

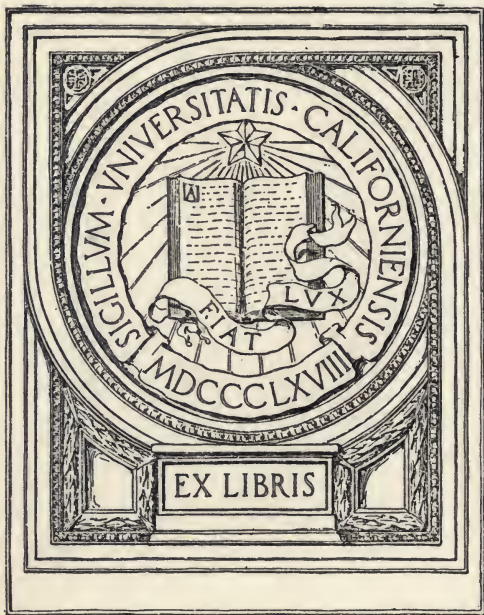
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*As California
Wild Flowers Grow*

CHANDLER.



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AS CALIFORNIA WILD FLOWERS GROW:

SUGGESTIONS TO NATURE LOVERS

BY

KATHERINE CHANDLER

Author of

“Habits of California Plants”
“In the Reign Coyote: Folklore from the Pacific Coast”
“The Bird-Woman of the Lewis and Clark Expedition”

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To the Memory of my Mother, Mrs. W. S. Chandler,
whose explorations into the haunts of the wild flowers, both in the
San Francisco Bay region and in the mountains of Deer Park, Lake
Tahoe, have introduced many persons to the wonders and the delights
of Nature.

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PREFACE.

This book is published with the hope of interesting our citizens in our native flora, both for their own pleasure and for its preservation. It is not intended to be a Botany, although its suggestions, if carried out, will surely lead to the use of botanies. Emphasis is laid on the habits of the blossoms because they are the most attractive part of the plant to us and the most important to it; but the habits of roots and stems and leaves are also worthy of notice.

When we consider a plant as a living individual, carrying on a definite life work, we will cease to destroy it heedlessly. Then, our beautiful species will not be marked "extinct." Then, our forests will be secured against fire, and then they will be lumbered scientifically so that future generations may still have their benefits in climate and in the resulting irrigation so necessary to the agriculture of California.

The cover of the book was designed and drawn by Mrs. Marie-Thérèse Bryner of San Francisco. Many of the photographs were taken by Mr. Antone J. Soares of Hayward, California. As it is desirable to give each species its full detail, no attempt has been made to have a scale of size.

I am indebted to Miss Alice Eastwood, the Botanist of the California Academy of Sciences, for correct data as well as for the initial training in observing the habits of plants; to the "Sunset Magazine" and the "San Francisco Chronicle" for permission to reprint fragments from their columns; to Dr. W. J. Beal for the weight of the seeds of the Willow-Herb; and to my sister, Mabel G. Chandler, for aid in correction.

KATHERINE CHANDLER.

San Francisco, California.
January 27, 1922.

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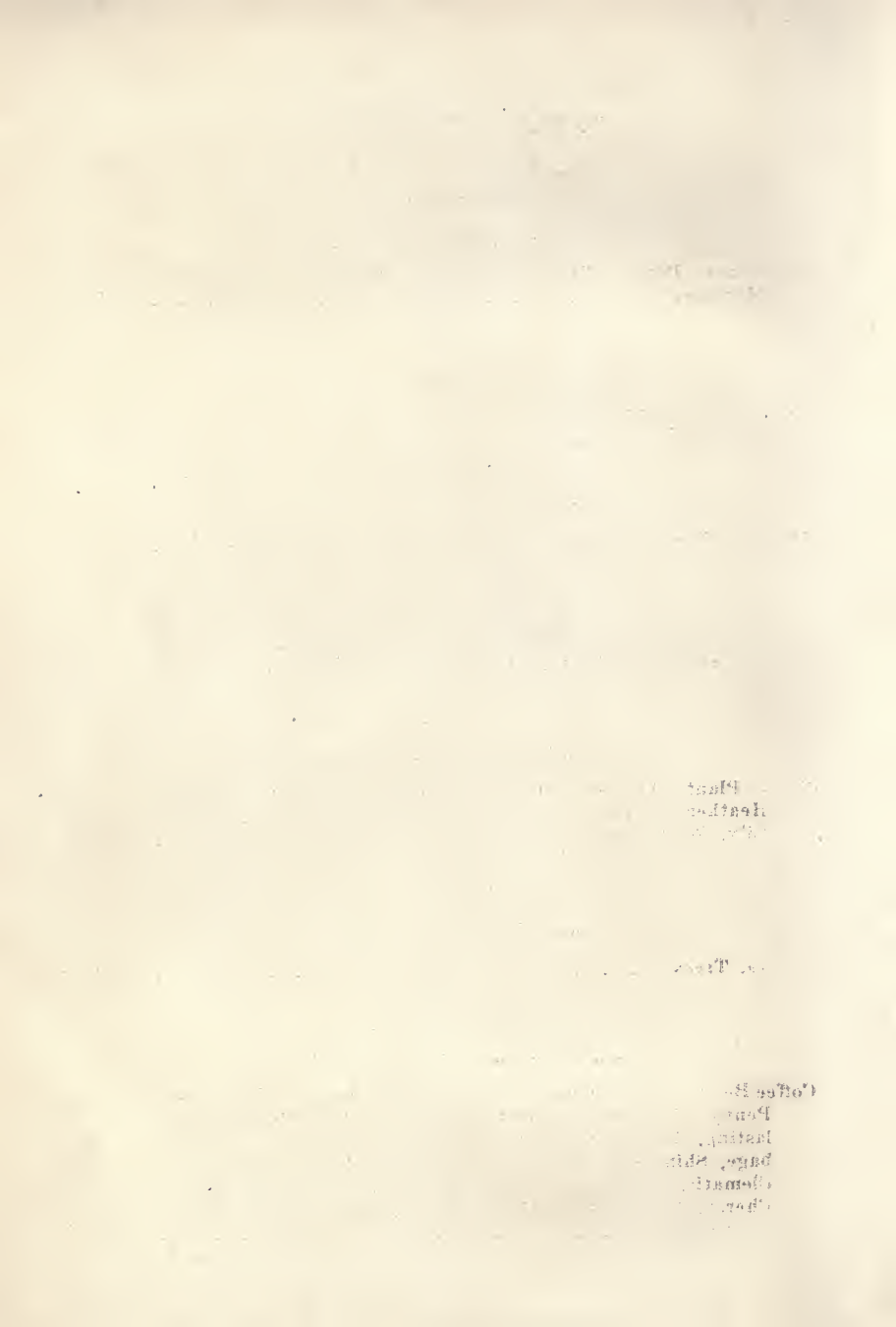
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BARBERRY Photographed by A. J. Soares



AS CALIFORNIA WILD FLOWERS GROW:

CHAPTER I.

SOME SIMPLE FLOWERS.

As far as plants themselves are concerned, they have but two objects in life: first, to produce the best possible seed and second, to get this seed dispersed to a new environment in which it can make a fair start. In exerting themselves to achieve these objects, the plants have become a source of esthetic enjoyment and economic profit to mankind. In the course of centuries, the plants have learned that cross-fertilization produces a superior seed, and so they have evolved blossoms of marvelous tints and shades to attract the eye of passing bird or insect. And, lest color be not attraction enough, they have added bowls of nectar whose fragrance on the sun-kissed air will tempt the palate of any insect who happens to be color blind.

Men today realize the advantage of promoting a project by an advertising banquet. We set out

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palatable viands in a decorative setting, and sometimes our project wins adherents and sometimes it does not. The plant, which is the oldest advertiser on the earth, makes no such economic mistake. It probably learned in the early ages that the wandering bee would gladly sip of its sweets and then, more often than not, depart without even a "thank you."

The plant's one object in advertising its blossoms is to get the pollen from one flower carried to the stigma of another. Often it ripens the anther of one blossom before its stigma so that its own pollen cannot possibly fertilize it; and it must have outside aid. While advertising its banquet free to the world, the plant takes very good care that any diner at its table must involuntarily help in the purpose for which he is invited.

One of the most skillful advertisers among our native plants is our State Flower, the California Poppy. Up and down the State, far and wide, it splashes its glorious color, typical of California with its many days of golden sunshine and its golden lodes awaiting but the industry of man to gladden the surface of the earth. Not only does Poppy revel in brilliant dye, but she weaves her material with a satiny sheen that reflects the light from every angle. No living creature can pass a Poppy bed without his eye being caught by her beauty. We humans

stop and admire and exclaim. The insect makes a closer investigation. He has an instinct that here is some material good for him. And so there is. For him alone does Poppy don her bright and lustrous gown. For him, she plans even greater pleasures than those of sight. Look at a Poppy, and you will see how generous she is.

In the center of the four satiny petals are arranged the stamens, with their anthers full to the brim of the pollen that to the bug is a toothsome meal. As he feeds hungrily, he moves around and jostles the stamens, and some pollen is dusted over him. This he carries away when he leaves the blossom. His appetite is not appeased with a visit to one flower so he dips into another. As he dives down, the pollen on his head and body is brushed against the waiting stigma, and it is quickly passed down to the ovary where it converts the little ovules into seeds. This is what Poppy has planned for. This is why she has developed her color and her sheen and her pollen—to make herself so attractive that she will be sure to have helpful visitors.

She seems impatient at any delay in getting her charms in view. Notice how she pushes her calyx right off over her head when she is ready to spread her splendid corolla. Then, later, this wonderful corolla does the duty of the calyx. It would never do to let cold or moisture touch the precious seed-

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making parts, so, as soon as the direct sunshine leaves her, the petals wrap themselves closely around the center. As the flower grows older, you will notice the individual petals curling at nightfall around the stamens attached to them. This means that the pistil has been fertilized, but there is still a bountiful supply of good pollen to be dispensed. It is only after her pollen has been all discharged and her ovules fertilized that Poppy exposes her heart to the shade, and then only for a brief period. Soon she casts each satiny petal aside so that the sunshine can pour directly on the seed-case and ripen its contents.

If you pick off a petal, you see that some stamens come with it. The stigma does not come off, not even when the seeds are fertilized. Watch a seed-case develop. See the veins running up and down. See the stigma forming the flat cap on its top. How does Mrs. Poppy get her seeds dispersed? Take a ripe pod in your hand and shake it. Little black seeds scatter around. How do they get out? Look under the rim of the cap between each vein. Poppy believes in a pepper-shaker style of seed-case, so that the gentlest zephyr will distribute some seeds; but she discovered early that if she put the holes in the top of the box, the rain and fog would seep in and destroy her precious children. But there! That rim of the stigma cap makes a protective roof, and

so under it is just the place to insure rain-proof seed exits. If you do not believe that Poppy now has a most efficient seed-case, just observe a new-turned railroad embankment. This year it may have only a few scattered plants, but next season it will be a veritable carpet of gold.

If you care to read about flowers, you will find that our Poppy has been more sung about than any other of our California wild flowers. All visitors have been impressed with its beauty. Indeed, its botanical name, *Eschscholtzia californica*, tells of a scientist who visited here over a century ago. John Friedrich von Eschscholtz was born in Dorpat, Russia, November 12, 1793, and died there May 19, 1834. He became a physician and naturalist, and as such accompanied the Russian scientific voyages around the world in 1815-1824. He was in California at two different intervals. He wrote so enthusiastically of this golden flower, new to European eyes, that botanists named it for him, and added the name of its birthplace for the species.

About fifty years before the Russians entered San Francisco Bay, some Spanish sailors, approaching the southern coast of the State, saw the blaze of the poppies on the hills and exclaimed, "The altar cloth of San Pasqual! The altar cloth of San Pasqual!" This referred to the history of Saint Pascal, who was a favorite of the Spanish peasants. He

was born in Aragon, Spain, in 1540. As a child, poverty made it necessary that he tend his flocks day and night, without relief, so that he never had opportunity to go inside a church to worship God as his heart desired. Living ever under the open skies, he seemed to absorb that simple faith that led the Shepherds of the East to the Manger at Bethlehem. This faith taught him that if his duty prevented his offering his devotion before an altar erected by man, his prayers on the pasture slopes would be as acceptable in the eyes of the Almighty. So, as he tended his sheep, he would seek a bed of beautiful wildflowers and kneel there to offer his homage. His pious devotions attracted the attention of the Franciscans; and he was educated and later became a devout son of Saint Francis d'Asis. Book learning did not dim his simple faith, and he devoted his life to helping the Spanish peasants whose duties called them to an outdoor existence. As he walked among the shepherds, he often said Mass on the hill slopes with a bed of wildflowers for an altar. So, the Spanish sailors, seeing the poppy beds ablaze on the California coast, naturally exclaimed, "There is the altar cloth of San Pasqual!" They landed from the little vessels on which they had suffered many hardships, and offered up Mass right amongst the Poppies, giving thanks for a safe delivery from the perils of the ocean and praises that they were

led to a land of such beautiful blossoming. So our California Poppy was instrumental in the first settling of our State. The name of San Pasqual, which is the Spanish for Saint Pascal, still lingers in San Diego County.

The Spanish Californians sometimes called the Poppy "Copa de Oro," which means "cup of gold," a most appropriate title. Sometimes, they did just as we do, called it the name of its garden sisters, "Poppy," which in Spanish is "Amapola" and "Dormidera." This last name means "sleepiness," and refers to the narcotic qualities for which the Poppy family is famous.

Our State Flower has a sister, also a native daughter, that is thought by many to be the most beautiful wildflower California produces. This is the Matilija Poppy, whose blossom and habits are quite un-



MATILIJA POPPY

like those of its golden relation. This plant grows tall, sometimes to fifteen feet, and its white blossoms spread out as wide as nine inches. They

are of the loveliest crepe, plaited in softest folds, around a central globe of crowded yellow stamens. While the California has but two sepals and four petals, the Matilija has three sepals and six petals. They are following a rule of the large family to which they belong, the *Papavaraceae*, that the parts of the calyx shall be half as many as those of the corolla.

While the California Poppy springs up after the first rains thrill the earth, Matilija does not bloom until late spring or summer. Even then she fears a cold snap, for she covers her sepals with warm hairs for protection. However, when she is ready to unfurl her snowy petals, she pushes off this hairy calyx in the same way Californica does her smooth one. The blossoms remain open several days, and, as they wave aloft, they attract many visitors. One glance at the heart of Matilija will show you that they are richly rewarded for any services they render. The seed-case is constructed on the pepper-shaker plan, and carried so high, it works most successfully.

