage and lovely flowers of delicate blue, violet or white colors.

N. AURITA Lindl. Large violet flowers, one of the finest species introduced into cultivation.

N. AURITA ALBA Dougl. A beautiful white form.

N. INSIGNIS Dougl. Bright blue flowers an inch in diameter.

N. MACULATA Benth. White, with a strong violet blotch at the top of each lobe of the corolla. 'Love Grove.'

NICOTIANA.

N. GLAUCA Graham. A slender shrub, a native of South America, very light green foliage and yellow flowers, considered very striking and ornamental among the sub-tropical foliage plants. Naturalized in Southern California.

NOLINA.

Perennial liliaceous plants, with a thick woody trunk, in aspect somewhat resembling the *Yucca*. The stout flowering stem bears a panicle of numerous small creamy white flowers.

N. BIGELOVII Watson. The flowering stem six to ten feet high, bearing a dense panicle. The plant sometimes grows ten or more feet high.

N. PALMERI Watson. A cluster of these plants will cover a considerable area, and with the coarse, grass-like foliage may well be mistaken for a patch of some coarse species of grass at a distance. Less ornamental than the preceding.

CENOTHERA.

An almost exclusively American genus of over one hundred species, many with showy flowers, and some long in cultivation as ornamental.

C. BIENNIS L. The Evening primrose, with its large showy flowers, is too well known to need description.

C. BISTORTA Nutt. Showy yellow flowers, usually with a dark brown spot at base of each petal. A low decumbent annual, the variety *Veitchiana* being the form commonly seen in cultivation.

C. CALIFORNICA Watson. Low flowers, large white, becoming pinkish, fragrant. One of the loveliest and most delicate of flowers, often two or three inches across.

ORTHOCARPUS.

A large genus of low, branching annuals, nearly related to *Castilleja*.

O. PURPURASCEUS Benth. An erect, diffusely branched annual, a span to a foot high, producing numerous dense and thick terminal oblong or cylindrical spikes of flowers. Corolla yellowish, tipped with crimson or red and the whole encircled by the brilliantly colored crimson-purple or rose-purple floral bracts. Hundreds of acres are often transformed into brilliant fields of purple by the abundance of this, one of the handsomest of the spring annuals of California.

PAPAVER.

P. CALIFORNICA Gray. While one of the latest discoveries, this plant ranks among the prettiest of our annuals, the fine bushy plant, a foot or more high, bearing large showy flowers of an average of two inches in diameter. The color is a bright saturn red to orange chrome, with a center of delicate sulphur yellow.

PENTACHAETA.

P. AUREA Nutt. This small hardy annual, with its large golden yellow heads of almost double flowers, introduced into cultivation in 1884, is a pretty dwarf composite that may be readily grown.

PENTSTEMON.

Hardy perennial plants with showy panicles of brilliantly colored flowers. Several of the numerous California species have long been in cultivation.

P. CENTRANTHIFOLIUS Benth. A showy species, two or three feet high, bearing long slender spikes of bright carmine-colored flowers, an inch long. Acres in extent of our mountain lands are sometimes a solid mass of carmine during the summer, when this handsome plant is in bloom. It was introduced in 1858.

P. CLEVELANDI Gray. One to three feet high, with dark green foliage and bearing a spike of lovely bright solferino-colored flowers, each an inch long.

P. PALMERI Gray. A tall growing species, with a long panicle of large white flowers delicately veined with purple.

P. SPECTABILIS Thurber. Corolla an inch long, broad, bluish-purple. Plant two or three feet high, glabrous. Flowers in a loose elongated panicle. A very showy species. This genus contains nearly a hundred species, nearly all worthy of cultivation, and many native to California.

PHACELIA.

P. CAMPANULARIA Gray. One of the finest species in the genus yet known in cultivation. Has received a first-class certificate in England, where it was introduced a few years ago.

P. CONGESTA. A useful plant in bee-gardens, like the rest of the genus, and one of the best known species in cultivation.

P. TANACETIFOLIA Benth. The Tansy-leaf Phacelia has long been in favor in cultivation for its beautiful foliage. An erect hardy annual, one to three feet high, bearing cymosely clustered spikes of light bluish flowers.

P. TANACETIFOLIA ALBA. A fine cultivated variety, with white flowers.

P. ORCUTTIANA Gray. One to three feet high, branching, bearing a profusion of small white flowers with brilliant yellow centers.

P. PARRYI Torr. One of the loveliest and most desirable of the many pretty annuals of Southern California for cultivation, second only in value to *P. campanularia*. The plant delights in warm sunny exposures, and produces large brilliant royal purple flowers with an open rotate corolla. Everyone admires this modest flower, whose bright face looks out at one with something akin to a human expression.

P. WHITLAVIA Gray. Large bell-shaped blue flowers.

PICEA.

P. SITCHENSIS Carr. Probably the tallest spruce known, growing 150 to 200 feet high, and of pyramidal form. An excellent timber tree.

PLATYSTEMON.

P. CALIFORNICUS Benth. A low annual, a span high, with delicate sulphur-yellow flowers, called Cream-cups by the children. Belongs to the Poppy family.

PROSOPIS.

P. JULIFLORA D C. The Mesquit tree of the desert regions, sometimes planted for hedges. The bean-like pods of this tree are useful for forage, and form an important article of food among some Indian tribes. Very sweet and nutritious.

P. PUBESCENS Benth. The Screw-bean. A smaller tree than the Mesquit, with curiously twisted pods.

PRUNUS.

P. ILICIFOLIA Walp. The Holly-leaf cherry. A beautiful dark evergreen shrub, yielding a pleasant edible fruit. Useful for hedges or ornamental planting.

PSEUDOTSUGA.

P. DOUGLASII Carr. The magnificent Douglas spruce, better known commercially, perhaps, as the Oregon pine. A gigantic tree, 200 to over 300 feet in height, and very beautiful.

Var. *macrocarpa* Engelm. A small form.

RHUS.

R. OVATA Watson. A handsome evergreen shrub, noted for its glossy foliage and graceful form. The small dark red berries make a cooling drink, pleasantly flavored, resembling lemonade, and the Indians formerly gathered sugar from this species. Thus it may be appropriately termed a Lemonade and Sugar Tree.

R. INTEGRIFOLIA Nutt. The dark evergreen foliage of this shrub or small tree, locally known as the Mahogany, is very handsome, while the larger bright red berries, coated with a white waxy substance also make a refreshing and cooling drink. The Californians formerly gathered and dried the berries for this purpose.

ROMNEYA.

This large white-flowering perennial poppy, named in honor of Dr. T. Romney Robinson, a noted astronomer, is one of the stateliest of California's contributions to horticulture. It is quite a hardy shrub with us, requiring only a sheltered position to protect its flowers; in England it is classified as half-hardy. A rich loamy soil is most suitable to its needs. In early spring vigorous shoots start from the dormant roots, growing from six to fifteen feet high, which do not die down but need to be pruned well back in the fall. A single species.

R. COULTERI Harvey. This magnificent wax-like flower has become very popular wherever known. The large hairy buds open at daylight, the crimped petals slowly unfolding from over the huge bunch of bright yellow stamens (as large as a walnut), until they spread out from six to nine inches. The flowers last several days and the buds open well in water. The foliage is very effective and makes with the flower an artistic study. Grown from either seed or cuttings with difficulty, but a well established root will well repay the attention bestowed upon it.

ROSA.

R. CALIFORNICA C. & S. The wild rose of California, with its

large, single, lovely pink flowers, is as pretty as its more showy cultivated sisters, and equally admired by those who love the beauties of nature.

R. MINUTIFOLA *Engelm.* Parry's wild Mexican rose, with its small, finely incised foliage, and small pink or white flowers that closely nestled among the leaves, met with a warm welcome when discovered in Lower California in 1882, but has steadily repulsed the kind advances of the gardener and refuses to long survive away from its native sky.

SALVIA.

S. CARDUACEA *Benth.* The Thistle-leaved sage, known to the Mexicans as *Chia*, is densely white-woolly, with prickly foliage, and showy lavender colored flowers, an inch long, in many-storied head-like whorls on a stem a foot or two high. Cultivated in Europe since 1854.

S. COLUMBARÆ *Benth.* Smaller and less conspicuous. Also known as *Chia*. The seeds of either species infused in water form a pleasant mucilaginous drink; used largely by the aborigines medicinally as a beverage.

SAMBUCUS.

S. GLAUCA *Nutt.* The California Elder forms a large bush or small tree and bears prolifically of its edible berries, prized by some for making pies or sauce.

SCHINUS.

S. MOLLE *L.* A graceful evergreen tree, a native of Mexico and South America, with glossy light green drooping leaves in twenty or more pairs of slender leaflets. The small white flowers in large panicles followed by lovely clusters of small red berries. The Pepper tree, as it is called, is very ornamental, and planted extensively for shade or avenues.

SEQUOIA.

A remarkable California genus, including the noted Redwood and Big-tree for which California is famous.

S. GIGANTEA *Decasne.* This giant of the California woods, is the largest and tallest tree known to exist on the American continent, attaining a height exceeding 300 feet, only exceeded in size by some of the gums of Australia.

S. SEMPERVIRENS *Endl.* The California Redwood is the most valuable timber tree on the Pacific Coast, attaining a height of 200 to 300 feet, with light but strong and durable wood, susceptible to a handsome finish, of a walnut brown color.

SIMMONDSIA.

S. CALIFORNICA *Nuttall.* A low diffusely branched shrub, forming oval bushes one to five (rarely ten or fifteen) feet high with pale,

rigid evergreen foliage, producing a pleasant edible nut. An ornamental shrub, growing in rich valleys or on arid hills from the Pacific Ocean to the borders of the Colorado Desert.

SISYRINCHIUM.

S. BELLUM *Watson*. The Blue-eyed grass bears umbel-like clusters of small rotate flowers of a delicate shade of mauve, with canary yellow centers. A profuse bloomer. Grows from a few inches to two feet high. A very pretty Iris-like plant.

TORREYA.

T. CALIFORNICA *Torr*. The Californian Nutmeg is a tree fifty to seventy-five feet high, with slender drooping branches often grown for ornamental planting.

UMBELLULARIA.

U. CALIFORNICA *Nutt*. The California Laurel is a handsome shrub or tree, ten to seventy feet high, with thick evergreen leaves, better known in cultivation as *Oreodaphne Californica*.

WASHINGTONIA.

W. FILIFERA *Wendland*. The Californian or Washington fan palm is too well-known to need description. It has become one of the most characteristic trees in Southern California and is a worthy memorial to the fame of the great Washington whose name it bears.

W. ROBUSTA *Wendland*. A robust variety (not specifically distinct?) said to be more easily grown. None of the characters which are said to distinguish these two palms appear to be constant.

YUCCA.

An American genus of a few species of handsome and conspicuous ornamental plants, well known in cultivation.

Y. BACCATA *Torrey*. The Wild Date, or Spanish Bayonet, is a stately plant, sometimes growing ten or more feet high, and producing a pyramidal panicle of fragrant waxy, pure white flowers, or often marked with purple. The large, sweet edible fruit is sometimes called wild bananas.

Y. BREVIFOLIA *Engelm*. The Tree Yucca of the Mojave Desert.

Y. WHIPPLEI *Torrey*. The flowers borne in a large panicle on a scape five to twelve feet high. The rigid serrulate leaves surround the base of the stem in a dense cluster. The flowers are waxy-white or purple tinged. The plant dies after blooming, while the preceding species live year after year.

ZAUSCHNERIA.

Z. CALIFORNICA *Presl*. The flowers of this plant are one to two inches long and three-quarters of an inch across, scarlet to scarlet

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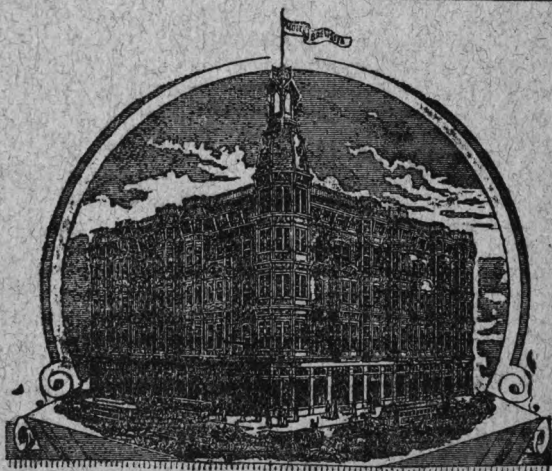
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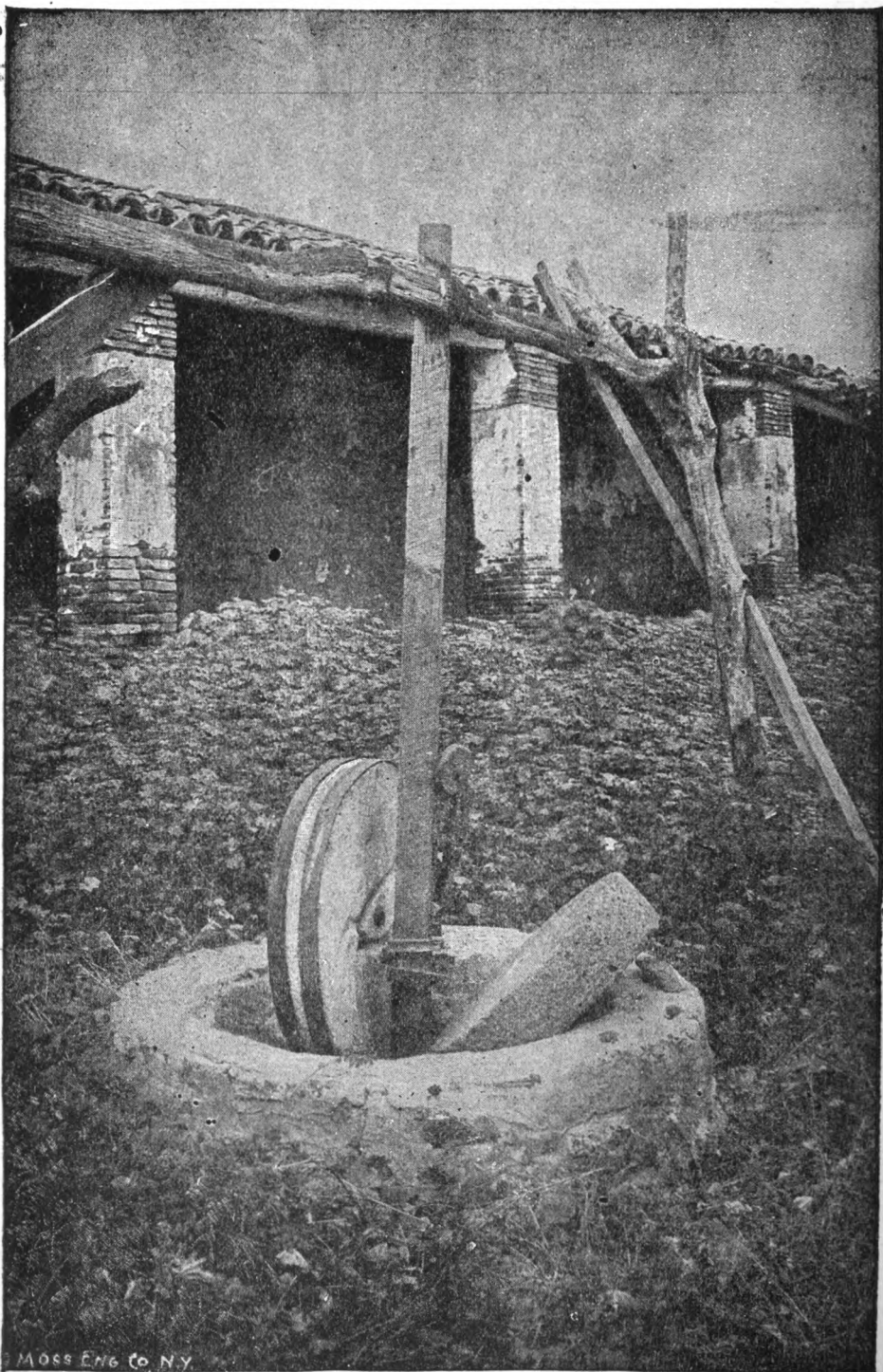
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First Olive Oil Mill in California.

NEW BOMBYLIDÆ OF THE GROUP PARACOSMUS.

Among the Bombylidæ having a short proboscis is a small group of insects in which the body is elongated and nearly naked, being entirely destitute of flattened scales and of stout bristles, while the hair is so very short and sparse as to be scarcely discernible with the naked eye. To this group belongs our only described genus, *Paracosmus* Loew, containing two described species, *Edwardsii* Loew, and *Morrisoni* Osten Sacken. I have collected three other species belonging to this group. One of these, to which I apply the generic term *Amphicosmus*, differs from all the others in having three, instead of only two submarginal cells in each wing; the structure of the antennæ and the course of the second vein of the wings are the same as in *Paracosmus*. Another species differs from *Paracosmus* in the structure of the antennæ, in the course of the second vein, and in that the ocellar tubercle is situated much farther forward upon the front; to this form I apply the generic term *Metacosmus*. This form is known to me only in the female sex. The third species agrees with *Paracosmus* in the course of the second vein and in the situation of the ocellar tubercle, but the tip of the third antennal joint is rounded instead of being truncated; still I am unwilling to found a new genus on so trivial a character as this, but prefer to place this species in the genus *Paracosmus*, at least for the present. I will now give a more extended characterization of these three new forms.

AMPHICOSMUS n. gen. Body elongated, nearly naked, destitute of flattened scales and of stout bristles. Head subglobular, front in profile gently convex, not greatly projecting at base of antennæ; face scarcely one-fourth as long as the front, projecting farther forward than the latter, with which it forms an obtuse angle. Antennæ somewhat approximate at base, about one-fourth as long as the head, first two joints subequal in length, together slightly shorter than the third; the latter tapers but slightly towards the apex which is obliquely truncated, the upper angle prolonged in a short tooth, the lower angle broadly rounded. Proboscis not projecting beyond the oral margin, labellæ well-developed; palpi slender, clavate at the tips, slightly over one-half as long as the proboscis. Eyes narrowly separated in the male, very widely separated in the female. Ocellar tubercle close to edge of occiput. Scutellum rounded behind. Abdomen much narrower than the thorax, seven-segmented in both sexes; male genitalia exposed and very large. Wings with three submarginal and four posterior cells, all of the latter open, as is also the anal cell; bifurcation of second and third veins occurs before base of discal cell; tip of second vein curving

forward and meeting the costa at right angle; costa of male destitute of small points; small crossvein beyond middle of discal cell. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting.

AMPHICOSMUS ELEGANS n. sp. Male. Black. Front (except on the vertex) and sides of face whitish pollinose and short sparse white pilose, middle of face bare, shining black; posterior half of the oral margin whitish. Antennæ wholly black, the first two joints sparse white pilose. Occiput white pollinose. Thorax short sparse white pilose, marked with two white pollinose stripes which extend from the front end to a point slightly beyond the middle; a large white-pollinose humeral spot extending to the root of each wing, and a smaller spot on the pleura above the hind coxæ. Scutellum, short sparse white pilose, destitute of pollen. Abdomen with hind margin of the first segment white, of the second segment and sides and hind margins of the third and fourth segments reddish; pile of abdomen very short, sparse, white; venter reddish in the middle, the base and apex black. Femora black, the base and apex yellowish; tibiæ yellowish, the apex black; tarsi black, the base more or less yellowish. Wings wholly hyaline. Halteres wholly white.

Female same as the male with the following exceptions: Front in the middle, and upper portion of occiput destitute of pollen; lower part of front, sides of face broadly, and entire oral margin, white, as is also the lower part of the occiput next the eyes. Thorax destitute of the two white pollinose stripes which occur in the male. Abdomen with the second, third and fourth segments wholly reddish, the hind margins of the fourth, fifth and sixth segments narrowly bordered with white, the end of the seventh segment broadly yellow. Femora largely or wholly yellowish. Length 4.5 to 7 mm. Los Angeles county, Cal. Two males and two females, in June.

I caught these specimens while they were on the wing, hovering over the ground only a few inches from it among some low herbage. At the time of capturing them I supposed that they were Syrphids belonging to the genus *Baccha*, to which group of insects they bear a very close superficial resemblance.

METACOSMUS n. gen. Body elongated, nearly naked, destitute of flattened scales and stout bristles. Head subglobular, front in profile gently convex, slightly projecting forward at base of antennæ; face less than one-third the length of the front, projecting forward nearly on a plane with the lower portion of the latter. Eyes very large, quite widely separated in the female. Antennæ equal in length to the face, second joint scarcely visible, third joint

over twice as long as the first, gradually tapering to the tip which is blunt and bears several minute hairs. Ocellar tubercle situated nearly midway between the upper edge of the occiput and the insertion of the antennæ. Proboscis not projecting beyond the oral margin, the labellæ very large. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting. Wings with two submarginal and four posterior cells, all of them open, as is also the anal cell; tip of second vein not curving forward, meeting the costa at an acute angle; second submarginal cell nearly straight along its upper edge; bifurcation of second and third veins occurs before the proximal end of the discal cell; small crossvein beyond middle of discal cell.

METACOSMUS EXILIS n. sp. Female. Head black, anterior portion of oral margin and underside of head behind the mouth, white; front very sparse short white pilose, orbits lightly, face densely white pollinose. Antennæ black. Occiput very short sparse white pilose. Thorax and scutellum polished black, very short sparse pilose. Abdomen polished black, hind margins of segments one to five narrowly bordered with white; abdomen laterally compressed, the posterior end truncated; venter black, hind margin of each segment narrowly bordered with white. Legs yellowish brown, coxæ black, tarsi brownish at the apex. Wings wholly hyaline, small crossvein at last third of the discal cell. Halteres brown, the knobs white. Length 6 to 7 mm. Orange county, Cal. Two females, in May.

These insects I captured about six years ago, resting on the ground in the hot sunshine, but I have never succeeded in obtaining another specimen since that time, although I have repeatedly looked for them.

PARACOSMUS INSOLENS n. sp. Male. Black. Front and face densely white pollinose and very short sparse pilose; eyes widely separated. Proboscis not projecting beyond the oral margin, labellæ very large. Antennæ with first two joints subequal in length, together slightly more than one-half as long as the third, the latter compressed, broadly oblong in profile, rapidly tapering to the tip which is blunt but not distinctly truncated. Occiput bare in the middle above, elsewhere densely white pollinose. Thorax sparsely white pollinose, a stripe of white pollen above the coxæ. Scutellum with a stripe of white pollen at its base. Abdomen with hind margins of segments one to six bordered with white, becoming less extended on each succeeding segment, sides of first segment with a cluster of white pile; in certain lights a large portion of the abdomen appears to be white pollinose; venter lightly white

pollinose. Tibiæ with the extreme base yellowish; pulvilli very large, whitish. Wings wholly hyaline, small crossvein at or slightly beyond the middle of the discal cell; tip of second vein curving forward and meeting the costa at an obtuse angle. Halteres brown, the knobs light yellow; in front of each is a dense cluster of white pile. Genitalia consisting of a globular lower piece surmounted by a narrow shield-like piece which on either side is prolonged backward into two quite long and rather broad processes truncated at their tips, the latter curving toward each other. Length 3.5 to 4.5 mm. Los Angeles and San Diego counties, Cal. Eight males, in May and June, resting upon the bare ground in the hot sunshine.

This species will be readily distinguished from the other two described species by the color of the legs, as well as by the rounded tip of the third antennal joint.

D. W. Coquillett.

CONTRIBUTIONS TO WEST AMERICAN MOLLUSCA.—I.

In this series of papers it is intended to present in connected form stray notes on the mollusca of the Pacific Coast, with bibliographical references, and especial attention to geographical distribution. In this first contribution we have to enumerate various new species founded by my friend, Dr. R. E. C. Stearns, in a paper published in the Proceedings of the United States National Museum (xiii. 205-225), entitled 'Descriptions of new West American land, fresh-water and marine shells, with notes and comments.'

HELIX (ARIONTA) COLORADOENSIS Stearns, Proc. U. S. Nat. Mus. xiii. 206, pl. xv. figs. 6, 7, 8. Grand canyon of the Colorado, opposite the Kaibab plateau, at an elevation of 3,500 feet. Allied to *H. remondi*.

HELIX (ARIONTA) MAGDALENENSIS Stearns, l. c. 208, pl. xv. figs. 11, 12, 13. Magdalena, Sonora, Mexico. Allied to *H. rowelli*.

HOLOSPIRA SEMISCUPLA Stearns, l. c. 208, pl. xv. figs. 1, 4. Near San Carlos, Chihuahua, Mexico. Closely allied to, if not a variety of *H. coahuilensis*.

HOLOSPIRA ARIZONENSIS Stearns, l. c. 208-9, pl. xv. figs. 2, 3. Dos Cabezas, Arizona.

MELANIA (?GONIOBASIS) ACUTIFILOSA Stearns, l. c. 211, pl. xv. fig. 9. Eagle Lake, California, at an altitude of 5,115 feet.

CYCLOTHYCA Stearns, l. c. 212. New subgenus of *Capulus*, with *C. corrugata* for type.

CYCLOTHYCA CORRUGATA Stearns, l. c. 212, pl. xv. figs. 5, 10. From west coast of Nicaragua.

MITRA (? COSTELLARIA) NODOCANCELLATA Stearns, l. c. 213, pl. xv. fig. 14. Gulf of California.

VENERICARDIA BARBARENSIS Stearns, l. c. 214, pl. xvi. figs. 3, 4. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENERICARDIA BOREALIS Conrad, Am. Con., 39 (with fig.); Stearns, l. c. 215, pl. xvi. fig. 8; Gould, Inv. Mass.; Arcturus rudis Humphrey MS.; Cardita vestita Deshayes. Circumpolar.

VENERICARDIA VENTRICOSA Gould. Stearns, l. c. 216, pl. xvi. figs. 5, 6. Puget Sound.

