

*Journal of the*  
INTERNATIONAL  
GARDEN CLUB

VOL. III

DECEMBER, 1919

No. 4

*Pacific Coast Lilies and their  
Culture*

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IN an article in the June number of the JOURNAL I gave some notes on general conditions on this coast as bearing on acclimatization of plants in the Eastern United States. In this number I treat the Western Liliiums in detail.

Some species of the Western Lilies and notably *L. Pardalinum*, *L. Washingtonianum* type and *L. Humboldtii* were sent to the Eastern United States and to Europe at an early date and for the last thirty years good collected bulbs of nearly all of the species are available for culture. In Europe and especially in England they have been well tried out and many of them quite as successfully as the generality of world Liliiums.

It is difficult to generalize on lily culture. Each species has some individuality as to likes and dislikes and some are very decidedly difficult until the exact equation is discovered. Then there are matters never explained, as for instance why the common Madonna Lily luxuriates in English cottage gardens yet is often the despair of the highest trained gardeners. I



feel that no matter how skilled the grower or easy the species there is an element of experiment in the culture of all lilies and that the lily grower always has something new to learn. But against an element of uncertainty as to lilies in general rests the comforting fact that nearly every grower can succeed with a number of fine species.

At the Lily Conference held in London July 1901, a paper on "Western American Lilies" written by the writer was read. Lately Mr. A. Grove, an Englishman, has written a valuable monograph on the world's lilies which is the latest authority. As Mr. Grove's data on Western Lilies was, I think, entirely secured through coöperation with the writer I take it that, unless perhaps in nomenclature, our conclusions vary but little.

All of the Western American Lilies would fall under Baker's *Eulirion* or funnel shaped flowers, or Martagon with the segments revolute, but for the purposes of this article I shall disregard this division and group them as to their affinities in bulb and habitat. This because the article is designed rather to give data on culture than as a key to species.

I will therefore divide them into three groups.

GROUP I. *Lilium Humboldtii* typifies these. They have ovoid or ovate bulbs composed of long closely overlapping scales not usually jointed. The flowers are of the Revolute type.

GROUP II. Lilies with ovate or ovoid bulbs of long overlapping scales not usually jointed and with funnel-form flowers excepting *Kellogii* in which they are revolute.

GROUP III. Lilies with rhizomatous running bulbs having a central core densely covered with small overlapping scales which are nearly always jointed. The flowers may be revolute, broadly, or narrowly funnel form. *Lilium Pardalinum*, *L. Parryii*, *L. parvum*, and *L. maritimum* respectively typify these which for convenience will be treated separately, with some notes on related forms. All of these are usually called *Bog Lilies*. All of them are found within the boundaries of the great state of California. Seven of them extend into Southern Oregon and three throughout Western Oregon, while but one crossed the Columbia River and extend to British Columbia.



One only is certainly found in Arizona and possibly New Mexico while one possibly grows in Lower California. Neither the first nor the second group have any close affinities either east of the Rocky Mountains in America or in the Old World. Mr. Burbank was unable to cross any of them with Old World lilies in a cross which showed any signs of interbreeding. All of them can be and have been intercrossed.

The third group has in *Lilium superbum* a near relative of *L. Pardalinum* and in *L. canadense* a first cousin of *L. parvum*.

## GROUP I

### L. HUMBOLDTII

The bulbs are large, often measuring 8 inches in circumference and not infrequently up to 15 inches, are nearly ovate and very compact and of thick unjointed scales. They are very easily handled either dry or in barely moist packing.

The stems are very stout and self supporting and rather rough as is the foliage. The larger portion of the leaves are disposed in many whorls, while the large flowers are from six or eight in small plants, to twenty to thirty very commonly, and up to eighty in exceptionally fine specimens. As the lower pedicels are quite long and as they reduce as they ascend the inflorescence of a fine plant is almost a perfect pyramid. The perianth is 3 to 4 inches long and closely revolute, nodding, and of a rich orange color. Many claret colored dots are on the central portion. In size of flowers it averages about as in *L. speciosum*.

It is found only in the Sierra Nevada range of Central California and usually at an altitude of from 2500 to 4000 feet. There is an exception however in a large colony on the Sacramento River at little over 300 feet above sea level. It is a woodland lily found associated with Yellow Pine (*P. ponderosa*) and deciduous oaks, but is more likely to be found in an open forest where the trees are scattered in a park-like manner. There it is not confined to any exposure but is scattered widely and usually in a rather clayey soil. Still I have seen it in an



alluvial deposit in open canyons and on the Sacramento River it is in a sticky black clay (adobe).

It might well be supposed that it is strictly a woodland lily and it is so naturally, but where, as often occurs, the land is cleared and orchards or grain fields succeed the forests, this lily can be seen larger and finer than is the rule in woodlands and the bulbs are wonderfully fine. Undoubtedly the cultivation tends to keep the moisture up. But on the other hand the California summer in that region is very hot and the sun baking very severe.

I think that without question its natural distribution in woodlands is only due to the fact that its seeds need the moisture nearer the surface and the protection, but that when they are once well started it is immaterial. A year ago I saw hundreds in a vineyard flowering finely among the grapes.

To diverge a little from the subject, I think that practically all lilies which flower freely the first season after planting have a liberal supply of roots above the bulbs, and that the best forcing lilies are those in which this tendency is most marked. These upper roots feed the flowering stem but do little to develop the bulb. The basal roots which are the mainstay of the plant are much slower in developing and we often find this conspicuous in *Lilium auratum*. We have a glorious bloom the first year with heavy roots above the bulb, but in the fall we find that the bulb has decreased in size or even disappeared altogether. It is easy to flower *Lilium auratum* well, hard to establish it.

*Lilium Humboldtii* has no roots above the bulb and is a little slow in forming roots at the base, and so the grower need look for no flowers the first year or even find that the bulb lies dormant with no stem at all. But when once established it is a strong grower and very persistent. I am sure that wild bulbs are often twenty or thirty years old and I would not doubt a century.

In California the decay of the old scales proceeds very slowly, each year a scar is left by the growing stem and I have often counted fifteen or twenty scars, each recording a year of lily





LILIUM HUMBOLDTII  
MAGNIFICUM



life, while even then a mass of leaf mold shows where still older growth preceded the earliest of these scars.

In cultivation at The Terraces I find *L. Humboldtii* most easy and this whether in a reddish soil rather clayey, in gravelly soil rich with humus, in silty soil with much lime, or in an alluvium. Elsewhere it takes well to heavy clays. I cannot see but that in any of the aforementioned soils it does as well as in its native home.