The name "Matilija" is the Indian title for the river in Ventura County along whose banks the Spanish first found this Poppy. Its botanical name is *Romneya trichocalyx*. *Romneya* is for an Irish astronomer, Thomas Romney Robinson, of Armagh Observatory. *Trichocalyx* refers to the calyx being formed of three parts.

The *Romneya Coulteri* resembles the Matilija so closely that it is often called Matilija. It does differ in some ways. Its branches come up more firmly from the base, and its sepals are smooth, with no hairs. As every Poppy has the habit of pushing off its sepal cap when it is ready to bloom, people do not generally notice its calyx. The *Romneya Coulteri* blossom looks exactly like that of the *Romneya trichocalyx*, so it is little wonder we confuse them. *Coulteri* is for Dr. Thomas Coulter, who botanized in Mexico for many years, and who collected the wildflowers of California in 1831 and 1832. His collection was sent to Trinity College, Dublin. After his death, the collection was arranged by Professor W. H. Harvey, the curator of the herbarium of Trinity College, and it is still to be found there.

All three of these poppies are widely cultivated today. The *Eschscholtzia* loses heart when transported from its native land and blooms paler and weaker and less satiny. It has been evolved into various shades of pink and red, but under cultivation, it never matches in beauty its glorious wild abandon. The two *Romneyas* retain their native qualities and are handsome additions to garden or park. Today we value our poppies chiefly for their beauty, but the Spanish Californians used to fry the leaves of californica in olive oil for a hair tonic, and the Indians before them used the leaves as

greens. Many of the family are raised in Europe for the seeds, from which is extracted an oil as sweet as olive oil and quite as useful for food purposes. The seeds are also good to eat with bread. Perhaps you have relished the "poppy bread" made by our French bakeries. Among the ancients, the poppy was sacred to Ceres, the goddess in Roman mythology who had supervision over tillage and harvests.

A plant that takes no chances on an insect's going astray while seeking its nectar is the Radish. It spreads out its four petals in the form of a cross and then interlines them with little paths leading down to its feast. These



RADISH

lines are called "honey paths," and they are found in many insect-summoning flowers. The petals of the Radish diminish into claws, so that the visitor has little interference in satisfying his hunger; and, either coming or going, he is sure to knock against the stamens. At the slightest touch, the anthers pour out their

pollen, and Mr. Bug has his head or his back or his legs "powdered with gold." His appetite is never satisfied with the feast set in one flower, so off he journeys into the next to devour its store. As he fumbles around, some of the pollen he carries is sure to be rubbed on the stigma. The stigma, you know, is the top of the pistil in which lie little cells waiting for the pollen to convert them into seeds.

In the Radish, the seeds grow very quickly. As the pistil lengthens out into a purple-tinted pod, they swell it out at regular intervals, making it resemble a string of beads. Do you think this construction helps get the seeds scattered? Watch them. The botanical name of the Radish, "*Raphanus*," comes from two Greek words, "quickly" and "appear." If you will watch the speed with which the plant takes hold of a waste field, you will see that it has lost none of its energy in the passing centuries. "*Sativus*," the name of this species, indicates something "common."

Run your fingers over the leaf of the Radish. Taste it. Do not the feeling and the flavor suggest to you why the plant is not eaten up when young by the herb-eating animals? If a plant does not protect itself from the ground up, it may lose its opportunity of making seed; and no self-respecting plant would do that.

The pungency of the Radish that is disagreeable

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to animals makes it valuable to man. Its whole family—the *Cruciferae*, from its petals being arranged like a cross—is useful, giving us many of the vitamins now considered so necessary to our vitality and also the principal condiments which transform ordinary foods into palatable dishes. In California, there are many *Cruciferae*, and they are worth while studying. Note the similarity in the shape of their blossoms and the number and arrangement of the stamens and the differences in the shapes of their seed-cases. Which shaped pod will get the new seeds farthest away from the mother plant? Several of our *Cruciferae* are really natives of the Eastern Continent; but, through the efficiency of their seed-cases, they accompanied the human pioneers to this Western land. The Radish is one of these seventeenth century immigrants, and in the genial climate of California its descendants have increased in size and in beauty.

One of the best plants in which to study the process of cross-fertilization is the Willow-Herb. The blossoms wave at the top of the stem, usually a bright magenta which can be seen at some distance. The four petals open broadly, disclosing the eight stamens standing up bravely, with their firm little anthers on top; while the undeveloped style and stigma remain crouched in the center. The anthers ripen in the sunshine and pour out their pollen on



WILLOW HERB

Photographed by A. J. Soares

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investigating visitors. As they empty, the style grows erect, with its stigma a gray bulb on the top. When the anthers are quite withered, the style pushes quickly beyond them, and the stigma opens into four whitish lobes sensitive to any pollen that may touch them. The seed pods swell quickly; and their long, slender lines, tinged with magenta, make the plant still beautiful after the flowers have passed.

When the seeds are mature, the pod splits open at the top, curving back into four sections. In each section is a row of fleece-crowned seeds, all eager to sail off in the unknown air. The pod curves back gradually, so that all the seeds are not exposed at once. When the top ones are carried away by a breeze or scattered by some animal stirring against the lower branches of the plant, the pod curves further back, allowing a new set to be freed. The snowy silky hairs are about a half inch long, and the tips of the hairs are slightly glued to the walls of the pod, some to one side, some to the other, so that the seed hangs between. The seeds are so light that it is estimated that it would take 30,000, hairs and all, to weigh as much as a white bean. With so little weight to carry, it is not surprising that the parachutes cover long distances from the mother plant.

It is this habit of the seeds that has given Willow-Herb her other common name, Fireweed. When a

country has been laid bare by flames, the next season the Fireweed springs up like magic. The tuft-buoyed seeds have been searching for just such a naked land to settle in. Plant societies have just as much competition as human societies have; and they, too, seek to lessen the struggle for existence by emigration. It is true that the individual plant starts off to make its fortune at an earlier stage than does the individual human; but, when once landed at its destination, through the unconscious kindness of bird or animal or wind, its struggles parallel those of the human pioneer. If it be easily discouraged, it is driven out of existence; but, if it can adapt itself to its new environment, its race will soon have control of the surrounding territory. The Fireweed is of adventurous stock. It is ever seeking uninhabited regions; and when other settlers move in and life becomes crowded, off it hazards again. The family has traveled into the Arctic regions, and explorers write of using its leaves as greens to give variety to their *menu*. It certainly is bitter enough to be a good tonic. In Kamchatka, they extract a sugar by boiling the whole plant, and use this as a foundation to make an ale and a vinegar.

The name Willow-Herb, as well as the botanical name of the species, *angustifolia*, comes from the shape of the leaves. *Epilobium*, the genus, is from two Greek words, "upon" and "pod," and you readily see that this well describes the blossom habit.

A flower that bees and butterflies and human beings all seem to admire alike is the Mariposa. We delight in its exquisite hues and beautiful shape. The insects are attracted by the color, and they find the simple cup an easy vessel from which to sip their sought-for breakfast. The Mariposa is most generous in her hospitality. Not only does she tint her cup rose or yellow or lilac, but she adds great splotches of maroon or brown or yellow, or perhaps bands of gold, or both splotches and bands in one blossom, with dots added for extra measure. All this decoration is developed just to indicate to the visitor where her honey lies. She does not set the feast out simply in open plates. She has learned that visitors like variety. So she digs little pits for her nectar; and, to add a touch of that mystery which quickens the desires of all individuals, she covers them closely with a curtain of thick hairs. If you think that the insects do not respond to this enticement, just count the number of kinds you see enter a Mariposa any sunny day. Of course, as they push aside the curtain, they are dusted with the pollen from the six upright stamens. This they carry to the next flower, and so Madame Mariposa is rewarded for her munificence.

As you see, the Mariposa's parts are in threes, three sepals, three petals, six stamens, and a three-



MARIPOSA Photographed by A. J. Soares

angled seed-case. It belongs to the *Liliaceae*, or Lily family. Have you noticed how careful the Mariposa is of her pollen? See how the petals fold tightly unless the sun is shining. How does she scatter her seeds? Do the plants that come from seeds bloom the first year? Have you ever recklessly pulled up a Mariposa? What was on the end? You see by pulling up the plant you have not only stopped the life of this year's Mariposa, but you have taken up the bulb which would produce a new individual. In gathering Mariposa, do take a scissors along and cut the stems. Then you have the enjoyment of their beauty and have not injured their bulbs.

"Mariposa" is the Spanish word for "butterfly," and was given this beautiful flower by the Spaniards who settled California in 1769. Mariposa County gets its title from the myriads of these lilies that gladden its acres. The genus to which the Mariposa belongs—*Calochortus*—includes some of our most beautiful native flowers. In other countries they have been introduced into gardens and are among the most prized of cultivated bulbous plants. The name, *Calochortus*, is from the ancient Greek, meaning "beautiful grass," which you can see is most appropriate. The name of this species, *purpurascens*, simply means "purplish," from the tint of

its petals. Many of the *Calochortus* family are not so simply shaped as is the Mariposa. Note the Fairy Lanterns, the Pussy's Ears, the Golden Lanterns. Whatever their shape, they are all remarkably handsome. One or more species is found in every locality in the State, and any Californian has an opportunity to study at first hand their beguiling ways with insects.

CHAPTER II.

SOME TUBULAR FLOWERS.

Some plants do not arrange their floral envelopes simply, as do the Poppy, the Radish, the Willow-Herb, and the Mariposa. They have learned that certain small insects specialize in burglary, creeping in between petals, robbing the pantry, and slinking out without carrying even one grain of pollen to pay for their meal. The plants are not encouraging thieves nor beggars. They are willing to do their part, but they wish the other individual to carry his share of the burden of life. So, many plants have joined their parts into one continuous whole with only the one entrance. Any visitor that comes to them must pass the anthers and the stigma.

The Gilia has five petals, but it joins their lower parts together into a funnel shape and spreads out their tops into five lobes. It attaches its five stamens to the inside of this tube, and no bug can get down that passage or come out of it without receiving some pollen on its head. Then, as it partakes of the honey in the next flower, this pollen falls on the stigma, and the Gilia is repaid for her ingenuity in building.

The *Gilia* is found throughout the State, but it varies in size, in color, in arrangement. Some are the tiniest of blossoms, regular fairy nosegays in pink, white, lilac, salmon-hue, and they grow so low and so thick that they form a beauteous carpet for Mother Earth. Others grow taller, with more showy flowers. The Scarlet *Gilia* of the Sierras, sometimes called the Scarlet Fuchsia, is very handsome and also very interesting in its growth. It covers its leaves and stems with a sticky substance so that little crawling bugs have learned to keep away from it. It hangs out its scarlet tubes loosely so that they wave on each stirring breath of air and beacon to the winged butterfly or the hummingbird. These can send their tongues down the flower tube and feast; but, in doing so, they will get some pollen on their heads to be carried to a neighboring *Gilia*. The Scarlet *Gilia* is not afraid of the first cold snaps in Autumn, but just colors her leaves red and reddish brown, as if she thought warmth lay in color, and goes on sending out new flowers at the ends of her many little branches. Her seeds, formed in the cooling days, are very hardy. When scattered on even rocky slopes, they lie under the snow all winter, and in summer hasten on with the work of their species. No seed seems to be wasted, for in a few summers a whole hillside becomes glorious with their coloration.

The Gilias do not all bloom in the daylight. For instance, one whose common name is Evening Snow prefers to attract a night moth to help her in her



GILIA

fertilization. She rolls up her petals in the day-time, but as the afternoon nears its close, she becomes suddenly alert. She unfurls her five white banners and sends out great whiffs of her fragrance. After the sun sets, the moths start out seeking their meals. Both fragrance and ghostly white blossoms guide them; and they co-operate, even though

unconsciously, with Mrs. Gilia.

The correct pronunciation of the genus name, *Gilia*, is He'li-a, its first syllable sounding exactly like the first in Gila River or Gila monster. The flower was named in honor of a Spanish botanist, Felipe Louis Gil, who lived in the last half of the eighteenth century, just at the time when our State was being settled by white men. We in California should be careful of the pronunciation of our Span-

ish names, as the history of the State is bound up with them. The species of *Gilia* used in illustration is *dichotoma*, which means "two-forked," from the way in which the flower stems branch out on either side of the stalk.

The Silene makes a very positive objection to feeding insects who do not return services. She early learned that ants were very skillful in extracting sweets without paying toll, so she reconstructed her plant from the ground up to impede their climbs to her blossoms. She developed her nodes into comparative mountains; and covered herself with soft hairs. When

that did not daunt them, she evolved glands that would secrete a bitter, sticky substance and deposit it all along the stems and leaves. Now, woe to that ant that attempts to mount a Silene. It is as difficult as for a human being to loosen himself from the quicksands. Even with this safeguard, Silene



SILENE

was not satisfied that her seed-making parts were

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secure from spoliation. To make security doubly sure, she united her five sepals into a tough tubular calyx, with the outside both hairy and sticky. It is inflated below to look formidable to tiny eyes looking upward, but it converges at the top into five points which mark the apexes of the five original sepals. Lest this calyx appear too forbidding to guests she wishes to welcome, she has ten prominent brownish veins marking the way up to the opening.

While the stem, leaf, and calyx are developed to repel insects, the corolla is formed to attract. Thus *Silene* announces definitely that she wishes creatures that fly, and not those that merely crawl. The corolla is beautifully fashioned. Each petal has a narrow limb inside the calyx, but it spreads out into a broad claw on reaching the light. The claw has a cleft in the center, and also a little tooth on each outer side; and just where it leaves the calyx, it waves an upright banner. These five banners, standing close to each other in a ring, are called the crown of the corolla; and they are there to guide the flying creature down to the tube in which lies the nectar he desires. Inside the petals rise the ten stamens, each flaunting a pollen box; and inside them, and lower down, are the three styles and their stigmas. The corolla tube is not wide, so when fumbling around, whether for nectar or for pollen, the insect will get some dust on his body and carry.

it away to the next flower. After the ovules are fertilized, the petals fall away, but the tough calyx persists as a protection to the maturing seeds.