MIDON PROLONGATUS Cpr., *Annals and Magazine of Natural History*, 3d ser., xiv. 424; Stearns, l. c. 217, pl. xvi. figs. 7, 9. Neeah bay, and Middleton island.

LUCINA ÆQUIZONATA Stearns, l. c. 220, pl. xvii. fig. 34. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENUS (CHIONE) EFFEMINATI Stearns, l. c. 221, pl. xvii. figs. 1, 2. Panama bay.

PERIPLOMA DISCUS Stearns, l. c. 222, pl. xvi. figs. 1, 2. San Pedro, Long Beach and vicinity, Los Angeles county, California.

PERIPLOMA ARGENTARIA Conrad, *Jour. Phila. Acad. Nat. Sciences*, vii. pt. II (1837), 238, pl. 18, fig. 8; Stearns, l. c. 223, 224. Dr. Stearns treats this as synonymous with P. PLAIUSCULA Sby.

PERIPLOMA PLANIUSCULA Sby., Proc. Zool. Soc. London, 1834, p. 87; P. argentaria Conr., l. c.; P. alta C. B. Adams; P. Centicularis Sby.; P. excurva Cpr.; P. excurvata Cpr., British Ass. report, 1856, p. 287. Synonymy as given by Stearns, l. c. 224. Pacific coast south of Point Conception.

? PERIPLOMA PAPYRACEA Cpr., Proc. Zool. soc. London, 1856, p. 229. Stearns (l. c. 224), mentions this as a West American species belonging to Carpenter's Mexican and Panamic province.

HELIX (ARIONTA) CARPENTERI Newc. variety INDIENSIS L. G. Yates, Nautilus, iv. 63 (also p. 51); Orcutt, Nautilus, iv. 67. Indio, San Diego county, California, in the Colorado desert region. Dr. Yates bases this variety on specimens collected by Dr. Stephen Bowers. Specimens collected in the same vicinity by the writer I have referred (Orcutt, l. c.) to H. Traskii, of which I consider it to be a well marked variety. Dr. Stearns (l. c. 206) refers to H. carpenteri as a synonym of H. remondi, so that Dr. Yates' variety will have to be referred to that, or a related species.

HALIOTIS RUFESCENS Swains. Hemphill, Nautilus, iv. 59; Orcutt, l. c. 67. The geographical range is quoted as from Mendocino county to San Nicholas island, California, and Santo Tomas landing, Lower California.

Lathyrus Splendens.

CYPRAEA (LUPONIA) SPADICEA Cpr., Nautilus, iv., 54, 71. The Santa Barbara channel is given as the most northern station yet recorded for this species. Seventy-five fine living examples are reported as found in one day some 15 or 18 miles northwest of Santa Barbara. Point Concepcion, forty miles north, is suggested as possibly its northern limit. Miss Ida M. Shepard (Nautilus, July, 1890) records it from near Long Beach, Los Angeles county.

BYTHINELLA HEMPHILLI Pilsby, Nautilus, iv. 63. Near Kentucky ferry, Snake river, Washington. Allied to *B. aldrichi*.

C. R. Orcutt.

LATHYRUS SPLENDENS.

(From *Vick's Magazine*, xiv. 220.)

California has doubtless furnished a greater variety of lovely wild flowers and beautiful plants that have gracefully yielded to cultivation than any other State in the Union. Annually new members of her floral circle win their way into our gardens and a permanent place in our affections. One of these latest introductions, known for years among the simple mountain people of Southern California as the 'Pride of California, has become widely recognized as well worthy of the name.

This is the deep rose-red to crimson flowered perennial pea, *Lathyrus splendens*, named many years ago by one of the charter members of the California Academy of Sciences, Dr. Albert Kellogg, whose memory is held in reverence by those who knew his pure life. For many years after this handsome vine had received its name it was completely lost sight of by botanists, until its very existence was doubted, and in the great work on the flora of California (Watson's Botany) was treated as a synonym.

In the spring of 1882, a party of several botanists, including the late Dr. C. C. Parry, started from San Diego to explore the then little known peninsula of Lower California. Just below the line, in a rocky canyon, we discovered this magnificent flower ornamenting the evergreen bushes along the watercourse with its graceful and brilliant blossoms. Dr. Parry at once shouted, it is Kellogg's *Lathyrus splendens*, and such it proved to be.

Many times since have I seen it clambering over the bushes on the higher table lands of Lower California, beside some perennial stream, or bordering a dusty highway. In the mountains back of San Diego, this year (1890), it was one of the few wild flowers that had 'watched the old year out and the new year in.' It was in its

greatest splendor in April, when the bushes for miles and miles were heavily loaded with its showy blossoms; on the 15th of June I plucked evidently the last cluster of the season.

The beloved botanist, Dr. Asa Gray, had the pleasure of admiring and picking this flower in our garden, on his last visit to California. Though Dr. Parry, at the time of its rediscovery in 1882, introduced it to the attention of European horticulturists, by whom it was well received, it was not until last year that this, the loveliest vine in the west, received attention in America.

It is considered hardy, blossoming the second season from the seed, forming a strong vine, capable of covering a veranda or arbor. Dr. Parry, after seeing it covering a porch in San Diego with its luxuriant foliage and profuse blossoms, pronounced it the handsomest plant in the West. Well may it be called the pride of the two Californias—Upper and Lower—and a fit representative of two republics.

C. R. Orcutt.

PUGET SOUND AND ALASKA.

Nearly all the shores of Puget Sound are about alike. Wooded, rolling back to the mountains, they form a setting to a rather nice scenery. The height from the water's edge to the top of the bluff varies from a few feet to a hundred. Every where you see evidences of a vast glacial drift, composed of round pebbles, boulders and sandy loam. The general color of soil is reddish yellow. On top of this grows the gigantic firs, two to three hundred feet high. At Snohomish City, Wash., there is a cut in the railroad that is lined with marine fossils, Cretaceous, I believe. There are clams, razor shells, mussels, worm cases and tubes, and a trace of coal is found, also some broad leaves resembling flags. This cut is about 200 feet above Puget Sound, and the same shells are found there today. The coal fossils at Wilkerson are known and described. Coal is found plentifully, adjacent to the sound, and iron further back. The journey to Alaska should be taken by every naturalist that can do so. Its glaciers, mountain peaks, broad rivers and other novel features should be seen. The Treadwell gold mine, well known as one of the largest and richest in quantity of ore is opened in the side of a high hill. The ore is low grade, but easily got out and pays well. The fauna of this country is very interesting and varied. Black bear have been shot from the steamers' decks, going through the Narrows. The glaciers, probably because they break off in the bay, cannot be surpassed in beauty and size.

U. L. Hertz.

RHODODENDRON OCCIDENTALE.

This beautiful flowering shrub extends from Oregon southward throughout California, to the mountains of San Diego, but has not as yet been reported from Mexican territory. It grows from two to sometimes twelve feet high, rarely more than six feet, however, and covers the hillsides and tangled meadows of the sierras at from three to six thousand feet altitude.

In its magnificent display of flowers during June and July it defies description, surpassing the finest oleanders and azaleas in its beauty and profusion. Its masses of beautiful and fragrant flowers are showy and attractive, the hundreds of flowers, two to three inches in diameter, completely covering the bushes for weeks at a time.

The flowers are white, or commonly rose-tinged, variegated by a pale yellow band. The shrub is of easy cultivation in rich moist soil, and should receive treatment similar to our better known garden azaleas. Although deciduous, it is worthy of attention among ornamental plants on the Pacific Coast. 'Like the oleander the plant is poisonous if eaten by children or animals, but no bad effects ever result from handling it or using the flowers.'

INDIAN METHOD OF PREPARING WOOL AND COTTON.

It was my misfortune to be sick with intermittent fever, in October, 1870, at the village of Achiabampo, Sonora, on the Gulf of California. The village of Achiabampo has two distinct divisions, one inhabited by Mexicans, the other by Indians. The Indians will trade with and work for the Mexicans, but will not allow their houses to be near the habitations of Mexicans. There was but one hotel in the village, kept by a Mexican, at the edge of the Mexican part and near the Indian portion of the village.

During my convalescence I was interested in watching what transpired in the Indian quarters, and particularly in observing their method of preparing wool. The method was the same as applied to cotton by Indians on the Atlantic side of Mexico, which I had previously seen.

An Indian's blanket by day serves him as an overcoat, by night for cover, and wool is to him of great importance. He is willing to bestow much labor upon its preparation.

I am of the opinion that the method of preparation is of ancient origin, though wool was unknown to the Indian before the advent

of the Spaniard, since these same people, I was informed, clean cotton in the same manner, some growing cotton in their fields, or buying from other Indians and Mexicans.

In the preparation of wool a small hide is placed in a convenient place on the ground, with something beneath its center to raise it a few inches from the ground. The wool is, of course, previously washed and now placed in the center of the hide. The operator—a woman—takes a kneeling posture and proceeds to thrash the wool with a long, well seasoned stick, strong and slightly larger in the center than at the ends.

With each measured stroke the stick is brought low by the right hand while the left hand is brought in contact with the wool, the thumb and finger encircling the stick, which is withdrawn through the left hand, thus preventing the wool from scattering during the thrashing process. It is a slow process, but these patient people are equal to the task and the wool is brought into the same condition as if prepared by machinery.

In the preparation of cotton, the Indians have first the slow and tedious task of separating the seeds by hand, before submitting the cotton to the slow, measured strokes of the Indian lady who represents the Indian cotton gin. The steady measured stroke and the withdrawal of the stick through the left hand prevents the scattering of the lint, which one who has not seen the operation might expect.

Slow as the process is, it has for many years answered the requirements of these people, and by patient labor they are enabled to accomplish much in a single day.

To a stranger it is an interesting sight to watch these simple people prepare their wool and cotton for spinning, with only a stick, patience and long experience to bring about the desired results.

Edward Palmer.

SEA PANSIES.

One of the most beautiful of the organisms on the Pacific Coast is the *Renilla amethystina*, or sea pansy, as it is very appropriately called. It is really a community of coral-like animals living in a structure somewhat of the size and shape of a pansy flower, with a short stem that further carries out the resemblance.

The color of the main structure is of a rich royal purple, while the jelly-like animals themselves are white, and peeping out from their doorway appear like stars in the firmament of the heavens.

These communities are not rare on our sandy shores, but may

only be found by accident by those who have not learned the secrets of marine life. At low tide they may be found buried in the sands, with nothing to indicate their presence but an imperfectly circular line in the smooth-washed surface of the beach that only a trained eye is likely at first to detect.

If one of these sea pansies is removed from the sand and placed in a dish of sea water, the creatures that form the community will soon manifest life, and reveal a most beautiful structure showing plainly their relationship to the coral 'insect.'

Each individual polyp in the community will be found to possess eight long fringed tentacles around a narrow disk. The numerous individuals of each community are arranged on the upper surface of a flattened cordate fleshy structure, to the lower surface of which is attached a stem like organ, useful alike as a means of locomotion and for the anchorage of the tenement house in the sand.

The sea pansy is a near ally of the sea pens and the sea fans—which latter are branched and resemble beautiful flowering shrubs or plants. The organ-pipe coral belong to the same group of polyps according to some systems of classification. A hundred years ago the corals were all thought to be plants, as they closely imitated almost all kinds of vegetation, but they are now regarded as true animals.

THE LOQUAT.

The loquat, a beautiful evergreen tree native to China and Japan, was first named by Joseph Hooker, *Photinia eriobotrya*. It has received other names, like *P. japonica* and *Eriobotrya japonica*, and is now generally known under the latter name, though the first has priority and there seems no good reason to give it generic rank.

It is perfectly hardy on the California coast, south of Marin county, and may be grown further north if given slight protection.

It has been incorrectly called the Japan plum, but this name has been wisely discarded by California horticulturists who unite in calling it by its proper name, loquat.

It is remarkable for its refreshing fruit, which is elongated in shape, about two inches in length, pale yellow in color, with a very peculiar flavor, 'combining that of the tamarind and pineapple, and is highly agreeable.'

The tree is easily raised from the seed or may be grafted upon its own stock or on the quince. It does not require any particular soil apparently, and at maturity will bear from twenty to thirty

pounds of fruit to the tree. The fruit is in most demand among the Chinese, but when it becomes more generally cultivated and better known it will be in demand among all classes, and will readily bring a good price.

Hitherto the loquat has been mainly planted for ornamental effect as it is a grand bush for scenic effects. The fruit begins to ripen in late spring and continues through several months. The seed forms the larger part of the fruit, and one who eats the luscious pulp only wishes there were more of it and less seed. Seedlings are very variable and a variety with a small seed might be produced and propagated from it by budding to the pecuniary profit of the originator.

The tree seems to be free from insect pests. *Photinia villosa* is another native Japanese fruit, edible and pleasant, but not yet sufficiently known in this country. The loquat thrives in Santa Barbara, Los Angeles and San Diego counties, in California, and will doubtless do well in Arizona and New Mexico.

THE POMEGRANATE.

One of the most familiar of the mission fruits of California, is the ruby-red fruit of *Punica granatum*, a shrub native to the north of Africa, and to southwestern Asia, where it extends up the sides of the Himalayas to an altitude of 6,000 feet.

Its value as a hedge plant is great, but this use is often overlooked. As an ornamental evergreen bush it ranks high, its well-known showy habit recommending it to every eye. With its rich colored flowers, and the peculiar, cooling fruit, it is welcome and allowed to flourish in all the older Mexican gardens, and the fruit may be found for sale in our larger markets, mostly being in demand among the nationalities of the south of Europe.

We believe the shrub is grown in Oregon and Washington, but only for ornament.

The bark of the pomegranate contains 32 per cent. of tannin and is used for dyeing the yellow Morocco leather, and the outer rind of the fruit is also used as a dye.

The pomegranate is perfectly at home in Arizona, where it may be found in many gardens. The fruit varies in color from nearly white (inside) to dark ruby red or wine color, the darker fruits when crushed in water making a pleasing drink, like lemonade—the lighter colored fruits not being so sour. The commoner variety in cultivation is of a bright orange color. C. R. Orcutt.

THE GRANADILLA.

There are several species of the Passion-flower grown in Mexico for their edible fruit, that are deserving of a trial in California.

The best known species of the granadilla is *Passiflora edulis*, a native of the southern part of Brazil, which has already been planted in several places in California. The flower is of medium size, whitish with a faint tinge of blue,

It is a strong-growing vine, bearing flowers and fruit almost the year through, the fruit of the size of a small hen's egg, pale purple, useful for making into jelly, when ripe the fruit has an 'acid cooling flavor.'

There are about two hundred species of Passion-flowers recognized, native to various portions of America from the southern United States to Brazil, in South America. Some of the species are exceedingly handsome vines and prized for their magnificent flowers.

One of the most commonly cultivated species of the granadilla-fruit is *Passiflora quadrangularis*, also a native of Brazil. One species (*P. macroptera*) produces an edible fruit weighing eight pounds apiece.

May-pops of the southern states is the fruit of *Passiflora incarnata*. The fruit of *P. ligularis* has been pronounced as one of the finest fruits in existence.

Many of the tropical species are natives of mountainous regions and will endure our mild temperate climates, and the strong-growing vines, with the curious and beautiful flowers are well adapted for covering various structures and may be rendered both useful and ornamental. But nowhere in the United States do they attain a greater luxuriance than on the Pacific coast. Our national colors are reproduced in the red, the white and the blue flowers of the several rival varieties.

C. R. Orcutt.

WOMEN IN SCIENCE.

(Read before the Pacific Coast Women's Press Association.)

Women eminent in Science have received more praise for what they have done than is their due. Comparatively speaking, so few women have entered this field of knowledge that when one does accomplish somewhat she is as loudly lauded as the precocious child. But in science as everywhere else in the domain of thought women should be judged by the same standard as her brother. Her work must not be simply very well done *for a woman*.

In the limited time at my disposal today I shall confine myself almost wholly to those whom I have met or whose work more o_r

less closely touches my own. I shall not, therefore, be at all exhaustive. But I cannot refrain from saying a few words of Mary Somerville whom I believe to have been not only the most eminent woman in Science of her time, but of all time. Her love of science was not the outgrowth of a regard for some person whom she might assist as was the case with her contemporary, Caroline Herschel, and most women who have entered the field of science.

Indeed, love of scientific study, especially higher mathematics, led her to persevere against the wishes of her friends and the popular prejudice against the higher education of women which her first husband shared.

She did not, however, begin to publish until urged to do so by friends who wished her to contribute a volume to the Society for Diffusing Useful Knowledge. In his letter to Dr. Somerville asking if Mrs. Somerville could not be prevailed upon to write an account of Laplace's Mechanism of the Heavens, which should give to the unlearned some insight into this work, Lord Brougham paid her the high compliment of saying that it must be left undone unless Mrs. Somerville would undertake it, as there was none other capable of doing it. At the earnest solicitation of her husband she finally consented to undertake the work. Of it she herself has written: 'Thus suddenly and unexpectedly the whole course of my life was changed. I rose early and made such arrangements with regard to my children and family affairs that I had time to write afterwards; not, however, without many interruptions. A man can always command his time under the plea of business, a woman is not allowed any such excuse.' In this last expression has Mrs. Somerville shown why so few women have become eminent in science. While she was thoroughly a womanly woman devoted to her family, enjoying society and mingling freely in it, fond of the theatre and of travel, she despised the small talk of the gossip, and was one not to indulge in frittering away her time. I must also call your attention to the fact that Mrs. Somerville's second husband, himself a classical scholar and a scientist, had no ambition for himself but chose to assist his illustrious wife in revising her MSS., correcting the proofs and verifying her results—in short, to do for her what most women of ability do for their husbands.

Dr. Maria Mitchell, professor of astronomy at Vassar, has so recently been brought to the notice of everyone at her death that it is not necessary to recount her achievements.

The direct influence of woman upon the natural and physical sciences has been little felt; but indirectly women have done a great deal. First, as helpers of their masculine friends; secondly, by

popularizing science, especially in compiling books for children; and thirdly, by subscriptions in aid of science.

A very large per cent. of those pursuing biological researches have been led into these lines by a course in medicine, and it is rather rare to find a naturalist who may not claim the title of M. D. As women have not been admitted to medical colleges until during the past few years this fact may account very largely for the non-appearance of women's names in the proceedings of museums and scientific societies. It is an almost startling fact that, among the one hundred and fifty contributors to the pages of the proceedings of the United States National Museum during the eleven years of their publication there appear the names of only three women—two on ichthyology, one on mollusca. In the publications of the British Museum I am not acquainted with the papers of any woman, and it is so with most of the scientific societies of foreign lands. The Royal Society, however, is a notable exception, and during the five years between 1882 and '87 four women have published papers on histological subjects in the Royal Society's proceedings.

Several of the western academies of science have women on their membership lists who write for the proceedings of these societies. A notable example is that of the Natural History Society of Wisconsin, which has published a number of contributions to our knowledge of the *Attidæ* or Jumping Spiders by Professor G. W. and Elizabeth G. Peckham. The work of Professor and Mrs. Peckham is not only descriptive, but they have carried on extensive experiments with regard to the habits of the arachnids.

To Professor and Mrs. Louis Agassiz must the credit be given for placing an entering wedge for women in science not alone for the State of Massachusetts but for the United States as well. In 1873 Professor Agassiz inaugurated a summer school of science on the island of Penikese, in Buzzard's Bay. Here 50 young students gathered, about 20 being women. A few of the young men from some of our eastern universities unused to seeing women in college, entered a protest against their presence at Penikese. Agassiz did not at all share their feeling and at once put a stop to it. Learning who the students were he announced the first morning at breakfast that the launch was then ready at the wharf and certain gentlemen, whose names he called, would leave. No entreaties on the part of both ladies and gentlemen of the school would alter Professor Agassiz's decision. Women were here admitted to the study of nature on equal terms with men.

I have been personally acquainted with six of the women who

were at this island school of Agassiz. The wife of Dr. David S. Jordan, president of the Leland Stanford Junior University, then Miss Susan Bowen was professor of zoology at Mount Holyoke at the time of her marriage. Although Mrs. Jordan's home and social duties took much of her time so that she did not carry on researches independently she was enthusiastic in aiding her husband in his scientific work. She died in November, 1886. Her chair at Mount Holyoke is filled by Professor Cornelia M. Clapp.

Mrs. Fanny Bergen since studying with Agassiz has, with her husband, written a most readable little book on The Development Theory. For the past twelve years she has been an invalid and confined to the room. Notwithstanding this serious drawback to work of any kind Mrs. Bergen has steadily published on scientific topics and her series of papers on Animal Lore which appeared in the *Popular Science Monthly* have been a contribution to science.

Prof. and Mrs. H. H. Straight spent their first days of married life at Penikese, which has been a delightful memory, as it was an inspiration for the two who were already turning to science teaching in the normal school at Oswego, New York. Prof. Straight was later at the head of the scientific department in a school of Illinois, but by exposure and overwork he brought on consumption whereupon Mrs. Straight took his place. At his death she was desirous of continuing the work to carry out the plans her husband had made; but she was appointed to a position in Japan, where, with her two little children, she now is.

Lydia W. Shattuck was the most notable teacher of botany Mt. Holyoke has had, but death has cut short her scientific career.

Susan Hallowell has been professor of botany at Wellesley College ever since her summer at Penikese.

Mrs. Zella Reid Cronyn, now living in Massachusetts, was for some time principal of the public schools of San Diego. She encouraged her pupils to form a cabinet and to study the specimens collected and helped them to found the Historical Society, since merged with the Society of Natural History. Whether most of the women who had the good fortune to be among the number instructed by Agassiz have become teachers of science I do not know. Certain it is that now, after nearly twenty years, they are not prominently known in the world of science. Indeed not one of the number has made so brilliant a reputation as have many of the men, for we count among the most distinguished scientists of America some of those who shared the teaching of him whose genial face and almost magic gift of teaching are known throughout the breadth of his adopted land.

Mrs. Louis Agassiz has contributed to scientific literature in writing jointly both with her husband and son. 'A Journey in Brazil' is very largely the work of Mrs. Agassiz, who accompanied her husband during his entire journey and kept full notes of all that occurred. 'Seaside Studies in Natural History,' a most charming book, was written by Mrs. Agassiz and Dr. Alexander Agassiz. Mrs. Agassiz has also written on natural history topics for children. Her 'Life and Letters of Louis Agassiz' may well be classed with her scientific work. It is so happily written that it is as interesting as a novel, and one lays it down with a kinder feeling for the world.

The island school so auspiciously begun by Agassiz was abandoned after the second year, as the island proved to be too inaccessible. Outgrowths of this famous school of science are the various marine laboratories of the eastern United States, chief among which is the one at Woods' Holl, Massachusetts, first opened to students in June, 1888. The present tendency in biology to investigate the life histories and to study the minute structures of plant and animal life is largely due to the influence of our Grays and Agassiz, and the opportunities afforded at these schools by the sea-shore. Among the women who have been studying at Woods' Holl during the three summers this laboratory has been open I may mention the following: Professor Cornelia M. Clapp, of Mount Holyoke College, who was also at Agassiz's Penikese laboratory, has spent every summer at Wood's Holl. She prepared her material for study during the first summer and is now writing her paper On the Lateral Line of *Batrachus tau*, one of the toad fishes. Miss Platt, a student at Bryn Mawr, formerly of Harvard, last summer at this laboratory was studying the development of the brain of the shark. She has gone to Germany to continue her investigations. Miss Marcella I. O'Grady, a professor at Vassar, was working on the problem of Kupfer's Vesicle. Miss Randolph is now in Germany; at Woods' Holl she was studying the embryology of *Spirorbis*.

Science is exacting, requiring the devotion of months and even of years to the completion of a series of observations which, sometimes, must be carried on with little or no interruption; therefore we much more often find women popularizing the results of students of science, rather than adding to the positive knowledge of the world by studies and researches of their own. So many women have written popular books on natural history, especially for children, that I shall not attempt to name them.

There is the tendency at present for women to work out for themselves problems in the physical world independently of their

brothers and husbands which is no doubt due to the training in our higher universities which young women now receive almost, or quite as fully as young men. The school for the collegiate instruction of women at Cambridge, generally known as the Harvard Annex, gives to women as full advantages in scientific study and research as to men, except in the department of cryptogamic botany. Three or four of these Harvard women, if I may so term them, are now preparing papers embodying the original research of several years—Miss Henchman and Miss Platt in the department of animal morphology, and Miss Reul in botany.

Although women, as a usual thing, have not pursued long continued researches in science, they are furthering the progress of science very largely by bequests and special funds. Indeed, I do not know but they are doing more in this way than men. Professor Goodale, of Howard, conducts a large botany class of Boston women. Some of them in their zeal contributed so largely to that department of Howard College that it was possible to push to completion the museums and laboratories of botany as otherwise would have been out of the question.

In 1881 a marine biological laboratory was established at Anisquam, Mass. This was the work of women of Boston. Afterward it was thought best to establish another at Woods' Holl, but during the winter of 1887-8 these women were instrumental in organizing a lecture course in science in aid of the laboratory. They were eminently successful, and in June, 1888, the Marine Biological Association opened the doors of the new laboratory to students. I have already given some account of the women who have studied here during the past three summers, which, like the earlier Penikese school, is open to both sexes. However, as might be expected, a larger number of men avail themselves of the unequalled advantages of the place. There have been attracted to it the most prominent biologists of America, professors and teachers of science whose reputations are already established, finding here not only unexcelled facilities for prosecuting their investigations during the summer vacation, but also the opportunity to confer with their colleagues. Thus has this work of women—the Woods-Holl Biological Laboratory—been of paramount importance to science.