#### LILIUM HUMBOLDTII MAGNIFICUM

A large strong growing lily with stem and foliage much like the type. The foliage is rather darker and smoother. In form, size of flower and manner of inflorescence it is also similar, but in color very different. The basic color is rich orange but there are many purple-maroon dots each encircled with crimson, and often almost covering the entire orange base. It is a most striking coloration.

In bulb the two are quite dissimilar. *Magnificum* has an ovoid or elongated bulb of thick scales some of which are always jointed and often several jointed. With slight exposure the bulb colors a deep purple.

Also most distinct is the fact that a very liberal supply of roots are formed above the bulb, that even small bulbs flower and that any fair bulb is sure to give a good bloom the first year as well as to root well at the base for permanent establishment. This makes this variety a most excellent garden lily. I know of few better.

A native of Southern California, it is found in the range facing the ocean beginning at Santa Barbara and on down to Los Angeles and in the mountains east of that city. Within this region its distribution is only in the canyons and a hundred feet or so from the bottom. This is due without doubt to the need of its upper root system for surface moisture, which in that rather arid region would not be found elsewhere.

It is often very deep seated. In some of the Southern Californian mountains there are peculiar canyons with flat bottoms





LILIUM HUMBOLDTII  
MAGNIFICUM



from 50 to 100 feet wide built up of round boulders and alluvial soil. In these bottoms I saw this lily as much as 12 feet high with unbelievably heavy stems.

Robert Kessler saw a wild specimen about 12 feet high and had 85 flowers. At Sierra Madre in the valley east of Los Angeles a garden specimen was seen two years ago that produced two stems with 100 flowers and last year three stems and 85 flowers. The first year the stems were 11 feet high and last year 8 feet.

Some of the bulbs were fully 3 feet down and many 2 feet. I take it however that this was rather from debris being washed over established bulbs than through the bulbs seeking that level, but it demonstrates that lilies can be planted very deep if the soil is sweet and well drained.

Early botanical writers described a *Lilium Humboldtii ocellatum* and their figures and descriptions cover both this lily and the next. For garden use however I prefer the name given above as it is now well established.

#### LILIUM HUMBOLDTII BLOOMERIANUM OR LILIUM BLOOMERIANUM

This lily is exactly like the preceding excepting that it is a minor form. It is a handsome slender lily growing from  $2\frac{1}{2}$  to 4 feet in height with from a few to twenty fine flowers colored as in *magnificum*.

Its bulbs are conspicuously jointed with two or three joints which easily detach so that unless handled very carefully the bulb becomes truncated. It is easily grown and a sure, free bloomer.

In the two southern counties of California adjoining the line of Lower California striking, separate short mountain ranges rise from a comparatively low country and to quite a height. I have not the data at hand but I think as high as 10,000 feet. While very arid at their base the upper reaches are clothed with beautiful forests of pine and deciduous trees and it is here that *Lilium Humboldtii Bloomerianum* finds its home.



## LILIUM COLUMBIANUM

This beautiful lily has a small bulb seldom weighing over an ounce and composed like that of *Humboldtii* of closely appressed lanceolate scales which are not jointed. Its foliage is a light pleasing green, smooth and mostly in whorls, the few to perhaps a dozen flowers are a light orange perhaps well described as golden, with some small dottings. The segments are closely revolute. It is hardy, graceful and adaptable—a nice lily to do with.

Its extremely wide and varied habitat well demonstrates its adaptability. In California it first occurs close to the ocean near Humboldt Bay well to the northwest corner of the state. There it is in sandy soils on raised ocean beaches and in the open among scattered shrubs. The ocean is near at hand and the climate is very rainy in winter and foggy in summer. A little further north in Southern Oregon it is scattered through open woodland in the moister reaches. In the Willamette Valley, the great Valley of Oregon, in the Puget Sound region and north in coastal British Columbia it is very widely distributed in open woodlands and usually associated with the Brake ferns. I have seen it among ferns 5 or 6 feet high only slightly overtopping them. Throughout these regions the soil varies greatly, now rather clayey, then decidedly sandy, but always with an abundance of leaf mold at the surface. East of the great Cascade range in northeast Oregon and on up into British Columbia it is widely scattered as a woodland lily associated with ferns. In this region it meets a decided winter not far from that of New York in cold, but drier.

I find no difficulty with its cultivation in any type of garden loam, while it is happy in a sandy loam. The bulbs are very easily handled but being small there is much danger of their losing vitality by being handled too dry. I think it better to keep in barely moist peat from the first until planted.



## LILIUM BOLANDERII

This is quite different from the other lilies of this group and indeed from all other lilies. The bulbs are like those of *L. Columbianum* but composed of fewer and thicker scales. They are small. The leaves are smooth, the foliage rather dark and the few flowers half erect, funnel-formed with spreading tips and of a peculiar red rather approaching a brick red. The inner base is faintly dotted and the lily at large rather suggests a *Fritillaria*.

It is one of the most local of Lilies, and is found only near the border of California and Oregon and probably a square of 20 miles would include every wild specimen. It is found mostly at an altitude of from 3000 to 5000 feet.

It was mistakenly ascribed to Humboldt County, California by Sereno Watson who named it, but that was due to the confusion of herbarium specimens with *Lilium Kelloggii*. Through this odd confusion Professor Bolander an eminent early botanist after whom it was named as its discoverer never saw it until years later.

In its native home it is either found in very open woods or associated with low growing shrubs and in a reddish mineralized soil which is rather clayey than otherwise.

In cultivation a well drained soil either clayey or gravelly meets its needs and I cannot say that it is a particularly difficult lily if—There is always an “if.”

In this case it is that it is rather difficult to handle the bulbs without overdrying unless they are collected late, say past mid October on. If then never allowed to dry but packed in moist leaf mold or peat they can be kept in good order. Overdrying is not so dangerous in a large lily bulb but in the case of a bulb an ounce or so in weight it is decidedly devitalizing.



## GROUP II

## LILIUM WASHINGTONIANUM

The typical *Lilium Washingtonianum* is a large strong-growing lily with a bulb composed of long and slender rather thin, overlapping scales and in the wild bulbs the bulb is much elongated laterally. This is not true in cultivation.