The common name of the *Silene*, Catch-Fly, is readily recognized as appropriate, and so is its other popular name, *Campion*, which means "Field Flower." Sometimes it is called *Wild Pink*, because it belongs to the world-wide family of Pinks, the *Caryophylleae*. *Silene*, the older botanists say, comes from *Silenus*, the Satyr in Greek mythology, who was the constant companion of *Bacchus*, probably because these revelers laid plans to catch the weak through their appetites; but Professor *Jepson* gives the derivation of the name from *sialon*, the Greek for "saliva," referring to its viscosity. *Verecunda*, the name of the species here shown, means "modest," and well describes its unobtrusiveness.

The *Wild Currant*, which roams California from the seaside to the high Sierras, arranges its floral envelope in a tube with the tops spread out. At the Coast, this shrub sends out its blossom after the first rains, so that usually one can gather a great bunch before Thanksgiving. The individual flower, if taken away from its group cluster, looks very much like the individual blossom of the *Trailing Arbutus* or *Mayflower* of the East—that delicate beauty which always arouses the enthusiasm of the

poet of Spring. It is but an accidental resemblance, as the plants do not belong to the same family and have quite different habits; yet our Currant, bursting out as it does when most members of the Floral Kingdom are still sleeping, brings to us the same thrill of joy in the awakening life of Nature as does the Mayflower to the East.

The Currant is illustrative of California's topsyturvy calendar. Along



WILD CURRANT

the Coast, as soon as the early rains vivify the earth, be they in October or in December, the Currant sends out her new leaves of delicate green and her graceful tassels of pink and white to indicate that, in spite of the almanac's announcing Winter, it is really Spring on the Western Shore. Then, in the Sierras, as soon as the June and July sun has lifted the heavy

snow blanket, out bursts the Currant of that altitude in her delicate green and gladsome pink to proclaim that, while the almanac may call it Summer, it is really Spring in our Western Mountains.

The Currant's leaves send out a spicy fragrance that has earned it the name of Incense Bush. This summons the birds and bugs from afar. Then, the little pink flower, with its five stamens and two-parted style, is compensated for her early venturing. Notice how her tube grows darker after the seed is formed. When does this tube fall off? Notice the leaves, their upper and lower surfaces; their coating in the cold and in the warm months; the way they are attached to the stems; their differences in appearance at different ages.

The Currant is ideal for cultivation, as it responds to the slightest effort to improve its conditions. In England, it is planted in the gardens and parks as an ornamental shrub. Even in a foreign land, it clings to its old-home habits and bursts into bloom ahead of any of its neighbors. Wherever it dwells, be it at sea level or on mountain slope, in its native West or transported to the Atlantic Shores, it seems to have a psychic sense of the approach of Spring, and it rushes forth to welcome her before more materialistic plants have even heard her approaching footsteps. The Currant's genus name, *Ribes*, comes from the mystic Arabian, which perhaps portrays a quality of the race. The species, *sanguineum*, describes the color of the flower buds.

An interesting fact connected with California Flora is that many of the specimens from which the

species were named are still perfectly preserved in the British Museum in London. The British attention was called to the rich array of plants in California when Vancouver visited our shores in 1792, when he was in the Pacific to act as England's representative to settle the Nootka difficulty. Because that commission of English and Spaniards arranged a settlement of their controversy without going to war, they had more thought to devote to the arts and sciences of Peace. Hence, they kept records of the plants and animals of the foreign countries.

The botanist of Vancouver's Expedition was Archibald Menzies, a surgeon of the Royal Navy. He had visited the Northwest Coast of America in 1779 and had become interested in the flowers. Vancouver wrote in his report: "For the purpose of preserving such new or uncommon plants as he might deem worthy of a place amongst His Majesty's very valuable collection of exotics at Kew, a glazed frame was erected on the after part of the quarter deck for the reception of those he might have an opportunity of collecting." Menzies collected three sets of California plants, one of which went to Kew Gardens, one to the British Museum, and one to the herbarium of the Botanical Society in Edinburgh. As he was the first scientist to make known many of our plants, his name is applied to a number of the California species. One of the

Baby-Blue-Eyes is named in honor of him, *Nemophila Menziesii*.

From the time of Vancouver on, the British collection of California plants has been continuously added to, so that today, if a student wishes to study the "type" of a plant, he goes to London for many of them. When a scientist collects a new plant, he classifies it and studies it; and, if it does not belong to any known species, he considers it a new plant and names it. This original specimen is called the "type" of that plant. It seems wonderful today, when all the scientists that collected them are long dead and most of them unknown, that such frail little plants as Baby-Blue-Eyes and *Mimulus* are as good specimens to study the type from as they were when picked over a hundred years ago.

Under the Spanish and Mexican Governments, the capital of California was Monterey, and every vessel had to enter that port and register at the Custom House before it received a permit to visit other places on the Coast. For this reason, most of the Coast plants gathered by visiting scientists were taken from the vicinity of Monterey, and so Monterey is known among botanists as the "type region" of California.

In addition to being the "type region," Monterey holds other and more important claims to the interest of the botanist. It is the region where plants

from the North stopped in their progress south and where plants of the South stopped in their advance north, so that it is the home of both northern and southern species. Then, too, in it still are found plants which have ceased to exist in a wild state anywhere else on the surface of the earth. There are peculiar species of the *Ceanothus* and *Manzanita* and of other plants that grow nowhere else.

The best known plant endemic to the region is the Monterey Cypress, whose native habitat is only in two groves along that coast. The grove at Cypress Point extends for two miles along the water and for sixty rods inland; the one at Point Lobos is much smaller. The Monterey Cypress natively is the most restricted of any coniferous plant in the world. This seems peculiar when one knows how plants disperse their seeds so broadcast, and one sees that each Monterey Cypress cone produces about one hundred and fifty healthy seeds, all light-winged and easy to be carried by the wind. It seems even more strange when one sees how the Monterey Cypress is scattered over the world under cultivation. The seeds in open-air nursery beds germinate in two or three weeks, and the seedlings flourish like weeds. Its seeds were first taken abroad in 1838; and before the end of the century, it was the most widely cultivated cone-bearer of Southern and Western Europe, South America and Australia,

Its closely crowded leaves, developed to withstand the sea winds of its native shore, make it an admirable hedge or windbreak to protect more delicate species.

CHAPTER III.

SOME FANTASTIC FLOWERS.

Some plants, in developing their blossoms so that the bug and the bird must aid them, have achieved fantastic shapes. Just notice the Bleeding Heart, with its symmetrical roseate flower. The calyx is inconspicuous, its two sepals soon falling off. The four petals are in two pairs, quite differently shaped. The outer pair form the red heart which attracts the insect; the inner pair is spoon-like, with the tops of the bowls joined, forming a protecting dome over the anthers and stigma. Separate the pairs of petals with a pin and see the construction for yourself.

Is it possible for a bug to crawl down to the dishes of honey without getting its head "powdered with gold"? And, with such ravenous appetites as these little creatures seem to possess, it is about certain that he will visit the next dangling red heart. Then, his powdered head will brush the two lobes of the stigma, and he has paid for his refreshments. Watch the insects that linger around the Bleeding Heart. Can they feast from her table without going inside? See how the plant waves the blossoms on



Photographed by A. J. Soares.

BLEEDING HEART

top of long, naked stems so that no leaves will hide them. Does that mean that the visitors will come on wings? Note how each blossom hangs its head, and how weak its little stem is. Is it likely birds try to get its honey?

Observe the leaves. See how they are dissected. Bleeding Heart does not care for much warmth. She makes her leaf surface smaller by cutting it into fern-like divisions. They absorb less sunshine than if they were spread out their original breadth. Does Bleeding Heart thrive in the sun or in the shade? Does she die when her blossoms and leaves have disappeared?

The botanical name of our Bleeding Heart is *Dicentra formosa*. "*Dicentra*" is from two Greek words, "twice" and "a spur"; and "*formosa*" means beautiful. A sister, also a native of California, is *Dicentra chrysantha*, the Golden Dicentra. While not so beautiful as the Bleeding Heart in the wild gardens, this becomes handsome under cultivation. A relative in the Eastern States is commonly known as "Dutchman's Breeches," from the shape of the corolla.

Another California plant that bears a Greek name and that has evolved an odd corolla, is the *Cynoglossum grande*. The common name, Hound's Tongue, is an exact translation of the Greek *Cynoglossum*, and they are derived from the shape and

texture of the green leaves at the base of the flower stalk. "*Grande*," every Californian knows, means "large," so called because our native species is unusually handsome.

The Hound's Tongue is one of the early bloomers, either at the coast or in the mountains. Notice the leaves when the plant is young. They are covered with the finest, softest of hairs, making a garment as warm as a human mother would use to envelope her new baby. Aside from protection from cold, perhaps Hound's Tongue had another reason in producing this pubescence. Her first leaves are pinkish and must look appetizing to herbivorous animals seeking a springtime meal. If the leaves were quite naked, they might be devoured whole. The hairs make eating uncomfortable and the bitter taste makes them unpalatable so they are left to guard the flower stalk hidden in their midst.

A little warm sunshine acts as magic on this stalk, and it raises its flower head towards the sky as if to absorb the Heaven's own hues. Its buds are colored the softest pink of the early dawn, and its flowers the intense azure of the mountain sky when observed from the floor of a deep canyon. Her success in dyeing her blossom should satisfy Hound's Tongue; but, as a matter of fact, she learned centuries ago that her revel in blue made her too inconspicuous under the immense cerulean arch.



Photographed by A. J. Soares
HOUND'S TONGUE

This would never do. The greatest injustice a plant can do its descendants is to have inconspicuous flowers, unless it develops some substitute attraction; and Hound's Tongue had no idea of shirking her duty. Loving the sky, she did not wish to change her color, so she copied its beauties still further by developing an arch of white at the inner curve of each petal. We notice at once the effectiveness of this color contrast, and so does the insect. He may be soaring under the heavenly blue until he is surfeited with that shade, but his eyes are caught by the five white crests, and down he swoops. Or he may be climbing up with the sky filling his vision, when a sudden glimpse of those gleaming crests will divert his footsteps. Once under the snowy arch, the same process goes on. As he feeds, he is powdered with pollen, which he carries to another blossom.

Having so arduously developed her beautiful blossom to secure cross fertilization, Hound's Tongue takes no chances on her seed being wasted. On each of the four nutlets that are ripened in her ovary, she has evolved numerous hooks. No moving thing can pass her, be it sheep or be it human, without these little barbs catching in his covering. Perhaps you have had the experience of brushing them off your clothes. That is exactly why Hound's Tongue so fashioned them. Her seeds are sure to

be carried away from the parent plant to a new soil where they can more easily carry on her project.

The Milkweed, too, forms a curious floral envelope for her seed-making parts. She has the calyx and corolla regular, with five parts each. She has five stamens, one attached to the base of each petal; but, instead of having them grow up free as the stamens in the Buttercup, she unites their filaments into a tube which encloses the pistil. At the top of each stamen is an anther with two cells, each cell containing a flattened, pear-shaped mass of waxy pollen. The two pollen pears of the same anther are not hung together; but the left one is hung on the same tiny stalk as is the right one of the next anther. So there are five sets hanging, each of two waxy pears, one pear from each of the two adjacent anthers. The stigma is connected with these anthers but is above them. Obviously, the Milkweed needs some insect aid. So, she has developed a fascinating set of nectaries, or honey glands. Five hoods are placed in a ring between the corolla and the stamens, and each hood carries a horn curving inward. These hoods are the conspicuous part of the flower. Examine them, and your respect for the Milkweed will mount high.

Of course, the bee dives into the hood head first to get the nectar. The waxy pollen pears stick to his legs and are carried to the next blossom. As

his mouth is down at the honey plates, his legs wave above and hit the stigma. You always find bees around Milkweed. You can see two in this illustration. So often have I found them asleep in the Milkweed flowers in the early morning before the sun has warmed the air that I wonder if there be a narcotic in the nectar. Perhaps not. Maybe the feast is so delicious that the bees simply forget to go home. I have picked the stalks with the sleeping creatures on many times and carried them into the



MILKWEED

house. When the warmer air roused them from their naps, there was a great commotion. Bang! they buzzed against one window. Bang! against another. Scold and grumble until they find the open door and return to freedom.

Observe the leaves and the bud coverings of the Milkweed. Why are they so wooly? Do you find any holes bored in the leaves? Do you think the insects like the juice? Milkweed, like Hound's Tongue, has made ample preparation for the dis-

semination of her seeds, but in quite a different way. She crowns each seed with a tuft of silky hairs so that it can float off on the air. Which seed gets the surest transportation, the one that depends upon the air or the one that hooks on some moving creature?

The common name, Milkweed, explains itself. The botanical name of the genus, *Asclepias*, is given in honor of Esculapius, the physician of the Greeks, who first appears in Homer as a human being and later enters their mythology as the God of Healing. His daughters were Hygieia and Panacea and Aegle. From the first, we have today "Hygiene," the science of Health; from the second, "Panacea," a remedy for all diseases; and for the third, there is named a family of Indian plants with high medicinal value. We might surmise from its title that Milkweed has curative qualities. Perhaps it has, but, as a matter of every-day fact, the foliage of our California species is poisonous to animals. Perhaps this quality is what makes the bees drowsy. Study the Milkweed of your locality. You may discover some fact important to the science of healing.

One of the California wild flowers you know best, wherever you may live, is the Castilleja or Paintbrush. She, too, has evolved a peculiar floral envelope. Perhaps you have been thinking that all the brightly colored part was the flower. Just examine the stem carefully, and you will see

that the lower colored parts are not blossoms, but just bracts.

• The *Castilleja* decided to group her small flowers near each other, but she saw no need of multiplying blossoms just to attract color-loving eyes; so, instead, she dyed the leaf-like bracts that they might be seen afar and serve as signals. Then she built the calyx into the tube and rouged it. She evolved the corolla like the calyx, but that proved too simple. So, she flattened it out and then divided it into two parts. The back part is a long beak-like shape, which stoops over and encloses the four stamens and the style; the front lip is short and small, with three little teeth on its upper surface. The insect creeps in over the short lip and works his way down to the honey. As he comes out, he gets entangled in the upper lip and hits the stigma first and leaves the pollen he carries from another blossom. He also gets a new dusting to take away with him. Observe the various blossoms on the same stalk. Do the stamens and pistils mature at the same time? In some of the flowers, you find the style with its stigma hanging out of the floral tube. What does that mean?