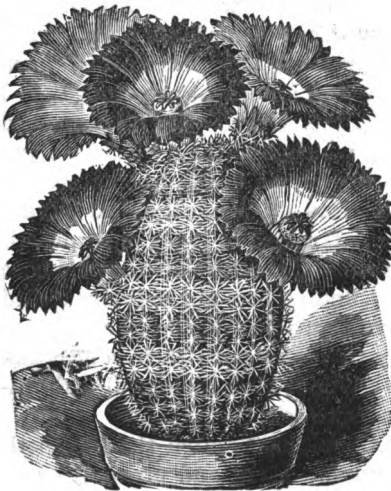
Mrs. Thompson, of Stamford, Conn., has created the Elizabeth Thompson Science Fund 'for the advancement and prosecution of science in its broadest sense.' The fund now amounts to \$26,000. The income from this amount is annually distributed by the trustees of the fund to applicants who are making scientific investigations irrespective of the country wherein they are carried on, the

foreigner, then, having an equal chance with the American naturalist. 'This endowment is not for the benefit of any one department of science, but it is the intention to give the preference to those investigations which cannot otherwise be provided for, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance.' About 30 grants for specific purposes have been made from this fund to investigators in various parts of the United States, in England, Scotland, Germany, Italy and Canada. The investigations were in meteorology, chemistry, physics, medicine, psychology, paleontology, physiology, entomology, zoology, astronomy, history and cooking. Only one of these grants is for investigations by our own sex, and that one is \$300.00 for experiments on cooking. *Rosa Smith Eigenmann.*

THE RAINBOW CACTUS.

(From the Rural Californian, xiv, 261.)

The *Echinocereus candicans* of American catalogues is certainly one of the most beautiful of the many varieties of cacti now known in cultivation. In beauty of spines and brilliancy of flowers it can



RAINBOW CACTUS.

scarcely be surpassed or even equalled by any known species. The plant is three or four inches in diameter and from a few inches to probably more than a foot in height. Plants in my possession are five inches high and about four inches in diameter. The plant is closely enveloped by a network of stiff spines borne on the twenty or more narrow ribs of the plant, in clusters of twenty or more. The spines range in color from an ivory whiteness to deep crimson, the colors alternating in rings around the plant and thus giving origin to its popular name of the rainbow cactus.

It blooms profusely—a plant six inches in height often bearing a dozen flowers, and each flower measuring from three to five inches

across. The flowers are of a bright crimson, shading to white toward the center. Its culture is easy, as is the case with most cacti.

It is a native of the southeastern part of Arizona and Sonora, Mexico. The spines are said to be in individual plants at times wholly white, and again, all the spines on a plant will be of a blood red or crimson color.

The true *Echinocereus candicans*, Gill, is a native of the region of La Plata, South America, and when young is of a globular form like an *Echinocactus*, closely covered with very long spines. Our rainbow cactus has been described by Dr. Engelmann under the name of *Cereus pectinatus* var. (?) *rigidissimus*, but it seems to the writer as worthy of specific rank. The following detailed descrip-



C. PECTINATUS.

tion is subjoined: Plant ovate-cylindrical; ribs 20 to 22, slightly interrupted; areolae linear-lanceolate, crowded on the ribs, somewhat woolly when young; spines all radiating, interwoven, recurring from the bulb-like base, awl shaped, very sharp, rigid, white, yellow or red, pellucid; lateral spines long, stout, 12 to 16 in number; the lower spines short, upper ones 3 to 6, bristly, shorter, fasciculate. Flowers produced from the side of the plant beneath the summit; ovary with 50 to 60 clusters of small rigid spines; aepals forming a tube, 60 in number, the 40 inferior ones subulate, the upper 20 lanceolate-acuminati; petals under 20 in number, purple; stigmata less than 12, green; fruit ovate to globose, spiny; seeds tuberculated. From Sonora and Arizona. Differs from C.

pectinatus mainly in its larger and more robust growth, in the absence of central spines and the rigidity of the long radial spines, one fourth to one half inch long.

CEREUS PECTINATUS Engelm.—Plant ovate-cylindrical; ribs 18 to 23; areolae lanceolate; radial spines 16 to 20, subrecurved, pectinated, tips rosy; central spines, 2 to 5, short; flowers purple with 60 to 70 clusters of 10 to 15 rigid spines on the ovary. The flowers are two to three and a half inches across and very fragrant—one flower is said to scent a whole house. The plant is of caespitose growth as shown by the illustration and one cluster will bear a large number of flowers in a single season. Single plants will often bear a dozen or fifteen flowers, and four or five may open in one day.



CEREUS CAESPITOSUS.

VAR. ARMATUS POSEL.—Ribs 15 to 16; radiating spines 16 to 20 with a single central spine longer than the rest. This variety is described from Monterey, Mexico, and is little known. Engelm. was in doubt as to whether it was a form of this species or of *C. caespitosus*.

VAR. RUFISPINUS is a horticultural variety with beautiful pink spines, otherwise probably not different from the typical form.

VAR. ROBUSTUS of Sonora and Arizona is another horticultural name for the rainbow cactus, for which Engelm. name should receive preference.

Cereus pectinatus, and *C. caespitosus* also, are often grafted on *Cereus grandiflorus*, presenting a rather curious appearance. They are much more beautiful, however, in their natural condition, and there is nothing to be gained by the grafting process except an oddity and an unnatural growth.

CEREUS CAESPITOSUS Engelm.—A near relative to the preceding in this small but beautiful plant. One of the most profuse bloomers and in itself a perfect gem, it is not strange that the plant is a general favorite wherever introduced. It will retain vitality for a year without roots or potting. It seldom exceeds six inches in height, but when scarcely an inch high has been known to bear four large purple flowers at a time!

Plant cespitose, ovate-cylindrical; ribs 12 to 18; areolae lanceolate; radial spines 20 to 30, straight or slightly recurved, pectenated, white; central spine rarely present, when present very short. Tube of the flower purple, 80 to 100 clusters of 6 to 12; fine hair-like spines on the ovary.

VAR. MINOR Engelmann, spines short, flower small.

VAR. MAJOR Engelmann, spines long, flower large.

VAR. CASTANEUS Engelmann, spines red or chestnut color.

This species inhabits Texas and northeastern Mexico as far south as Monterey, and is now common in cultivation.

Cereus adustus, *C. infispinus* and *C. longisetus* are other red-flowered species of *Cereus* found in the United States, and belonging to this section of the genus. By some authors these species are placed in a separate genus, *Echinocereus*, but the writer prefers for the present to treat them as constituting only a sub-genus of *Cereus*.

C. R. Orcutt.

COMPANIONSHIP.

'He that walketh with wise *men* shall be wise, but a companion of fools shall be destroyed.' Prov. 13: 20.

'Tis said in tales of orient lands,
The very soil exhales
The dainty fragrance of the rose,
Whose bloom there never fails.

Oh, if from the unconscious clod,
Where beauty weaves its bower,
Ambrosial air shall sweetly spring,
To honor thus a flower;

How wide the power of mind oe'r mind,
And blest are they who know,
The fragrant paths where wise men walk,
And with them wiser grow.

More than in classic groves to stray,
The presence of wise friends,
Sweeter than Asian sweet waters,
The blessing that descends.'

—Mrs. E. E. Orcutt.

AN OREGON MOUSE.

Frederick W. True has recently described a new species of mouse in the Proceedings of the U. S. National Museum (xiii, 303-4), from a specimen sent by the writer to the Smithsonian Institution, to which the name *Phenacomys longicaudus* has been given. The following description of this interesting animal is taken from Mr. True's paper:

Size moderate, about equalling that of *Hesperomys leucopus*. Ears moderate, nearly concealed by the surrounding fur. Hind foot not relatively longer than in the other species of the genus. Tail long; with the hairs, equal to the body in length.

Color above nearly uniform bright rusty brown; only the tips of the hairs are of this color, the remainder being dark plumbeous. Mixed with the brown-tipped hairs are numerous longer black hairs. Under surfaces white, slightly tinged with rusty brown, especially on the abdomen. The hairs of the throat are white to the base, but elsewhere they are only tipped with light color, the lower portions being plumbeous.

The tail is dusky chocolate-brown above and below. Fore feet brown, like the upper surface of the body; toes more or less dusky. Hind feet similar, but the toes more dusky. A spot on the outside of the metatarsus lighter than the rest of the foot. A portion of the whiskers dusky, the rest whitish. Nose dusky.

Measurements. (Dry skin No. 13373, type).—Total length, 148mm; tail, with hairs, 62mm; hind foot, 20.2mm; ear from behind, 4.6mm.

The skull belonging to the type is badly broken, and it is only possible to give the dimensions of some of its parts.

Measurements of the skull.—Length of the crowns of the upper series of molar teeth, 5.8mm; lower molars, 5.7mm; length of nasal bone, 6.6mm; breadth of interorbital construction, 2.8mm.

The molar teeth resemble those of *P. intermedius*, but the lozenges are narrower, and the external re-entrant folds of enamel in the upper molars are directed less backwards and those of the lower molars less forwards than in that species. The molars are rooted. The skull is that of a youngish individual.

Regarding the habits of this mouse, I would say that it seems to be almost exclusively arboreal, having only been taken, so far as I am able to learn, in the branches of the Douglas spruce. The type specimen was sent me from Marshfield, Coos county, Ore., by a friend, L. J. Cornelius, of Siuslaw River, who had shown me a nest of this, built about 60 feet from the ground in a small clump of

leaves and twigs, on a limb some six inches in diameter and about six feet from the body of the tree. On felling the tree about a year before he had captured one, which unfortunately had not been preserved. Of course I requested him to obtain one for me if possible, with the result that last summer, while in Coos county, he secured the specimen on which the species is based.

My first discovery of this animal was in June, 1886, in the valley of Elk Head, on the head waters of Elk creek, a tributary of the South Umpqua river, and some seven miles east of Voncalla, Douglas county, while out looking for birds' nests. I saw a nest which I took to be an old bird's nest, on the upper side of a branch in a clump of twigs some thirty feet from the ground. On throwing a stick at it to ascertain its character, I was surprised to see a mouse run out of it upon a twig, where it stopped. I threw again and succeeded in dislodging the little fellow, which, on capturing, I at once recognized as something new. I kept it for some time alive, secured the nest, and soon after sent it, with measurements, to the Smithsonian Institution, but unfortunately the package was lost, and I failed to secure another until the one described by F. W. True. I have, however, found their nests down Elk creek, along the Coquelle river, in Coos county, in southern Douglas county, and also on the upper Willamette tributaries, in Lane county, and believe it will yet be found in Washington and perhaps through the whole of the northern Pacific coast.

The nest is a novelty in itself, being about the size of a robin's nest, and built after the usual manner of mice in shape, but almost exclusively of the leaves of the tree in which it lives, which are split into threads from end to end, forming very slender filaments, seldom broken, and each leaf is frequently split twice or more, making from two to four threads of each leaf. These threads are soft, dry and apparently warm, and they show much ingenuity in the general make-up of the whole nest. Rarely has a few unsplit leaves, moss and twigs on the outside of the nest been found.

For some reason which I have not been able to discover, these nests seem to be frequently changed or deserted, from the fact that we frequently find in the woods and under lone trees of this variety, on the ground, small parts and at some times almost, as it appears, the entire nest; and I know of no other animal that has been known to split the leaves of this tree, as this one certainly does.

As to the food of this animal I can only surmise, as I did not dissect the only specimen I ever saw in the flesh, nor have I any clue farther than its habits of living in trees, but think it must subsist on the fruit of the tree, which is usually in fruit more or less all the

year, especially on those isolated and much branched trees which are found away from thick timber, and in which I believe it to be most abundant.

This conclusion is further verified by the relation of the teeth in the genus *Phenacomys* to the genus *Hesperomys*, which are rooted in both genera. The latter usually prefers grain to other food, and the teeth are more adapted for masticating hard food than the *Arvicolas*, whose teeth are not rooted and which feed on grass. From the tracks in the snow which I have seen at different times around the foot of the trees which it inhabits, and which tracks I think were made by this animal, I judge that it does not hibernate, and that it may to some extent feed on grass; but I have not been able to trace these tracks to any distance from the tree greater than two or three yards, neither am I positive that they were made by this animal.

Any information leading to a further knowledge of this interesting creature will be thankfully received, and we will be very grateful to anyone who will be kind enough to send us specimens or measurements. Alcoholic specimens or specimens in the flesh much preferred.

Aurelius Todd.

THE MESQUITE BEAN.

(From the *Pacific Rural Press*, June 7, 1890.)

One of the most useful and characteristic of the trees indigenous to the southern—Mexican—borders of the United States is the mesquite tree, also known vernacularly in some localities as the Cashaw, or *Algerobia* tree.

According to Dr. V. Havard of the United States army, this tree constitutes the principal growth of the wooded tablelands and high valleys throughout South and Southwestern Texas. It extends westward through New Mexico and Arizona to San Diego, California, and is found to the southward through Mexico, Central and South America to the southern parts of the Argentine Republic (exclusive of Patagonia).

Prosopis dulcis (Kunth) is probably the correct botanical name of our tree, though it is usually called *Prosopis juliflora* D. C., by American botanists. *Algarobia glandulosa*, *Prosopis horrida*, *P. juliflora*, *P. siliquastrum* and *P. glandulosa* are either synonyms or mere varieties, according to Bentham.

The mesquite is frequently nothing but a thorny, straggling shrub, growing in large impenetrable thickets near the coast or over the sandhills of the Colorado desert. Elsewhere in less exposed sit-

uations, it becomes a low, wide-spreading tree, 20 to 30 feet in height, with a trunk seldom over a foot in diameter, although sometimes found from two to three feet in thickness.

In the arid regions, where this tree is found in its best estate, this tree is most useful for the excessively hard, durable wood, valuable for fuel, in fencing or for other uses. Mesquite posts and rails are but slightly affected by exposure to the influences of ordinary weather. The trunk and roots as well are unsurpassed for fuel, making a hot fire, and in many sections, from California to Texas, is the most common, often the only obtainable, fuel. The wood is also useful in cabinet work, being heavy, fine-grained, and taking a fine polish, when it has the appearance of mahogany. It is richly colored, varying from purplish black in the center to a reddish brown and yellow near the bark.

The tree is also adapted for live fences; of rapid and easy growth in situations where scarcely any other tree will thrive, it can be made to form impenetrable hedges in a few years from the seed.

Baron von Mueller says: 'The variety *glandulosa* exudes a gum not unlike gum arabic, and this is obtained so copiously that children could earn two to three dollars a day in gathering it in Texas, latterly about 40,000 pounds being bought by druggists there.'

On the other hand, Dr. V. Havard in speaking of the mesquite tree of Texas, says: 'During the summer months the bark secretes an amber colored gum which has the taste of gum arabic, and like it makes excellent adhesive mucilage. Its solution in water is slightly acid and astringent; it is a useful and palatable drink in the diarrhoea of children. The quantity of gum secreted by each tree is not large enough to make it an important article of commerce.'

In California I have never observed the gum in any quantity. I have collected specimens of this gum that closely resembled jet in color and very hard when found—evidently caused to exude by fire.

The tree produces abundantly of its long and slender bean-like pods, with a thick and spongy mesocarp, sweetish to the taste. These pods contain from 25 to 30 per cent of grape sugar, 11 to 17 per cent of starch, 7 to 11 per cent of protein; of organic acids, pectin and other non-nitrogenous nutritive substances 14 to 24 per cent. They are also comparatively rich in potash, lime and phosphoric acid. The pods of several varieties are said to be rich in tannic acid.

Containing, as they do, more than half their weight in assimilable nutritive principles, these pods constitute a valuable article of food, and are one of the staples with many Mexicans and Indians.

The Cahuilla Indians, and also the Cocopahs of the Colorado desert region in California, gather large quantities of the pods annually, the time of harvest lasting from June into August, when the trees are frequently loaded with their golden wealth.

The squaws go out into the groves and bring back their 'hotls' (a large, coarse-mesh sack, resembling a hammock) and baskets full of the yellow pods. They then grind the pods in their stone mills or 'matates,' into a coarse meal or flour, remove the seeds and hard shells around the seeds, and then cook to suit their taste. Sometimes they boil the flour in water and make a gruel or pudding, but the larger portion of the meal goes to form large, flat cakes or loaves of bread which may be made to supply food for many months to come, and are easy for the nomadic tribes to transport.

This bread is very sweet and pleasant to the taste, with a pleasant, slightly acid and astringent, spicy flavor. A sparkling drink, called *aloja*, is also made from these pods. The Comanche and Apache Indians formerly used large quantities of an alcoholic drink—a weak beer—made by fermentation of the flour.

The mesquite beans (as the pods are commonly called) are relished by most herbivorous animals, and horses and cattle will eat them with avidity and thrive on them as a substitute for grain. They are likely to be more largely utilized as fodder for stock than as human food.

In this connection, it is worthy of note that the pods of the mesquite produced in the valleys near the coast are almost invariably thin and bitter instead of thick, sweet and nutritious, as are those grown in the more arid sections on the Colorado desert and eastward. Evidently a warm, dry climate is necessary to the best development of the fruit, the fogs and coast winds causing a very inferior product.

The delicate green, finely divided foliage renders this a very beautiful tree when in leaf, and it is well worthy of being extensively cultivated.

C. R. Orcutt.

THE TENT CATERPILLAR.

These common pests having been so very plentiful this year in this locality (Moosup Valley, R. I.), I resolved to make a study of them, not adding anything new, perhaps, to the cause of science, but satisfying myself as to their habits. At the usual time in early spring the webs began to show upon apple and wild cherry trees. It is said that the young caterpillars feeding upon the tender leaves eat on an average two apiece each day. At this rate it does not

take many days to make quite a showing of naked boughs. As the caterpillars grow a new skin is formed under the old one, which splits down the back and drops off. When fully grown the worm is not such an unsightly object to look upon, if one could forget what a pest it is. They are then about two inches long, the black body covered with many yellow hairs, with a white stripe along the back, and many irregular light streaks down the sides. Between these and the white stripe is a row of pale blue spots on each side of the back.

I brought in one of the spindle-shaped cocoons, which seems to be made of white silk, sprinkled with a sulphur colored powder. Having kept it for about three weeks my patience was rewarded by a sight of the full-fledged moth, which was about one and one-quarter inches across the upper wings, which were of a dark fawn color, crossed by two oblong lighter streaks edged with white. I was surprised to find such a tiny hole in the end of the cocoon; it seemed almost impossible that the moth could have escaped. It is said that soon after the adult insects appear the females begin to lay their eggs. These are in clusters of about three hundred, arranged in the form of a belt around a small twig. This is covered with a varnish-like substance which serves as a protection during winter, as the belt remains upon the twig until the following spring. The season when the branches are bare is therefore the best time to war against this pest. If the trees are carefully searched at this time these egg clusters may be easily found and destroyed.

S. E. Kennedy.

EDITORIAL.

Our frontispiece this month is an illustration of the first olive mill on the Pacific Coast. We are indebted for it to the genial secretary of the California state board of horticulture, Mr. B. M. Lelong. The mill was built at the old mission at San Diego, the oldest mission in California.

Our new dress has been very favorably commented upon, and this magazine is the first to appear in this new style of self-spacing type. In beauty of typography we can now reasonably claim no superior in the world, and none of equal excellence in this respect on the Pacific Coast. We look to our contributors to assist us in making such a statement equally true of the matter presented our readers.

The demands of the general public sustains our view that there is a field for a journal that shall maintain a high standard, reliable,

combining practical methods with scientific accuracy. It is impossible to divorce technical details from our work in this treatment, but we aim to give enough in popular style to repay the general reader. On the other hand, the specialist will find the journal indispensable from the quantity of original matter, whether it be in technical or popular language.

NOTES AND NEWS.

LUPINUS NANUS.—Of all the annual lupines, this dwarf Californian species is one of the most charming, the shade of purple-blue being particularly pleasing. When in Essex recently, I saw a large patch of it on a seed farm, and was enabled to realize what a mass of pleasing color is formed when so grown. The seed farmers sow thinly, and then take out some of the plants if they deem them to be too crowded. The individuals, having room in which to develop, form dense tufts and bloom with surprising beauty and brilliancy. But in ordinary gardens the sower of seeds of annuals seems unable in most cases to overcome the bad habit of sowing too thickly, or of understanding the necessity for some thinning out. Only let any one grow this delightful annual in good soil in an open situation and give it plenty of room, and its beauty will astonish.—*The Garden*, xl. 53.

LAYIAS.—These pretty hardy annuals were shown at Chiswick the other day in the Kew collection of cut flowers and attracted great attention. The one which in the Kew group attracted chief attention was *Layia heterotricha*, with flowers about the diameter of a half-crown piece, yellow eye, rich yellow ground, edged very evenly on the points of the petals with pure white. The edging is narrow and clearly defined, the ground a very beautiful shade of apricot-yellow. Out in the gardens and under a north wall there is a small bed of *Layia elegans*, presumably the same thing. Both are lovely annuals and should be universally grown, especially to furnish flowers for cutting. *Layia glandulosa* in the Kew collection has charming pure white flowers. This is a lovely little variety also and should become an immense favorite, especially for vase or espergne decoration.—*The Garden*, xl. 53.

A NEW ASTER.—Those who are interested in these beautiful fall blooming wild flowers, will find a new species illustrated and described in a recent number of the *Botanical Gazette*. It is called *Aster Orcuttii*, and is from the Colorado desert, in California. It

is a very handsome species, and well worth cultivating. The flowers are not borne in clusters or panicles, as in so many asters, but are singly on the ends of the stalks. The edges of the leaves are also so deeply cut as to be almost comb like, and very different in appearance to the ordinary run of the asters as we see them in the east.—*Meehans' Monthly*, i. 22.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4112. Second annual report of the Cornell University agricultural experiment station, Ithaca, N. Y. 1889. (The first annual report is wanted by the editor.)

4113. Reports on the observations of the total eclipse of the sun, December 21-22, 1889, and of the total eclipse of the moon, July 22, 1888, to which is added a catalogue of the library, published by the Lick observatory. Sacramento. 1891. 122 pp. 8vo.

4114. Proceedings of the American Forestry Association at the summer meeting held in Quebec, September 2-5, 1890, and at the ninth annual meeting, held in Washington, December 30, 1890. Washington, D. C. 1891. 111 pp., 8vo. (Copies may be obtained of Charles C. Binney, 218 South 4th street, Philadelphia, at fifty cents each.)

4115. Catalogue of the herbarium of the late Dr. Charles C. Parry, of Davenport Iowa. Printed by Mrs. E. R. Parry, Davenport, Iowa. July, 1891. 82 pp., 8vo.

The collection contains upwards of 20,000 specimens, representing over 7,000 species, and is particularly rich in West American types. The herbarium, and an extensive botanical library, are now offered for sale by Mrs. Parry, and it is greatly to be hoped that they may be secured by some Pacific coast institution, where they most properly belong.

4116. The practical working of the Inter-state commerce act. By John A. Wright. Philadelphia. 1891. 40 pp., 8vo.

4117. Catalogue of economic plants in the collection of the U. S. Department of Agriculture. By William Saunders. Washington. 1891. 42 pp., 8vo.

4118. The Chocolate-plant (*Theobroma cacao*) and its products. Walter Baker & Co. Dorchester, Mass. 1891. 40 pp., 8vo., with illustrations.

4119. U. S. Dept. Agriculture: Forestry Division. Bulletin No. 5. What is Forestry? By B. E. Fernow. Washington. 1891. 52 pp.

4120. U. S. Dept. Agriculture. Papers on horticultural and kindred subjects. By William Saunders. Washington. 1891. Reprinted from reports of the department of agriculture. 1863-1889.

2121. Basket-work of the North American aborigines. By Otis T. Mason. Washington. 1890. From the report of the Smithsonian Institution, 1883-'84, part ii. pp. 291-306 and plates i. to lxiv.

4122. Geological survey of Missouri. Bulletin No. 5. 1891.

4123. Illustrative cases of congenital club-foot. By H. Augustus Wilson, M. D. Reprinted from Annals of Gynæcology and Pædiatry. June, 1891. From the author.

4124. Directions for collecting birds. By Robert Ridgway.

4125. A catalogue of the fresh-water fishes of South America. By C. H. and R. S. Eigenmann.

4126. Fishes collected by William P. Seal in Chesapeake bay, at Cape Charles City, Virginia, September 16 to October 3, 1890. By Barton A. Bean.

4127. Relations of temperature to vertebrae among fishes. By David Starr Jordan.

4128. On the structure of the tongue in humming birds. By Frederic A. Lucas.

4129. Contributions to American botany. xviii. By Sereno Watson. From Proc. Amer. Acad. Arts and Sci., xxvi, 124-163. From the author.

This paper consists (1) of descriptions of some new N. A. species, chiefly of the U. S., with a revision of the American species of the genus *Erythronium*; (2) descriptions of new Mexican species, collected chiefly by C. G. Pringle in 1889 and 1890; (3) upon a wild species of *Zea* from Mexico; and (4) notes upon a collection of plants from the Island of Ascension. Liebmann's genus *Llavea*, of the Sapindaceæ, is named *Neopringlea*—worthily dedicated to the eminent Mexican explorer, C. G. Pringle.

4130. The relation of the Mexican flora to that of the United States. By Sereno Watson. From Proc. A. A. A. S., xxxix, 291-2. Abstract. From the author.

4131. Notes on North American Halorageæ. By Thomas Morong. Reprinted from Bull. Tarr. Bot. Club, xviii, 229-246. From the author.

Callitriche longipedunculata is herein described from the mesas near San Diego, California. This plant was distributed by C. R. Orcutt under the name *C. marginata* in 1884.

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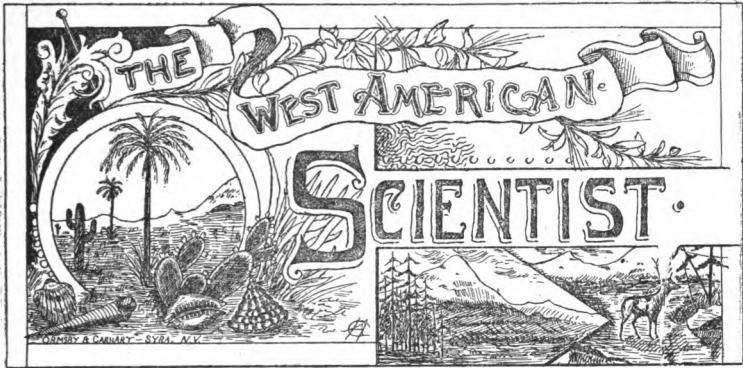
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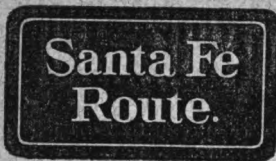
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Volume I.