Both stem and leaves are smooth and of a pleasing light green, and the leaves are disposed in many-leaved whorls. The large funnel-formed flowers vary from a few to thirty but exceptional plants bear far more and even fifty may be found. Many years ago I visited a mountain side where thousands were from 4 to 7 feet high and had borne from twenty to thirty blossoms. If in the shade the stems tend to be slender but in the open they are often quite stout.

The petals are  $2\frac{1}{2}$  to 3 inches long and the tips merely broadly spreading—not recurved. This makes quite a large flower. The color is uniformly white in the type and there may be small purple dots at the center.

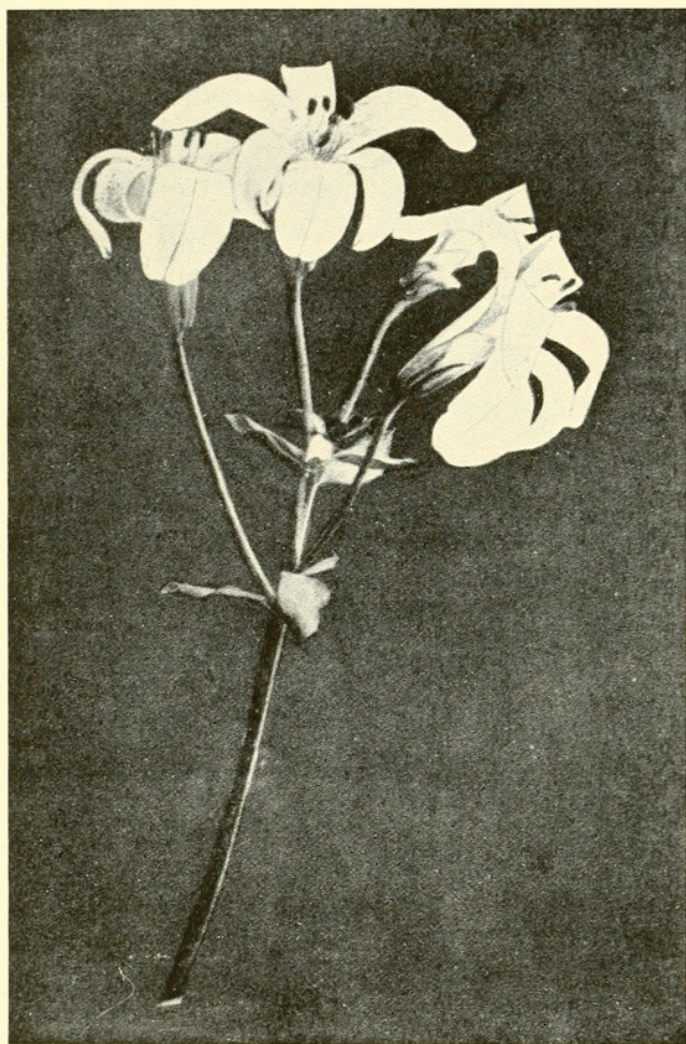
It is a gloriously lovely lily in every way but I think that its greatest charm is in the exquisite spicy fragrance unexcelled by any flower. In its flowering season it perfumes the mountain sides, yet has not the overpowering sweetness of some of the Japanese lilies.

As the traveler ascends the long westerly slope of the Sierras of Central California he finds *Lilium Washingtonianum* shortly after he leaves *Lilium Humboldtii* and from 4000 to 7000 feet altitude. It is widely distributed from the Yosemite Valley northward to where the Sierras end southeast of Mount Shasta.

Seldom really in woodlands, it is usually found in copses of shrubbery through which it grows. If the copses are burned it simply luxuriates for about three years and numbers of seedlings grow. As the shrubbery grows up it dies out excepting where the shrubbery is least dense. I have seen it wonderfully happy just below where a melting snow bank watered it in late July.



The native soils in these regions are always open and rather loose. While often of volcanic origin they are usually in appearance a sandy loam well mixed with mold. Perfect drainage is ever present.



LILIUM  
WASHINGTONIANUM

I wish that I could recommend this grand lily for general culture but after well toward forty years acquaintance with it I can point to few successes. Perhaps others will grasp the point which I have missed.

It has no roots above the bulbs and roots at the base rather slowly. While strong flowering stems are usually pushed up



the first year there is not the root system to support them and they develop poorly.

One great trouble in its culture is the strong tendency of collected bulbs to go quickly into a soft rot. While I have handled some lots of it successfully I have never found a way in which there is any assurance of doing so. The reader will note that these remarks apply only to the Sierran typical form.

#### LILIUM WASHINGTONIANUM MINOR

This handsome lily is found about the base of Mount Shasta in California and more rarely northwest for about 50 miles. It has a small compact bulb about one quarter the size of the type and bulbs weighing 4 ounces are extremely large for it.

The stems are slender and seldom over 4 feet high and a dozen flowers to the stem are to be seen in well developed plants. The segments of the flower are rather broader than in the type but in fragrance and other points it is the same. The bulb is more easily handled and grown.

In very open woods and among brushy copses it is to be found in a reddish volcanic soil. The altitude is from 3500 to 6000 feet and the winters quite severe. To Californians this is the Shasta Lily.

There is a point in the Siskiyou Range where the following lilies may be found within ten miles. *L. Columbianum*, *L. Washingtonianum minor*, *L. Washingtonianum purpureum*, *L. Bolanderii*, *L. Roezlii* and *L. Kelloggii*. I doubt if at any other point in the world as many lily species are found.

#### LILIUM WASHINGTONIANUM PURPUREUM

With a stout stem, and leaves as in the type but it is fuller foliaged, from ten to fifteen flowers, and a large rather solid bulb with heavier scales than in the type and the scales con-



spicuously jointed. While in some bulbs only a few of the scales are two or three jointed I have had lots where they were so much so that in handling them the joints would break off and leave only a truncated base consisting of the lowermost joints.

This interesting feature shows an approachment to the rhizomatous bulbs of the *Pardalinum* group. I may say in passing that these scales readily make little bulbs. In sawdust used in packing one may, the succeeding spring, find hundreds of perfect little bulbs formed by scales.

It is in the flower that it is most distinct. The segments of the perianth are shorter than in *L. Washingtonianum* and overlap in the tube to form a short funnel with broad lips. The fragrance is as with the type.

The name is to a degree a misnomer. In some localities it is locally known as the White Lily yet perhaps 90 per cent of the flowers taken at large, open either white tinted purple and soon becoming purplish wine color or open of that color.

