sadly from actual blooms. This shade will be left severely alone, and only those plants will be described which are distinct and outstanding.

The majority of the varieties of *P. officinalis* are worth cultivating. The double crimson is the one most often grown. This group contains several real gems, with distinct, glowing, clear colors not seen in other peonies. *P. lobata* gives to its varieties Otto Froebel and Sunbeam, its bright, clear, almost cerise pink shade. These three are worth a place in any garden and will blend without clashing in color harmonies. Ceres and Charmer, though not varieties of *P. lobata*, also exhibit this clarity of color. Fire King and *anemoneflora aurea ligulata* are reds of clear color while the recent Dutch variety, Lize Van Veen, is said to be pure salmon pink.

Of the other species, *P. macrophylla*, a pale yellow single fading to white on opening, is characterized by broad handsome dark green foliage which makes a lovely picture in the border during the entire growing season. It is an extremely early bloomer, often opening before *P. tenuifolia*, which usually leads the procession. Last year the height of the peony season in my garden fell on June 6th and *P. macrophylla* bloomed on April 27th.

*P. tenuifolia*, the species, is a dwarf red single, with finely cut, delicate light green foliage, which sometimes dies down after blooming, to appear no more until the following spring. There are five varieties in this group, differing in foliage, color, and bloom form and all are distinct and worthy of cultivation. The double crimson variety, *P. tenuifolia flore-pleno*, has received a rating of 8.5 out of a possible 10 in the symposium of the American Peony Society.

These plants should be of particular interest to gardeners in the South where it is impossible to extend the peony blooming season on the late end because of the extremely hot weather. The use of some of the species mentioned will lengthen it at least a month on the early end. This factor, in addition to the beauty and adaptability of the subjects should secure for them a place in your garden.

Kensington, Md.

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The Influence of Fire on Western American Flora

By Carl Purdy

In reviewing the various causes for diversity and location of the trees, shrubs, and plants of the Pacific Coast, Professor Jepson, our leading botanical writer, puts fires as among the most potent. The same thing may be said of most of the flora west of the Mississippi. I do not know whether fire had much to do with the flora of the Atlantic region, but doubt it, for rains were more frequent and fires less common or widespread. It is said, however, that the Indians set fires to open up land for their crops.

In California the deep student can see the effects of fire everywhere. That does not mean that he sees blackened areas and dead stumps all around or even often, but the effects of fires are far more deep seated. For a very long time preceding the white occupation of the country the Indians burned grass and brush at rather short intervals. We do not know just how short but it is probable that they waited no longer than for a growth of brush that would burn well. This practice made it easier to hunt and because fire stimulated the
growth of bulbs and plants which they
used for food, and in heavily timbered
areas it opened the trails over which
they made trips to lakes for fish or to
the seashore for seaweed used for salt.
Before there were Indians, it is
certain that fires were frequent. In
one electric storm in northwest Cali-
for, the forest authorities reported
over thirty fires set by lightning.
While not so easy to trace and prove,
it is very likely that rolling stones
might strike sparks which falling in
dry matter would make a blaze. When
it is considered that in California there
is little or no rain for the period from
June to October, or even later, and that
everything gets tinder-dry, we can
easily surmise that once started, fires
burned until inflammable material was
exhausted.
We do not have to look far for proofs
that fires have been periodic for many
ages. One and perhaps the oddest is
in the life history of the knob cone
pine. This pine is found in some of the
dryest portions of northern and central
California and has a cone so dense in
the structure and so pitchy that it
never opens of itself by sun heat.
It will rot first on the tree to which it
sticks. When a fire burns a grove of
these pines, the cones open by the heat
slowly so that the seeds are dropped in
the cooling ashes and a new grove is
seeded. As this pine is not long-lived,
it is plain that without fires it would
have died out. In the northwest, Pinius contorta has the same life history.
The most perfect and indelible proofs of recurrent fires through very
long periods lies in some of the trees.
In those brushy or thickly timbered
areas of California called chaparral,
all trees and shrubs belong to two
classes. In the first are those which
sprout freely from the burned stumps
and thus perpetuate themselves. In
the other, very hard, bony seeds are
produced and these seeds can lie
dormant for many years and would be
uninjured in most fires. When fire
occurs they come up in great numbers.
A tree like the Douglas spruce, the
young specimens of which have thin
bark which a fire easily kills and whose
seeds are inflammable and do not
possess much vitality after a year,
could not exist in a region of frequent
fires. On the other hand, take the
California Laurel (Umbellularia). It
sprouts freely after a burn and is hard
to kill if you wish to do so. Ages ago,
we will say, one was burned while
young. Sprouts came along the out-
side, and in time they again were
burned, the new sprouts being borne on
the outside. This would be the case
both because there would be a gathering
of inflammable material at the center
and because in time the older wood
would decay and be burned out. Burn-
ing after burning at varying intervals
occur through the hundreds of years
and finally you have a tree like one in
my garden in which beautiful trees
make a circle about twenty-five feet
across with the wood in some sections
disconnected, while in others a rim of
wood may connect several groups.
How old, I may ask, would such a tree
be? And I would answer that a guess
of several thousands of years would
not be amiss. In the redwood forest
the so-called "goose nests" were
formed in the same way. They are
much larger and usually have a rim of
wood connecting all of the tree sprouts.
In the chapparal regions of California
many species of trees show this forma-
tion and all alike tell of long repeated
fires.
Not only the trees and shrubs but
the flowers of such regions show adap-
tation to fire. In a brushy area one
may see very few flowering plants and
apparently none of some species, while
after a burn the area will be a solid
mass of bloom of many sorts and
amongst them some of which not a
single plant could have been found
before the fire.
I do know that certain flower seeds
can remain dormant a long time. Just
how long I do not know, but the follow-
ing is an instance. For some years my
work took me into a certain region of
Lake County, California, at the flower-
ing season and during these years I saw a single plant of Argemone. The Argemone is of the poppy family, very prickly and with a large white flower like tissue paper, a flower that one could hardly fail to observe. This one example was in a gravel bed near a road and I thought that the seeds had been brought in by travelers, man or animal. One year, when five miles away, I came in sight of this mountain. It looked like there had been a slight fall of snow. They were all Argemones. The seed had lain dormant at least twenty years.