Number 5.

SCIENCE AND HORTICULTURE

An Illustrated Monthly Magazine

DEVOTED TO

Fruits and Flowers and Popular Science.



SEPTEMBER, 1891.



LOS ANGELES, CALIFORNIA:

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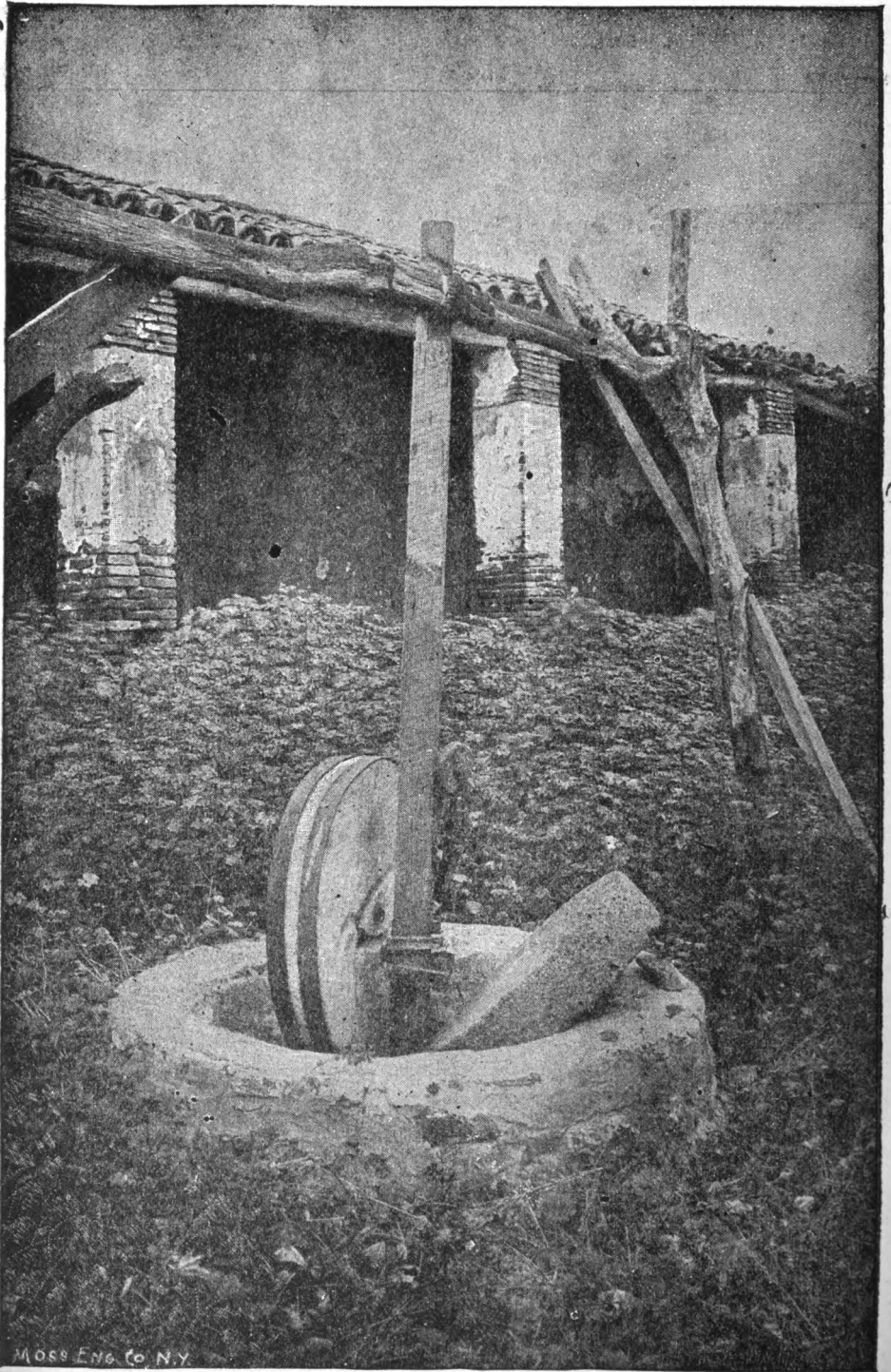
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NEW BOMBYLIDÆ OF THE GROUP PARACOSMUS.

Among the Bombylidæ having a short proboscis is a small group of insects in which the body is elongated and nearly naked, being entirely destitute of flattened scales and of stout bristles, while the hair is so very short and sparse as to be scarcely discernible with the naked eye. To this group belongs our only described genus, *Paracosmus* Loew, containing two described species, *Edwardsii* Loew, and *Morrisoni* Osten Sacken. I have collected three other species belonging to this group. One of these, to which I apply the generic term *Amphicosmus*, differs from all the others in having three, instead of only two submarginal cells in each wing; the structure of the antennæ and the course of the second vein of the wings are the same as in *Paracosmus*. Another species differs from *Paracosmus* in the structure of the antennæ, in the course of the second vein, and in that the ocellar tubercle is situated much farther forward upon the front; to this form I apply the generic term *Metacosmus*. This form is known to me only in the female sex. The third species agrees with *Paracosmus* in the course of the second vein and in the situation of the ocellar tubercle, but the tip of the third antennal joint is rounded instead of being truncated; still I am unwilling to found a new genus on so trivial a character as this, but prefer to place this species in the genus *Paracosmus*, at least for the present. I will now give a more extended characterization of these three new forms.

AMPHICOSMUS n. gen. Body elongated, nearly naked, destitute of flattened scales and of stout bristles. Head subglobular, front in profile gently convex, not greatly projecting at base of antennæ; face scarcely one-fourth as long as the front, projecting farther forward than the latter, with which it forms an obtuse angle. Antennæ somewhat approximate at base, about one-fourth as long as the head, first two joints subequal in length, together slightly shorter than the third; the latter tapers but slightly towards the apex which is obliquely truncated, the upper angle prolonged in a short tooth, the lower angle broadly rounded. Proboscis not projecting beyond the oral margin, labellæ well-developed; palpi slender, clavate at the tips, slightly over one-half as long as the proboscis. Eyes narrowly separated in the male, very widely separated in the female. Ocellar tubercle close to edge of occiput. Scutellum rounded behind. Abdomen much narrower than the thorax, seven-segmented in both sexes; male genitalia exposed and very large. Wings with three submarginal and four posterior cells, all of the latter open, as is also the anal cell; bifurcation of second and third veins occurs before base of discal cell; tip of second vein curving

forward and meeting the costa at right angle; costa of male destitute of small points; small crossvein beyond middle of disacel cell. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting.

AMPHICOSMUS ELEGANS n. sp. Male. Black. Front (except on the vertex) and sides of face whitish pollinose and short sparse white pilose, middle of face bare, shining black; posterior half of the oral margin whitish. Antennæ wholly black, the first two joints sparse white pilose. Occiput white pollinose. Thorax short sparse white pilose, marked with two white pollinose stripes which extend from the front end to a point slightly beyond the middle; a large white-pollinose humeral spot extending to the root of each wing, and a smaller spot on the pleura above the hind coxæ. Scutellum, short sparse white pilose, destitute of pollen. Abdomen with hind margin of the first segment white, of the second segment and sides and hind margins of the third and fourth segments reddish; pile of abdomen very short, sparse, white; venter reddish in the middle, the base and apex black. Femora black, the base and apex yellowish; tibiæ yellowish, the apex black; tarsi black, the base more or less yellowish. Wings wholly hyaline. Halteres wholly white.

Female same as the male with the following exceptions: Front in the middle, and upper portion of occiput destitute of pollen; lower part of front, sides of face broadly, and entire oral margin, white, as is also the lower part of the occiput next the eyes. Thorax destitute of the two white pollinose stripes which occur in the male. Abdomen with the second, third and fourth segments wholly reddish, the hind margins of the fourth, fifth and sixth segments narrowly bordered with white, the end of the seventh segment broadly yellow. Femora largely or wholly yellowish. Length 4.5 to 7 mm. Los Angeles county, Cal. Two males and two females, in June.

I caught these specimens while they were on the wing, hovering over the ground only a few inches from it among some low herbage. At the time of capturing them I supposed that they were Syrphids belonging to the genus *Baccha*, to which group of insects they bear a very close superficial resemblance.

METACOSMUS n. gen. Body elongated, nearly naked, destitute of flattened scales and stout bristles. Head subglobular, front in profile gently convex, slightly projecting forward at base of antennæ; face less than one-third the length of the front, projecting forward nearly on a plane with the lower portion of the latter. Eyes very large, quite widely separated in the female. Antennæ equal in length to the face, second joint scarcely visible, third joint

over twice as long as the first, gradually tapering to the tip which is blunt and bears several minute hairs. Ocellar tubercle situated nearly midway between the upper edge of the occiput and the insertion of the antennæ. Proboscis not projecting beyond the oral margin, the labellæ very large. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting. Wings with two submarginal and four posterior cells, all of them open, as is also the anal cell; tip of second vein not curving forward, meeting the costa at an acute angle; second submarginal cell nearly straight along its upper edge; bifurcation of second and third veins occurs before the proximal end of the discal cell; small crossvein beyond middle of discal cell.

METACOSMUS EXILIS n. sp. Female. Head black, anterior portion of oral margin and underside of head behind the mouth, white; front very sparse short white pilose, orbits lightly, face densely white pollinose. Antennæ black. Occiput very short sparse white pilose. Thorax and scutellum polished black, very short sparse pilose. Abdomen polished black, hind margins of segments one to five narrowly bordered with white; abdomen laterally compressed, the posterior end truncated; venter black, hind margin of each segment narrowly bordered with white. Legs yellowish brown, coxæ black, tarsi brownish at the apex. Wings wholly hyaline, small crossvein at last third of the discal cell. Halteres brown, the knobs white. Length 6 to 7 mm. Orange county, Cal. Two females, in May.

These insects I captured about six years ago, resting on the ground in the hot sunshine, but I have never succeeded in obtaining another specimen since that time, although I have repeatedly looked for them.

PARACOSMUS INSOLENS n. sp. Male. Black. Front and face densely white pollinose and very short sparse pilose; eyes widely separated. Proboscis not projecting beyond the oral margin, labellæ very large. Antennæ with first two joints subequal in length, together slightly more than one-half as long as the third, the latter compressed, broadly oblong in profile, rapidly tapering to the tip which is blunt but not distinctly truncated. Occiput bare in the middle above, elsewhere densely white pollinose. Thorax sparsely white pollinose, a stripe of white pollen above the coxæ. Scutellum with a stripe of white pollen at its base. Abdomen with hind margins of segments one to six bordered with white, becoming less extended on each succeeding segment, sides of first segment with a cluster of white pile; in certain lights a large portion of the abdomen appears to be white pollinose; venter lightly white

pollinose. Tibiæ with the extreme base yellowish; pulvilli very large, whitish. Wings wholly hyaline, small crossvein at or slightly beyond the middle of the discal cell; tip of second vein curving forward and meeting the costa at an obtuse angle. Halteres brown, the knobs light yellow; in front of each is a dense cluster of white pile. Genitalia consisting of a globular lower piece surmounted by a narrow shield-like piece which on either side is prolonged backward into two quite long and rather broad processes truncated at their tips, the latter curving toward each other. Length 3.5 to 4.5 mm. Los Angeles and San Diego counties, Cal. Eight males, in May and June, resting upon the bare ground in the hot sunshine.

This species will be readily distinguished from the other two described species by the color of the legs, as well as by the rounded tip of the third antennal joint. *D. W. Coquillett.*

CONTRIBUTIONS TO WEST AMERICAN MOLLUSCA.—I.

In this series of papers it is intended to present in connected form stray notes on the mollusca of the Pacific Coast, with bibliographical references, and especial attention to geographical distribution. In this first contribution we have to enumerate various new species founded by my friend, Dr. R. E. C. Stearns, in a paper published in the Proceedings of the United States National Museum (xiii. 205-225), entitled 'Descriptions of new West American land, fresh-water and marine shells, with notes and comments.'

HELIX (ARIONTA) COLORADOENSIS Stearns, Proc. U. S. Nat. Mus. xiii. 206, pl. xv. figs. 6, 7, 8. Grand canyon of the Colorado, opposite the Kaibab plateau, at an elevation of 3,500 feet. Allied to *H. remondi*.

HELIX (ARIONTA) MAGDALENENSIS Stearns, l. c. 208, pl. xv. figs. 11, 12, 13. Magdalena, Sonora, Mexico. Allied to *H. rowelli*.

HOLOSPIRA SEMISCUPLA Stearns, l. c. 208, pl. xv. figs. 1, 4. Near San Carlos, Chihuahua, Mexico. Closely allied to, if not a variety of *H. coahuilensis*.

HOLOSPIRA ARIZONENSIS Stearns, l. c. 208-9, pl. xv. figs. 2, 3. Dos Cabezas, Arizona.

MELANIA (?GONIOBASIS) ACUTIFILOSA Stearns, l. c. 211, pl. xv. fig. 9. Eagle Lake, California, at an altitude of 5,115 feet.

CYCLOTHYCA Stearns, l. c. 212. New subgenus of *Capulus*, with *C. corrugata* for type.

CYCLOTHYCA CORRUGATA Stearns, l. c. 212, pl. xv. figs. 5, 10. From west coast of Nicaragua.

MITRA (? COSTELLARIA) NODOCANCELLATA Stearns, l. c. 213, pl. xv. fig. 14. Gulf of California.

VENERICARDIA BARBARENSIS Stearns, l. c. 214, pl. xvi. figs. 3, 4. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENERICARDIA BOREALIS Conrad, Am. Con., 39 (with fig.); Stearns, l. c. 215, pl. xvi. fig. 8; Gould, Inv. Mass.; *Arcturus rudis* Humphrey MS.; *Cardita vestita* Deshayes. Circumpolar.

VENERICARDIA VENTRICOSA Gould. Stearns, l. c. 216, pl. xvi. figs. 5, 6. Puget Sound.

MIODON PROLONGATUS Cpr., *Annals and Magazine of Natural History*, 3d ser., xiv. 424; Stearns, l. c. 217, pl. xvi. figs. 7, 9. Neeah bay, and Middleton island.

LUCINA ÆQUIZONATA Stearns, l. c. 220, pl. xvii. fig. 34. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENUS (CHIONE) EFFEMINATI Stearns, l. c. 221, pl. xvii. figs. 1, 2. Panama bay.

PERIPLOMA DISCUS Stearns, l. c. 222, pl. xvi. figs. 1, 2. San Pedro, Long Beach and vicinity, Los Angeles county, California.

PERIPLOMA ARGENTARIA Conrad, *Jour. Phila. Acad. Nat. Sciences*, vii. pt. II (1837), 238, pl. 18, fig. 8; Stearns, l. c. 223, 224. Dr. Stearns treats this as synonymous with *P. PLAIUSCULA* Sby.

PERIPLOMA PLANIUSCULA Sby., Proc. Zool. Soc. London, 1834, p. 87; *P. argentaria* Conr., l. c.; *P. alta* C. B. Adams; *P. Centicularis* Sby.; *P. excurva* Cpr.; *P. excurvata* Cpr., British Ass. report, 1856, p. 287. Synonymy as given by Stearns, l. c. 224. Pacific coast south of Point Conception.

? PERIPLOMA POPYRACEA Cpr., Proc. Zool. soc. London, 1856, p. 229. Stearns (l. c. 224), mentions this as a West American species belonging to Carpenter's Mexican and Panamic province.

HELIX (ARIONTA) CARPENTERI Newc. variety INDIOENSIS L. G. Yates, *Nautilus*, iv. 63 (also p. 51); Orcutt, *Nautilus*, iv. 67. Indio, San Diego county, California, in the Colorado desert region. Dr. Yates bases this variety on specimens collected by Dr. Stephen Bowers. Specimens collected in the same vicinity by the writer I have referred (Orcutt, l. c.) to *H. Traskii*, of which I consider it to be a well marked variety. Dr. Stearns (l. c. 206) refers to *H. carpenteri* as a synonym of *H. remondi*, so that Dr. Yates' variety will have to be referred to that, or a related species.

HALIOTIS RUFESCENS Swains. Hemphill, *Nautilus*, iv. 59; Orcutt, l. c. 67. The geographical range is quoted as from Mendocino county to San Nicholas island, California, and Santo Tomas landing, Lower California.

Lathyrus Splendens.

CYPRAEA (LUPONIA) SPADICEA Cpr., Nautilus, iv., 54, 71. The Santa Barbara channel is given as the most northern station yet recorded for this species. Seventy-five fine living examples are reported as found in one day some 15 or 18 miles northwest of Santa Barbara. Point Concepcion, forty miles north, is suggested as possibly its northern limit. Miss Ida M. Shepard (Nautilus, July, 1890) records it from near Long Beach, Los Angeles county.

BYTHINELLA HEMPHILLI Pilsby, Nautilus, iv. 63. Near Kentucky ferry, Snake river, Washington. Allied to *B. aldrichi*.

C. R. Orcutt.

LATHYRUS SPLENDENS.

(From *Vick's Magazine*, xiv. 220.)

California has doubtless furnished a greater variety of lovely wild flowers and beautiful plants that have gracefully yielded to cultivation than any other State in the Union. Annually new members of her floral circle win their way into our gardens and a permanent place in our affections. One of these latest introductions, known for years among the simple mountain people of Southern California as the 'Pride of California, has become widely recognized as well worthy of the name.

This is the deep rose-red to crimson flowered perennial pea, *Lathyrus splendens*, named many years ago by one of the charter members of the California Academy of Sciences, Dr. Albert Kellogg, whose memory is held in reverence by those who knew his pure life. For many years after this handsome vine had received its name it was completely lost sight of by botanists, until its very existence was doubted, and in the great work on the flora of California (Watson's Botany) was treated as a synonym.

In the spring of 1882, a party of several botanists, including the late Dr. C. C. Parry, started from San Diego to explore the then little known peninsula of Lower California. Just below the line, in a rocky canyon, we discovered this magnificent flower ornamenting the evergreen bushes along the watercourse with its graceful and brilliant blossoms. Dr. Parry at once shouted, it is Kellogg's *Lathyrus splendens*, and such it proved to be.

Many times since have I seen it clambering over the bushes on the higher table lands of Lower California, beside some perennial stream, or bordering a dusty highway. In the mountains back of San Diego, this year (1890), it was one of the few wild flowers that had 'watched the old year out and the new year in.' It was in its

greatest splendor in April, when the bushes for miles and miles were heavily loaded with its showy blossoms; on the 15th of June I plucked evidently the last cluster of the season.

The beloved botanist, Dr. Asa Gray, had the pleasure of admiring and picking this flower in our garden, on his last visit to California. Though Dr. Parry, at the time of its rediscovery in 1882, introduced it to the attention of European horticulturists, by whom it was well received, it was not until last year that this, the loveliest vine in the west, received attention in America.

It is considered hardy, blossoming the second season from the seed, forming a strong vine, capable of covering a veranda or arbor. Dr. Parry, after seeing it covering a porch in San Diego with its luxuriant foliage and profuse blossoms, pronounced it the handsomest plant in the West. Well may it be called the pride of the two Californias—Upper and Lower—and a fit representative of two republics.

C. R. Orcutt.

PUGET SOUND AND ALASKA.

Nearly all the shores of Puget Sound are about alike. Wooded, rolling back to the mountains, they form a setting to a rather nice scenery. The height from the water's edge to the top of the bluff varies from a few feet to a hundred. Every where you see evidences of a vast glacial drift, composed of round pebbles, boulders and sandy loam. The general color of soil is reddish yellow. On top of this grows the gigantic firs, two to three hundred feet high. At Snohomish City, Wash., there is a cut in the railroad that is lined with marine fossils, Cretaceous, I believe. There are clams, razor shells, mussels, worm cases and tubes, and a trace of coal is found, also some broad leaves resembling flags. This cut is about 200 feet above Puget Sound, and the same shells are found there today. The coal fossils at Wilkerson are known and described. Coal is found plentifully, adjacent to the sound, and iron further back. The journey to Alaska should be taken by every naturalist that can do so. Its glaciers, mountain peaks, broad rivers and other novel features should be seen. The Treadwell gold mine, well known as one of the largest and richest in quantity of ore is opened in the side of a high hill. The ore is low grade, but easily got out and pays well. The fauna of this country is very interesting and varied. Black bear have been shot from the steamers' decks, going through the Narrows. The glaciers, probably because they break off in the bay, cannot be surpassed in beauty and size.

U. L. Hertz.

RHODODENDRON OCCIDENTALE.

This beautiful flowering shrub extends from Oregon southward throughout California, to the mountains of San Diego, but has not as yet been reported from Mexican territory. It grows from two to sometimes twelve feet high, rarely more than six feet, however, and covers the hillsides and tangled meadows of the sierras at from three to six thousand feet altitude.

In its magnificent display of flowers during June and July it defies description, surpassing the finest oleanders and azaleas in its beauty and profusion. Its masses of beautiful and fragrant flowers are showy and attractive, the hundreds of flowers, two to three inches in diameter, completely covering the bushes for weeks at a time.

The flowers are white, or commonly rose-tinged, variegated by a pale yellow band. The shrub is of easy cultivation in rich moist soil, and should receive treatment similar to our better known garden azaleas. Although deciduous, it is worthy of attention among ornamental plants on the Pacific Coast. 'Like the oleander the plant is poisonous if eaten by children or animals, but no bad effects ever result from handling it or using the flowers.'

INDIAN METHOD OF PREPARING WOOL AND COTTON.

It was my misfortune to be sick with intermittent fever, in October, 1870, at the village of Achiabampo, Sonora, on the Gulf of California. The village of Achiabampo has two distinct divisions, one inhabited by Mexicans, the other by Indians. The Indians will trade with and work for the Mexicans, but will not allow their houses to be near the habitations of Mexicans. There was but one hotel in the village, kept by a Mexican, at the edge of the Mexican part and near the Indian portion of the village.

During my convalescence I was interested in watching what transpired in the Indian quarters, and particularly in observing their method of preparing wool. The method was the same as applied to cotton by Indians on the Atlantic side of Mexico, which I had previously seen.

An Indian's blanket by day serves him as an overcoat, by night for cover, and wool is to him of great importance. He is willing to bestow much labor upon its preparation.

I am of the opinion that the method of preparation is of ancient origin, though wool was unknown to the Indian before the advent

of the Spaniard, since these same people, I was informed, clean cotton in the same manner, some growing cotton in their fields, or buying from other Indians and Mexicans.

In the preparation of wool a small hide is placed in a convenient place on the ground, with something beneath its center to raise it a few inches from the ground. The wool is, of course, previously washed and now placed in the center of the hide. The operator—a woman—takes a kneeling posture and proceeds to thrash the wool with a long, well seasoned stick, strong and slightly larger in the center than at the ends.

With each measured stroke the stick is brought low by the right hand while the left hand is brought in contact with the wool, the thumb and finger encircling the stick, which is withdrawn through the left hand, thus preventing the wool from scattering during the thrashing process. It is a slow process, but these patient people are equal to the task and the wool is brought into the same condition as if prepared by machinery.

In the preparation of cotton, the Indians have first the slow and tedious task of separating the seeds by hand, before submitting the cotton to the slow, measured strokes of the Indian lady who represents the Indian cotton gin. The steady measured stroke and the withdrawal of the stick through the left hand prevents the scattering of the lint, which one who has not seen the operation might expect.

Slow as the process is, it has for many years answered the requirements of these people, and by patient labor they are enabled to accomplish much in a single day.

To a stranger it is an interesting sight to watch these simple people prepare their wool and cotton for spinning, with only a stick, patience and long experience to bring about the desired results.

Edward Palmer.

SEA PANSIES.

One of the most beautiful of the organisms on the Pacific Coast is the *Renilla amethystina*, or sea pansy, as it is very appropriately called. It is really a community of coral-like animals living in a structure somewhat of the size and shape of a pansy flower, with a short stem that further carries out the resemblance.

The color of the main structure is of a rich royal purple, while the jelly-like animals themselves are white, and peeping out from their doorway appear like stars in the firmament of the heavens.

These communities are not rare on our sandy shores, but may

only be found by accident by those who have not learned the secrets of marine life. At low tide they may be found buried in the sands, with nothing to indicate their presence but an imperfectly circular line in the smooth-washed surface of the beach that only a trained eye is likely at first to detect.

If one of these sea pansies is removed from the sand and placed in a dish of sea water, the creatures that form the community will soon manifest life, and reveal a most beautiful structure showing plainly their relationship to the coral 'insect.'

Each individual polyp in the community will be found to possess eight long fringed tentacles around a narrow disk. The numerous individuals of each community are arranged on the upper surface of a flattened cordate fleshy structure, to the lower surface of which is attached a stem like organ, useful alike as a means of locomotion and for the anchorage of the tenement house in the sand.

The sea pansy is a near ally of the sea pens and the sea fans—which latter are branched and resemble beautiful flowering shrubs or plants. The organ-pipe coral belong to the same group of polyps according to some systems of classification. A hundred years ago the corals were all thought to be plants, as they closely imitated almost all kinds of vegetation, but they are now regarded as true animals.

THE LOQUAT.

The loquat, a beautiful evergreen tree native to China and Japan, was first named by Joseph Hooker, *Photinia eriobotrya*. It has received other names, like *P. japonica* and *Eriobotrya japonica*, and is now generally known under the latter name, though the first has priority and there seems no good reason to give it generic rank.