As to soils it has wide adaptability. In clayey soils, in volcanic soils or in the good clay loams it is alike at home. Drainage it always has and moisture during its growing season.

About Klamath Lake it meets a climate not very different from New York while in places it is much milder. It is however safely hardy.

From the practical garden point of view it is perhaps notable for the fact that its bulbs are very easy to handle. With any care they are little harder to pack and ship than potatoes. As an extreme instance take this. A collector shipped a thousand to me loosely packed in a large case with only straw packing. This in the heat of a California September. Very few were in any way injured by this rough treatment.

An incident that occurred some years ago may be of interest. In the grain fields of a section of the upper Willamette Valley in Oregon, a land of hop fields too, this lily was quite widely scattered. The plowing for the grain was not deep and only occasionally did a plow cut the top of the deep seated lily bulbs. They thrived wonderfully with this culture and flowered before



the grain was cut. The bulbs were truly enormous. One measured 28 inches in circumference and weighed 4 pounds. The farmers were however so annoyed by people walking through the fields to gather the lovely flowers that the lilies were dug out by them. The same stimulation occurs at intervals where woodlands or brushy lands are brought into cultivation and always to the benefit of the lilies.

In cultivation it can hardly be said that this is a very easy lily yet I usually succeed and it is well grown in many regions in England. A well drained deep soil either gravelly, loamy or even open clay. Shelter from harsh winds, light shade where the summer heat is great, and moderate moisture are the indicated treatment. Not a lily for the careless nor a lily for any one to despair of who takes care.

#### LILIUM RUBESCENS

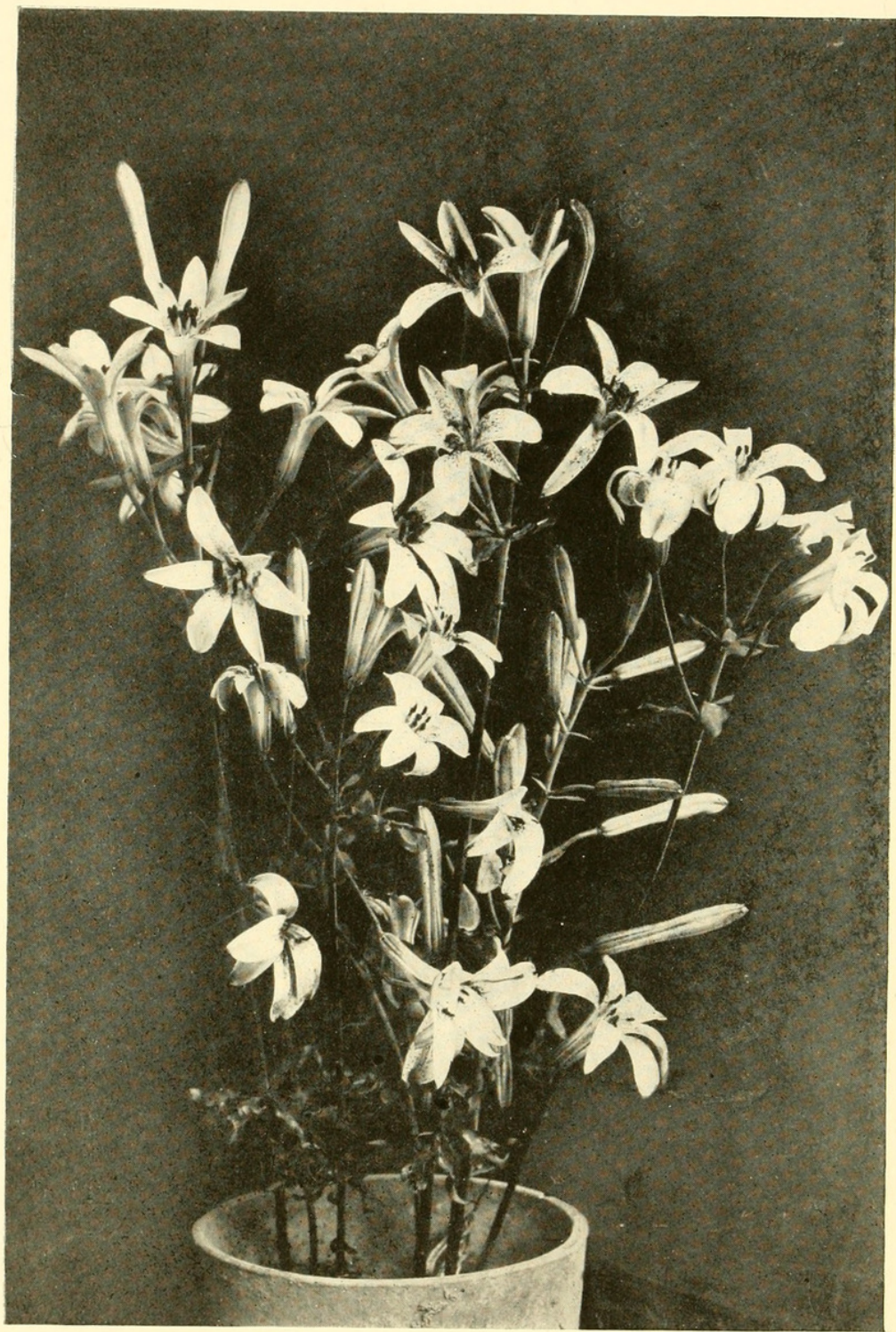
This was long confused with *Lilium Washingtonianum* and was even called *L. Washingtonianum purpureum* by some. It is very distinct.

The bulb is always solid and ovoid, the foliage similar but with more, and more perfect whorls, the flowers are narrowly tubular with recurving tips. When few they are borne in umbels while if many are in racemes. At first opening they are almost white but thickly dotted with purple. The purplish dottings quickly spread till the flower is all wine purple and on one stem may be seen all of the colorations from the opening white to purple. It is a delightful and striking lily.

Almost all notes as to the size of the lilies or the number of flowers are apt to be misleading. It is oftener a matter of soil and situation. For instance I have seen a group of *L. rubescens* 11 feet high with thirty or forty flowers while it is often seen with two or three flowers on an erect stem 2 to 3 feet high. Plants 6 to 7 feet with 20 flowers are common in nature.

Like *L. Washingtonianum* this lily has a delightful fragrance which persists in pressed flowers for months. I often trace wild plants by the fragrance.