Some botanists claim that *Castilleja* is a parasitic creature, feeding on the roots of other plants. What do you think about that? If you study the plant carefully, you may be able to clear its name of this charge. It certainly has none of the ear-

marks of a parasite. It has a root of its own, and it has green leaves, showing that it does some work for itself. Study those leaves. Do you ever find any one plant upon which every leaf has the same shape? Is there any reason for their deep veining? Or for their silky down? Have you noticed the many seeds in the case? How are these seeds dispersed? Is that the reason the *Castilleja* soon covers an acreage?

Castilleja is named in honor of a Spanish botanist,



CASTILLEJA

Castillejo. The species shown here is *parviflora*, meaning "poor flowers." They are smaller than many of their sisters, but even this species often grows large and beautiful. Perhaps the type from which the species was named was picked at the end of summer in some dry situation. You know, from your own observation, that the earlier blossoms of every species grow more

magnificent than the later ones. If you keep picking the blossoms, the plant will send out new ones

so as to secure seed, and she makes them as fine as she can. Some persons never pick their cultivated flowers, thinking they prefer them on the plant; but this simply shortens the period in which they can enjoy the blooms. The more you pick, the harder the plant will work to carry out its own object.

Castilleja is not at all poverty-stricken in tints and shades of pigment. When Nature dips into her paint box to dress her floral children, she uses red less frequently than any other color; but she loses her restraint when she comes to California. She has given us a greater percentage of red blossoms than she has bestowed upon any other land. She seems to have given Castilleja free play with the primary colors, only bidding her to keep as much as possible to the colors of Spain. And well has Castilleja done her part. Along the Coast, she blooms out in every combination of red and yellow imaginable—cardinal, scarlet, yellow orange, burnt orange—with all their shades and tints. In the Sierras, she not only wears all these hues, but she adds a dip of blue in the mixing and comes out in crimson, carnelian, magenta, vermillion—lovelier shades than ever Paris milliner invented. At about 6,500 feet above sea level, Castilleja will cover mountain slopes with such beauty that one can simply stand open-mouthed in admiration. And each plant pushes upward with such energy that they

often reach over four feet. Then, too, they have a great love of living. While there is a bit of ground left exposed, Castilleja ornaments it. Even after the first autumn snows have come and gone, as first snows usually do, Castilleja bravely waves a dash of color, not very large in the late season, but enough to show her spirit. Because of the cheer Castilleja brings to California, in all our altitudes, in all our climates, I dislike to think of her being accused of being a parasite. Perhaps, by a careful study of its habits, you can acquit this courageous creature of this charge.

CHAPTER IV.

SOME GROUPED FLOWERS.

A handsome shrub that is widely distributed over the State is the *Ceanothus* or California Lilac. Every one has admired it, as it adds color to the landscape, sometimes a vivid blue, sometimes a smoky haze, sometimes a creamy white. Sometimes it crawls along the ground, making the Squaw Carpet of the Sierras; at others, it towers to over twenty feet, as in the Lilac of the Coast Range. Sometimes its leaves are broad and leathery; sometimes long and narrow; sometimes it is hairy, sometimes spiny; but with all its variations of stem and leaf, it has one habit common to all its species. It bunches up its little flowers close together, so that they will make a mass of color that will be seen at a distance. It does not make the flower groups the same shape on different species. Sometimes they form a flat head, sometimes a plume; but always they store up such quantities of nectar that its fragrance perfumes the whole countryside. Even the nectar differs in the species. Sometimes it is just unalloyed sweetness; at others, it has the odor of mixed flour and water.



Photographed by A. J. Soares

CEANOTHUS

Each tiny blossom would have a small chance in attracting insects; but, grouped together, their color and fragrance summon myriads. Indeed, they are so crowded with all sorts of creeping creatures that sometimes it is hazardous to introduce them into one's house, no matter how much one may admire their decorative effect. If you examine each tiny flower, you will see that it is quite perfect. The five sepals touch each other to form a protection around the honey glands, for the lower part of the petal is a mere claw. It broadens at the top and curves toward the center like a hood. The stamens seem to wish to avoid any protection from the petals, for they grow long and hang quite outside the floral envelope. No matter what type of creature touches the *Ceanothus*, it is going to be splashed with pollen. And so delectable is the refreshment the *Ceanothus* offers that no creature will leave without accepting the hospitality of several blossoms.

With so much aid so honestly earned, very good seeds are made. You perhaps have noticed the many new plants springing up around the mother bush. Does the plant arrange for the seeds getting any distance from their natal place? What birds have you found eating these seeds?

The name *Ceanothus* means "a spring plant," referring to its early beauty and fragrance. The

species here pictured is *verrucose*, so named because it is covered with wart-like elevations. *Ceanothus* was given the genus by Theophrastus, a Greek who studied under Plato and under Aristotle. Among many books that he wrote were ten volumes entitled "Of the History of Plants" and eight called "Of the Causes of Plants." Does not that last title sound fascinating? Does it not make us seem a part of the World History when the native plants we are studying fit into the same class as those known in the days of Aristotle?

A plant that passes as an insignificant weed has a picturesque way of grouping its flowers. Just as in the case of the *Ceanothus*, the Plantain has perfect blossoms, each one of which is capable of seed-making. However, the Plantain wishes a superior seed; and having learned that its individual flowers have no attraction, it sends up long ribbed stalks towering above its lance-like leaves and swells out the top into a spike of densely crowded flowerets.

Just examine one the next time you walk. You find them anywhere there is enough earth to give them a footing, whether it be along the State Highway or bordering a city sidewalk. See how the flower head sways in the slightest breeze. This motion will catch the eye of bird or insect even if the color is not impressive. Do all the flowers mature at the same time? Notice the tiny bracts

that subtend each flower. Why are they so placed? Observe the seed-cases. When the seeds are quite ripe, the top of the case falls off like a lid, and the seeds are free to migrate. How do they get around? Have you noticed birds eating them?

The Plantain may be very insignificant in appearance, but at heart it is really a great adventurer. Many of our most famous humans are like that. Neither Napoleon nor Grant was impressive in stature. The Plantain was born in Europe; but disliking the crowded conditions there, it fastened a seed in the wool of a sheep and received free passage to Mexico. After multiplying in that country, it wearied for new fields to conquer. It clung, perhaps to a hair of the very horse that entered California with Padre Junipero Serra. At any rate, it was an early pioneer. In our State, it has roamed from South to North, and from the Sea to the Sierra. It adapts itself to any condition or climate. If the farmer expel it from his rich fields, it thrives in the poor soil at the edges; and its rosette of green furnishes fair pasturage before the grass gets fully started.

The genus was named *Plantago* by the ancient Romans, and an account of its virtues appears in the *Historia Naturalis* of Pliny the Elder, who lived in Italy in the first century of the Christian era. In many countries, it is deemed to have medicinal value. Its leaves, made into a poultice, are



PLANTAIN

Photographed by A. J. Soares

said to reduce ulcers and tumors. There is so much mucilage in its seeds that it is extracted and used for papering and also for stiffening cotton goods. The most common species in California is *lanceolata*, from the shape of the leaves. It is a native of England. There, the children call it "bullies" or "sodgers" (soldiers) and play a game knocking off its flower heads. Try the game. Has the change of climate made the ribbed stalk any more resistant?

Another plant that crowds its perfect flowers close together so as to make a far-distance appeal is the Barberry. Human advertisers have learned by experimentation that the color combination which can be seen farthest and clearest is yellow and black. Notice the signboards as you ride along. The Barberry approaches this combination as nearly as she can. Against her dark, glossy leaves, she poses groups of yellow flowers, and a bird or a bee must be blind indeed not to catch the flashed invitation. In the individual blossom, the action of the stamens is very interesting. If a bug is feeding at the honey glands and hits the base of the stamens, as he is sure to do, they close in toward the pistil; and each anther at their summits opens a little valve, which is swung on a hinge, and empties its pollen. Perhaps you can set the stamens in motion by using a pin. Try it.

With such a successful color advertisement, the

Barberry might have unwelcome visitors who would devour her, body and all. To guard against this, she makes her leaves tough and leathery, curves their edges, and places a spine at each turn. Then she sets each leaf close to the stem and crowds them thick together. Woe to a hungry cow or a greedy goat who tackles the Barberry. The leaves of the Barberry resemble those of the European Holly in shape and in texture, though not in color. Of late years, the florists have commercialized this passing resemblance by combining the leaves of the Barberry with the berries of the California Holly for Christmas decorations.

The fruit of the Barberry is, as one would suspect from the name, a berry, and it is as handsome as the flower clusters and the leaves. How do the seeds get carried about? With such an armed base, is it likely an animal will approach them? The fruit has given the genus its name, *Berberis*, which is from the Arabian for its berry, *Berberys*. The species is *pinnata*, from the arrangement of the leaves. The fruit is said to make good jelly and preserves, but it is somewhat bitter. The Indians used to dry it for winter. They used the root also, making a yellow dye from it. In fact, every part of the Barberry can be commercialized if we regard the plant simply for its use to man. If, however, we regard it for the pleasure its beauty gives us, we



Photographed by A. J. Soares
CHRISTMAS BERRY

will find it one of the best hedges our native Flora produces. It grows quickly, its branches cling together and keep out intruders, and it is always a joy to look upon.

Another native shrub that can easily be grown in our gardens is the Christmas Berry. It, too, early acquired a knowledge of the advertising value of massing color. Each small flower is perfect and with its dish of nectar could attract a helper; but the Christmas Berry blooms in summer when food is plentiful, and then, too, she towers above the ground so that her small individual blossom would not attract notice were it not accompanied by a goodly company of its fellows.

The Christmas Berry, like the Barberry, makes her leaves disagreeable to the wandering stock; and so she is left undisturbed to grow year after year until she often reaches beyond twenty feet. With her white banners in the heat of summer and her red in the days of cold weather, she ever adds beauty to our landscape; and it is to be deplored that many touring automobilists tear her apart so ruthlessly.

Observe the calyx in this plant. See how narrow it is below and broad above. It is said to be turbinate, or top-shaped, with the apex down. As the corolla falls off, the calyx curves inward and joins together its five parts, completely enclosing the seed-case. As the seeds are growing, the calyx also

grows, a soft mealy berry; and when they are fully mature, it signals the glad tidings to the world by donning a rich cardinal coat. If you cut open a mature berry, you will find that the center resembles the core of an apple with the seeds well protected inside it. If you taste the berry, you will find it sweet and spicy.

Why does Madame Christmas Berry take so much trouble with her seed-case? Well, with all her love of



CHRISTMAS BERRY

beauty, she is a utilitarian. She ever has the instinct that she must get her seeds scattered. So she wears the cardinal coat to attract the eyes of Mr. Bird as he wings past. She hangs each berry on a loose little stem so that he can pull it off without losing his temper. She seasons the berry with sugar and spice so that it will be palatable. She puts the little seeds in a membraneous case so that, if Mr. Bird gobbles his food whole, the seeds can pass through his digestive system without being harmed. It is claimed by some botanists that the

seeds of Christmas Berry are never able to produce plants unless they have passed through the alimentary canal of a bird. Others claim that they will grow if you clean them when you pick them. Suppose you investigate and see what are the facts about these seeds.

The botanical name of the Christmas Berry, *Heteromeles arbutifolia*, deals with its fruit and leaves. *Heteromeles* indicates that the fruit is not the same substance throughout, and that you have seen by cutting the berry and finding the central cavity. "*Arbutifolia*" tells that its leaves are like those of the *Arbutus* family. "Folia," you know, always indicates "leaves," whether in a book or in a plant. We commonly call this plant California Holly because its berries are cardinal for Christmas; and our traditions teach us that Yuletide decorations, to be conservative, should be holly.

Lately we have been reviving the Spanish Californian name for the shrub, Tollon. We pronounce it correctly, but we mis-spell it. The early Spanish pioneers found it growing in gorges, and so they named it "Tollon," or gorge berry. The botany of the United States Geological Survey, which is the standard for California, spells the name correctly; but our modern writers seem to be too far away from the Spanish days to remember their orthography, and they are misled by the Spanish Californian

pronunciation of the letters "ll" as "y"; so they have been writing the name "Toyon." However, we can spell it correctly, just as we spell San Jose correctly, and not "San Hosa."

We have come to mis-spell another Spanish plant name, by depending upon our ear. When the early Spanish Californians explored the Sacramento Valley, they came to a river whose banks were gorgeously draped in the autumnal festoons of wild grape leaves and fruit. They were footsore and thirsty. The acid fruit was so welcome to the tired adventurers that they named the stream the Grape River, Rio Uva. Now, the Spanish Californians pronounce "v" much like they did "b." So when they said "Rio Uva," the Americans replied, "Oh, yes. Uba River." That did not look very well, so they prefixed a "y"; and so we have, since before the days of the famous Dam, the "Yuba River." So, too, we have "abalone," instead of "avalone." Spelling comes and spelling goes, but we must remember that the tumbling Yuba River owes its name to the useful plant that still beautifies its banks, the wild grape, or "la uva."

The plants already treated in this chapter arrange their blossoms in clusters for advertising purposes, but each little perfect flower swings on its own individual stalk. However, one plant family, the largest in existence, has advanced beyond co-operation

merely to attract attention. This is the *Compositae*, which you know well either in your garden or in the wildwoods. Its genera differ, but they all are fashioned to carry on their life-work co-operatively. Just as people living in cities secure service more easily than those residing on isolated ranches, so does *Compositae* get what she wants by limiting her area.

Let us take the Seaside Daisy. You see a yellow center, surrounded by violet rays. Look close at the center. It is made up of tiny flower tubes crowded densely together, and for the whole mass there is but one circle of light-colored rays to summon visitors. These rays form a glorified group corolla, and their only duty is to advertise. In correlation with the group corolla, *Compositae* has developed what may be considered a group calyx, as it performs for the flower head the duties that a calyx does in an individual flower. It is called an involucre and is made up of many leaflets crowded together. It is tough and not only protects the tender members of the head from moisture and from cold, but forms a strong wall against certain thieving insects who try to cut through and surreptitiously drain the honey glands from below.