It is perfectly hardy on the California coast, south of Marin county, and may be grown further north if given slight protection.

It has been incorrectly called the Japan plum, but this name has been wisely discarded by California horticulturists who unite in calling it by its proper name, loquat.

It is remarkable for its refreshing fruit, which is elongated in shape, about two inches in length, pale yellow in color, with a very peculiar flavor, 'combining that of the tamarind and pineapple, and is highly agreeable.'

The tree is easily raised from the seed or may be grafted upon its own stock or on the quince. It does not require any particular soil apparently, and at maturity will bear from twenty to thirty

pounds of fruit to the tree. The fruit is in most demand among the Chinese, but when it becomes more generally cultivated and better known it will be in demand among all classes, and will readily bring a good price.

Hitherto the loquat has been mainly planted for ornamental effect as it is a grand bush for scenic effects. The fruit begins to ripen in late spring and continues through several months. The seed forms the larger part of the fruit, and one who eats the luscious pulp only wishes there were more of it and less seed. Seedlings are very variable and a variety with a small seed might be produced and propagated from it by budding to the pecuniary profit of the originator.

The tree seems to be free from insect pests. *Photinia villosa* is another native Japanese fruit, edible and pleasant, but not yet sufficiently known in this country. The loquat thrives in Santa Barbara, Los Angeles and San Diego counties, in California, and will doubtless do well in Arizona and New Mexico.

THE POMEGRANATE.

One of the most familiar of the mission fruits of California, is the ruby-red fruit of *Punica granatum*, a shrub native to the north of Africa, and to southwestern Asia, where it extends up the sides of the Himalayas to an altitude of 6,000 feet.

Its value as a hedge plant is great, but this use is often overlooked. As an ornamental evergreen bush it ranks high, its well-known showy habit recommending it to every eye. With its rich colored flowers, and the peculiar, cooling fruit, it is welcome and allowed to flourish in all the older Mexican gardens, and the fruit may be found for sale in our larger markets, mostly being in demand among the nationalities of the south of Europe.

We believe the shrub is grown in Oregon and Washington, but only for ornament.

The bark of the pomegranate contains 32 per cent. of tannin and is used for dyeing the yellow Morocco leather, and the outer rind of the fruit is also used as a dye.

The pomegranate is perfectly at home in Arizona, where it may be found in many gardens. The fruit varies in color from nearly white (inside) to dark ruby red or wine color, the darker fruits, when crushed in water making a pleasing drink, like lemonade—the lighter colored fruits not being so sour. The commoner variety in cultivation is of a bright orange color.

C. R. Orcutt.

THE GRANADILLA.

There are several species of the Passion-flower grown in Mexico for their edible fruit, that are deserving of a trial in California.

The best known species of the granadilla is *Passiflora edulis*, a native of the southern part of Brazil; which has 'already' been planted in several places in California. The flower is of medium size, whitish with a faint tinge of blue,

It is a strong-growing vine, bearing flowers and fruit almost the year through, the fruit of the size of a small hen's egg, pale purple, useful for making into jelly, when ripe the fruit has an 'acid cooling flavor.'

There are about two hundred species of Passion-flowers recognized, native to various portions of America from the southern United States to Brazil, in South America. Some of the species are exceedingly handsome vines and prized for their magnificent flowers.

One of the most commonly cultivated species of the granadilla-fruit is *Passiflora quadrangularis*, also a native of Brazil. One species (*P. macroptera*) produces an edible fruit weighing eight pounds apiece.

May-pops of the southern states is the fruit of *Passiflora incarnata*. The fruit of *P. ligularis* has been pronounced as one of the finest fruits in existence.

Many of the tropical species are natives of mountainous regions and will endure our mild temperate climates, and the strong-growing vines, with the curious and beautiful flowers are well adapted for covering various structures and may be rendered both useful and ornamental. But nowhere in the United States do they attain a greater luxuriance than on the Pacific coast. Our national colors are reproduced in the red, the white and the blue flowers of the several rival varieties.

C. R. Orcutt.

WOMEN IN SCIENCE.

(Read before the Pacific Coast Women's Press Association.)

Women eminent in Science have received more praise for ~~what~~ they have done than is their due. Comparatively speaking, so few women have entered this field of knowledge that when one does accomplish somewhat she is as loudly lauded as the precocious child. But in science as everywhere else in the domain of thought women should be judged by the same standard as her brother. Her work must not be simply very well done *for a woman*.

In the limited time at my disposal today I shall confine myself almost wholly to those whom I have met or whose work more o

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less closely touches my own. I shall not, therefore, be at all exhaustive. But I cannot refrain from saying a few words of Mary Somerville whom I believe to have been not only the most eminent woman in Science of her time, but of all time. Her love of science was not the outgrowth of a regard for some person whom she might assist as was the case with her contemporary, Caroline Herschel, and most women who have entered the field of science.

Indeed, love of scientific study, especially higher mathematics, led her to persevere against the wishes of her friends and the popular prejudice against the higher education of women which her first husband shared.

She did not, however, begin to publish until urged to do so by friends who wished her to contribute a volume to the Society for Diffusing Useful Knowledge. In his letter to Dr. Somerville asking if Mrs. Somerville could not be prevailed upon to write an account of Laplace's Mechanism of the Heavens, which should give to the unlearned some insight into this work, Lord Brougham paid her the high compliment of saying that it must be left undone unless Mrs. Somerville would undertake it, as there was none other capable of doing it. At the earnest solicitation of her husband she finally consented to undertake the work. Of it she herself has written: 'Thus suddenly and unexpectedly the whole course of my life was changed. I rose early and made such arrangements with regard to my children and family affairs that I had time to write afterwards; not, however, without many interruptions. A man can always command his time under the plea of business, a woman is not allowed any such excuse.' In this last expression has Mrs. Somerville shown why so few women have become eminent in science. While she was thoroughly a womanly woman devoted to her family, enjoying society and mingling freely in it, fond of the theatre and of travel, she despised the small talk of the gossip, and was one not to indulge in frittering away her time. I must also call your attention to the fact that Mrs. Somerville's second husband, himself a classical scholar and a scientist, had no ambition for himself but chose to assist his illustrious wife in revising her MSS., correcting the proofs and verifying her results—in short, to do for her what most women of ability do for their husbands.

Dr. Maria Mitchell, professor of astronomy at Vassar, has so recently been brought to the notice of everyone at her death that it is not necessary to recount her achievements.

The direct influence of woman upon the natural and physical sciences has been little felt; but indirectly women have done a great deal. First, as helpers of their masculine friends; secondly, by

popularizing science, especially in compiling books for children; and thirdly, by subscriptions in aid of science.

A very large per cent. of those pursuing biological researches have been led into these lines by a course in medicine, and it is rather rare to find a naturalist who may not claim the title of M. D. As women have not been admitted to medical colleges until during the past few years this fact may account very largely for the non-appearance of women's names in the proceedings of museums and scientific societies. It is an almost startling fact that, among the one hundred and fifty contributors to the pages of the proceedings of the United States National Museum during the eleven years of their publication there appear the names of only three women—two on ichthyology, one on mollusca. In the publications of the British Museum I am not acquainted with the papers of any woman, and it is so with most of the scientific societies of foreign lands. The Royal Society, however, is a notable exception, and during the five years between 1882 and '87 four women have published papers on histological subjects in the Royal Society's proceedings.

Several of the western academies of science have women on their membership lists who write for the proceedings of these societies. A notable example is that of the Natural History Society of Wisconsin, which has published a number of contributions to our knowledge of the *Attidæ* or Jumping Spiders by Professor G. W. and Elizabeth G. Peckham. The work of Professor and Mrs. Peckham is not only descriptive, but they have carried on extensive experiments with regard to the habits of the arachnids.

To Professor and Mrs. Louis Agassiz must the credit be given for placing an entering wedge for women in science not alone for the State of Massachusetts but for the United States as well. In 1873 Professor Agassiz inaugurated a summer school of science on the island of Penikese, in Buzzard's Bay! Here 50 young students gathered, about 20 being women. A few of the young men from some of our eastern universities unused to seeing women in college, entered a protest against their presence at Penikese. Agassiz did not at all share their feeling and at once put a stop to it. Learning who the students were he announced the first morning at breakfast that the launch was then ready at the wharf and certain gentlemen, whose names he called, would leave. No entreaties on the part of both ladies and gentlemen of the school would alter Professor Agassiz's decision. Women were here admitted to the study of nature on equal terms with men.

I have been personally acquainted with six of the women who

were at this island school of Agassiz. The wife of Dr. David S. Jordan, president of the Leland Stanford Junior University, then Miss Susan Bowen was professor of zoology at Mount Holyoke at the time of her marriage. Although Mrs. Jordan's home and social duties took much of her time so that she did not carry on researches independently she was enthusiastic in aiding her husband in his scientific work. She died in November, 1886. Her chair at Mount Holyoke is filled by Professor Cornelia M. Clapp.

Mrs. Fanny Bergen since studying with Agassiz has, with her husband, written a most readable little book on The Development Theory. For the past twelve years she has been an invalid and confined to the room. Notwithstanding this serious drawback to work of any kind Mrs. Bergen has steadily published on scientific topics and her series of papers on Animal Lore which appeared in the *Popular Science Monthly* have been a contribution to science.

Prof. and Mrs. H. H. Straight spent their first days of married life at Penikese, which has been a delightful memory, as it was an inspiration for the two who were already turning to science teaching in the normal school at Oswego, New York. Prof. Straight was later at the head of the scientific department in a school of Illinois, but by exposure and overwork he brought on consumption whereupon Mrs. Straight took his place. At his death she was desirous of continuing the work to carry out the plans her husband had made; but she was appointed to a position in Japan, where, with her two little children, she now is.

Lydia W. Shattuck was the most notable teacher of botany Mt. Holyoke has had, but death has cut short her scientific career.

Susan Hallowell has been professor of botany at Wellesley College ever since her summer at Penikese.

Mrs. Zella Reid Cronyn, now living in Massachusetts, was for some time principal of the public schools of San Diego. She encouraged her pupils to form a cabinet and to study the specimens collected and helped them to found the Historical Society, since merged with the Society of Natural History. Whether most of the women who had the good fortune to be among the number instructed by Agassiz have become teachers of science I do not know. Certain it is that now, after nearly twenty years, they are not prominently known in the world of science. Indeed not one of the number has made so brilliant a reputation as have many of the men, for we count among the most distinguished scientists of America some of those who shared the teaching of him whose genial face and almost magic gift of teaching are known throughout the breadth of his adopted land.

Mrs. Louis Agassiz has contributed to scientific literature in writing jointly both with her husband and son. 'A Journey in Brazil' is very largely the work of Mrs. Agassiz, who accompanied her husband during his entire journey and kept full notes of all that occurred. 'Seaside Studies in Natural History,' a most charming book, was written by Mrs. Agassiz and Dr. Alexander Agassiz. Mrs. Agassiz has also written on natural history topics for children. Her 'Life and Letters of Louis Agassiz' may well be classed with her scientific work. It is so happily written that it is as interesting as a novel, and one lays it down with a kinder feeling for the world.

The island school so auspiciously begun by Agassiz was abandoned after the second year, as the island proved to be too inaccessible. Outgrowths of this famous school of science are the various marine laboratories of the eastern United States, chief among which is the one at Woods' Holl, Massachusetts, first opened to students in June, 1888. The present tendency in biology to investigate the life histories and to study the minute structures of plant and animal life is largely due to the influence of our Grays and Agassiz, and the opportunities afforded at these schools by the sea-shore. Among the women who have been studying at Woods' Holl during the three summers this laboratory has been open I may mention the following: Professor Cornelia M. Clapp, of Mount Holyoke College, who was also at Agassiz's Penikese laboratory, has spent every summer at Wood's Holl. She prepared her material for study during the first summer and is now writing her paper On the Lateral Line of *Batrachus tau*, one of the toad fishes. Miss Platt, a student at Bryn Mawr, formerly of Harvard, last summer at this laboratory was studying the development of the brain of the shark. She has gone to Germany to continue her investigations. Miss Marcella I. O'Grady, a professor at Vassar, was working on the problem of Kupfer's Vesicle. Miss Randolph is now in Germany; at Woods' Holl she was studying the embryology of *Spirorbis*.

Science is exacting, requiring the devotion of months and even of years to the completion of a series of observations which, sometimes, must be carried on with little or no interruption; therefore we much more often find women popularizing the results of students of science, rather than adding to the positive knowledge of the world by studies and researches of their own. So many women have written popular books on natural history, especially for children, that I shall not attempt to name them.

There is the tendency at present for women to work out for themselves problems in the physical world independently of their

brothers and husbands which is no doubt due to the training in our higher universities which young women now receive almost, or quite as fully as young men. The school for the collegiate instruction of women at Cambridge, generally known as the Harvard Annex, gives to women as full advantages in scientific study and research as to men, except in the department of cryptogamic botany. Three or four of these Harvard women, if I may so term them, are now preparing papers embodying the original research of several years—Miss Henchman and Miss Platt in the department of animal morphology, and Miss Reul in botany.

Although women, as a usual thing, have not pursued long continued researches in science, they are furthering the progress of science very largely by bequests and special funds. Indeed, I do not know but they are doing more in this way than men. Professor Goodale, of Howard, conducts a large botany class of Boston women. Some of them in their zeal contributed so largely to that department of Howard College that it was possible to push to completion the museums and laboratories of botany as otherwise would have been out of the question.

In 1881 a marine biological laboratory was established at Anisquam, Mass. This was the work of women of Boston. Afterward it was thought best to establish another at Woods' Holl, but during the winter of 1887-8 these women were instrumental in organizing a lecture course in science in aid of the laboratory. They were eminently successful, and in June, 1888, the Marine Biological Association opened the doors of the new laboratory to students. I have already given some account of the women who have studied here during the past three summers, which, like the earlier Penikese school, is open to both sexes. However, as might be expected, a larger number of men avail themselves of the unequalled advantages of the place. There have been attracted to it the most prominent biologists of America, professors and teachers of science whose reputations are already established, finding here not only unexcelled facilities for prosecuting their investigations during the summer vacation, but also the opportunity to confer with their colleagues. Thus has this work of women—the Woods-Holl Biological Laboratory—been of paramount importance to science.

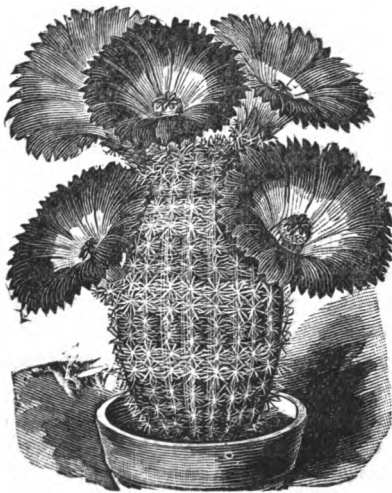
Mrs. Thompson, of Stamford, Conn., has created the Elizabeth Thompson Science Fund 'for the advancement and prosecution of science in its broadest sense.' The fund now amounts to \$26,000. The income from this amount is annually distributed by the trustees of the fund to applicants who are making scientific investigations irrespective of the country wherein they are carried on, the

foreigner, then, having an equal chance with the American naturalist. 'This endowment is not for the benefit of any one department of science, but it is the intention to give the preference to those investigations which cannot otherwise be provided for, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance.' About 30 grants for specific purposes have been made from this fund to investigators in various parts of the United States, in England, Scotland, Germany, Italy and Canada. The investigations were in meteorology, chemistry, physics, medicine, psychology, paleontology, physiology, entomology, zoology, astronomy, history and cooking. Only one of these grants is for investigations by our own sex, and that one is \$300.00 for experiments on cooking. *Rosa Smith Eigenmann.*

THE RAINBOW CACTUS.

(From the Rural Californian, xiv, 261.)

The *Echinocereus candicans* of American catalogues is certainly one of the most beautiful of the many varieties of cacti now known in cultivation. In beauty of spines and brilliancy of flowers it can



RAINBOW CACTUS.

scarcely be surpassed or even equalled by any known species. The plant is three or four inches in diameter and from a few inches to probably more than a foot in height. Plants in my possession are five inches high and about four inches in diameter. The plant is closely enveloped by a network of stiff spines borne on the twenty or more narrow ribs of the plant, in clusters of twenty or more. The spines range in color from an ivory whiteness to deep crimson, the colors alternating in rings around the plant and thus giving origin to its popular name of the rainbow cactus.

It blooms profusely—a plant six inches in height often bearing a dozen flowers, and each flower measuring from three to five inches

across. The flowers are of a bright crimson, shading to white toward the center. Its culture is easy, as is the case with most cacti.

It is a native of the southeastern part of Arizona and Sonora, México. The spines are said to be in individual plants at times wholly white, and again, all the spines on a plant will be of a blood red or crimson color.

The true *Echinocereus candicans*, Gill, is a native of the region of La Plata, South America, and when young is of a globular form like an *Echinocactus*, closely covered with very long spines. Our rainbow cactus has been described by Dr. Engelmann under the name of *Cereus pectinatus* var. (?) *rigidissimus*, but it seems to the writer as worthy of specific rank. The following detailed descrip-



C. PECTINATUS.

tion is subjoined: Plant ovate-cylindrical; ribs 20 to 22, slightly interrupted; areolae linear-lanceolate, crowded on the ribs, somewhat woolly when young; spines all radiating, interwoven, recurring from the bulb-like base, awl shaped, very sharp, rigid, white, yellow or red, pellucid; lateral spines long, stout, 12 to 16 in number; the lower spines short, upper ones 3 to 6, bristly, shorter, fasciculate. Flowers produced from the side of the plant beneath the summit; ovary with 50 to 60 clusters of small rigid spines; sepals forming a tube, 60 in number, the 40 inferior ones subulate, the upper 20 lanceolate-acuminati; petals under 20 in number, purple; stigmata less than 12, green; fruit ovate to globose, spiny; seeds tuberculated. From Sonora and Arizona. Differs from *C.*

pectinatus mainly in its larger and more robust growth, in the absence of central spines and the rigidity of the long radial spines, one fourth to one half inch long.

CEREUS PECTINATUS Engelm.—Plant ovate-cylindrical; ribs 18 to 23; areolae lanceolate; radial spines 16 to 20, subrecurved, pectinated, tips rosy; central spines, 2 to 5, short; flowers purple with 60 to 70 clusters of 10 to 15 rigid spines on the ovary. The flowers are two to three and a half inches across and very fragrant—one flower is said to scent a whole house. The plant is of caespitose growth as shown by the illustration and one cluster will bear a large number of flowers in a single season. Single plants will often bear a dozen or fifteen flowers, and four or five may open in one day.



CEREUS CAESPITOSUS.

VAR. ARMATUS POSEL.—Ribs 15 to 16; radiating spines 16 to 20 with a single central spine longer than the rest. This variety is described from Monterey, Mexico, and is little known. Engelm. was in doubt as to whether it was a form of this species or of *C. caespitosus*.

VAR. RUFISPINUS is a horticultural variety with beautiful pink spines, otherwise probably not different from the typical form.

VAR. ROBUSTUS of Sonora and Arizona is another horticultural name for the rainbow cactus, for which Engelm.'s name should receive preference.

Cereus pectinatus, and *C. caespitosus* also, are often grafted on *Cereus grandiflorus*, presenting a rather curious appearance. They are much more beautiful, however, in their natural condition, and there is nothing to be gained by the grafting process except an oddity and an unnatural growth.

CEREUS CAESPITOSUS Engelm.—A near relative to the preceding in this small but beautiful plant. One of the most profuse bloomers and in itself a perfect gem, it is not strange that the plant is a general favorite wherever introduced. It will retain vitality for a year without roots or potting. It seldom exceeds six inches in height, but when scarcely an inch high has been known to bear four large purple flowers at a time!

Plant cespitose, ovate-cylindrical; ribs 12 to 18; areolae lanceolate; radial spines 20 to 30, straight or slightly recurved, pectenated, white; central spine rarely present, when present very short. Tube of the flower purple, 80 to 100 clusters of 6 to 12; fine hair-like spines on the ovary.

VAR. MINOR Engelmann, spines short, flower small.

VAR. MAJOR Engelmann, spines long, flower large.

VAR. CASTANEUS Engelmann, spines red or chestnut color.

This species inhabits Texas and northeastern Mexico as far south as Monterey, and is now common in cultivation.

Cereus adustus, *C. infispinus* and *C. longisetus* are other red-flowered species of *Cereus* found in the United States, and belonging to this section of the genus. By some authors these species are placed in a separate genus, *Echinocereus*, but the writer prefers for the present to treat them as constituting only a sub-genus of *Cereus*.

C. R. Orcutt.

COMPANIONSHIP.

'He that walketh with wise *men* shall be wise, but a companion of fools shall be destroyed.' Prov. 13: 20.

'Tis said in tales of orient lands,
The very soil exhales
The dainty fragrance of the rose,
Whose bloom there never fails.

Oh, if from the unconscious clod,
Where beauty weaves its bower,
Ambrosial air shall sweetly spring,
To honor thus a flower;

How wide the power of mind oe'r mind,
And blest are they who know,
The fragrant paths where wise men walk,
And with them wiser grow.

More than in classic groves to stray,
The presence of wise friends,
Sweeter than Asian sweet waters,
The blessing that descends.'

—Mrs. E. E. Orcutt.

AN OREGON MOUSE.

Frederick W. True has recently described a new species of mouse in the Proceedings of the U. S. National Museum (xiii, 303-4), from a specimen sent by the writer to the Smithsonian Institution, to which the name *Phenacomys longicaudus* has been given. The following description of this interesting animal is taken from Mr. True's paper:

Size moderate, about equalling that of *Hesperomys leucopus*. Ears moderate, nearly concealed by the surrounding fur. Hind foot not relatively longer than in the other species of the genus. Tail long; with the hairs, equal to the body in length.

Color above nearly uniform bright rusty brown; only the tips of the hairs are of this color, the remainder being dark plumbeous. Mixed with the brown-tipped hairs are numerous longer black hairs. Under surfaces white, slightly tinged with rusty brown, especially on the abdomen. The hairs of the throat are white to the base, but elsewhere they are only tipped with light color, the lower portions being plumbeous.

The tail is dusky chocolate-brown above and below. Fore feet brown, like the upper surface of the body; toes more or less dusky. Hind feet similar, but the toes more dusky. A spot on the outside of the metatarsus lighter than the rest of the foot. A portion of the whiskers dusky, the rest whitish. Nose dusky.

Measurements. (Dry skin No. 13373, type).—Total length, 148^{mm}; tail, with hairs, 62^{mm}; hind foot, 20.2^{mm}; ear from behind, 4.6^{mm}.

The skull belonging to the type is badly broken, and it is only possible to give the dimensions of some of its parts.

Measurements of the skull.—Length of the crowns of the upper series of molar teeth, 5.8^{mm}; lower molars, 5.7^{mm}; length of nasal bone, 6.6^{mm}; breadth of interorbital construction, 2.8^{mm}.

The molar teeth resemble those of *P. intermedius*, but the lozenges are narrower, and the external re-entrant folds of enamel in the upper molars are directed less backwards and those of the lower molars less forwards than in that species. The molars are rooted. The skull is that of a youngish individual.

Regarding the habits of this mouse, I would say that it seems to be almost exclusively arboreal, having only been taken, so far as I am able to learn, in the branches of the Douglas spruce. The type specimen was sent me from Marshfield, Coos county, Ore., by a friend, L. J. Cornelius, of Siuslaw River, who had shown me a nest of this, built about 60 feet from the ground in a small clump of

leaves and twigs, on a limb some six inches in diameter and about six feet from the body of the tree. On felling the tree about a year before he had captured one, which unfortunately had not been preserved. Of course I requested him to obtain one for me if possible, with the result that last summer, while in Coos county, he secured the specimen on which the species is based.

My first discovery of this animal was in June, 1886, in the valley of Elk Head, on the head waters of Elk creek, a tributary of the South Umpqua river, and some seven miles east of Voncalla, Douglas county, while out looking for birds' nests. I saw a nest which I took to be an old bird's nest, on the upper side of a branch in a clump of twigs some thirty feet from the ground. On throwing a stick at it to ascertain its character, I was surprised to see a mouse run out of it upon a twig, where it stopped. I threw again and succeeded in dislodging the little fellow, which, on capturing, I at once recognized as something new. I kept it for some time alive, secured the nest, and soon after sent it, with measurements, to the Smithsonian Institution, but unfortunately the package was lost, and I failed to secure another until the one described by F. W. True. I have, however, found their nests down Elk creek, along the Coquella river, in Coos county, in southern Douglas county, and also on the upper Willamette tributaries, in Lane county, and believe it will yet be found in Washington and perhaps through the whole of the northern Pacific coast.

The nest is a novelty in itself, being about the size of a robin's nest, and built after the usual manner of mice in shape, but almost exclusively of the leaves of the tree in which it lives, which are split into threads from end to end, forming very slender filaments, seldom broken, and each leaf is frequently split twice or more, making from two to four threads of each leaf. These threads are soft, dry and apparently warm, and they show much ingenuity in the general make-up of the whole nest. Rarely has a few unsplit leaves, moss and twigs on the outside of the nest been found.

For some reason which I have not been able to discover, these nests seem to be frequently changed or deserted, from the fact that we frequently find in the woods and under lone trees of this variety, on the ground, small parts and at some times almost, as it appears, the entire nest; and I know of no other animal that has been known to split the leaves of this tree, as this one certainly does.

As to the food of this animal I can only surmise, as I did not dissect the only specimen I ever saw in the flesh, nor have I any clue farther than its habits of living in trees, but think it must subsist on the fruit of the tree, which is usually in fruit more or less all the

year, especially on those isolated and much branched trees which are found away from thick timber, and in which I believe it to be most abundant.