LILIUM RUBESCENS



It is only found in the Coast Ranges north of San Francisco Bay for about 150 miles but within that limit meets most varied conditions. In the Redwood forest it is known as the Redwood Lily and is found on open ridges in underbrush in a clay soil. At one point it is on a ridge within 1000 feet of the ocean. Farther east it is on the north or northeast exposure of high peaks in a vast region of close shrubberies locally called Chapparal. There it is the Chapparal Lily. Still further from the ocean it grows in rocky debris among the Golden Oaks. So with clayey soil, gravelly soil or broken down rocks mingled with leaf mold, its soil needs sum up with good drainage, protection from harsh winds, moisture during its growing season.

*Lilium rubescens* is a much better garden lily than either form of *Lilium Washingtonianum*. I was rather surprised to be told by a San Franciscan that he grew it very well in the almost pure ocean sand of that city. Unless collected rather late, say mid October, its bulb also is rather hard to handle.

#### LILIUM KELLOGII

This is very similar to the others in bulbs and foliage but very distinct in flower. It is a true Martagon with segments closely revolute. The bulbs are of about the size of those of *Lilium Columbianum*, the stems often  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet in height, slender and often three to eight flowered, although I have grown them with twenty flowers. The color is a pinkish purple lightly dotted; and with a pleasing fragrance unlike that of any other lily.

Like *Lilium Bolanderii* its habitat is a very small area and probably 50 miles of a very narrow belt reaching from Humboldt County north would cover its extremes.

It is found either in very open Redwood forest or in open pine woods, and in soils always rather clayey.

I have found it quite easy to grow and flower. A very good percentage of mature bulbs will flower the first year and I have never known of wild bulbs producing as fine a bloom as I averaged.





LILIUM KELLOGII



## GROUP III. THE BOG LILIES

As this article is designed more to aid in culture than as a botanic treatise it will be well to digress somewhat to remark as to bulbs of this group.

In all of this group the rhizomatous bulbs are not deep seated in the ground nor do they grow where the soil becomes quite dry. In handling out of the ground they should never be allowed to dry out in the least. The trained collector digs and washes his bulbs and packs at once in the field in moist spagnum or green moss. He sees that the stored bulbs never get dry at all. He knows that too much moisture may stimulate root growth in the packing but realizes that this can do little hurt as compared with loss of vitality through any drying. In successful culture with Bog Lilies the first essential is good bulbs full of vitality and fresh.

The purchaser of such bulbs should use like care to keep unplanted bulbs either in moist leaf mold, damp moss or best of all in damp powdered peat. There is no danger of rot unless bulbs have overdried at some time after being dug.

In this group we have lilies with creeping rhizomatous bulbs formed by a narrow core-like substance very densely covered with overlapping scales which are usually jointed. The flowers may be either closely revolute as with *L. Pardalinum*, broadly funnel-form as with *L. Parryii* or narrowly funnel form as with *L. parvum*. All are so called Bog Lilies. They are seldom really so, and no one of them does its best in boggy soil.

## L. PARDALINUM

Of the bog lilies this is distinguished by a rhizome with one or two jointed scales which increases by the growing bulb which may be called an eye of one year forming from one to five new eyes, each of which may produce a flowering stalk and in turn multiply in like ratio. The rate of multiplication of the more prolific strains of this lily when in fine soil is startling. I have seen five hundred closely interlocked bulbs which had come from a single original. No other Western Lily has





LILIUM PARDALINUM



this mode of reproduction and no other produces more than one eye excepting in rare instances.

The smooth light green leaves may be broadly or very narrowly lanceolate, may be scattered thickly on the stem or in part disposed in whorls.

The large closely revolute perianth is orange red on the lower third and some shade of red or crimson on the upper two-thirds and spotted at the center.

There are innumerable variations in the wild plants so that the lily is hardly the same in any two localities of the very extensive region over which it is spread. Some of these variations have been named but the names have not been consistently kept by dealers and signify little, although there are variations well worth keeping separate.

The form from Mendocino County, California is often put out as *californicum* and a most brilliantly colored form was called *Johnsonii*.

In Southern California there is the very rare form *fragrans*. The type is not in the least fragrant while this very light colored form is. I am satisfied however that it is either a hybrid of *L. Pardalinum*  $\times$  *Parryii* or a connecting species, as its bulb character approximates that of *L. Parryii*.

As a garden lily *L. Pardalinum* is unexcelled. It will succeed in any garden loam with moderate watering; it thrives either in sun or shade and flowers freely. In an alluvial soil it thrives wonderfully.

Botanists have little to say of bulbs but the lily dealer or collector is forced to pay much attention to that side of the matter for bulbs differ immensely as to behavior when out of the ground. Many lily bulbs which are quite healthy when left alone are simply hopeless when dug and kept for long out of the ground. Fungi and bacteria seem to have an especial affinity for them. They go into a soft rot or a dry rot in spite of all known precautions.

The bulb of *L. Pardalinum* is one of the easiest to handle out of the ground. Of course it should never be allowed to get dry, but if packed in moist moss, spagnum, or peat it carries





LILIUM PARDALINUM  
CALIFORNICUM



and keeps perfectly for a long period. This insures its reaching the grower in good order and that fact alone might perhaps account for the difference between success and failure. A few years ago an English gardening paper published a series of reports from lily growers of their experience with different lilies and I think that no other lily had been a success in so many places.

As I have said it is very widely distributed on this coast and is found from the Mexican line near San Diego to Northern California. It is found in both the Coast Ranges and the higher interior ranges from sea level to about 5000 feet altitude.

In the Northern Coast Ranges it is more likely to be along the banks of some small living stream well up in the mountains where, rooted in a sandy sedimentary deposit, its roots run down to the water for a sure supply. Shrubbery lightly shades it or it overtops a strong growth of perennials. If the banks are lined with alders its growth is more slender and graceful but its flowering poorer.

Again in the same region some spring bursts out of the brushy hill slopes and moistens quite an area of soil which is loose and rich with mold. In these little meadow-like expanses *Pardalinum* is most happy and often forms dense colonies.

Almost as happy and much taller, it grows where a spring seeps under a deposit of gravelly soil or the debris of a shaly cliff. Here where apparently the soil is quite dry but where abundant moisture is to be found a foot to two down the very finest specimens grow.

In the Sierras they are not nearly as widely distributed but at times are far more abundant for in the Sierras the best moisture conditions are to be found in open meadows of black soil, a sand rich with humus. In one such meadow-like valley I once saw tens of thousands scattered all over its expanse. Later it became a hay field (timothy) and the lilies were even happier.