In the center, the little flowers in the outside rings open first, while the inner circles stay tight in bud. The stamens ripen while the pistil is immature, and



Photographed by A. J. Soares
SEASIDE DAISY

the anthers discharge their pollen inside their floral tube. Then the pistil grows up quickly and pushes this pollen outside the floret. You have seen the golden dust loose on top for any one to pick up. Mr. Bee in passing the outer circles gets some pollen on him and carries it to some stigma in the right stage to receive it. Should the unexpected happen, and no insect visit the Daisy, she would still make seed. Her inner circles will be sending out their pollen when the outer stigmas are ready to seize it, and some powder must reach them.

Before the flower head is ripe, pull out one of the florets and examine its calyx. Its base is annexed firmly to the bottom of the pistil. Its top is dissected into numerous silky bristles. These are the "pappus," which remain on the head when the corolla fades and which float the ripe seeds into the air. Probably you have blown at them to "tell your fortune" by the number left on the head.

"Pappus" is derived from the word for "Grandfather," and refers to the appearance of age of the white silky hairs. The name of the genus of this Daisy, *Erigeron*, refers to this pappus. It is from two Greek words, "spring" and "old man." Many people with no knowledge of the Classics commonly call the plant "the old man of spring," so it must be a fitting title. The species, *glaucus*, means "covered with white bloom that easily rubs off." Pass your

fingers along the plant, and you will see that this name, too, is truly descriptive.

CHAPTER V.

SOME FLOWERS THAT LIKE HIGH ALTITUDES.

Public opinion has always esteemed a love of flowers a feminine quality, in spite of the fact that all the world botanists have been men. In the past, only man could venture into new regions and explore unknown heights, for woman's place was in the haunts of home. So men discovered new plants and named them and described them. This masculine description is probably the foundation for many of the mistakes in the color of flowers as set down in botanies. Few men, not artists, see the difference in hues and shades and tints as women do. This defect in the color education of men—as well as the fact that many plants have been described from dried specimens, whose color is quite unlike the fresh beauty—has often led astray amateur botanists.

But to-day is the era of the amateur botanist as well as of the amateur in every other line. Women now find themselves free to tramp anywhere their brothers may. They invade the most remote wilds and eagerly examine the flora in its native soil.

Their written descriptions of plants* have placed in the hands of the average citizen books more intelligible to him than those written by men, probably because the unscientific eye is most quickly attracted by the color of the blossom.

The heyday of blossomtime in the Sierras lies between the middle of July and the middle of August. The wise old mountains have learned that they have only three months free from their snowy blanket, and they respond to every ray of the sun with a plant that joys through its whole life history in an accelerated beauty. Nothing seems listless. The plants which at the Coast produce inconspicuous seeds here wave a bright scarlet or cardinal pod. Along our whole Eastern Range, the season is about the same, although the varieties of flowers may differ. In the Lake Tahoe Forest Reserve, one gets a representative collection of Sierran plants with only a healthful amount of mountain climbing.

From the Tahoe level of 6,200 to the 10,000 foot summits, one finds a varying array. First, one is impressed by the aspiring sisters of the blossoms that gladdened the Coast in the spring days of March and April; and then by the new flowers that never descend to the lower levels. In the upper regions,

*Miss Parsons: "Wild Flowers of California" and Mrs. Dana-Parsons: "How to Know Wild Flowers", both based on color classifications, have made many people acquainted with the wild flowers.

the white Forgetmenot, the Buttercup, and the golden Brodiecea are small and scrawny as if worn out by long travels from the sea. The yellow Violet is a wood dweller, pallid and shrinking in comparison with the glowing Johnny-Jump-Up. The blue and the white Violet are smaller and more delicate. The Squaw Grass is a poor diminutive of the beautiful plume that waves on Mount Tamalpais. But that ends the list of blossoms that grow less beautiful with ascent.

The Columbines are glorified sisters of the Coast beauties, and crowd so closely over every sunny hillside that they tint the slopes red. The Castilleja bursts into every shade and tint of red and yellow that man ever dreamed of, and the color bracts are longer and more plentiful. The Star of Bethlehem and the Breath of Heaven expand in the higher altitude, and the False Solomon's Seal and its sister Smilacena are as common as the Buttercups at the Coast. The Hound's Tongue is an irradiated development, seeming flecks of sun-kissed sky scattered through the woodlands. The Lupine family is well represented, and is as well equipped for securing insect aid as any of the species. One exquisite creature in iridescent lavender displays a keel of purest gold to lure the giddy fly. When she has accomplished her purpose and received pollen from another blossom, she changes her brilliant keel to

darkest purple; but, whether in lavender and gold or in lavender and purple, she is one of the loveliest of her family.

The most beautiful *Brodiaea* above the Tahoe level is a white so pure that it seems the very soul of whiteness. Most of the shrubs have white blossoms, and the white is always a surprise in its utter cleanliness. The *Ceanothus*, the Cherry, the Service Berry, the Bridal Wreath, the Elder, the Chamisso, the Labrador Tea, all seem to revere the memory of the pure snow that protects them for so many months a year and to strive to perpetuate it in their blossoms. They achieve a whiteness that the flowers at the Coast do not reach.



SNOW PLANT

One could go on indefinitely enumerating the variations from the Coast species, but the especially Sierran blossoms are more interesting. Probably the one that most interests the Alpine visitor is the Snow Plant. This is one radiant cardinal glow from root to bell-rimmed crown, symbolic of the Sierran Spring in its

intense vitality. It does not grow out of the snow, as poets are wont to picture it, but springs from the brown piney earth after the snow has melted. Sometimes snow is all around the exposed ground, and this may have given the artist his color contrast, and he failed to notice that the spot from which the Snow Plant rose was free of white. Snow Plant plans her growing in the fall, with new little plants all ready to come up when instinct tells them that the sun reaches the ground.

The Snow Plant loves bright color and disdains to wear green leaves and prosaic brown stems. It tinges its whole body red: the fleshy simple stem, the bracts which it substitutes for leaves, the bells which are its blossoms, and the fruit it produces, all red, except sometimes whitish at the base and root. People not knowing the plant often pick it up when it is simply a column of red bracts wrapped around the unawakened flowers. It is not at all beautiful in that stage and gives no idea of its shapeliness in maturity. If left unhandled, it really becomes beautiful, and it is interesting in its development.

If one watches its haunt, some day you see a pushing up of the brown earth in a little heap. From this, soon peeps a pale red tip. This comes out farther, showing some tightly wrapped bracts. It grows taller, displaying more and more bracts with each inch of height. Finally, its full length is ex-

posed, the part next the brown earth swelling out for a good base. The lower part may remain whitish or pale red; but from a few inches above the ground, it grows more vivid each day. As the bracts deepen in color, they loosen their tight hold on the fleshy stem, and from between them rise symmetrical bells one after another around the stem until they reach the summit. The fleshiness of the structure keeps it from wilting, so that when the topmost bells are ringing the lowest ones are still fresh. Then the Snow Plant is truly beautiful. The individuals vary in the intensity of their red, but they all have a sort of scintillation, as if diamond dust had been mixed in their structure. Never, never, pick one until it hangs out its bells to its very apex, and then you will be rewarded for your self-control. Because the ruthless or the heedless gather the immature plant, leaving no opportunity for seed-making, the Federal Government has imposed a fine of twenty-five dollars for picking a Snow Plant in the National Parks.

If the Snow Plant is left alone, it can propagate its kind successfully. Its bells are constructed to make insects work for its purpose when once they enter them. And there is no doubt they will come, with the bright glow and the luster catching every ray of sunshine that dips under the trees and reflecting it into the eye of each passing winged creature.

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The Snow Plant's calyx holds fast to the seed-case and forms a roundish nut, with the filament hanging out of the center. As soon as the flowers are fertilized, the Snow Plant loses its sparkle and its red becomes a darker shade, but the red persists even after the plant is dried.

The botanical name describes the appearance of the plant—*Sarcodes*, the Greek for "fleshy," and *sanguinea*, from the Latin for "blood." The Spanish Californians called it *Sangre de Cristo*, the "blood of Christ." They evidently believed, as many people do today, that the red flower rises directly from the white snow, and they saw the appropriate comparison of the magic of Christ's blood making the world pure.

A Sierran plant that announces the Spring earlier than does the Snow Plant is the Anemone. One day you gaze at a bank of snow on a sunny hill-slope. It is shining white, but motionless. The very next day, as as your eyes linger on



ANEMONE

it, you are startled. It quivers and has warmer tints. Then you realize that the snow has been replaced overnight by the Anemones. Even though their advent is the same year after year, it never loses the effect of magic. The explanation is simple. The earth is so warm that it melts the snow next to it, making a cave with just a thin crust between it and the sky. The Anemone, eager for a glimpse of the sun, starts her growth under this crust, in this conservatory as it were; and the very hour the crust disappears, she flings wide her floral banners. In her haste she does not bother to make a corolla, but she tints her calyxes blue and lavender and pink and cream, all in the softest Dresden hues, so that no insect suspects that she is not wearing a full outfit. She has many stamens and a delicate meal spread. Any early bug is well paid for the services he renders her. The blossoms are so dainty, waving over the gray-green deeply-cleft leaves that they appeal to the human as does the Baby-Blue-Eyes at the Coast. The Anemone is buoyant with life only just after the snow has left her. In a couple of weeks, both blossoms and leaves on the same patch grow smaller and narrower. One not acquainted with their habits would think them a different plant. But, higher up, new Anemones are emerging from under hollow snow, so that, beginning at 6,500 feet in early June, one

still enjoys their loveliness in the middle of July at 8,000.

The name *Anemone* is from the Greek, meaning "Wind Flower," because the blossom likes exposed ledges. *Drummondii* is after a Scotch botanist who collected our mountain flowers.

Another beautiful blossom that is a native of our



SIERRA PRIMROSE

mountains is the Sierra Primrose. It does not come lower than 7,500 feet and probably climbs a thousand feet higher. Shortly after the snow vanishes, it appears on slopes that are partially rocky but not too much exposed to wind. If Mrs. Primrose were not provident, she would have a very short life. The Sierran sun seems concentrated heat as it pours on these cliffs and

is reflected from them. It would surely frizzle her up were the plant as delicate as the charming blossom appears. But Mrs. Primrose is prepared for this blazing sun. Her stems are thick and woody; and, instead of standing erect, they

creep along the ground under bunches of leaves crowded so thickly that they make a permanent shade. No matter at what angle the sun darts its rays, they do not reach that stem nor diminish its store of food and drink stored up for the plant's summer sustenance. The leaves are thick to hold their moisture and narrow not to present too much surface to the sun, and on the angle of each leaf is a sharp tooth to pierce the tongue of any marauding animal. With such an excellent foundation, Mrs. Primrose can well support her seed-making parts.

She raises them upon a slender stalk and groups them together at the top. All the flowers do not come out at once, but the lower ones first, just as in our cultivated primrose or cowslip. Her petals are a deep rose, with a yellow center. Sometimes a wine color ring outlines this yellow; and with the pale stamens enclosed, it gives you the impression of an eye looking straight at you, an eye friendly and yet appealing, so that you instantly fall in love with the flower and spontaneously quote Wordsworth.

However, Mrs. Primrose does not care for human impressions. She is set on captivating the bug's fancy. She succeeds because his taste in color and form is the same as ours. She is very careful of her seed-making organs. As the sun goes down, she furls her petals tight around them, to open again

when brightness and warmth returns. She unfolds her buds very gradually, so that a single stalk of Primrose in a glass of water will keep sending out fresh blooms for three weeks.

This is the only native Primrose we have in California. The botanical name, *Primula*, is from the Latin *primus*, meaning "first," referring to its early blooming after the snow's departure. "*Suffrutescens*" is also Latin, and indicates that the plant has woody stems at its base.

Two alpine plants that seek the same altitude as the Primrose, though they prefer more moist locations, are the heathers, the white and the so-called purple. This last evidently was named from a dried specimen, as its blossoms are decidedly not purple. They are a bright magenta when fresh, before fertilization. While both heathers belong to the Heath Family—that clan of such wondrous beauty as the Snow Plant, the Pyrola, the Rhododendron, the Madroño, the Manzanita—they differ in appearance from each other. Both are evergreens, both cling close to the warm bosom of Mother Earth, and both grow woody stems so as to conserve food for the plant; but there, as far as the untrained eye is concerned, the resemblance ends.

The White Heather presses its leaves close to the stem, in rows of four, and overlaps the lower upon the upper, for all the world as the Cedar does. In

fact, the stems look like little twigs of Cedar. You can readily see that White Heather is exposing just as little as possible of her leaf surface to the Sierran sunshine. To counterpart her stubby leaves, she hangs above them the most graceful blossoms, each a pure white perfect bell, with five reddish sepals symmetrically arranged around its base. A bed of White Heather suggests a summer camp of the fairies, with the snowy chimes resounding a welcome to the concord of Nature. And with fairies come the other wee folk, who crawl into Mrs. White Heather's bell and pay the dues for her hospitality.

White Heather is named *Cassiope*, for a favorite in Greek mythology, the same lady whose memory is honored by the constellation Cassiopeia's Chair. *Mertensiana*, the species, is for a German professor, Franz Karl Mertens, who won renown in the study of plants.

Magenta Heather also crowds her small green



WHITE HEATHER

leaves, but she holds each one out at an angle from the stem. The twigs of this evergreen suggest a miniature pine-tree at first glance, but, of course, the leaves are not needles in a sheath. Mrs. Magenta Heather forms her blossoms like saucers and crowds them together on the top of the stems. She hangs the stamens quite prominently outside the corolla, and nothing can pass her flower cluster without knocking the little anthers. The style also protrudes, and it remains on the seed-case after the seeds are mature.



MAGENTA HEATHER

Magenta Heather is sometimes called *Bryanthus*, because of traits similar to those of the mosses. The botanical name of the genus is *Phyllodoce*, from the

Greek explaining the structure of its leaves. The species is *Breweri*, in honor of William H. Brewer, a botanist, who collected California wild flowers from 1860 to 1865. He was the first to collect scien-

tifically in our Sierras, so it is fitting that this unusual evergreen should hold his name.

Another member of the Heath family which likes the mountains is *Ledum glandulosum*, or Labrador Tea. It is a beautiful evergreen shrub, with rigid reddish brown branches which often are covered with a rust-colored dust. The glossy leathery leaves make a fine color contrast as they crowd closely around the stem. It is only the upper surface of the leaf that is dark green and shining, but it curves its edges back so that the under side is well hidden and only the upper catches the eye. There is an object in this rolling of edges. The under side of the leaf is a pale green, not strong-looking like the top, but it is dotted over with glands that manufacture an aromatic resin. It would never do to expose these glands to the mountain sunshine, so *Ledum* turns her leaf edges over as a protective awning. Each leaf terminates in a sharp little point, but it is too soft to hurt any mouth that might attack it. *Ledum* depends upon her taste to discourage animals from devouring her.