This conclusion is further verified by the relation of the teeth in the genus *Phenacomys* to the genus *Hesperomys*, which are rooted in both genera. The latter usually prefers grain to other food, and the teeth are more adapted for masticating hard food than the *Arvicolas*, whose teeth are not rooted and which feed on grass. From the tracks in the snow which I have seen at different times around the foot of the trees which it inhabits, and which tracks I think were made by this animal, I judge that it does not hibernate, and that it may to some extent feed on grass; but I have not been able to trace these tracks to any distance from the tree greater than two or three yards, neither am I positive that they were made by this animal.

Any information leading to a further knowledge of this interesting creature will be thankfully received, and we will be very grateful to anyone who will be kind enough to send us specimens or measurements. Alcoholic specimens or specimens in the flesh much preferred.

Aurelius Todd.

THE MESQUITE BEAN.

(From the *Pacific Rural Press*, June 7, 1890.)

One of the most useful and characteristic of the trees indigenous to the southern—Mexican—borders of the United States is the mesquite tree, also known vernacularly in some localities as the Cashaw, or *Algeroba* tree.

According to Dr. V. Havard of the United States army, this tree constitutes the principal growth of the wooded tablelands and high valleys throughout South and Southwestern Texas. It extends westward through New Mexico and Arizona to San Diego, California, and is found to the southward through Mexico, Central and South America to the southern parts of the Argentine Republic (exclusive of Patagonia).

Prosopis dulcis (Kunth) is probably the correct botanical name of our tree, though it is usually called *Prosopis juliflora* D. C., by American botanists. *Algarobia glandulosa*, *Prosopis horrida*, *P. juliflora*, *P. siliquastrum* and *P. glandulosa* are either synonyms or mere varieties, according to Bentham.

The mesquite is frequently nothing but a thorny, straggling shrub, growing in large impenetrable thickets near the coast or over the sandhills of the Colorado desert. Elsewhere in less exposed sit-

uations, it becomes a low, wide-spreading tree, 20 to 30 feet in height, with a trunk seldom over a foot in diameter, although sometimes found from two to three feet in thickness.

In the arid regions, where this tree is found in its best estate, this tree is most useful for the excessively hard, durable wood, valuable for fuel, in fencing or for other uses. Mesquite posts and rails are but slightly affected by exposure to the influences of ordinary weather. The trunk and roots as well are unsurpassed for fuel, making a hot fire, and in many sections, from California to Texas, is the most common, often the only obtainable, fuel. The wood is also useful in cabinet work, being heavy, fine-grained, and taking a fine polish, when it has the appearance of mahogany. It is richly colored, varying from purplish black in the center to a reddish brown and yellow near the bark.

The tree is also adapted for live fences; of rapid and easy growth in situations where scarcely any other tree will thrive, it can be made to form impenetrable hedges in a few years from the seed.

Baron von Mueller says: 'The variety *glandulosa* exudes a gum not unlike gum arabic, and this is obtained so copiously that children could earn two to three dollars a day in gathering it in Texas, latterly about 40,000 pounds being bought by druggists there.'

On the other hand, Dr. V. Havard in speaking of the mesquite tree of Texas, says: 'During the summer months the bark secretes an amber colored gum which has the taste of gum arabic, and like it makes excellent adhesive mucilage. Its solution in water is slightly acid and astringent; it is a useful and palatable drink in the diarrhœa of children. The quantity of gum secreted by each tree is not large enough to make it an important article of commerce.'

In California I have never observed the gum in any quantity. I have collected specimens of this gum that closely resembled jet in color and very hard when found—evidently caused to exude by fire.

The tree produces abundantly of its long and slender bean-like pods, with a thick and spongy mesocarp, sweetish to the taste. These pods contain from 25 to 30 per cent of grape sugar, 11 to 17 per cent of starch, 7 to 11 per cent of protein; of organic acids, pectin and other non-nitrogenous nutritive substances 14 to 24 per cent. They are also comparatively rich in potash, lime and phosphoric acid. The pods of several varieties are said to be rich in tannic acid.

Containing, as they do, more than half their weight in assimilable nutritive principles, these pods constitute a valuable article of food, and are one of the staples with many Mexicans and Indians.

The Cahuilla Indians, and also the Cocopahs of the Colorado desert region in California, gather large quantities of the pods annually, the time of harvest lasting from June into August, when the trees are frequently loaded with their golden wealth.

The squaws go out into the groves and bring back their 'hotls' (a large, coarse-mesh sack, resembling a hammock) and baskets full of the yellow pods. They then grind the pods in their stone mills or 'matates,' into a coarse meal or flour, remove the seeds and hard shells around the seeds, and then cook to suit their taste. Sometimes they boil the flour in water and make a gruel or pudding, but the larger portion of the meal goes to form large, flat cakes or loaves of bread which may be made to supply food for many months to come, and are easy for the nomadic tribes to transport.

This bread is very sweet and pleasant to the taste, with a pleasant, slightly acid and astringent, spicy flavor. A sparkling drink, called aloja, is also made from these pods. The Comanche and Apache Indians formerly used large quantities of an alcoholic drink—a weak beer—made by fermentation of the flour.

The mesquite beans (as the pods are commonly called) are relished by most herbivorous animals, and horses and cattle will eat them with avidity and thrive on them as a substitute for grain. They are likely to be more largely utilized as fodder for stock than as human food.

In this connection, it is worthy of note that the pods of the mesquite produced in the valleys near the coast are almost invariably thin and bitter instead of thick, sweet and nutritious, as are those grown in the more arid sections on the Colorado desert and eastward. Evidently a warm, dry climate is necessary to the best development of the fruit, the fogs and coast winds causing a very inferior product.

The delicate green, finely divided foliage renders this a very beautiful tree when in leaf, and it is well worthy of being extensively cultivated.

C. R. Orcutt.

THE TENT CATERPILLAR.

These common pests having been so very plentiful this year in this locality (Moosup Valley, R. I.), I resolved to make a study of them, not adding anything new, perhaps, to the cause of science, but satisfying myself as to their habits. At the usual time in early spring the webs began to show upon apple and wild cherry trees. It is said that the young caterpillars feeding upon the tender leaves eat on an average two apiece each day. At this rate it does not

take many days to make quite a showing of naked boughs. As the caterpillars grow a new skin is formed under the old one, which splits down the back and drops off. When fully grown the worm is not such an unsightly object to look upon, if one could forget what a pest it is. They are then about two inches long, the black body covered with many yellow hairs, with a white stripe along the back, and many irregular light streaks down the sides. Between these and the white stripe is a row of pale blue spots on each side of the back.

I brought in one of the spindle-shaped cocoons, which seems to be made of white silk, sprinkled with a sulphur colored powder. Having kept it for about three weeks my patience was rewarded by a sight of the full-fledged moth, which was about one and one-quarter inches across the upper wings, which were of a dark fawn color, crossed by two oblong lighter streaks edged with white. I was surprised to find such a tiny hole in the end of the cocoon; it seemed almost impossible that the moth could have escaped. It is said that soon after the adult insects appear the females begin to lay their eggs. These are in clusters of about three hundred, arranged in the form of a belt around a small twig. This is covered with a varnish-like substance which serves as a protection during winter, as the belt remains upon the twig until the following spring. The season when the branches are bare is therefore the best time to war against this pest. If the trees are carefully searched at this time these egg clusters may be easily found and destroyed.

S. E. Kennedy.

EDITORIAL.

Our frontispiece this month is an illustration of the first olive mill on the Pacific Coast. We are indebted for it to the genial secretary of the California state board of horticulture, Mr. B. M. Lelong. The mill was built at the old mission at San Diego, the oldest mission in California.

Our new dress has been very favorably commented upon, and this magazine is the first to appear in this new style of self-spacing type. In beauty of typography we can now reasonably claim no superior in the world, and none of equal excellence in this respect on the Pacific Coast. We look to our contributors to assist us in making such a statement equally true of the matter presented our readers.

The demands of the general public sustains our view that there is a field for a journal that shall maintain a high standard, reliable,

combining practical methods with scientific accuracy. It is impossible to divorce technical details from our work in this treatment, but we aim to give enough in popular style to repay the general reader. On the other hand, the specialist will find the journal indispensable from the quantity of original matter, whether it be in technical or popular language.

NOTES AND NEWS.

LUPINUS NANUS.—Of all the annual lupines, this dwarf Californian species is one of the most charming, the shade of purple-blue being particularly pleasing. When in Essex recently, I saw a large patch of it on a seed farm, and was enabled to realize what a mass of pleasing color is formed when so grown. The seed farmers sow thinly, and then take out some of the plants if they deem them to be too crowded. The individuals, having room in which to develop, form dense tufts and bloom with surprising beauty and brilliancy. But in ordinary gardens the sower of seeds of annuals seems unable in most cases to overcome the bad habit of sowing too thickly, or of understanding the necessity for some thinning out. Only let any one grow this delightful annual in good soil in an open situation and give it plenty of room, and its beauty will astonish.—*The Garden*, xl. 53.

LAYIAS.—These pretty hardy annuals were shown at Chiswick the other day in the Kew collection of cut flowers and attracted great attention. The one which in the Kew group attracted chief attention was *Layia heterotricha*, with flowers about the diameter of a half-crown piece, yellow eye, rich yellow ground, edged very evenly on the points of the petals with pure white. The edging is narrow and clearly defined, the ground a very beautiful shade of apricot-yellow. Out in the gardens and under a north wall there is a small bed of *Layia elegans*, presumably the same thing. Both are lovely annuals and should be universally grown, especially to furnish flowers for cutting. *Layia glandulosa* in the Kew collection has charming pure white flowers. This is a lovely little variety also and should become an immense favorite, especially for vase or espergne decoration.—*The Garden*, xl. 53.

A NEW ASTER.—Those who are interested in these beautiful fall blooming wild flowers, will find a new species illustrated and described in a recent number of the *Botanical Gazette*. It is called *Aster Orcuttii*, and is from the Colorado desert, in California. It

is a very handsome species, and well worth cultivating. The flowers are not borne in clusters or panicles, as in so many asters, but are singly on the ends of the stalks. The edges of the leaves are also so deeply cut as to be almost comb like, and very different in appearance to the ordinary run of the asters as we see them in the east.—*Mechans' Monthly*, i. 22.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4112. Second annual report of the Cornell University agricultural experiment station, Ithaca, N. Y. 1889. (The first annual report is wanted by the editor.)

4113. Reports on the observations of the total eclipse of the sun, December 21-22, 1889, and of the total eclipse of the moon, July 22, 1888, to which is added a catalogue of the library, published by the Lick observatory. Sacramento. 1891. 122 pp. 8vo.

4114. Proceedings of the American Forestry Association at the summer meeting held in Quebec, September 2-5, 1890, and at the ninth annual meeting, held in Washington, December 30, 1890. Washington, D. C. 1891. 111 pp., 8vo. (Copies may be obtained of Charles C. Binney, 218 South 4th street, Philadelphia, at fifty cents each.)

4115. Catalogue of the herbarium of the late Dr. Charles C. Parry, of Davenport Iowa. Printed by Mrs. E. R. Parry, Davenport, Iowa. July, 1891. 82 pp., 8vo.

The collection contains upwards of 20,000 specimens, representing over 7,000 species, and is particularly rich in West American types. The herbarium, and an extensive botanical library, are now offered for sale by Mrs. Parry, and it is greatly to be hoped that they may be secured by some Pacific coast institution, where they most properly belong.

4116. The practical working of the Inter-state commerce act. By John A. Wright. Philadelphia. 1891. 40 pp., 8vo.

4117. Catalogue of economic plants in the collection of the U. S. Department of Agriculture. By William Saunders. Washington. 1891. 42 pp., 8vo.

4118. The Chocolate-plant (*Theobroma cacao*) and its products. Walter Baker & Co. Dorchester, Mass. 1891. 40 pp., 8vo., with illustrations.

4119. U. S. Dept. Agriculture: Forestry Division. Bulletin No. 5. What is Forestry? By B.E. Fernow. Washington. 1891. 52 pp.
4120. U. S. Dept. Agriculture. Papers on horticultural and kindred subjects. By William Saunders. Washington. 1891. Reprinted from reports of the department of agriculture. 1863-1889.
2121. Basket-work of the North American aborigines. By Otis T. Mason. Washington. 1890. From the report of the Smithsonian Institution, 1883-'84, part ii. pp. 291-306 and plates i. to lxiv.
4122. Geological survey of Missouri. Bulletin No. 5. 1891.
4123. Illustrative cases of congenital club-foot. By H. Augustus Wilson, M. D. Reprinted from Annals of Gynæcology and Pædiatry. June, 1891. From the author.
4124. Directions for collecting birds. By Robert Ridgway.
4125. A catalogue of the fresh-water fishes of South America. By C. H. and R. S. Eigenmann.
4126. Fishes collected by William P. Seal in Chesapeake bay, at Cape Charles City, Virginia, September 16 to October 3, 1890. By Barton A. Bean.
4127. Relations of temperature to vertebrae among fishes. By David Starr Jordan.
4128. On the structure of the tongue in humming birds. By Frederic A. Lucas.
4129. Contributions to American botany. xviii. By Sereno Watson. From Proc. Amer. Acad. Arts and Sci., xxvi, 124-163. From the author.

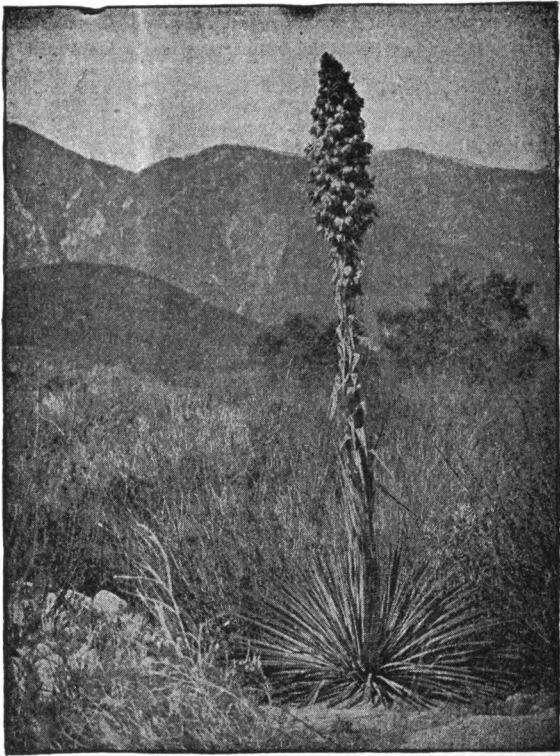
This paper consists (1) of descriptions of some new N. A. species, chiefly of the U. S., with a revision of the American species of the genus *Erythronium*; (2) descriptions of new Mexican species, collected chiefly by C. G. Pringle in 1889 and 1890; (3) upon a wild species of *Zea* from Mexico; and (4) notes upon a collection of plants from the Island of Ascension. Liebmann's genus *Llavea*, of the Sapindaceæ, is named *Neopringlea*—worthily dedicated to the eminent Mexican explorer, C. G. Pringle.

4130. The relation of the Mexican flora to that of the United States. By Sereno Watson. From Proc. A. A. A. S., xxxix, 291-2. Abstract. From the author.

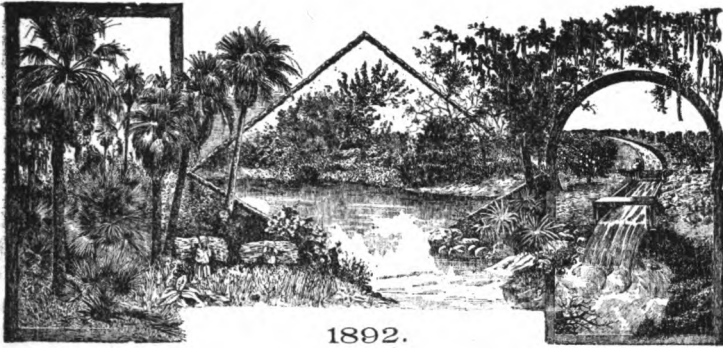
4131. Notes on North American Halorageæ. By Thomas Morong. Reprinted from Bull. Tarr. Bot. Club, xviii, 229-246. From the author.

Callitriche longipedunculata is herein described from the mesas near San Diego, California. This plant was distributed by C. R. Orcutt under the name *C. marginata* in 1884.

CALIFORNIA TREES AND FLOWERS.



YUCCA WHIPPLEI.



CALIFORNIA TREES AND FLOWERS.

'In all parts of the civilized world, the refinement, innocence and happiness of the people may be measured by the flowers they cultivate,' says an eloquent author. I would add, that the wild flowers of a country must furnish a truthful index to the adaptability of that land as a home for the human race, for, where they abound, there too man may seek for fruitful toil, pleasure and rest.

Where may lovelier flowers, more brilliant tints, or more delicate coloring be found in greater profusion than on the mountains and mesas, in canyon and meadow, throughout the length and breadth of California! And where may a more perfect abiding place be found for man!

It is to the beautiful annuals which in springtime cover the hills and mesas, that California owes her just fame as a land of flowers. Perhaps in no country in the world do the early spring flowers so change the face of the earth from a desolate waste to a beautiful garden, as on the Pacific coast—hills, mesas, mountains and valleys, and the arid plains of the desert, alike, quickly responding to the vivifying rain. California has probably already furnished to the horticulturist a greater variety of beautiful flowers and stately trees than any other State in the Union. Yet many others are awaiting the appreciation of man, or wasting their sweetness on the desert air.

In this essay it is intended to give brief descriptions of those already introduced into cultivation, with reference to the varieties produced by cultivation, together with notes on many that are well worthy of introduction. A few trees and plants, not natives of California, but now closely identified with our flora, either by cultivation or naturalization, are also noticed.

*) An asterisk indicates that the colors have been carefully determined by comparison with Ridgway's 'Nomenclature of Colors.'

ABIES.

The firs are magnificent trees, of pyramidal form and rapid growth.

A. BRACTEATA Nuttall. A tall slender, strictly pyramidal tree, 100 to 150 feet high and one to two feet in diameter. Unknown in cultivation.

A. CONCOLOR Lindl. The Silver Fir is a very ornamental tree, growing from 80 to 150 feet high attaining a diameter of three or four feet. Foliage of a pale silvery green, whence its name.

A. GRANDIS Lindl. The White Fir attains a height of 200 to 300 feet, with a diameter of three or four feet, and is distinguished by the glossy, green upper surface of the leaves.

A. MAGNIFICA Murray. The Red Fir exceeds 200 feet in height, and reaches a diameter of ten feet. Foliage rigid, bark thick of a reddish brown color, from which it receives its vernacular name in common with the following species.

A. NOBILIS Lindl. Red Fir, scarcely distinguishable from the preceding species.

ABRONIA.

The Abronias are charming trailing plants, sometimes called wild verbenas from the resemblance between the verbenas and their showy umbels of brilliant flowers, which are of great fragrance, and produced abundantly.

A. LATIFOLIA Fischholtz. Waxy lemon yellow flowers, possessing the odor of orange blossoms. A hardy annual in cultivation, perennial in its wild state, like the following species.

A. UMBELLATA Lam. The finest species, producing a profusion of large umbels of bright rose-purple flowers.*

A. VILLOSA Wilson. A slightly smaller plant, but producing equally large umbels of bright rose-purple flowers.*

ABUTILON.

The Abutilons are highly prized green-house plants, of elegant habit. California offers one of the most beautiful species, as yet unknown in cultivation.

A. AURANTIACUM Watson. A low compact shrub, a foot high, with large, velvety, light green leaves and showy 'golden flowers.' Found near the southern border of the state, in Lower California.

ACACIA.

Several Australian species of Acacia have been extensively grown in California, either for their beauty or utility. Only one species is a native, and that, *A. Greggii*, or Cat's Claw, cannot be recommended for trial. These are mostly small trees or shrubs of rapid growth.

A. DECURRENS *Willdenow.* The Black Wattle is one of the most prized, and is largely planted for forest culture, because of its rapid growth, the value of its timber, its beauty and the bark which is rich in tannin.

A. DEALBATA *Link.* Silver Wattle. Very ornamental.

A. FARNESIANA *Willdenow.* Oppopanax is prized for its delicate, delicious and wonderfully persistent perfume, for which it is often grown. It is valued for other reason, and is of especial historic interest, since it is credited with having furnished the crown of thorns with which the Savior was crowned.

A. MELANOXYLON. Make one of the finest of sidewalk trees, sturdy and symmetrical in form.

A. PYCNANTHA *Bentham.* The Golden Wattle is second only to *A. decurrens* in importance for its yield of tanner's bark.

ACANTHOMINTHA.

A. ILICIFOLIA *Gray.* A showy mint-like annual, abundant on the mesas near San Diego, and well worth attention. A span high, with white flowers marked with purple.

ACTINOLEPIS.

A. CORONARIA *Gray.* A low annual bearing numerous yellow flowers.

ADENOSTOMA.

Evergreen shrubs, belonging to the rose family, two to ten feet high, which produce an effect upon the landscape similar to that of the heaths of the Old World. By studying the natural blending and contrasts of our wild shrubs and trees in their native haunts, the landscape artist could gather some useful hints, and the species of this genus would prove useful in his work.

A. FASCICULATUM *Hooker & Arn.* This *Chamisal* often covers large areas of country so dense y as to be almost impenetrable. The foliage is very dark green.

A. SPARSIFOLIUM *Torrey.* Foliage light pea green; flowers in large terminal panicles, white and fragrant.

AGAVE.

The so-called Century Plants are among the best known of the succulent ornamental plants that are in cultivation. California furnishes several beautiful species.

A. DESERTI *Engelmann.* A glaucous-leaved species, peculiar to the Colorado Desert. Flower stalk seven to ten feet high, surmounted with a large panicle of flowers of a chrome yellow.* These plants, also known as Mescal or Maguey, from which the alcoholic liquor *mescal* is made, are useful for their strong fibre.

A. PRINGLEI *Engelmann.* A mountain form of *A. deserti*, rare and beautiful.

A. SHAWII *Engelmann*. One of the most striking and ornamental species of the genus, prized for its compact dark green leaves.

A. PARRYI *Engelmann*. Native of Arizona, as also the following species.

A. PALMERI *Engelmann*.

A. SCHOTTI *Engelmann*.

ALFILARIA.

Erodium cicutarium and *E. moschatum* are about equally well known by the name *Alfilaria*, and are valuable forage plants. The foliage is finely divided like a fern leaf, and the rose-purple* flowers are half an inch across. The two generally grow together so that the seed is generally mixed. A considerable demand has sprung up, and *Alfilaria* is being extensively sown in arid localities for forage.

ALLIUM

A large genus, including the onion of the vegetable garden. Some of the wild forms native to California are very pretty, but mostly with small flowers and worthless for cutting. Interesting garden plants.

A. ACUMINATUM *Hook*. Usually a low plant, six inches high, with a good sized umbel of pretty rose-purple flowers.

A. CUSICKI *Watson*. A dwarf vernal form, with white flowers commonly tinged with purple.

A. FALCIFOLIUM *Hook & Arn*. Flowers rose colored.

A. FIMBRIATUM *Watson*. A pretty plant, abundant in the mountains of Southern and Lower California, bordering the Colorado Desert. It sends up a stout scape a few inches high,—rarely more than three inches—bearing twenty-five or thirty flowers of a deep rose purple*, sometimes of a light shade. Its Mexican name is *Lavilla*.

A. HAEMATOCYTON *Watson*. A small species, six or eight inches high, bearing an umbel of six to twelve small white flowers with greenish stripes and a reddish brown centre. It is a tender plant.

A. SERRATUM *Watson*. A showy little plant, about ten inches high, with a naked stem and a many-flowered umbel of dark, bright rose-purple* flowers half an inch wide.

A. UNIFOLIUM *Kell*. A unique little species, with white to rose-purple flowers. Three inches to a foot high.

ANTIRRHINUM.

A. ORCUTTIANUM *Gray*. A tall, slender annual, with long spikes of either white or violet flowers, discovered in 1882. Perhaps the prettiest of the wild Snapdragons of California.

AQUILEGIA.

Gracelul perennial plants, hardy and very ornamental. Columbine.

A. CAERULEA James. Two feet high, with large showy blue or white flowers.

A. CAERULEA FLORE PLENO. Double flowers.

A. CHRYSANTHA. A fine species, with long yellow spurred flowers. The most graceful and beautiful for cultivation.

A. TRUNCATA F. & M. The form in cultivation is a hybrid, with large yellow flowers, the sepals and spurs of a deep orange red.

ARBUTUS.

A. MENZIESII Pursh. The Madroña is a handsome tree, some times a hundred feet high, with reddish bark and lovely white flowers.

ARCTOSTAPHYLOS.

The Manzanitas are handsome shrubs, with reddish exfoliating bark, evergreen—usually light colored—foliage, and lovely clusters of bell-shaped snow-white or rosy blossoms, which often appear even before the snow is off the ground. If these could be coaxed into the same graceful habits of growing under man's care as obtain with them in their wild state, they would be among the most popular of the ornamental shrubs of the Pacific Coast.

A. BICOLOR Gray. A coast species, a few feet high.

A. GLAUCA Lindl. A fine but variable mountain form.

A. MANZANITA Parry. The *Manzanita*, one of the largest and most beautiful species, peculiar to the Pacific Coast.

A. OPPOSITIFOLIA Parry. A willow-leaved species from Lower California.

A. PRINGLEI Parry. A peculiar mountain form. Very beautiful.

A. UVA-URSI Spreng. Bear berry.

ARGEMONE.

A. HISPIDA Gray. Thistle Poppy A stout prickly annual three to six feet high, producing numerous large, showy, white flowers, four to five inches in diameter, almost rivaling the *Romneya* in beauty, and conspicuous by night or day. Foliage bright green. A very decorative plant, recommended for large grounds.

A. MEXICANA L. Flowers yellow. Otherwise similar.

ASTER.

A beautiful perennial species, a foot high, with large conspicuous flowers, two inches across, and of a delicate mauve or lavender, has lately been discovered on the Colorado Desert. It is likely to prove an acquisition to horticulture.

BAERIA.