I have said that there were no varieties of *L. Pardalinum* distinct enough for botanical notice although many are well



worth while propagating for garden color. I should however make an exception for *Lilium Wareii* or *L. Pardalinum Wareii* which might well be called the Lost Lily. *L. Wareii* has a bulb between *L. Pardalinum* and *L. Parryii*. Its perianth is closely revolute and of about the size of *L. Pardalinum* and the flower is very fragrant. The color is a clear solid rich yellow, a most desirable shade. It is a really one of the finest of world's lilies and its history is most interesting.

F. A. Miller of San Francisco had it from a collector who found it somewhere in the back country of San Diego County thinking that he was collecting nothing but *L. Pardalinum*. Mr. Miller sent it to T. S. Ware of London, one of England's great horticultural growers of the day, and when Ware flowered it he found that he had a most unique lily. It was named *Lilium Wareii*, was described in the *Garden* of London, was the subject of one of the *Garden's* superb chromo lithographs and in that way its identity is perfectly fixed.

Ware wrote to me for further supply and gave me his data which I followed up, and used the original collector, then an old man. Not another bulb of this fine lily has ever since been found. I am of the opinion that research in the peninsula of Lower California will bring it back, for near the Mexican Line I have found *Lilium Pardalinum fragrans* which is *L. Wareii* in all excepting that there is quite a little red suffused through its yellow base color. When *L. Wareii* was to be had \$10 each was the price for its bulbs.

#### LILIUM PARVIFLORUM

Might be and has been called *L. Pardalinum minor*.

It is a distinct species, and a much smaller lily than the other. The bulb differs in having more than two jointed scales and very rarely producing more than two eyes, never more. It is therefore a solitary lily and propagates by seeds only.

Its stem is slender and the light green leaves are rather narrowly lanceolate and either scattered thickly or somewhat in whorls, according to the size of the plant. It is often 2 to 3



feet high with a few flowers but at its best it is 6 feet with as many as twenty blossoms.

Its color varies very greatly, just as does *L. Pardalinum* but nearly always with an orange center and outer sections of some shade of red and most usually of crimson. The inner third is lightly dotted, and it is always fairly fragrant.

I have seen one form in the Southern Sierras in which the flower is orange yellow throughout but dotted. This form was confused by botanists with *L. Columbianum* which is a far different lily. This confusion has led botanists to attribute the latter to the Sierras where it never occurs.

As I have said *L. parviflorum* is an extremely variable lily and there are forms which are very strikingly colored and desirable. None have been named or distributed horticulturally.

The habitat is well marked. Beginning in the Kings River country of the Southern Sierras (California) it is to be found at from 3000 to 5000 feet altitude as far north as the base of Mount Shasta and in the granitic ranges west of Mount Shasta. It is not found in Oregon or in the Coast Ranges proper. It is to be found along small streams in alluvial soil or in small meadows where the soil is alluvial and moist. More often it is associated with tall perennials or low shrubs which it overtops. I have never seen it in soil which could be called boggy.

It is a good lily, not quite as adaptable as *L. Pardalinum*, but its fragrance and earlier flowering give it a place. There are no difficulties in its garden culture in any good loamy soil where ordinary garden moisture is maintained. It could not help thriving in a well prepared lily bed.

#### LILIUM ROEZLII

Has a bulb almost identical in formation with that of *L. Parryii* with scales often three jointed. A perfect bulb is a very beautiful thing, pearly white and almost lace like with the innumerable fine jointed scales. The stem is slender and graceful with very long slender leaves scattered



thickly on the stem. The closely revolute flowers are oftener few in number and probably twelve would be an extreme. Its color is a clear orange very close to golden with no trace of red, and finely dotted on the inner third. This in the type. To the west they are orange in the center and deep crimson on the outer two thirds. I doubt if a well grown specimen is excelled in graceful loveliness by any lily.

It was discovered at an early date and then lost. Its early discoverer attributed it to Utah which was very misleading to later botanists although correct, for the early territory of Utah extended to the Sierras and boundaries were very vague in the popular mind. Its real home is in the Siskiyou Range, a distinct range running east and west on the line of California and Oregon in the gap between where the Sierras end and the Cascades begin. The Siskiyou Range is one of the richest botanical regions of America and there is a large number of very fine species entirely confined to this area one of which is the superb Weeping Spruce, *Picea Breweriana*.

*L. Roezlii* grows at an altitude of from 3000 to 5000 feet in, as a rule, exactly such soil as would suit *L. Pardalinum* or *parviflorum* with this exception. I have at times found it in bogs of an almost true peat, and often in an alluvial soil so rich in humus and so wet as to be well called mucky.

It is well to say a word as to hardiness in general at this point. The Siskiyou lie far enough north to have quite cold winter weather even about their bases. Early in the winter it may freeze quite deeply before there is much snowfall, while later the higher elevations are covered rather heavily. These conditions do not vary much from those we will say in New York excepting that the air is probably much drier early in the winter.

*L. Roezlii* experiences all of these variations as do *L. Kellogii*, *L. Bolanderii*, *L. purpureum* and a number of species of *Calochortus*, and *Brodiaeas*. In my garden *L. Roezlii* does well in a sandy loam. I do not think that there is any doubt that the well prepared lily bed fitted for Asiatic lilies will meet its needs perfectly.



## L. PARRYII

In this the bulb has three or more joints and never produces more than a single new eye. It is therefore solitary. The stem is slender and graceful and from  $2\frac{1}{2}$  to 5 feet high with many light green lanceolate leaves either scattered or with a whorl at base. The segments of the perianth are 3 to  $3\frac{1}{2}$  inches long and form a broadly open funnel-formed flower with slightly recurving tips. In color *L. Parryii* is a clear solid pale lemon yellow, with some deeper and approaching golden. The dotting is not uniform, for some flowers are clear and others slightly purplish-dotted at base. The flowers are borne in racemes of from a few to perhaps fifteen at the most and are delightfully fragrant.

Eulogy cannot be well overdone with this fine subject and lily growers are willing to take endless pains to grow it well. In my own gardens I have always flowered it easily the first year yet for some time failed too often to establish it permanently but I am now doing so very successfully. They are in a sandy loam soil in the full sun but in a fairly cool situation. The soil is never wet and in the summer the first 2 inches are quite dry but below that line it is always moist with just about the degree of moisture that I prefer for Perennial Phlox or Delphiniums,—that should tell the story to a gardener. Still it would be well to prepare a bed as follows. Take two to three parts of sand, one to three parts of either peat or leaf mold, and a liberal addition of charcoal or grit. See that drainage is perfect and give a fairly cool situation either with shifting shade, or in cooler climates in the full sun. Get good bulbs and plant early. They begin rooting at once even in August.