The blossoms are a pure white and are clustered at the top of the stem. The stamens hang out past the petals, and the style also is long. Any creature, winging its way past and hovering a moment above the *Ledum*, will be tempted and help her in her seed-making.

The name, *Ledum*, is the ancient Latin for this genus. *Glandulosum*, one can see, is a description of the leaf's activity. If you crush a leaf, the air is instantly aromatic with turpentine; and, if you taste



LABRADOR TEA

it, the flavor is that of pure turpentine. It is said that the shrub poisons sheep, but I have my suspicions that it is one of the few plants they dislike and do not destroy. The common name, Labrador Tea, comes from the Atlantic member of the family, *Ledum palustre*, whose leaves are used as a beverage. Sir John Franklin and his party, in their Arctic Expedi-

tion of 1819-1822, made a tea of the leaves, which they found reviving in the polar cold. They reported that it had the taste and fragrance of rhubarb, so its glands must make a product different from that which our native species manufactures.

A Sierran plant that seems to be in the process of changing the form of her corolla is the Gentian. In joining her five petals together into a funnel, she



GENTIAN

Photographed by A. J. Soares

seems to have found that each petal is too broad. She does not wish to trim them off nor yet to spread them out and leave an easy entrance for visitors; so she plaits the extra material into folds until each lobe stands out distinctly, just as a dressmaker plaits extra material into folds to make a skirt hang properly. Perhaps in the coming centuries, Gentian will absorb these folds, or perhaps she will modify them into some fantastic form; but at present she seems proud of them and calls attention to them by waving on their tops several slender bristles. Of course, these little appendages stir in each breath of air and catch the eye of the butterfly.

Being overgenerous in corolla cloth, Gentian economizes in other lines. She has a very short style, so that the two spreading lobes of the stigma are closely annexed to the ovary. You generally see small bugs around the Gentian. Probably she concocts a special dish to their liking so that they will creep down her tube to the waiting stigma. The five stamens, too, have comparatively short filaments, their heads not coming to the top of the corolla. The filaments are joined to the petals just at the bottom of the folds. An insect, in passing down the plaits or in returning up them, will be sure to wriggle enough to disturb the stamens and have the anthers empty their contents on him.

Because Gentian blooms late in August and in

September, she has to see that her seeds are well protected from an early cold snap. When fertilization is completed, she does not cast aside the corolla, but wraps it around the seed-case. She changes her blue to a purple, and then to an ashy hue, to warn insects that they are no longer welcome. The calyx, too, stays on, so as to give extra warmth. The species shown here is called *calycosa*, because of the leaf-like bracts around the bottom of the flower.

The Gentian is esteemed a great treasure by flower lovers. Its blue is quite unlike that of any blossom we have at the Coast. When you stumble unexpectedly upon a Gentian bed, the impression is of a bit of sky fallen to earth. Do you think that blue makes a deeper appeal to the human mind and heart than do other colors? What tint are the flowers we regard with most tenderness? What of blue in our paintings of religious subjects? Is Judas ever depicted wearing the color of the Heavens?

The Gentian was named for King Gentius of Illyria, that eastern borderland of the Adriatic whose history spells romance right down to this hour. Gentius was something of a practicing physician, and he made known the curative qualities of the root of the plant. Even today the essence of the Gentian is used in medicine.

Another Sierran plant that seems to be in the era of changing its parts is the Pentstemon. Any

schoolboy who has drawn a pentagon will guess that "pentstemon" means "five stamens." Well, that is what the word does mean; but look in the blossom and count the stamens bearing anthers on their tops. You see there are but four.

In the ancient days, long before this genus was



PENTSTEMON

named, the flower probably did have five stamens; but it evidently concluded that four with good healthy anthers could work to better advantage than five in the crowded quarters of its throat. So it is transforming that fifth stamen into something else — something more beautiful and quite as useful. The plant, for all its artistic taste in form and texture and

color, has a very practical trait. It will not endure a useless part. If there be no work for an organ, it evolves it into something that can do work or else it devolves it out of existencce. Examine the throat of the Pentstemon. The four regular stamens bend a little at their base, but stand up straight as

they approach the light. From behind them, see, a filament rises straight up. That was originally the fifth stamen, but see how much more showy is the beard it now wears than are the anthers the other stamens carry. It projects this beard just to attract insects. When they arrive, down they go into the funnel, stumbling against the stamens in such narrow quarters and receiving their meed of pollen.

The Pentstemon here pictured is the *Newberryi*, sometimes called the Pride of the Mountains. It is a rugged perennial, growing low in height but spreading its woody stems in every direction. It does not seem to need good soil, for it creeps anywhere over the granite cliffs, sometimes on their tops, sometimes filling side crevices which cannot possibly contain much ground. It does not disdain the earth, for it flourishes at the foot of cliffs where the pine needles and the disintegrated granite, uniting for ages, form a rich mold. Its blossoms are a rich crimson; and, flung against the grey rocks, it makes a striking color contrast that is appreciated not only by man but by bird and bug.

The anthers and the beard of the projecting filament of the fifth stamen are covered with a dense wool which shows any hungry creature the path to the dining hall. This wool grows cinerous, or ash-colored, as the blossom ages. The leaves of this Pentstemon are leathery, a dark green, with toothed

edge. They form an effective background for the crimson blossoms.

Under cultivation, the *Pentstemon* enhances its beauty, increasing in size and softening its texture, while losing none of its ability to choose brilliant color. Its common name is Beard-Tongue, from that changing fifth stamen. It is this organ that gives it the botanical name, as the ancient scientists wished to emphasize the fact that it was present. *Newberryi* is in honor of Dr. J. S. Newberry, who was a member of Lieutenant Williamson's party that made one of the first surveys of California, beginning in 1853. All these Government surveying parties had among their number botanists who collected the new plants and introduced them to the world of Science.

A close relative of the *Pentstemon* is the *Mimulus*, they both being members of the *Scrophulariaceae* or Figwort Family. The Pink *Mimulus* is one of the lovely flowers of the high Sierras. Its pale green foliage and rather weak stems crowned by its exquisite rose pink blossoms give the impression that it is an escape from the conservatory. On first acquaintance, one marvels that such a delicate creature can live under such extremes of climate. With a longer observation, one sees that this delicacy is only in appearance. Pink *Mimulus* is really abounding in vigor. It sends out its first blossoms

in late July in some shaded nook on a creek bank. Then, as the water recedes into a narrow channel and exposes a rocky bed along its course, as all California streams do in summer, Pink *Mimulus* springs up overnight among the newly uncovered rocks. Of course, there must be soil among the stones, rich surface soil brought down by the stream and deposited in the sluggish turn; the water is probably near the undersurface; the Sierran sun pouring on the bare boulders raises the temperature; so it really is an ideal forcing bed for Pink *Mimulus*; but the place looks so barren and she looks so delicate that you doubt your eyes and have to reason out the conditions that make it possible for her to thrive there. Thrive there she does and increases her race. Even after the late September frosts, even until the October snows, you can pick some Pink *Mimulus* on the emerged creek bed; and the more you pick, the more she rushes out to fulfill her duty before winter overtakes her.

The calyx of Pink *Mimulus* is said to be prismatic because it has five flat faces joined together by five angles. Each face terminates in a tooth pointing upward. The calyx remains on after the corolla falls away. The calyx, as well as the stem and leaf, are furnished with little hairs to keep the plant warm.

The lovely corolla is in two lips, not very differ-

ent in size, but the upper with two lobes curving backward and the lower with three spreading out. Each lobe has flecks or lines, or both, of darker rose or sometimes crimson. The lower lip has stripes of pure gold or paler yellow, with hairy ridges, to show the way to the honey dishes. Inside the corolla are the four stamens standing in pairs with their anthers ready to discharge the pollen on any visitor. The pistil has a stigma that acts in a peculiar way. It spreads out two flat surfaces, white and sticky, one to either side. If a grain of pollen touches it, the two parts come together mechanically, closing tight while the pollen gets down to the ovules. You can watch it work by touching the lobe with a pin.

The Pink Mimulus is *Mimulus Lewisii* in botany. *Mimulus* is from the Latin for "comic actor," because the genus seems to present a mimicking face. From this fact, many of our species are commonly known as the "Monkey Flower." *Lewisii* is for Captain Meriweather Lewis of the United States Army who, with Captain William Clark, in 1803-6, journeyed from the Mississippi across the Rocky Mountains and down the Columbia River to the Pacific Ocean, the first white men to make this arduous trip. It is on the results of their expedition that the United States based our claims to the Oregon Territory. Great Britain acknowledged the

justice of the claim; and so, through a scientific expedition, we acquired that great Northwest without shedding one drop of blood. Captains Lewis and Clark described all the animals and plants they came across. In the mountains of Montana, they first viewed Pink Mimulus. Later, botanists named the species for the intrepid soldier. Our *Mimulus Lewisii* seems to be living up to her title, cheerfully overcoming all obstacles to perform her duty.

One of the beautiful flowers of the high Sierras that comes after mid-summer is the Alpine Lily. Its blossoms are perfect bells, formed by the three sepals and the three petals being shaped and shaded exactly the same. The individual flowers are not large, but so many of them branch out on either side of the same stem that they give the impression of great bloom. The botany of the United States Geological Survey reports from two to fifty flowers



ALPINE LILY

on the same stalk, but the happy medium is more often found.

The buds of Alpine Lily have the tips of the segments meeting together. As the sun warms them, the sides swell out a little; then, just below the top, they split apart; this split proceeds upward, until finally the tips separate; then the upper part of the segment curves backward, while the rest of the perianth remains funnel-shaped. The bud is rather pale, and the outside of the perianth never gains the rich glow of the interior. That is a gorgeous velvety orange or reddish orange or burnt orange, with spots and veins of wine and maroon and brown. At the base, each segment is stained with its wealth of nectar, and down the segment from tip to base runs a "nectariferous groove" to direct the visitors. The six stamens rise above the curve of the perianth, and the anthers sway loosely on their tops. The style is long and its stigma spreads into three lobes. The hummingbird and the butterfly find it a pleasant place to call; and for their entertainment they repay Alpine Lily by carrying pollen to the next blossom. The capsule has three cells and in it are ripened many little seeds. Alpine Lily holds her three-cornered seed-case up straighter than she does her blooms. She knows that the hummingbird and the butterfly have a purpose of their own in seeking her company and that they will find her bell at whatever

angle it droops. But the wind is another thing. It has no purpose in helping her distribute her seeds. It is unaware of her existence save as an obstacle that needs a little energy to pass. Should the capsule hang in the lee of a leaf, it might hold its seeds until it grew weary and dropped them right under the mother plant. That would never do. The seeds must be dispersed as widely as possible so that the new plants will have little competition.

These seeds need unfrequented places to settle in. It takes several years for lily seed to develop into a bulb from which grows the flower stalk. For some years, it sends up leaves just above the ground, varying their shapes with different years. During the same period, it is developing underground towards a bulb of short thick-pointed scales. Finally, it has progressed enough to produce fruit, and it joys upward into its bloom of sun-tinged bells.

The bulb underground multiplies into bulblets, so that the lily is propagated in two ways. One should never pull any member of the Lily Family—*Calochortus*, *Fritallaria*, *Brodiaea*, *Zygadenus*, or others of the beautiful sisterhood—as the jerk kills the bulb. Cut the lower stalk with a knife or shears, and the bulb is still good for a number of new plants.

Alpine Lily is sometimes called Little Tiger Lily from its coloring. Its botanical name is *Lilium*

parvum. *Lilium* is the ancient Latin name for the family, and *parvum* is from the small bulb or small flowers.

A lowly sister of Alpine Lily that springs up in the damp spots in the Sierras as soon as the snow disappears, and that always lives in moist places, is the Wild Garlic or Wild Onion. One may not care for its odor, but the quality that produces this same odor often gives savor to many an otherwise insipid camp stew. The Wild Onion bulbs had developed the year before, so as to be ready to rush into bloom with the first cleared earth. They wear a reddish or a brown coat for winter protection. Within the heavier colored coat are fitted closely many veined layers, so that the bulb is said to be "tunicated," as is the cultivated onion. From the center of the bulb starts the new plant, pushing up two green tips ready to burst through the ground at the first hail from the sunshine. The leaves all rise from the top of the bulb and overlap at their base. As they grow in the air, they spread out long and narrow, and finally their ends become threadlike and twist inwardly. They take no chances of shutting out the sunshine from the precious blossom, and they wither away early.

From the center of the leaves, there rises a naked scape, on the top of which is borne the numerous pink flowers. In this floral envelope, the sepals and

WILD ONION



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petals are exactly alike and each is striped delicately with a pinkish brown. The six stamens are securely attached to the base of the segments, and their anthers do not extend beyond the perianth. The bug must touch these anthers in seeking the nectar dishes below. The flowers are grouped together so as to attract attention. There are papery bracts at the bottom of the cluster, which hold the sunshine around them. The flowers on the outside mature first, and then by gradual turns they ripen to the center. This process gives a longer time in which to attract visitors.

When the seed is formed, the perianth remains on, withering into a papery substance. The capsule is three-lobed, with a double crest on top of each lobe. When the seeds are ripe, the seed-case begins at the top to split into three parts, very slowly because the cells are held together by a sort of lattice-work. When a whiff of air dashes by, it hits the capsule, and the three distended parts slap together and then rebound. Out go their top seeds. Then the capsule slits down a little farther, and the process is repeated. If all the seeds could be carried away by the first breeze, they would all go in one direction. By opening the capsule gradually, Wild Onion catches the tide of various directions, and within a few years she is able to populate a wide acreage. You will observe this same habit of the

capsule in your garden lilies, or in any wild species near you.

The cows love the Wild Onion. If at sunset in a mountain pass you meet a herd returning from the day pasturage, their breath nearly makes you faint. Quite different from "the sweet breath of kine" of the poet. The milk is tainted so strongly that the taste appears even in biscuits and cakes. There is no way to keep the cattle in the Sierras from Wild Onion, if there be any in their neighborhood, except by locking them in a corral. Once free, they rush to it, as a boy does to a fire, and with more reason.