The Baerias (named in honor of Prof. Baer of the University of Dorpat) are very pretty annuals, of easy culture in ordinary soil.

B. GRACILIS Gray. A span or more high, producing many small heads of small, yellow flowers.

BLOOMERIA.

Bloomeria is a genus of beautiful liliaceous plants related to Brodiaëa, and peculiar to California.

B. AUREA Kellogg. The broad glossy leaf three or four feet long. The large bulb, an inch in diameter, grows six inches deep in the soil, producing a tall scape bearing a large umbel of showy orange colored flowers.

B. CLEVELANDI Watson. A smaller plant, seldom over six inches high, with umbels of bright yellow flowers. Named in honor of Mr. D. Cleveland, of San Diego.

BREVOORTIA.

B. COCCINEA Watson. Vegetable Firecracker. A showy plant, producing a tall grass-like stem two to three feet high, bearing a pendant umbel of richly colored flowers, blood crimson tipped with white, one to three inches in length.

BRODIÆA.

The Brodiæas have narrow grass-like leaves and slender stems bearing an umbel of bright colored flowers. All are easily grown and forced, doing well in clayey, rather moist soils, but should be dried off at time of blooming.

I.—BRODIÆA.

B. CAPITATA Benth. Flower stalks slender, a foot high, bearing a dense head of purple flowers. Sometimes called Wild Hyacinth.

B. CAPITATA ALBA. A pure white form, prized in cultivation.

B. CONGESTA Smith. Two to four feet high, with deeper, brilliant purple flowers

B. MULTIFLORA Benth. Low, six inches high, bulb producing several slender stalks, bearing umbels of purple flowers.

II.—HOOKERA.

The following species are considered by some botanists to form a distinct genus named Hookera.

H. GRANDIFLORA Smith. Produces a few very large glossy purple flowers.

H. MINOR Wat on. Bears a loose, spreading umbel of large royal purple flowers from a short stem. A general favorite.

H. ORCUTTII *Greene*. A foot or two high, with large lavender to royal purple flowers, discovered in 1882. One of the choicest species.

H. STELLARIS *Greene*. Flowers rich purple with white center, in a star-like cluster.

H. TERRESTRIS *Kellogg*. Flowers red-purple.

III.—TRITELEIA

The following species are included by Prof. Greene in the genus *Triteleia*, but they are best known in cultivation under the old classification.

T. HYACINTHINA *Greene*. Flowers milky white, banded with green.

T. IXIODES *Watson*. Low, bearing numerous light yellow flowers banded with green. Very pretty

T. LAXA *Benth*. Tall, with umbel of 15 to 30 large blue flowers.

T. PEDUNCULARIS *Lindl*. Flowers glossy purple on long stems. Rare.

CALANDRINIA.

C. MENZIESII *Hook*. A low, succulent annual, very variable, with pretty red or purple flowers.

C. MENZIESII ALBA. Flowers pure white.

C. ROSEA. A form in cultivation, presumed to have originated in California.

CALOCHORTUS.

I.—MARIPOSA TULIPS.

These Tulips, excepting the true lilies, are the finest of the beautiful liliaceous plants of the Pacific Coast. The Mariposa or Butterfly Tulips are highly recommended for winter flowering and are gaining great popularity in the East and in Europe. Each species varies greatly in color, and the erect, cup-like flowers are of large size, and of the richest and most brilliant coloring. The stout, slender flower stalks vary from eight inches to two or three feet in height, each bearing from a few to fifteen or twenty flowers.

C. AUREUS *Watson*. Three to six inches high, flowers clear yellow, or with a narrow crescent of purple above the well-defined roundish gland, which is densely covered with reflexed hairs.

C. GUNNISONI *Watson*. Petals light lilac, yellowish green below the middle, banded and lined with purple.

C. KENNEDYI *Porter*. A rare species only known in the Mojave Desert where it is very difficult of access. The large flowers two inches across, of a deep orange vermilion,* produced on short stout scapes. *A magnificent species.*



CALOCHORTUS.

- C. LUTEUS Dougl.** Plant low, with clear lemon yellow flowers.
- C. MACROCARPUS Dougl.** Stout and tall, the lilac flowers banded with purple.
- C. NUTTALLII T. & G.** Tall, flowers large, of a creamy whiteness, banded with green on the back of the petals. A strong growing plant.
- C. LEICHTLINII Hook.** A low mountain form of the last.
- C. PALMERI Watson.** Rose purple flowers, with maroon purple spots at base of petals.*
- C. SPLENDENS Dougl.** Lustrous rose purple, with often a maroon purple spot at base of petal*. Greatly admired.
- C. VENUSTUS Benth.** Regarding this species considerable confusion exists relative to the nomenclature of the numerous beautiful varieties. The following are the leading varieties known in cultivation, the first being considered the type of the species.
- 1—Roseus. Creamy white inside, with rose-colored blotch at top of petal, a beautiful tinted eye in center, and silky gland at base; rich carmine on back. A perfect gem.
 - 2—Citrinus. Citron yellow.
 - 3—Oculatus. White inside, with richly colored eye-like spots.
 - 4—Purpurascens. Rich purplish lilac, with eye-like spots.
- C. WEEDII Wood.** This is one of the finest of the Mariposa Tulips, two or three feet high, producing several large and brilliant orange yellow flowers, delicately dotted with brown and covered with silky hairs. Peculiar to Southern California.

II.—STAR TULIPS.

The Celestial or Star Tulips differ from the Mariposa Tulips in the slender drooping stems, bearing many bell-shaped or globular flowers. A single long glossy leaf is characteristic of both sections of the genus.

- C. ALBUS Dougl.** A strong growing plant, with pearly white globular flowers, often an inch in diameter, lined with silky hairs. Very beautiful.
- C. BENTHAMII Baker.** Bearing two to six delicate nearly erect open bells, yellow, lined with silky hairs.
- C. FLEXUOSUS Watson.** Petals clear lilac.
- C. LILACINUS Kell.** Erect cup-shaped flowers, light lilac.
- C. MAWEANUS Leschlin.** Delicate open bells, white lined with silky blue hairs.
- C. NITIDUS Dougl.** A foot high, white or purplish flowers.
- C. NUDUS Watson.** Low and often slender, white or pale lilac, wholly without hairs.
- C. PULCHELLUS Dougl.** One of the hardiest and most beautiful species, resembling *C. albus*, but with rich yellow flowers.
- C. UNIPALORUS H. & A.** Large white flowers.

CALYCANTHUS.

C. OCCIDENTALIS *H. & A.* Sweet-scented shrub. An erect shrub, ten feet high, dark green foliage and purplish-red or white flowers. Deciduous.

CAMASSIA.

The Camass furnished to the Californian aborigine one of his most valued articles of food and to the white man it contributes a handsome flower. The Camassias are perfectly hardy in the eastern states. They thrive best in a porous soil.

C. CUSICKII *Watson.* The flowers of this species, borne in a long raceme, when first expanded are white, changing to pale blue after they have been open a few days. Nearly a yard high at maturity; bulbs large. 'Finest of the genus.'

C. ESCULENTA *Lindl.* The Indian Kamass grows from ten to twenty inches high, has long grass-like leaves, and bears a loose spike of violet-blue flowers, five inches long. The flowers are an inch or more wide, ten to twenty in a spike, and useful for cutting.

CARPENTERIA.

C. CALIFORNICA *Torrey.* An ornamental shrub related to the syringa, with fragrant white flowers.

CASTILLEIA.

C. AFFINIS *H. & A.* Painter's brush. A stout annual one to three feet high, abundant along moist banks of streams in Southern California, where the yellowish flowers tipped with red, in a leafy spike, and with bright red floral bracts, renders the plant very striking and conspicuous.

C. FOLIOLOSA *H. & A.* A perennial, one or two feet high, shrubby at base, clothed with a matted white wool. The inconspicuous yellowish or red tipped flowers outshone by the brilliant red of the floral bracts. Flourishes on dry hillsides.

CEANOTHUS.

The Wild Lilacs of the Pacific Coast are in endless variety. They are mostly graceful evergreen shrubs or small trees, bearing dense showy racemes of either blue or white flowers.

C. HIRSUTUS *Nutt II.* This is one of the most graceful of our Californian shrubs, with glossy foliage and bearing a profusion of campanula-blue flowers which fade to flax-flower and pearl blue.*

C. DIVARICATUS *Nutt.* Pale glaucous leaves, and light blue to white flowers. Very ornamental.

C. INTEGERRIMUS *H. & A.* Bears large open terminal racemes of white fragrant flowers.

C. ORCUTTI *Parr.* Flowers unknown. Native of the high mountains, of San Diego county.

C. THYRSIFLORUS *Lesch.* Sometimes a small tree, with bright blue flowers. One of the best known in cultivation.

CEREUS.

Cereus includes over 200 species of the most beautiful cacti, the most of them producing an abundance of brilliant colored or exquisitely tinted flowers. Some are delicate trailing plants, others are erect and rigid, in the giant cactus attaining a height of sixty feet. Many of the species are beautiful and curious in themselves, not needing to blossom to repay the attention bestowed upon them.

C. EMORYI *Engelm.* The Velvet Cactus is a cylindrical species covered with slender yellow spines, when young so soft and flexible as to suggest its popular name. The flowers are greenish yellow, not showy. In the United States only found near San Diego.

C. ENGELMANNI *Parry.* One of the most beautiful of the Cushion Cacti, with long white or rich brown spines, growing in clusters of few to many cylindrical heads a few inches tall, and bearing numerous large and bright magenta colored flowers. The fruit is edible, an inch in diameter, possessing the flavor of the strawberry.

C. GIGANTEUS *Engelm.* The Giant Cactus is the largest species known. Attains to a height of sixty feet, bearing large flowers and edible fruit.

CHAENACTIS.

C. ARTEMISIAEFOLIA *Grav.* A viscid-pubescent annual, one to five feet tall, bushy, with white or flesh-colored heads of composite flowers, an inch in diameter.

C. TENUIFOLIA *Nuttall.* An erect or decumbent annual, a span to a foot high with composite heads of flowers an inch across, of a lemon yellow approaching orange in the center.* A coarse but rather showy plant, like the preceding, remaining long in flower.

CHAMAECYPARIS.

C. LAWSONIANA *Parlat.* The Lawson Cypress is one of the most beautiful of the many native trees of the Pacific Coast, and is highly valued for its ornamental qualities. It sometimes attain a height of 150 feet.

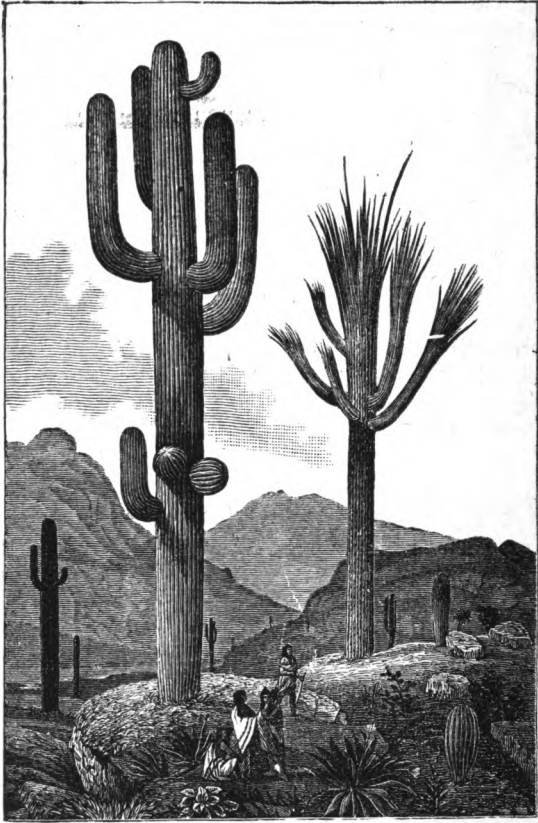
CHILOPSIS.

C. SALIGNA *Don.* The Desert Willow is a graceful willow-like shrub, related to the Catalpa, with showy white flowers two inches long, veined with purple.

CHLOROGALUM.

C. ANGUSTIFOLIUM *Kellogg.* Flowers white with yellowish-green lines.

C. PARVIFLORUM *Watson.* Flowering stems from six inches to six feet tall. Flowers not showy.



THE GIANT CACTUS.

(Cereus giganteus.)

C. POMERIDIANUM *Kunth*. The common Soap plant or *Amole* produces a large, spreading panicle of rather inconspicuous white purplish-veined flowers from an immense fibrous-coated bulb which is sometimes used as a substitute for soap.

CLARKIA.

C. ELEGANS *Dougl.* A showy, profuse flowering annual, six inches to several feet high, of rich purple and other colors. The following varieties have been produced by cultivation.

- 1.—Alba. With pure white flowers.
- 2.—Alba flore pleno. Double white flowers.
- 3.—Rosea. Rose-colored flowers.
- 4.—Rosea flore pleno. Double rose-colored flowers.

CLAYTONIA.

C. PERFOLIATA *Don.* A succulent annual, with small white or rose-colored flowers. In England it is considered very fine for salad, while in California it is known as Spanish Lettuce.

COBAEA.

C. SCANDENS *Cav.* A Mexican climber of the phlox family, highly valued as a rapid grower and for its large bell-shaped flowers, of an apple green color when first opened, changing to lavender and violet and finally to a rich prune purple.* A tall climber.

COLLINSIA

Tender annuals, commonly two-colored in their wild state, very pretty.

C. BARTSIAEFOLIA *Benth.* Purplish or pale violet flowers.

C. BARTSIAEFOLIA ALBA. A cultivated white variety, rarely found wild.

C. BICOLOR *Benth.* The most showy species, with purple and white flowers, three-quarters of an inch long, in large whorls. The following are the leading cultivated varieties.

- 1.—Alba. Lovely white whorls.
- 2.—Atrorubens. A pretty purplish-red variety.
- 3.—Candidissima. A very pretty dwarf white form.
- 4.—Carnea.
- 5.—Rosea.

COLLOMIA.

C. GRANDIFLORA *Dougl.* An erect annual related to the Gilias, a foot or two high with large showy salmon-colored flowers.

CUPRESSUS.

The California species of Cypress are among the most widely planted of evergreen trees or shrubs, and are very ornamental. The Monterey Cypress is especially useful for hedges. (The Lawson Cypress belongs to the genus *Chamaecyparis*.)

C. GOVENIANA *Griseb.* Usually a low bushy shrub or tree.

C. GUADALUPENSIS *Watson.* The Blue Cypress is one of the most ornamental species in the genus. Tall and graceful with fine glaucous foliage, and of a dense compact growth.

C. MACNABIANA *Murr.* A graceful little tree, rarely over ten feet high.

C. MACROCARPA *Hartw.* The Monterey Cypress. Said to resemble the Cedar of Lebanon in habit, with dense far-spreading branches.



DARLINGTONIA.

D. CALIFORNICA *Torrey.* A striking perennial plant of curious aspect. Of greenish yellow hue, bearing a nodding purplish flower. One of the Pitcher plants, noted for its alluring insects to their destruction.

DATURA.

D. METELOIDES *DC.* A rank growing plant, with large white flowers delicately shaded with violet. Very handsome in cultivation, but a common weed in California.

DELPHINIUM.

The larkspurs scarcely need an introduction, so many species having met with kindly reception. California, however, has the honor of having contributed several of the finest species yet introduced into general cultivation.

D. CARDINALE *Hook.* A stout perennial, five to seven feet tall, producing magnificent panicles of bright, handsome scarlet flowers with a yellowish center. Quite hardy.

D. DECORUM *F. & M.* A foot high, with a long spike of brilliant indigo blue flowers. Very fine.

D. NUDICAULE *T. & G.* Flowers in spikes a foot long, light scarlet to crimson.

DICENTRA.

Glabrous perennials, usually showy, with pinnately divided leaves and racemes or panicles of brilliant flowers.

D. CHRYSANTHA *H. & A.* A most generous plant, continuously in bloom from May until October. The small rich lemon yellow* flowers borne in a terminal panicle a foot or two long; the plant two to four feet high, very effective for grouping in borders; the finely divided foliage resembling some ferns, of a very pale bluish-green and very beautiful. Roots easily transplanted in the fall or winter, or the plant may be grown from seed. Grows wild on dry hills, but thrives in rich garden soil.

DODECATHEON.

The Giant Cyclamen, *Dodecatheon Clevelandi*, is one of the most charming of the many lovely spring flowers of Southern California. Every child in springtime is sure to gather large handfuls of the fragrant flowers, and each has some pretty name for them such as Rabbit-ears, Shooting-stars, or Mad Violets. The flowering stem is usually a foot high, bearing an umbel of six to twenty-five of the large brilliant flowers. The center of the flower is of a rich prune purple bordered with bright lemon yellow, the reflexed divisions of the corolla pure white or tipped with lavender or phlox purple. Several varieties have been introduced as follows.

D. CLEVELANDI *Greene*. As above described, with lavender colored divisions of the corolla. The varieties:

1—Alba. Divisions of a pure white.

2—Splendens. Divisions of a deep brilliant phlox purple.

ECHINOCACTUS.

This genus includes over 200 species of depressed-globose or cylindrical cacti, some of very large size. They are remarkable for their beauty and symmetry of growth, armed with strong spines as a rule.

E. CYLINDRACEUS *Engelm.* Noted for its beautiful flexuous spines, frequently of an ivory whiteness. I have measured one plant that exceeded ten feet in height, and nearly two feet in diameter. Usually under three feet high. Flowers two inches across, of a clear lemon yellow.*

E. EMORYI *Engelm.* Dull red spines and flowers.

E. LECONTEI *Engelm.* Spines of a silvery grey color usually.

E. POLYCEPHALUS *Engelm.* A rare desert species. Very distinct from all others.

E. ORCUTTI *Engelm.* A fine cylindrical form found in Lower California.

E. VIRIDESCENS *Nutt.* A depressed-globose plant, common near San Diego. Known as the Turk's head cactus.

E. WISLIZENI *Engelm.* The Giant Fish-hook cactus; the typical form occurs in New Mexico.

ERYTHEA.

A genus of beautiful palms peculiar to California, related to the genus *Brahea*, with which it has been sometimes included. The leaves are fan-shaped, without filaments. The fruit is edible, with seeds as large as marbles.

E. ARMATA *Watson*. The Blue palm, with bluish-white leaves for which it ranks high among the ornamental palms.

E. EDULIS *Watson*. A larger tree, of more rapid growth, and foliage of a dark green. Considered one of the most desirable of palms.

ERYTHRAEA.

The *Canchalaguas* are elegant annuals, a span to a foot high, producing a multitude of bright flowers. The following is the largest and handsomest species in the genus.

E. VENUSTA Gray. Flowers an inch across, rotate, with slender tube forming a center of delicate sulphur yellow, the usually five divisions of the corolla of a deep solferino, more rarely lavender or white.* Foliage and stems of light apple green.

ERYTHRONIUM.

The *Dog-tooth Violets* are distinctively American, with the exception of a single species that is a native of Europe and Asia. The greatest variety of forms thrive in their nativity on the Pacific Coast. They are beautiful lily-like flowers, highly prized in cultivation. They grow in shady places in rock and leaf mold as a rule. The following are the names by which the principal varieties are known in cultivation.

E. CITRINUM. A variety from Oregon.

E. GRANDIFLORUM. The leaves are broad and richly mottled in brown, green and white, with delicate straw-colored flowers, recurved like a lily.

E. GRANDIFLORUM ALBIFLORUM. This sends up from long, narrow corms, broad leaves, conspicuously blotched with purple, and tall, slender racemes of two to six nodding, lily-like, long-pedicelled flowers, which, when fully expanded, are nearly three inches across. The segments are pale yellow, dashed with orange towards the base, with darker orange spots on the interior face.

E. GIGANTEUM. Flowers pure white. Considerable confusion exists in the nomenclature of these plants, which only careful comparisons can straighten. This, *E. albiflorum* and *E. Smithii*, are all mere varieties of *E. grandiflorum* doubtless, and probably indistinguishable from the above variety.

E. HENDERSONI. Described as the handsomest species of the genus, with bright and strongly colored flowers which are very striking and attractive in their beauty. The petals have a very dark purple and somewhat blotched center, which is surrounded by a band of yellow, and beyond this they are pale purple.

E. HOWELLII. Light cream-colored flowers slightly tinged with red, with a yellow center. Discovered in Oregon by Mr. Thomas Howell, for whom it is named. An interesting species that has been found to thrive in New England in a loamy soil in open sunlight.

E. SMITHII. Flowers described as pure white on opening, often changing to purple.

ESCHSCHOLTZIA.

The Golden Eschscholtzia has aided in no small degree in making California famous as a land of sunny flowers, and has very fitly been selected as the state flower of California. In its wild state it often covers thousands of acres of hill or plain with its intensely brilliant and richly colored flowers, which in the bright sunlight are perfectly dazzling. Some botanists recognize more than a dozen species in this genus. The leading varieties in cultivation are known under the following names.

E. CALIFORNICA *Cham.* Flowers large, varying from deep orange to sulphur yellow or even white. The horticultural varieties are:—

- 1.—Alba. Pure white.
- 2.—Alba flore pleno. Double white. Very choice and beautiful.
- 3.—Aurantiaca.
- 4.—Compacta.
- 5.—Crocea. Bright yellow.
- 6.—Crocea flore pleno. Double yellow, new.
- 7.—Crocea striata.
- 8.—Dentata aurantiaca.
- 9.—Dentata sulphurea.
- 10.—Mandarin. Described as a new and very beautiful variety, of a rich orange or crimson backed with brilliant mandarin scarlet.
- 11.—Rosea. Very delicate rose color.
- 12.—Rosea flore pleno.
- 13.—Rose Cardinal. Bright rose to deep carmine, very pretty and remaining in bloom a long time.
- 14.—Tenuifolia.

EUCALYPTUS.

The Australian Gum trees are so thoroughly at home in California, and so extensively grown, as to almost be considered characteristic of the state. The more popular species are the following.

- E. AMYGDALINA.** The Giant Gum.
- E. CORYNOCALYX** *Muelle.* The Sugar Gum.
- E. GLOBULUS** *La Billardiere.* The Blue Gum, which is more extensively planted than all the others together.
- E. LEUCOXYLON** *Mueller.* The Iron-bark tree.
- E. ROSTRATA** *Schl.* The Red Gum, now coming into general favor.

FOUQUIERA.

F. SPLENDENS *Engelm.* The Candlewood, or *Hocotilo* of the Mexicans, is a curious, cactus-like plant, five to ten feet high, bearing terminal spikes or racemes of flaming scarlet flowers. It is characteristic of the desert regions, where it blossoms out whenever a shower occurs.

FRASERA.

F. PARRYI *Torrey*. A curious biennial, with a rotate 4-parted white corolla, dotted minutely with prune purple, and with an apple green spot on each division*. Flowers nearly an inch across, in a panicle borne on a stout stem one to four feet high.

FRAXINUS.

F. DIPETALA *H. & A.* Flowering Ash, a small shrub found in Lower California, producing in springtime a profusion of lovely white or flesh-colored flowers. A very ornamental shrub.

FREMONTIA.

A beautiful hardy deciduous shrub or small tree, named in honor of the late Gen. Fremont; bearing conspicuous bright yellow flowers, one to three inches across. But a single species in the genus.

F. CALIFORNICA *Torr.* Of graceful and symmetrical growth and greatly prized for its beauty. Thrives in a sandy loam.

FRITILLARIA.

The Fritillarias are all elegant in habit and among the most beautiful of the many members of the lily family. They have broad base leaves and strong leafy stems, bearing from a few to many flowers, like a spray of bells. The Crown Imperial and many other ornamental plants belong to the genus. The bulbs are light and easily sent by mail, and almost rival their flowers in beauty.

F. ATROPURPUREA *Nutt.* A foot high, growing in dry mountain soils, with dark purple, bell-shaped pendant flowers.

F. BIFLORA *Lin l.* The Chocolate Lily, as it is called by many of its younger admirers, is one of the finest species in a large genus of stately and handsome flowers. The strong leafy stem from a few inches to a foot tall, bearing from one to five large and beautiful deep claret brown campanulate flowers,* in a graceful cluster. Flower an inch long, slightly mottled with green.

F. LANCEOLATA *Pursh* A tall stately plant with curiously mottled greenish-yellow flowers.

F. LILIACEA *Linl.* A beautiful low-growing plant with white flowers.

F. PUDICA *Sprengel.* Of low dwarf habit, four to five inches tall, with yellow flowers. Early spring.

F. RECURVA *Benth.* A graceful plant, from eight inches to two feet in height, with crimson or scarlet flowers, brilliant and of long duration, useful for cutting. One of the most attractive of Pacific Coast plants, blooms early in cultivation and is readily grown in a light, loamy soil.

GILIA.

Handsome, low growing, profuse blooming annuals, well known to every cultivator of flowers. The genus is peculiar to West America with a few exceptions. A few species perennial but not yet known in cultivation. The numerous varieties in cultivation mostly originated in California, of which the following are best known.

- G. ACHILLEAEFOLIA *Benth.* Light blue clusters of flowers.
- G. ACHILLEAEFOLIA ALBA. White variety.
- G. BICOLOR.
- G. CAPITATA *Dougl.* Delicate blue, in dense clusters
- G. CAPITATA ALBA. White variety.
- G. CAPITATA MAJOR.



GILIA DIANTHOIDES.

G. DIANTHOIDES *Endl.* One of the most charming of Californian annuals, producing a profusion of brilliant rose-pink flowers which completely smother the little plant with loveliness. Flowers large, with a light yellow center. Plant seldom exceeds three inches in height, but forms a broad mat. A perfect gem

G. DIANTHOIDES ALBA. A choice white variety of surpassing beauty

G. LACINIATA.

G. LINIFLORA *Benth.* A finely branching plant, a foot or two high, with large white or pale blue flowers.

G. MINIMA CAERULEA. A dwarf form with lovely blue flowers

G. NIVALIS.

G. TRICOLOR *Benth.* Familiar in cultivation, with several horticultural varieties as follows:

- 1—Alba.
- 2—Rosea—splendens.
- 3—Rubro—violacea.