Robert Kessler of Los Angeles, a lily enthusiast, grew the flowers from which the accompanying photographs were made and narrates his methods as follows.

A man who had been at Kew Gardens, London, gave me the method. I took Japanese flower tubs and burned the insides so that the wood was well charred and into these I first put seven to eight  $\frac{3}{4}$ -inch drain holes, then a lot of sphagnum moss, then about 4 inches of granite chips. Over





LILIUM PARRYI



this I put some fine humus mixed with sandy silt, then a good sprinkle of coarse charcoal, then about 2 inches of fine river sand. On this the bulbs were planted and after being sprinkled with fine charcoal they were covered with 2 inches of sharp river sand.

The tub was then filled with humus and the top dusted with fine soot. The tallest were  $5\frac{1}{2}$  feet with fifteen flowers.

The above I think well worth reproducing as it at once gives a most successful method of growing this particular lily and the methods used by very successful experts with many other difficult lily species. It is well to call attention to the very careful guarding against those molds which kill some subjects, to the perfect drainage, the sharp sand about the bulbs and to the top humus which is most excellent to keep moisture well to the top. While innumerable lilies can be grown wonderfully well without any such care I do not doubt that the above described method would produce show specimens that would be surprisingly fine. In application it is not so very different from my conditions of perfect drainage, constant moisture a little below the surface and a soil rich with lime to insure sweetness. And let me again emphasize the necessity of careful handling of the bulbs themselves.

#### L. PARVUM

In this lily the bulbs are small with three or more jointed scales. The stems are slender and in most instances few flowered and a foot or two high, but this is not a specific point, for in the deeper meadow soil I have seen them growing with *Aconitum Fischerii* 5 to 6 feet high and many flowered. In small plants the lanceolate leaves are all scattered while in fine plants they are in part densely whorled. The small funnel-formed flowers ascend or are semi-erect and have recurving tips. The color scheme is of a dotted central orange with red tips. The true *L. parvum* is of one type and varies little. It is a near relative of *L. canadense* of the East and with us is almost an alpine. I think that it is never found below 6000 feet altitude and may reach an extreme of close to 10,000 feet



in a region of very deep snows. Not infrequently its snow covering has not melted in mid July.

It is found from a little north of the Central Pacific Railroad to the Yosemite Region in California, a region not over a hundred miles in length and very narrow. All of this is where glacial action was the great factor in making the soils and shaping the country and it is in the little glacial meadows bordering glacial lakes that this lily is oftenest encountered. The soil is a granitic sand mixed liberally with humus. Melting snows supply moisture liberally after the mountain spring comes but toward fall this is gone and the bulbs may become quite dry although never dry enough to wither them. The drainage is always good, the soil sweet and moisture at growing time plentiful. A multitude of alpine plants accompany them, none of which are in the least bog plants. They are oftener in the full sun but at 6000 feet this does not imply the same in cultivation.

It is neither easy nor hard to cultivate this lily. It is not a lily for popular culture nor is it a lily in the least to baffle the trained gardener. The treatment and soil recommended for *Parryi* or *parviflorum* meets its needs.

*Lilium parvum luteum*. This can be described as a major form of the last described species, with clear orange flowers dotted on inner third. It is a good lily.

A striking feature of the distribution of lilies in the Californian Sierras is the fact that they lie in strata if we may so call them at different altitudes. Thus at the summits and high up on the peaks we have the alpine *L. parvum*. Where that ends going down and following stream courses we have the *luteum*. This would be found in the Central Sierras at from 4500 to 6000 feet altitude. At its lower edge it would approach but not mingle with *L. Pardalinum* while *Lilium Washingtonianum* would be almost coterminous with it.

Below this line would be *Lilium Pardalinum* and *Humboldtii* in the Mid Sierras, *L. parviflorum* and *L. Humboldtii* in the Northern Sierras while *L. parviflorum* would go on south and partially replace *luteum* farther South.









LILIUM PARVUM, A MOUNTAIN  
LILY FROM CALIFORNIA



As far as I have been able to trace it *Lilium parvum luteum* varies but little and does not extend farther either north or south than does *L. parvum*. They do not however intermingle.

#### L. MARITIMUM AND L. OCCIDENTALE

All of the Bog Lilies that I have so far described are mountain lilies but the two species that I now come to are strictly seaside. None are found at an elevation greater than 300 feet above the sea nor at a distance greater than a few miles from salt water.

The rhizomatous bulbs are densely covered with single jointed scales (articulated only where they join the core of the rhizome.) They would differ from the ovate bulb in that in the latter the scales are not articulated. The stems are well furnished with dark green lanceolate leaves which are often scattered. The stems are also dark green. Ordinary plants are from 1 to 3 feet in height and from one to three flowered but exceptional plants approach 6 feet with perhaps a dozen flowers at the most. It is rather a dangerous thing to say just how tall or floriferous a lily may become for under exceptional conditions they may surprise one.

The open funnel-like or campanulate flowers of *Lilium maritimum* have recurving tips while in *Lilium occidentale* the flower is distinctly of the *Pardalinum* type and closely revolute. In both lilies the prevailing color is a deep crimson with the narrow throat reddish orange and somewhat spotted. Neither is fragrant. *L. occidentale* occasionally runs to more yellow at center and a lighter red at outer section.

Along the Californian Coast at intervals there are raised sea beaches at an altitude of from 50 to perhaps 400 feet above tidewater. These areas face the ocean and have a soil either with a sticky clay subsoil and a peaty top or the same with a deeper soil of ocean sand mixed with humus. Not infrequently there are bogs with quite a depth of peat.

The frequent and heavy fogs and the consequent cool and equable climate, and the soils have made a fit home for dense



growths of maritime pines and ericaceous shrubs. The Western Rhododendrons (*R. Californicum*) are there in endless numbers while such heathy plants as *Arctostaphylos*, *Vaccinums*, and *Ledums* form dense growths in the barrens. The bogs are full of *Ledums* and on hummocks among their interlacing roots *L. maritimum* is largest. The soil would be a pure vegetable peat, the drainage although in a bog, perfect, and the roots would go to perpetual moisture. But far more frequently it is found in ocean sand in the barrens away from bogs. To be sure the poor soil makes poor plants but they are quite happy unless the endless shrubs rob them, and, after a brush fire gives them more room when they are very fine indeed. *L. maritimum* is found from a little south of San Francisco to Northern Mendocino. Doubtless it grew on the site of San Francisco.