The Wild Onion is called *Allium bisceptrum* by scientists. *Allium* is the ancient Latin name for the genus, and *bisceptrum* describes the two crests on each lobe of the seed-case that this species wears.

Another member of the Lily family that seeks the Sierras is *Veratrum californicum*, or False Hellebore. This tall beauty is very unlike Alpine Lily or Wild Onion in appearance; but it has their true lily traits of the flower stalk coming from a root-stock of several years development, of having flowers with six segments and six stamens, and of ripening a three-celled capsule.

The *Veratrum* sends up a stout stalk from three to eight feet high, either near the creek bank or on a hillside, but always in good soil and never from the broken rock beds in which so many Sierran

plants thrive. Its leaves are thickly crowded at the base, but grow singly near and among the flower panicles. Each leaf is parallel-veined; each is sessile, that is, sitting on the stem; each forms a sheath



VERATRUM

around the stem, and each seems to have too much material, so *Veratrum* plaits it into folds just as *Gentian* folds her petals. With her large upward-slanting leaves, a meadow of *Veratrum* looks like a field of corn.

The blossoms come out in loose branches along the top of the stem, the lower branchlets longer than the upper so that the flower stalk

rising above the green base, sometimes to three feet, presents the appearance of a great creamy spire. The individual flowers are on tiny stems and crowd thickly around their branches, appearing on every side so that no matter which way you view the *Veratrum*, you seem to be looking at its front face. The blossoms are often two kinds on one plant, some that are perfect with both stamens and pistils and

others that have either stamens alone or pistils alone. Because it bears both kinds of flowers on the same plant, *Veratrum* is said to be "polygamous."

The perianth is fashioned of thick material not unlike that of the magnolia flower. If there has been plenty of snow the previous winter, most of the spires are as pure a cream as the cream cup. If the winter has been "dry"—which is only a comparative term as *Veratrum* only blooms at heights which are sure to have some snowfall—the flowerets come out a creamy green tint. Either the more moisture or the longer rest under snow blankets effects the color. Of course, any year, there are always some blossoms that do not shade to green. The six segments of the perianth contract in the lower part and are united in the base of the ovary. The six stamens are attached opposite them, but free from them. The ovary has three styles which curve outward from the center and which remain even after the seed is mature.

Veratrum wishes winged creatures to help in her fertilization. It covers the lower part of the flower stalk and sometimes the base of the flowers themselves with a white matted wool, in which any crawling insects would soon become entangled. Being polygamous, only the blossoms in which there are pistils—whether a perfect or a pistillate flower—form capsules. With such a dense florescence, *Vera-*

trum has hundreds of seed-cases. As she holds the dry capsules aloft, the wind rushes sibilantly through them. If you lie still near a clump of Veratrum in September, you can hear all sorts of conversations in most expressive accents.

It is said that the leaves and root of Veratrum are poisonous to stock. Of the root, I have no knowledge; but I do know from personal observation during many summers in the Sierras that cattle eat the leaves and flowers and show no evidence of illness. Certain insects relish the chlorophyl, the green tissue, of the leaves. One morning you will admire a magnificent group of Veratrum, glossy green leaves and beautiful creamy spire. The next, the leaves will be blanched, with a thin tissue over their veins, looking a skeleton under a veil. Who does the mischief? I do not know; but the work is swift and deadly.

Because of the similarity in the green base leaves, some people mistake Veratrum for Skunk Cabbage; but that is quite a different plant, with yellow flowers and it does not seek the Sierras. The name often applied to Veratrum, "False Hellebore," always makes me impatient. I have never understood why any plant should be dubbed "false." Even if it resembles some older species, it must have enough individuality to deserve a name of its very own. In human nomenclature, we may call the

son William, after the father, but we do not label the helpless infant "false," because of the relationship. Now, it is we humans who bestow the name on the plant, and why should we, even if we recognize a resemblance, give the same title with this ignominious epithet prefixed? California has quite a number of plants so ticketed—False Alum-Root, False Indigo, False Lupine, False Lady's Slipper, False Mallow, False Pimpernel, False Solomon's Seal. Any one of these could much better wear an individual title. "False Hellebore" is especially absurd. In ancient times, a genus of the Buttercup Family was named "Hellebore," and it has borne that name down through the centuries, and is still thriving under it. A familiar example of it is the Christmas Rose. Some time in the past, people began calling *Veratrum*, which is a true lily, with no resemblance to the Buttercup Family, "False Hellebore." There is no reason given for this title, but I suspect it is because of the medicinal uses of the two roots. The *Veratrum* is not now used as commonly as it was, but *veratria* is still extracted from it and used as an external application in obstinate cases of rheumatism and neuralgia. *Veratrum* refers to the roots, "truly black," and *californicum* shows that it is a native of our State.

CHAPTER VI.

SOME SPECIALIZING FLOWERS.

A number of our plants seem to have discarded the idea of one blossom doing all the work of seed-making. They have advanced to the stage of specialization and have their stamens in one flower and their pistils in another. Most of our trees do this. Sometimes the stamens and the pistils are on the same individual plant, as in the Pine, and they are termed "monoecious," from the Greek, "of one household." Sometimes the staminate blossoms are on one plant, and the pistillate on another, as in the Willow, and these are called "dioecious," or "in two households."

A lovely example of the dioecious is the *Garrya elliptica*, commonly called the Silk-Tassel Tree. The common name describes the flower chains. Little bracts, silk-covered, form cups in which are grouped several flowers. There are no corollas on either staminate or pistillate form, but both have calyxes. There are four stamens in each little flower, and because the pollen must get to another tree to reach the waiting stigmas, a great quantity



GARRYA

Photographed by A. J. Soares

is produced. You will notice that monoecious and dioecious plants are profligate in their discharge of pollen. You have been under the Willow's golden shower or trod in the sulphur bank under the Pine. As they must depend upon the agency of variant zephyrs, they must be prepared to waste much to accomplish little.

Garrya is called after an official of the Hudson Bay Company who observed the plant in the North. The city of Winnipeg, in Manitoba, was originally Fort Garry after the same explorer and only assumed its present title in 1873. *Elliptica* comes from the shape of the leaves. A sister is the *Garrya fremontii*, named for our American explorer, and commonly called the quinine-bush. The Fortyniners used a tea of this shrub as a substitute for quinine in fighting the malaria of the early mining districts.

In these suggestions for observation of our flora, we have been considering the plant in its individual development only, and not in its relations with the rest of the world; but in your daily life you have learned that nothing in the world exists by itself. As trees have certain habits that react upon the welfare of mankind, it is well that we pay attention to these. Every person, whether man or woman, boy or girl, has some influence on his associates; and the tree, too, though never having the unselfish impulses

that guide the higher man, is a power in its own vicinity and always an influence for good.

Just consider how the tree helps a hill in rainy weather. You have noticed places where the rain has pelted down on the slope, loosened the surface soil and carried it off to the streams, leaving exposed the rocky skeleton of the hillside. You remember that this tragedy occurred in the unprotected stretches and not where the trees stood guard over the ground. You have seen the roots of some up-turned tree, and know how many little, fine, hairy ones there are. The duty of these hairs is to drink up moisture for the tree's food; but, in doing this, they hold together the loose particles of soil. Just try to shake the soil from the finer roots, and you will find that the hairs have so close a hold on the particles that they break off with them. If you have observed closely, you have seen that the little drinkers occur on the outside of the spreading rootlets, just beneath the circumference of the leafy branches. If you will study how the roots of a small plant grow, you will find out why they are so distributed.

Sometimes you have sought shelter under a tree in a shower, because you have observed that the tree has a habit of shedding the rain, not directly under it, but at its circumference. The drip falls down to the waiting little mouths of the outside rootlets,

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and is carried into the tree. Some of it dodges in between the loose soil and trickles around until it finds some stream, either over or under ground; but it never tears away, tumultuously carrying off soil, as does that enthusiastic raindrop that has just fallen direct from the clouds.

If there are no trees to hold the earth together, and to keep the water in check, a heavy rainfall is likely to do damage in two ways. First, as already mentioned, by washing away the soil before it reaches the streams; and, second, by raising the creeks and rivers so that they overflow their banks and injure the lower valleys. In the countries around the Mediterranean, they have been cutting the trees off their mountains for many generations. In the middle of the last century, they discovered that the destructive floods in Southern France, Spain and Italy were due to there being no trees left at the sources of the rivers. In France, they began to plant new forests, and in fifteen years there was a marked difference in the frequency and the destructiveness of the floods.

Trees prevent floods by keeping the water from flowing off on the surface, and by turning its course so that it seeks subterranean channels. These underground streams usually find the surface later in the form of springs. The reason the scientists of Europe turned their attention to the forest problem was not

because of the floods, but because the springs of Spain, France, Italy and Turkey, that had been perennial for ages, were drying up, and the people were clamoring for their water supply. The different Governments became interested in the subject, and made provision for studying the effects of forests on climate and industries in their countries. Now, most of the European nations have forest academies where men go to study all the questions relating to forestry and to man's relation to it. They have, too, certain governmental regulations for the cutting of trees, so that no slope that commands the water supply of a region shall be denuded. Old trees can be felled only when young ones are ready to take their places. This pertains to private ownership. Just because a man holds deed to an acreage gives him no privilege to cut trees to the detriment of the public good.

In the United States, we are only beginning to consider the question. Here in California we are slaughtering the trees in such a ruthless way that the foresters of France, Italy, Sweden, Germany and Russia all hold up their hands in horror at our ignorance. In our Forest Reserves, there are rules for scientific lumbering on the public lands, but at present there is no law to limit the cutting on private holdings. John Smith today has the legal right to fell every standing tree on his possession, no mat-

ter if he devastate a mountain side and rob the future generations of food. His moral right lies with his own conscience. California has so small a rainfall that we need to be more careful of our forests than do Oregon, Washington, or our Atlantic sisters.

Trees really conduce to a greater rainfall. Their millions of cool leaves, elevated above the earth, form a condensing influence of the moisture in the air. You can see how they work if you hold a cold cover over a steaming pot and turn the floating steam into drops of water. The trees themselves send out some moisture into the atmosphere. Have you ever breathed on a looking-glass and seen the moisture that came from your lungs? Well, the leaves of a tree are its lungs, and these billions of lungs are breathing out moisture all the time. If you wish to prove it, place a dry glass over a growing plant, or take a leafy twig and place it through a card, with its stem in a glass of water, and its leaves above the card enclosed by a dry glass. Put it in the sunshine, or even in the light, and see what will happen in an hour's time.

This habit of the trees keeps the atmosphere near them moderately cool in the heat of the day. However, they do not always lower the temperature, for at night, when the earth is giving out the heat it gained from the sun during the day, the tree foli-

age forms a good blanket and shuts some of the warmth in near the ground. As a result, a forest region is never so hot nor so cold as a barren district near by. This is noticeable in canyons a half mile apart in the Tahoe Reserve. The valley of one stream lately denuded of its timber is filled at night with a cold fog which hangs low until the sun is high next day. An adjacent canyon, with its primeval forest untouched, is always free from this chilly dampness.

When the ground is well soaked with rain, you know that the part which gets dry and hard first is that exposed to the sun, and not that shaded by the trees. Have you noticed that each leaf on the tree is so arranged as to secure the greatest exposure to the sunshine? This endeavor to get light produces the different shaped leaves we find on the different kinds of plants. The result is that, while the leaves do not interfere much with each other's sunlight, they do make greater shade over the ground. This prevention of evaporation and the consequent storage of moisture in the soil makes it possible for many delicate plants to grow under trees months after their sisters who chose the glade have perished. You have learned this from observation. In summer you always seek ferns in woodsy spots. Have you given the trees a thought of gratitude for their service?

In many places, it would not be possible for smaller plants to exist if the hardier trees had not for centuries been inserting their roots into rocks, forcing them apart so that by wind and weather they are ground into particles. Then, the leaves off the tree, cast aside when their work is done, mix with these particles, and finally make a soil in which their weaker sisters can hold a footing. In this way, our Sierran peaks have been converted from bare, stony masses into smiling flower beds.

In return for the benefits the trees confer upon mankind, we treat them very scurvily. Lumbering is their greatest enemy, against which they can form no defensive habits. To lumbering, under scientific methods, there can be no objection. Civilization demands buildings and furniture; but it is to the deforesting of a district and the useless destruction of a species that the tree-lovers are opposed. In general, only mature trees should be cut, leaving enough standing not to interfere with the water supply. In the cutting, clear room should be left, so that the young trees will have plenty of space in which to tower. When it comes to a unique species like the *Sequoia gigantea*, what better tribute to our own sense than to let them stand unharmed for future generations to enjoy? Their wood is so soft it does not make durable lumber; and, as grapevine supports are not now supposed to be so necessary,

it may be that the Sequoia remaining will have a better chance for life.

The waste from lumbering, the dead limbs, the bark, etc., is responsible for two evils to trees. By covering the fertile earth, it prevents young trees from growing there; and, even worse, it forms a combustible mass to encourage a spreading fire. Forest fires are second only to lumbering in their enmity to trees. A cigarette or a campfire left smoldering is sufficient to set a mountain ablaze. In the high Sierras, where the soil has been made by the Pines and the Junipers toiling for ages, the fire will creep along the underground needles, with not the slightest evidence on the surface. Suddenly, at a distance, it will burst forth with a vehemence that will destroy a whole ancient forest. One can not be too careful to build his campfire on a rocky foundation and to be sure it is extinguished before he leaves. Just pouring a few coffee-pots of water on a fire built on Sierran soil will not kill it, as it will a fire on Coast ground. The deceitful thing is laughing at you under the surface and creeping from needle to needle. The United States Government has a heavy fine for campers who do not put out their fires; and to make the State more safe, in 1921, the Federal Government located public camps from the North to the South, through our chain of Parks and Forest Reserves, where fireplaces are

built for the convenience of the one who wishes to live outdoors. There is no longer the excuse of ignorance for burning up 40,000 acres by an abandoned campfire, as was done last summer.