When Americans came to California large areas were open and grassy, and there are some still so, but a very large area, then grassy, is now in timber or heavy brush. One might have attributed the openness to poor soil or lack of moisture but that theory would be contradicted by the actual fact that the grassy lands were richer and the other fact that since that time trees have grown in them. In those days when there were few domestic animals the growth of grass was very great. When in midsummer it caught fire, the heat was sufficient to kill even the top growth of trees, so trees could not spread by seeding because the intervals between fires were too short for them to reach the flowering age. The distribution of the flora again was largely governed by fires in many places. The flowers characteristic of open spaces would seed into the vales and intershapes of wooded areas and would not be choked out before another fire restored growing conditions.

Fire, too, has determined the shape of a vast number of trees over eighty years of age. An oak might naturally go up rather straight but when burned would send up several sprouts above the ground and now is a cluster of trees making a round-headed group rather than a tall tree. By far the larger part of oaks, laurels, and madrones of to-day illustrate this result.

The prairies from the Missouri River west were almost treeless, but while moisture was not so plentiful, the real reason, as in California, was the fact that grass fires kept trees from either growing or reaching the seeding age.

I have said that the Douglas spruce did not exist in the chaparral area where fires were periodic, but I must qualify that statement by saying that single trees or little groups of large old trees did continue to live on very rocky knolls or very steep slopes where enough tinder could not accumulate to make a hot fire. When fires became less frequent these isolated groves seeded out along the hillsides so that considerable tracts are heavily covered with them where none were before. Strangely enough, some of the isolated groups of Douglas spruces, whose situation had protected them through ages of frequent fires, have been killed by fire of late years. When fires were frequent in the steep country in which they lived, the heat was never enough to kill them, but when a fire burned the accumulated mass of leaves and dead brush of twenty to forty years, they were destroyed. On my own land there was a superb grove of very large black oaks, many hundreds of years old. They were killed by a fire about ten years ago. For this reason, enough rubbish had accumulated so the resultant heat killed a tree a hundred feet high.

Some bulbous plants like Erythroniums thrive best in light shade and the same may be said of some of our lilies. In the older days when fires crept through the large timber with little heat because there was so little accumulation of tinder, they left the woods park-like with large intershapes and practically no young trees. In many such places lilies, like Lilium humboldtii in California, or Lilium Washingtonianum farther north, were plentiful. During the last thirty years the woods that have been cut over have reseeded so densely that no lily can survive and the uncut woods have inter-seeded as densely. The year following a fire which crept through the low brush or open timber, the stronger lilies in more open places
seeded heavily, while by the second year the almost shaded out bulbs recovered their vitality and flowered freely. Seedlings came up in abundance. As the brush grew up these gradually shaded out until only in the more open spaces did any survive.

With Erythroniums the cycle varied somewhat, for in even heavy shade they would make leaves with few flowers, but after a fire those in less shaded places would flower wonderfully, and the second year those in the very shaded places would flower and seed and again the cycle would be repeated. The plants characteristic of woodlands often produce an abundance of seeds, but where there is an accumulation of either leaf mold or leaves it is seldom that seeds germinate.

Some of the Cypripediums produce an incredible number of seeds, yet groups of C. montanum which I have known for forty years are no more numerous now than then. An extreme instance of this is Sarcoches sanguinea, the brilliant snow plant of the Sierras. It is a saprophyte, a plant whose roots are not like those of other plants and require a certain leaf mold. The seeds are very fine and very numerous. I doubt if one in a hundred thousand germinate, or if they do, germinate where living conditions do not permit the seedlings to survive.

Ukiah, California.

Charming Native Iris for the Alpine Garden and Other Desirable Dwarf Sorts

By Edith H. Banghart

Recently I spent several days on the California Coast in the vicinity of Point Reys. The rolling hills, vivid in their new spring coat of green made a decidedly picturesque setting, with the whiteness of the sand dunes covered with brilliant sand-loving creepers, orange, magenta, and blue, and the clear deep blue of the sea as far as one could see. It was a heavenly picture. But to get to the seashore, one had to wade through the even more lovely yellows and blues and purples of myriads of wild iris, the beauty of which is just impossible to describe.

There are so many charming and delightful little types of dwarf iris. Lovely ones are native of our own country, and those little natives from other shores seem to make themselves happy amongst us, too.

We find little wee types growing in jagged rocks far out on the coast; they are not to be found anywhere short of the Arctic Circle, some authorities tell us, but there they are; and not the least mystifying is the fact that they seem to be growing right in the rocks with little or no soil.

Again, as the season advances, we will find beautifully colored varieties growing all along the river’s edge, and in the mountains under some gnarled and storm-tossed conifer. And, too, we will discover them at the edge of some silent forest bidding us to enter the woodland and seek further treasures. And so we find that in almost every environment and every clime there are dainty little types to give us cheery satisfaction in our alpine gardens.

For those who desire the collection of dwarf iris as a pastime, I append a few of the most interesting varieties. It is rather difficult to make a comprehensive selection in a small space. Personally, I believe that the following are amongst the most choice, many of which are obtainable in America. A few dislike being disturbed, but many of them can be grown from seed, which in