*L. occidentale* replaces it in exactly the same class of maritime country from the Eel River north to the Oregon Line near Crescent City. I would suspect its presence farther north along the Oregon Coast but botanical material has not been available from that region.

In my own garden I have given *Lilium maritimum* a boggy soil but claim no success. It ought to be grown well in the Rhododendron Lily bed and I think has been so grown in England. Climatic conditions in Southern England should be very favorable. In the eastern United States experience will have to be bought.

*L. maritimum* Var.—In Western Sonoma County in California an interesting variation of this lily is to be found in a series of little bogs with very sandy surrounding country. This is about fifteen miles from the ocean and is rather foggy. It is the region so commercially successful with the Gravenstein apple. These forms are rather reddish in color and unnamed.



## RÉSUMÉ OF NATIVE CONDITIONS OF WESTERN LILIUMS

It will be noted that all of the lilies of the *Humboldtii* and *Washingtonianum* groups are either from woodlands or grow amongst shrubs at higher elevations. That is in woodlands, they are always in the open woods where the lights are shifting and that if the woods thicken the lilies languish or disappear altogether. Where a fire goes through this open timber and kills the brush and some of the trees the lilies grow much finer and where areas of timber land have been cleared and the soil brought into not too deep culture the lilies have done better than they ever do in the natural state.

Again it is to be noted that in western forests the soil is almost always of fair depth with, we will say, 18 inches as the shallowest. Underlying this soil there is in much of the western forests a clay which is often impervious to tree root growth. In the Sierras and Cascades however the soils may be very deep.

Inasmuch as the same species thrive both in the shallower and the deep mountain soils it is certain that great soil depth is not a necessity or even particularly desirable. The indications in nature are unmistakable that the rhizomatous lilies which are rather shallow growing like a cool surface. The fact that they grow so well through shrubs and that a coat mold is often present rather indicates a love of cool surface.

The indications that such lilies as *L. Humboldtii*, *Bolanderii*, *Washingtonianum* or *rubescens* care at all for a cool surface are lacking. Surely a lily which will thrive in Californian sun with a shade temperature up to 110° above zero and not a drop of moisture from April till October does not have any particular objection to surface baking. I think that the same facts obtain with the lilies of the Chinese highlands. But with this surface baking we have well established bulbs very deep seated where the soil retains considerable moisture throughout the summer. As to why in nature lilies are seldom in the open see page 500 in writing of *L. Humboldtii*.



A résumé shows that our lilies thrive in a great variety of soils but that drainage is an essential. In clays and gravels, in sandy loams and in broken down masses of rocks, and even in sticky black clays (*L. Humboldtii*) they are to be found growing to perfection.

In some of these soils there is a moderate amount of humus but that cannot be considered a characteristic of our lily soils for these two groups, for as a rule Californian soils are deficient in humus and the constantly recurring forest and brush fires which date back to time immemorial prevent any material accumulation of leaf mold in any but our coastal woods. But these same fires insure an abundance of potash. Western soils are all well supplied with phosphates and I think that without question the use of bone meal with lilies is always desirable.

Eliminating what appears unessential and averaging conditions it would appear that the lily bed for these two groups should have a sweet soil and be made at least 18 inches in depth; shelter from harsh winds; a fair supply of potash and an addition of phosphates; either a well cultivated surface or that the moisture level below 3 inches should insure moderate dampness.

While full sun may be all right yet a shifting shade rather light at that, would be more likely to be a safe general rule. Beyond this take into consideration the fact that few lilies are able to reestablish a full system of basal roots the first year after being moved and it will be apparent that more care as to moisture is necessary in the newly planted lily bed than afterwards.

### CULTURE OF GROUP III

To a degree the remarks in regard to the first two sections apply to these as well. For instance forest fires are common where *L. Parryii*, *L. Pardalinum* and *L. parviflorum* live and are unknown in the homes of the others. They are always followed by unusually fine growth in the lilies affected. Also by



unusually large and healthy bulb growth. This would rather indicate that the leaf mold cover is not so essential as we might have supposed and that in well established lilies the protection of low shrubs through which they grow is rather a hindrance than a help. A rather revolutionary sequence yet it seems to be consistent with facts observed in countless instances.

It will be noted:

1. That they are either at fairly high altitudes or in a cool coastal climate.

2. That the soils are far more frequently a sandy alluvium and that as the mountain slopes are usually steep there is almost sure to be an addition of silt and charcoal as well as ashes to these alluvial deposits.

3. That they are shallow growers with 3 to 5 inches the usual rooting depth.

4. That while the surface soil may be even quite dry, moisture is always present within easy reach of the roots and that the very finest specimens of each species are found where the bulbs are in well drained soil, and the roots reach living moisture.

5. That while they are often very fine when growing amongst low shrubs they are better when a fire has burned those hosts and that while growing in open timbered canyons they languish when the timber becomes dense.

There is nothing to indicate that the natural soils are always rich in phosphates yet their use is safe. Climatically their hardiness throughout the East is to be supposed from their native habitats and has been abundantly proved in trials.

Summing up all indicates that the usual preparation of the lily beds approximate their needs. A soil rather loose and workable, composed of sandy or open soils either loam or light gravels with a good component of humus and of a depth of at least a foot and better 18 inches. Perfect drainage yet abundant moisture, a drainage layer of gravel, grit or broken stone leading into tiles would give this result in a well prepared lily bed. The bed might be in full sun in a cool climate yet ordinarily should be lightly shaded at least in the afternoon.



A mulch of leaf mold will keep the soil cool and equalize moisture yet the lilies will thrive better if its situation makes this unnecessary and the surface is kept mellow.

The bulbs should be planted from 3 to 4 inches deep and with the exception of *Lilium Pardalinum*, which in time becomes too dense, it is better to leave the plants undisturbed for a long time. At the most a protection of leaves should be given for the winter. Those who wish to try for the finest flowers would do well to follow the methods of culture given for *L. Parryii*.





Purdy, Carl. 1919. "Pacific Coast Lilies and Their Culture." *Journal of the International Garden Club* 3(4), 497–532.

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