GODETIA.

G. QUADRIVULNERA *Spacr.* A slender annual, with either white or bright phlox-purple flowers, quite showy, a foot or two high.

GREVILLEA.

G. ROBUSTA *Cunningham.* A beautiful tree for the lawn or street, indigenous to eastern Australia, but now extensively planted in California for its beauty. Of rapid growth and resisting drought in a remarkable degree. Grows to a height of 150 feet.

HESPEROCALLIS.

The Day Lily of the Desert is one of the most beautiful and characteristic plants of the desert regions of California. The

large edible bulb produces one or more flower stems which rise from one to two feet above the sand in which they grow, bearing from a few to thirty white fragrant flowers. A single species, *H. undulata*.

HETEROMELES.

H. ARBUTIFOLIA Roemer. The California Holly, or Christmas berry, is a handsome dark evergreen shrub, with white flowers and producing clusters of bright scarlet berries, which ripen at Christmas time.

JUNIPERUS.

J. CALIFORNICA Carr. Californian Juniper. A small shrub of ornamental value, common in Southern California.

J. OCCIDENTALIS Hook. These two are very similar in aspect.

LASTHENIA.

L. GLABRATA Lindl. A composite plant, a span to a foot high, producing a multitude of showy yellow flowers. Annual.

LATHYRUS.

L. SPLENDENS Kellogg. 'The Pride of California.' A splendid hardy perennial, producing a profusion of its large, brilliant rose red to crimson blossoms,* in clusters of ten or more. The most magnificent of the native climbing plants of West America.

L. VENOSUS Nutt. The flowers of this perennial pea are but a little smaller or less beautiful than the last, of a deep magenta. It has often been mistaken for *L. splendens*, but if once seen together they can always be recognized.

L. VESTITUS Nutt. Lovely white flowers, veined with rose.

LAYIA.

This genus was named in honor of Thomas Lay, the naturalist in Beechey's voyage. They are hardy annuals, thriving in any ordinary soil.

L. ELEGANS T. & G. The California Layia is a beautiful upright bushy plant, about a foot high, and producing in abundance brilliant lemon yellow* single flowers two inches across, the tips of the rays forming often a scalloped white border. Showy.

LEPTOSYNE.

L. DOUGLASHII DC. Easily mistaken for *Layia elegans* by those who are not botanists. Equally pretty but more modest and retiring.

L. MARITIMA Gray. A striking and showy plant, perennial, the succulent stems a foot or two high, producing large yellow flowers of great beauty, in abundance. Common on ocean beaches.

LIBOCEDRUS.

L. DECURRENS *Torr.* California White Cedar. A tall tree, conical in shape, in foliage and habit resembling *Thuja gigantea*.

LILIUM.

There are about fifty species of lilies in the world, California possessing eight handsome species, which are widely sought for their showy and often fragrant flowers. They are better known in European than in American gardens, but are worthy of greater attention in their native land.

L. WASHINGTONIANUM *Kellogg.* The Washington Lily is a tall, stately plant, with whorls of dark green leaves and many pure white fragrant flowers. A beautiful species, growing in loose soil on ridges or lightly shaded hillsides.

L. PARRYI *Watson.* This fine and exceedingly rare Lily, named in honor of the late Dr. C. C. Parry, produces lovely clusters of large and very fragrant flowers of a clear lemon yellow.

L. RUBESCENS *Watson.* A rare form resembling the Washington Lily, except in the color of its exceedingly fragrant flowers, which change from white to dark ruby red after opening.

L. PARVUM *Kellogg.* A low, slender, graceful plant, bearing from two to fifty or more bell-shaped flowers with light yellow centers dotted with brown, the petals tipped with scarlet or crimson,

L. MARITIMUM *Kellogg.* The Marine Lily resembles the last, small, with dark green foliage, and usually fewer deep crimson or blood-red flowers, dotted with black.

L. PARDALINUM *Kellogg.* Hardy and very handsome, preferring a rich moist soil; bearing large and brilliant crimson flowers, dotted with black and with a yellow center. A favorite.

L. HUMBOLDTII *R. & S.* Large and tall, stout, with orange, red flowers, spotted with brown. Thrives in dry open places. The Humboldt Lily is very stately and handsome.

L. COLUMBIANUM *Hanson.* A graceful miniature of the last.

LOBELIA.

L. SPLENDENS *Willd.* Two or three feet high, growing in moist situations, producing a many-flowered raceme of intense red blossoms.

LOESELIA.

L. TENUIFOLIA *Gray.* A showy plant, a span to a foot high, producing abundantly brilliant poppy-red or carmine flowers. Perennial.

L. EFFUSA *Gray.* An equally beautiful species of the mountains of Lower California, low in habit with light rose-purple flowers. Like Phlox and Gilia, *Loeselia* is a genus of lovely flowers, well worthy of cultivation.

LUPINUS.

Showy annuals or perennials, a few shrubby, bearing conspicuous flowers in terminal racemes. The great majority are indigenous to West America. Many have long been cultivated and grown popular. The California species best known in cultivation are the following:

L. AFFINIS *Agard.* A foot or two high, often growing very rank, producing large spikes of brilliant blue flowers.

L. DENSIFLORUS *Benth.* Less than a foot high, with white flowers arranged in umbel like clusters on the terminal spike. Sometime light sulphur yellow.

L. MICRANTHUS *Dougl.* Low in habit, with racemes of small light blue and white flowers. The cultivated form is considered quite pretty.

L. NANUS *Dougl.* A slender plant, with bluish, purple or white flowers.

L. NANUS ALBUS. The white flowered form.

L. ARBOREUS *Sims.* The Tree Lupin is a shrub four to ten feet high, with lilac colored flowers.

L. ARBOREUS LUTEUS. With sulphur yellow flowers, perhaps the typical form. A very ornamental shrub.

L. ELEGANS. What its name signifies.

L. GRANDIFLORUS. A perennial form, with blue, white or purple flowers.

L. POLYPHYLLUS *Lindl.* Perennial, similar to *L. grandiflorus* if the two are not identical or forms of the same species.

L. POLYPHYLLUS ALBIFLORUS. The white variety.

MAMILLARIA.



MAMILLARIA.

Very general favorites among the lovers of the odd or the beautiful are these unique little plants, most exquisite in form and finish. The scarlet edible berries, which cluster among the spines of our Californian cacti of this genus add also the beauty of these plants, though the blossoms are often inconspicuous.

M. DESERTI *Engelm.* A little gem, from the Mojave Desert, of which we have as yet seen but a single plant.

One of the choicest of the genus and we hope to rediscover the beauty soon.

M. GOODRIDGII *Scheer.* Sometimes called the Strawberry cactus, from the delicious flavor of its clubshaped fruit, but also called the Fish-hook cactus from the hooked central spines pro-

duced from the mamillae. The spines are sometimes of an ivory whiteness, but oftener of a rich brown color.

M. PHELLOSPERMA Englm. A handsome plant, worthy of a place in any lady's parlor.

MIMULUS.

M. CARDINALIS Dougl. A showy perennial species, with brilliant large scarlet flowers.

M. GLUTINOSUS Wendl. A low shrub, with bright evergreen foliage and a profusion of buff or salmon colored showy flowers.

M. MOSCHATUS Dougl. Musk. A low, musk-scented plant, bearing large lemon yellow flowers.

MONARDELLA.

A genus of many beautiful flowers, well worth extended cultivation, showy, often sweet scented, either perennial or annual.

M. MACRANTHA Grav. An evergreen species with dark glossy foliage, a span high, producing snowy heads of orange-red flowers.

M. NANA Grav. Almost identical in habit and general aspect with the last, the flowers pure white, sometimes suffused with rose. Very beautiful but less showy than the last.

M. LANCEOLATA G. & P. A showy annual, producing masses of bright phlox purple flowers, six to eight inches or a foot high, branching, with a strong but pleasant pennyroyal perfume, similar in aspect with numerous related forms, like *M. Pringlei* and many others, all of which are well worthy of a place in any garden.

NEMOPHILA.

Very pretty annuals, mostly Californian, with tender herbage and lovely flowers of delicate blue, violet or white colors.

N. AURITA Lm l. Large violet flowers, one of the finest species introduced into cultivation.

N. AURITA ALBA Dougl. A beautiful white form.

N. INSIGNIS Dougl. Bright blue flowers an inch in diameter.

N. MACULATA Benth. White, with a strong violet blotch at the top of each lobe of the corolla. 'Love Grove.'

NICOTIANA.

N. GLAUCA Graham. A slender shrub, a native of South America, very light green foliage and yellow flowers, considered very striking and ornamental among the sub-tropical foliage plants. Naturalized in Southern California.

NOLINA.

Perennial liliaceous plants, with a thick woody trunk, in aspect somewhat resembling the *Yucca*. The stout flowering stem bears a panicle of numerous small creamy white flowers.

N. BIGELOVII, *Watson.* The flowering stem six to ten feet high, bearing a dense panicle. The plant sometimes grows ten or more feet high.

N. PALMERI, *Watson.* A cluster of these plants will cover a considerable area, and with the coarse, grass-like foliage may well be mistaken for a patch of some coarse species of grass at a distance. Less ornamental than the preceding.

CENOTHERA.

An almost exclusively American genus of over one hundred species; many with showy flowers, and some long in cultivation as ornamental.

C. BIENNIS *L.* The Evening Primrose, with its large showy flowers, is too well known to need description.

C. BISTORTA *Nutt.* Showy yellow flowers, usually with a dark brown spot at base of each petal. A low decumbent annual, the variety *Veitchiana* being the form commonly seen in cultivation.

C. CALIFORNICA *Watson.* Low flowers, large white, becoming pinkish, fragrant. One of the loveliest and most delicate of flowers, often two or three inches across.

OPUNTIA.

The Tuna and the Prickly Pear are among the most prominent and characteristic plants of Southern California and Mexico, and while detested by many are really among the most useful of our indigenous or naturalized species. Their fruits formerly furnished the Indian with food, the spiny branches served the Mexicans for fences, while to the cattleman their succulent stems may furnish food for his stock. There are several hundred species known, many taking high rank as ornamental plants either from their oddity or beauty, but some species, like our chollas, are not desirable companions from their inveterate pugnaciousness. The *Opuntias* of California are briefly noted as follows.

I.—TUNA.

O. TUNA *Miller.* The Tuna of the Mexican was early introduced by the Spanish around the Californian missions. It is a picturesque plant, furnishing a delicious light green fruit, cool to the palate in the hottest day and very refreshing; from which choice jellies or liquors may be made, or even sugar manufactured.

O. TUNA-MANSE. A related form or variety with nearly globular orange fruit, blotched with red.

O. FICUS-INDICA, *Miller.* The Indian fig, the Tuna Colorado of the Mexicans, bears an egg shaped fruit, rather insipid to the taste, of a rich magenta color.

O. ENGELMANNI, *Salm.* The indigenous species, so familiar to all who have visited Southern California.

O. BASILARIS, E. & B. A low plant, seldom a foot high, with fascicles of very short and fine spines, but producing large and brilliant flowers of a magenta color. Highly valued for its beautiful blossoms and ornamental character.

II.—CHOLLA.

The Chollas are usually tall cylindrical plants, sometimes branching into tree-like forms and often covering large areas of country with dense, impenetrable thickets. Curious in a way they are sparingly cultivated, but woe unto all who incautiously handle them!

O. BIGELOVII, Engelm. A beautiful species, with numerous fine straw colored spines, peculiar to the region of the Colorado Desert. Spines very penetrating and tenacious.

O. PROLIFERA, Engelm. The common Cholla so abundant and characteristic of the vicinity of San Diego. Flowers of a pomegranate purple.*

O. SERPENTINA, Engelm. Procumbent, with yellow flowers. There are numerous other varieties which it seems needless to mention.

ORTHOCARPUS.

A large genus of low, branching annuals, nearly related to *Castilleja*.

O. PURPURASCEUS Benth. An erect, diffusely branched annual, a span to a foot high, producing numerous dense and thick terminal oblong or cylindrical spikes of flowers. Corolla yellowish, tipped with crimson or red and the whole encircled by the brilliantly colored crimson-purple or rose-purple floral bracts. Hundreds of acres are often transformed into brilliant fields of purple by the abundance of this, one of the handsomest, of the spring annuals of California.

PAPAVER.

P. CALIFORNICA, Gray. While one of the latest discoveries, this plant ranks among the prettiest of our annuals, the fine bushy plant, a foot or more high, bearing large showy flowers of an average of two inches in diameter. The color is a bright saturn red to orange chrome, with a center of delicate sulphur yellow.

PENTACHAETA.

P. AUREA Nutt. This small hardy annual, with its large golden yellow heads of almost double flowers, introduced into cultivation in 1884, is a pretty dwarf composite that may be readily grown.

PENTSTEMON.

Hardy perennial plants with showy panicles of brilliantly colored flowers. Several of the numerous Californian species have long been in cultivation.

P. CENTRANTHIFOLIUS Benth. A showy species, two or three feet high, bearing long slender spikes of bright carmine-colored flowers, an inch long. Acres in extent of our mountain lands are sometimes a solid mass of carmine during the summer when this handsome plant is in bloom. It was introduced in 1858.

P. CLEVELANDI Gray. One to three feet high, with dark green foliage and bearing a spike of lovely bright salmon-colored flowers each an inch long.

P. PALMERI Gray. A tall growing species, with a long panicle of large white flowers delicately veined with purple.

P. SPECTABILIS Thurber. Corolla an inch long, broad, bluish-purple. Plant two or three feet high, glabrous. Flowers in a loose elongated panicle. A very showy species. This genus contains nearly a hundred species, nearly all worthy of cultivation, and many native to California.

PHACELIA.

P. CAMPANULARIA Gray. One of the finest species in the genus yet known in cultivation. Has received a first-class certificate in England where it was introduced a few years ago.

P. CONGESTA. A useful plant in bee-gardens, like the rest of the genus, and one of the best known species in cultivation.

P. TANACETIFOLIA Benth. The Tansy-leaf Phacelia has long been in favor in cultivation for its beautiful foliage. An erect hardy annual, one to three feet high, bearing cymosely clustered spikes of light bluish flowers.

P. TANACETIFOLIA ALBA. A fine cultivated variety, with white flowers.

P. ORCUTTIANA Gray. One to three feet high, branching, bearing a profusion of small white flowers with brilliant yellow centers.

P. PARRYI Torr. One of the loveliest and most desirable of the many pretty annuals of Southern California for cultivation, second only in value to *P. campanularia*. The plant delights in warm sunny exposures, and produces large brilliant royal purple flowers with an open rotate corolla. Everyone admires this modest flower, whose bright face looks out at one with something akin to a human expression.

P. WHITLAVIA Gray. Large bell-shaped blue flowers.

PICEA.

P. SITCHENSIS Carr. Probably the tallest spruce known, growing 150 to 200 feet high, and of pyramidal form. An excellent timber tree.

PINUS.

The pines are too well known to require more than brief notice. The species in California are as follows:

- P. BALFOURIANA *Jeff.*
- P. CONTORTA *Dougl.*
- P. COULTERI *Don.*
- P. INSIGNIS *Dougl.* Monterey pine.
- P. JEFFREYI *Murr.*
- P. LAMBERTIANA *Dougl.* Sugar pine.
- P. MONOPHYLLA *T. & F.*
- P. MONTICOLA *Dougl.*
- P. MURICATA *Don.*
- P. PARRYANA *Engelm.* Pinyon.
- P. PONDEROSA *Dougl.*
- P. SABINIANA *Dougl.* Digger pine.
- P. TORREYANA *Parry.* Soledad pine.
- P. TUBERCULATA *Gordon.*

PLATYSTEMON.

P. CALIFORNICUS *Benth.* A low annual, a span high, with delicate sulphur-yellow flowers, called Cream-cups by the children. Belongs to the Poppy family.

PROSOPIS.

P. JULIFLORA *DC.* The Mesquit tree of the desert regions, sometimes planted for hedges. The bean-like pods of this tree are useful for forage, and form an important article of food among some Indian tribes. Very sweet and nutritious.

P. PUBESCENS *Benth.* The Screw-bean. A smaller tree than the Mesquit, with curiously twisted pods.

PRUNUS.

P. ILICIFOLIA *Walp.* The Holly leaf cherry. A beautiful dark evergreen shrub, yielding a pleasant edible fruit. Useful for hedges or ornamental planting.

PSEUDOTSUGA.

P. DOUGLASII *Carr.* The magnificent Douglas spruce, better known commercially, perhaps, as the Oregon pine. A gigantic tree, 200 to over 300 feet in height, and very beautiful.

Var. *macrocarpa* Engelm. A small form.

RHUS.

R. OVATA *Watson.* A handsome evergreen shrub, noted for its glossy foliage and graceful form. The small dark red berries make a cooling drink, pleasantly flavored, resembling lemonade, and the Indians formerly gathered sugar from this species. Thus it may be appropriately termed a Lemonade and Sugar Tree.

R. INTEGRIFOLIA *Nutt.* The dark evergreen foliage of this shrub or small tree, locally known as Mahogany, is very hand-

some, while the larger bright red berries, coated with a white waxy substance also make a refreshing and cooling drink. The Californians formerly gathered and dried the berries for this purpose.

ROMNEVA.

This large white-flowering perennial poppy, named in honor of Dr. T. Romney Robinson, a noted astronomer, is one of the stateliest of California's contributions to horticulture. It is quite a hardy shrub with us, requiring only a sheltered position to protect its flowers; in England it is classified as half-hardy. A rich loamy soil is most suitable to its needs. In early spring vigorous shoots start from the dormant roots, growing from six to fifteen feet high, which do not die down but need to be pruned well back in the fall. A single species.

R. COULTERI *Harvey*. This magnificent wax-like flower has become very popular wherever known. The large hairy buds open at daylight, the crimped petals slowly unfolding from over the huge bunch of bright yellow stamens (as large as a walnut), until they spread out from six to nine inches. The flowers last several days and the buds open well in water. The foliage is very effective and make with the flower an artistic study. Grown from either seed or cuttings with difficulty, but a well established root will well repay the attention bestowed upon it.

ROSA.

R. CALIFORNICA *C. & S.* The wild rose of California, with its large, single, lovely pink flowers, is as pretty as its more showy cultivated sisters, and equally admired by those who love the beauties of nature.

R. MINUTIFOLIA *Engelm.* Parry's wild Mexican rose, with its small, finely incised foliage, and small pink or white flowers that closely nestled among the leaves, met with a warm welcome when discovered in Lower California in 1882, but has steadily repulsed the kind advances of the gardener and refuses to long survive away from its native sky.

SALVIA.

S. CARDUACEA *Benth.* The Thistle-leaved sage, known to the Mexicans as *Chia*, is densely white-woolly, with prickly foliage, and showy lavender colored flowers, an inch long, in many-storied head-like whorls on a stem a foot or two high. Cultivated in Europe since 1854.

S. COLUMBARIÆ *Benth.* Smaller and less conspicuous. Also known as *Chia*. The seeds of either species infused in water form a pleasant mucilaginous drink; used largely by the aborigines medicinally or as a beverage.

SAMBUCUS.

S. GLAUCA *Nutt.* The California Elder forms a large bush or small tree and bears prolifically of its edible berries, prized by some for making pies or sauce.

SCHINUS.

S. MOLLE L. A graceful evergreen tree, a native of Mexico and South America, with glossy light green drooping leaves in twenty or more pairs of slender leaflets. The small white flowers in large panicles followed by lovely clusters of small red berries. The Pepper tree, as it is called, is very ornamental, and planted extensively for shade on avenues.

SEQUOIA.

A remarkable California genus, including the noted Redwood and Big-tree for which California is famous.

S. GIGANTEA Decasne. This giant of the Californian woods, is the largest and tallest tree known to exist on the American continent, attaining a height exceeding 300 feet, only exceeded in size by some of the gums of Australia.

S. SEMPERVIRENS, Endl. The California Redwood is the most valuable timber tree on the Pacific Coast, attaining a height of 200 to 300 feet, with light but strong and durable wood, susceptible to a handsome finish, of a walnut brown color.*

SIMMONDSIA.

S. CALIFORNICA Nuttall. A low, diffusely branched shrub, forming oval bushes one to five (rarely ten or fifteen) feet high with pale, rigid evergreen foliage, producing a pleasant edible nut. An ornamental shrub, growing in rich valleys or on arid hills from the Pacific Ocean to the borders of the Colorado Desert.

SISYRINCHIUM.

S. BELLUM Watson. The Blue-eyed grass bears umbel-like clusters of small rotate flowers of a delicate shade of mauve, with canary yellow centers. A profuse bloomer. Grows from a few inches to two feet high. A very pretty Iris-like plant.

TORREYA.

T. CALIFORNICA Torr. The Californian Nutmeg is a tree fifty to seventy-five feet high, with slender drooping branches often grown for ornamental planting.

UMBELLULARIA.

U. CALIFORNICA Nutt. The California Laurel is a handsome shrub or tree, ten to seventy feet high, with thick evergreen leaves, better known in cultivation as *Oreodaphne Californica*.

WASHINGTONIA.

W. FILIFERA Wendland. The Californian or Washington fan palm is too well-known to need description. It has become one of the most characteristic trees in Southern California and is a worthy memorial to the fame of the great Washington whose name it bears.

W. ROBUSTA *Wendland*. A robust variety (not specifically distinct?) said to be more easily grown. None of the characters which are said to distinguish these two palms appear to be constant.

YUCCA.

An American genus of a few species of handsome and conspicuous ornamental plants, well known in cultivation.

Y. BACCATA *Trey*. The Wild Date, or Spanish Bayonet, is a stately plant, sometimes growing ten or more feet high, and producing a pyramidal panicle of fragrant waxy, pure white flowers, or often marked with purple. The large, sweet edible fruit is sometimes called wild bananas.

Y. BREVIFOLIA *Engelm* The Tree Yucca of the Mojave Desert.

Y. WHIPPLEI *Trey*. The flowers borne in a large panicle on a scape five to twelve feet high. The rigid serrulate leaves surround the base of the stem in a dense cluster. The flowers are waxy white or purple tinged. The plant dies after blooming, while the preceding species live year after year.

ZAUSCHNERIA.

Z. CALIFORNICA *Pr. sl.* The flowers of this plant are one to two inches long and three quarters of an inch across, scarlet to scarlet vermilion, very showy, forty to fifty flowers on a stem. Plant two to five feet high, growing in large masses on dry hill-sides, but more luxuriant near water, where it becomes a very conspicuous flower. A half shrubby perennial, sometimes called wild fuchsia.

ZIZYPHUS.

Z. PARRYI *Torrey*. A spiny shrub, with small flowers, producing an edible fruit of a dull brownish cadmium-yellow color, said to make excellent jelly like its near relative, the cultivated jujube.

ZYGADENUS.

Z. FREMONTI *Torrey*. A pretty plant, belonging to the lily family, with paniculate racemes of cream-colored flowers.



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TO OUR PATRONS.

(Introduction to California "Trees and Flowers.")

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Many varieties mentioned in our descriptive list of "California Trees and Flowers," we are at times unable to supply, but on the other hand, we are continually introducing new and desirable trees and flowers to our novelty-loving friends. Descriptions of these, and supplementary notes on "California Trees and Flowers" may be found in this journal.

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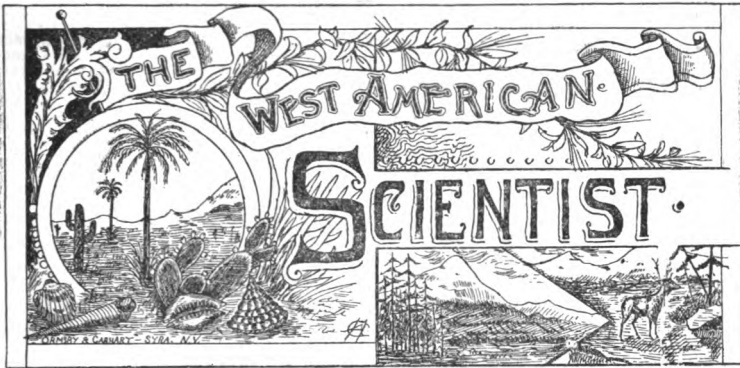
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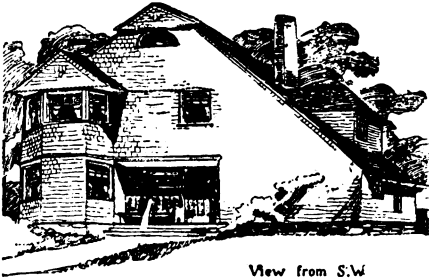
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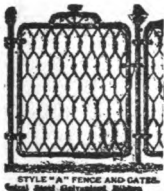
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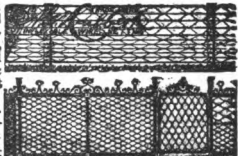
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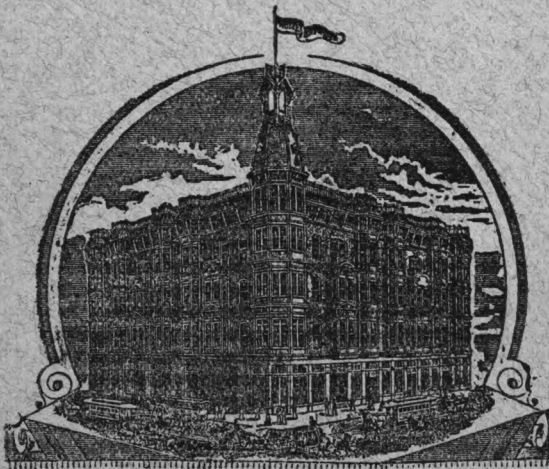
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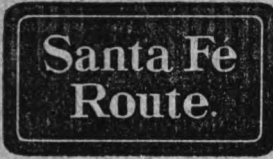
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