Of domestic animals, the sheep and the goat are the most destructive to trees. They eat the young ones closer to the ground than do cattle, and give them less chance to recuperate. Then, their sharp hoofs sink in the soil and cut them to pieces. Because of the necessity to increase our food supply in the early years of the war, sheep were permitted in the grazing areas in the Forest Reserves where they never before had been allowed. In four years, they have changed the flora of the hillslopes. No plant has a chance in their pasturage, and whole species are dying out. There is a high demand in the market for these mountain-fed lambs, but it seems to me we are paying too high a price for the delicacy with the extinction of some of our rarest flowers. Of course, with no verdure on the slopes, the earth will be washed away soon, and only bare rocks remain, and then there will be no pasturage to encourage the entrance of the sheep bands. Then, bountiful Nature will again play a free hand, and by toiling for years, build up a new soil and again secure plant life. Will the same species we have been enjoying again flourish on those Sierran slopes, or will their places be usurped by those hardier

immigrants who have already transported their seeds in the wool of the sheep?

If every child in every American school was taught to memorize and recite and understand Joyce Kilmer's poem, "Trees," perhaps the next generation would be wiser than we. Perhaps, then, the forests of our country would stand as eternal monuments to the spirit of Joyce Kilmer and those other thousands of brave Americans who lost their mortal lives on the battlefields of France that the soul of humanity might be forever free. Every American who cares for the future of our Nation should know this poem. I quote here only the first, third and final verses:

"I think that I shall never see
A poem lovely as a tree.

• • • • •
"A tree that looks at God all day,
And lifts her leafy arms to pray;

• • • • •
"Poems are made by fools like me,
But only God can make a tree."

—Joyce Kilmer, 1886.

CHAPTER VII.

SOME PLANTS WITH HEALING QUALITIES.

If there be one life more than another that renders a man independent of a physician, it is camping out. The open air, the simple food, the recuperative slumber restore tired nerves and stimulate all parts of the body to normal activity. Yet, even in these ideal conditions, sickness sometimes intrudes, and an acquaintance with Nature's remedies may save an outing trip from an abrupt ending. Mother Earth seems to have intended the rovers of the Western woods to be their own doctors, for at every hand, whether at sea sands or in Sierran stretches, she offers him a cure for every ill.

Many people who camp in the lower altitudes of California have their vacation spoiled by the ubiquitous poison-oak, even though hitherto they had never succumbed to its attacks. Now, near this same insidious poison, wherever it grows in the State, Nature has planted an antidote.

The best is *Rhamnus californica*, known as "coffee-berry," "pigeon-berry," or "yellow-root," in different localities. It is a shrub from four to eighteen feet high, with long leathery leaves and

small greenish-white flowers. The fruit is black and globular, and contains two or three seeds similar to the coffee bean. A wash made by steeping leaves and twigs is a preventive for poison-oak and also a cure. If the poison be severe, it is wise to take a dose of the tea internally at the same time one is making the external application. The virtues of this plant were well known to the Indians, who pointed them out to the Spanish padres. These found it so efficacious that they bestowed on it the name it still bears in commerce, *Cascara sagrada*, or sacred bark. *Rhamnus* is the ancient Greek name for the genus. Another species, also a native shrub, is *Rhamnus purshiana*, named for a Russian botanist. The genus is considered one of the most valuable laxatives known in the medicinal world to-day, and each year tons of the bark and twigs are exported from the State to the pharmaceutical laboratories of the East.

Two other California plants form with *Rhamnus* the three most important additions to the world's pharmacopoeia during the last century. These are the Yerba Santa, or "Holy Plant," and the *Grindelia*, both known to the Indians from time immemorial. Both are effective in colds, or in any trouble of the pulmonary system, and both may save the camper much anxiety. Yerba Santa grows on dry hillsides in western California, and reaches

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from three to five feet. Its leaves are long, narrow, stiff, leathery and sticky; they are edged with rigid teeth, and are covered underneath with a fine wool, through which the prominent veins protrude. As



YERBA SANTA

if all these precautions were not enough to repel animals, Yerba Santa makes her leaves bitterly aromatic. The corollas are funnel-shaped and vary in color from white to violet. The leaves are said to be a good substitute for tobacco, either for smoking or for chewing. For exporting to the druggists, the whole plant is cut, stalks and all. The botanical name of Yerba Santa is

Eriodictyon, from the Greek, referring to the wool and the netted veins of the leaves. The species shown here, *californicum*, is not so wooly as its sisters.

The Grindelia is sometimes called the Gum Plant, the Resin Weed, or the August Flower. It grows from two to four feet high, and its bright yellow flowers, which appear in summer, are similar



GRINDELIA Photographed by A. J. Soares

to those of the Sunflower. Its floral head acts just as that of Seaside Daisy does in attracting insects and in dispersing its seeds; but because it blooms in the open in the hottest season of the year, it has to take precautions of which Daisy has no need. If its buds were left exposed to the full glare of the sun, they would be burned dry before they could open. To ward against this, *Grindelia* covers each bud with a thick milky gum. In this gum are the healing qualities which have won *Grindelia* such esteem from mankind. Each summer about five or six inches of the top twigs are cut off and are shipped by tons to the East. Later it is sent back to us in the form of a medicine called *Grindelia*, which is prescribed to soothe whooping cough, bronchitis, asthma, and kindred complaints. It is also efficient, taken internally and applied externally, in banishing poison-oak. *Grindelia* is named for Hieronymus Grindel, a Russian botanist, who was a professor at both Riga and Dorpat. *Robusta*, the species, is so called because of its strength.

Even more common than Coffee Berry, Yerba Santa, or *Grindelia*, is Manzanita. It is a great blessing to the valley dweller who ascends to higher altitudes. Rarely a summer passes that a light scourge of dysentery does not attack Sierra camps, chiefly due to an overindulgence in mountain water. A tea of Manzanita will cure every case. Indeed,



MANZANITA Photographed by A. J. Soares

it has been effective when a physician's medicines have proved powerless. Manzanita is also used in compounding medicines to cure catarrh of the throat and stomach. Manzanita belongs to the beautiful Heath Family, and her little pink and white chimneys are well planned for securing aid in her seed-making. Her seeds have given her both the common and the scientific names. "Manzanita" is the Spanish for "little apple," and *Arctostaphylos* is the Greek for "bear grapes," because the animals love the fruit. This species is called *nummularia* because its leaves are shining with a glitter similar to the shine of a coin.

Another of our medicinal plants that still bears its Spanish name is Yerba Buena. The Indians used tea of it to allay fever and indigestion. They called it to the notice of the Franciscan Fathers, who, recognizing its worth, named it Yerba Buena, "the good herb." It makes a palatable beverage by pouring water over it and draining at once. A stronger decoction is needed for medicine. Aside from its dainty, graceful lines and its refreshing fragrance, Yerba Buena is interesting to observe as an individual. Notice how it sends down new roots wherever its stems touch the ground. Run your finger along its stem and feel the four corners, proving its membership in that well-known healing tribe, the Mints. Yerba Buena is *Micromeria Douglasii* in botany,

Micromeria being for its small flowers. *Douglasii* is for David Douglas, a Scotch botanist, who entered Washington and Oregon in 1825, and reached California in 1830. He remained here collecting until 1832, gathering over five hundred species. A few years after, he lost his life in the Sandwich Islands, now Hawaii.

Yerba Buena was the first name of that part of San Francisco now the business section. The Presidio on the Golden Gate was Presidio de San Francisco d'Asis; the Mission in the warm belt was the Mission de San Francisco d'Asis; but the early settlement in the cove on the east was called Yerba Buena because of the delicate vine covering its slopes. Yerba Buena it remained until after the American Occupation. Its change of title was due to an inspiration which gave a vision of the future of our city.

The first American Alcalde of San Francisco, Lieutenant Washington A. Bartlett, heard rumors that Mariano G. Vallejo and Robert Semple had contracted together to start a town on the Straits of Carquinez which would be a rival of Yerba Buena and that they had named it Francisca after General Vallejo's wife. Alcalde Bartlett realized that any town on the Bay of San Francisco bearing the name similar to it would attract more attention from the

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outside world than would one whose title was Yerba Buena. When Vallejo and Semple brought their contract to be recorded, as, according to Spanish law, a contract to be legal had to be recorded in the office of the nearest Alcalde, Bartlett informed them that he had just issued a proclamation on January 30, 1847, changing the name of the town of Yerba Buena to San Francisco, and he advised them to change the name of their town to something less confusing. They fussed and stormed. Each side drew adherents. Even the wise Thomas Larkin joined his friends Vallejo and Semple, and declared that, as it was known ahead that the name of their town was to be Francisca, the fact that it was not legally recorded before January 30 should not rob them of the title. The editor of the one newspaper in the territory refused to recognize the change, and for several weeks still headed his sheet, "Yerba Buena." Under Spanish law, and it still reigned in California in 1847, the decree of the Alcalde was final. So our city gained the name of its Bay and of the Patron Saint whose sons had introduced civilization into the West, and Francisca, the dreamed-of metropolis on the Straits of Carquinez, took another name from the baptismal list of Señora Vallejo, and has come down to us today as the town of Benicia. But Yerba Buena is not banished from our geographies. It still is the legal title of the

island east of San Francisco whereon is situated the United States Naval Training Station.

Another member of the Mint Family that helps allay physical woes and that is named for a noted botanist is our Penny Royal, or *Monardella*. Its species are scattered broadly over the State. One, the *odoratissima*, refreshes many a hot Sierran trail with its aroma. If its branches be hung around one's neck and under the hatband, the voracious mosquitoes, which linger for three weeks in the locality of each melted snowbank, will be put to flight. A weak tea of Penny Royal is a good substitute for the article of commerce, and a stronger solution is good for colic or as a general blood purifier.

Monardella is after Nicolas Monardes, a Spanish botanist, who was born in 1512, and who wrote many tracts on the medicinal and other useful plants, es-



PENNY ROYAL

pecially those of the New World. Living just after Columbus, in that adventurous era when

Spain was dazzling Europe with the results of her seeking a passage to the Spice Islands by crossing the Atlantic, Monardes always mentioned what we know as the Western Hemisphere as "The Indies." He was the first scientist to write descriptions of these newly discovered plants of the Indies, and his works created much interest in all the civilized countries. By 1579, they had been translated into Italian, French and English, in the order mentioned. The horse mints were first named in his honor, *Monarda*. When, later, new species of Penny Royal were found in America, their genus was called *Monardella*, or little *Monarda*. I am particularly glad that we have among our native plants one that keeps forever green the name of the most illustrious botanist of the sixteenth century.

Lanceolata, the species pictured, is named for its leaves. It grows in the Coast regions, and was well known by the Spanish Californians under the name of *Poleo*, which is Spanish for Penny Royal. Our English common name does not mean a royal remedy at a low price, as imagination might lead us to believe; but it is derived from the Latin through the French, and means a royal remedy against fleas. This virtue in the herb is what makes the mosquitoes dislike it so.

There is no excuse for a camper suffering any common disease to want a remedy. If he have

colds, Nature offers him, in addition to the plants already mentioned, the choice of a tea of fragrant elderberry blossoms; a decoction of horehound, which, by the way, is only an immigrant in our State; a tincture of sunflower, which is also adopted as an official drug for asthma, throat diseases and influenza; or an extract of wild peony, which will also allay dyspepsia.

If he be the victim of catarrh, he can lie on a pillow of the common everlasting; make a tea from the covering of the root of the mountain birch; or, if he be south of Santa Barbara, use a snuff of dried wooly blue curls. This flower was called *romero*, or rosemary, by the Spanish Californians, and by that name it is used in formal medicine. Fried in oil, it was used as an ointment for ulcers, and it is a valuable liniment for all muscular troubles.

If he succumbs to fever, he can make a tea of the button bush, which is also a good laxative, a tonic, and a cough cure; or a tea of the blue-eyed grass, which will sustain a patient several days without other food; or an infusion of bedstraw, whose name was earned by one of the species filling the Manger at Bethlehem.

If he suffers from rheumatism, there is the dogbane, the root of the skunk cabbage, which is also made into a salve for ringworm and white swelling; the white-veined shin leaf, whose name is borrowed

from England, where the peasants use a species for plasters for bruises and sores; or the clematis.

One often gets cut when leading the open life, but there need be no fear of infection if Nature's effi-



CLEMATIS

cient antiseptic, *Clematis ligusticifolia*, is at hand. This plant has evolved its leaf stems into an admirable climbing apparatus, by means of which its blossoms are flung out over bushes and trees, sometimes up to thirty feet. It needs its flowers in full free air, for it is like the *Garryi*, with staminate flowers on one plant and pistillate on a n o t h e r .

Depending largely upon the wind to carry its pollen, it does not pay overdue attention to its floral envelope. It has no corolla at all, but its sepals are petaloid, a rich cream color. When the seeds are fertilized, each pistil develops a long silky tail, which is really more conspicuous than the blossom. These tails twist together, and the soft balls sail off blithesomely to new homes.

The Spanish Californians valued this plant, call-

ing it "*Yerba de Chibato.*" Literally, this is "the herb of the young kid," but liberally translated, it becomes "the herb of the shepherd or goatsherd," as these custodians of flocks made a wash of it with which they cleansed and cured their animals' wounds. It is excellent for a cut from barbed wire. *Clematis* is from the Greek, meaning long, lithe branches," and *ligusticifolia* is practically the same from the Latin, the "leaves tying themselves tightly." Another species, the *lasiantha*, has larger flowers, and its leaves are covered with a soft silk.

After dwelling on the remedies Nature provides, it may be as well to mention some of the plants one should avoid tasting. The two daturas, the large-flowered white one and the common jimson weed, are both poisonous. Both have a maddening effect on those who eat them. The former was used by the Indians to stimulate their warriors before entering battle, and it was fed to children to produce a trance in which they could predict the future. The bulb of the zygadene has earned its title of "death camaso"; the larkspur and the holly-leaved cherry are both poisonous to sheep and cattle; the beautiful azalea hides death in flower, leaves and root; the white nightshade is equally vicious; the largest flowered phacelia poisons many persons by the mere gathering; the monkshood, or aconite, is disastrous to animals; and the euphorbia poisons when brought

into contact with wounds, and it affects the eyes if held near them.

However, the helpful plants far exceed the poisonous ones, both in number of species and in frequency of individuals. Having acquired the habit of observation, the camper can wander to the utmost wilds of the State feeling as secure from sickness as if accompanied by his private physician.

While the habits of wild plants are the results of centuries of adaptation to environment and are formed quite independent of any human influence, their titles and their transportations and their uses are interwoven with the history of man. If you dip into the study of our native flora, you are piling up great pleasures for your future. You not only gain new physical strength in following them to their homes and new mental agility in observing their variations; but through the names of even the commonest species, you step into the realms of mythology and adventure and romance.

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