

The NATIONAL
HORTICULTURAL
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JOURNAL OF THE AMERICAN HORTICULTURAL SOCIETY

JULY, 1934

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THE NATIONAL HORTICULTURAL MAGAZINE

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Silvia Saunders

[See page 213]

Paeonia hybrida

Flower crimson, 3-4 inches across, May 19

Our Picturesque Eucalyptus Trees

BY DANA R. TYSON

One of the prime favorite trees of California, yet one whose actual nature and habits are little known by the general public, is the eucalyptus tree; a widely planted genus in Southern California, yet one with which the ordinary layman does not find the time to acquaint himself or delve into the history of so fine a friend as this tree represents.

Many books have been written on the technical characteristics and nomenclature of the Eucalyptus for the use of botanists, nurserymen and professional plantsmen, but few are available that describe them in a manner easily understood by the ordinary home garden lover or the layman tree planter. For those people who delight and enjoy the hasty examination and determination of our ordinary shade trees this paper is written, and it is the desire of the writer that it may enable them to enjoy the acquaintance of the trees and flowers themselves, and to more readily recognize a few of the varieties as they grow in the field.

The native home of the eucalyptus is the continent of Australia and some of the adjacent islands of Tasmania, New Guinea, Timor and a few of the Moluccas. Nearly all the species, however, are found in Australia, and it is there that the first trees were discovered. There is considerable romance connected with the discovery of the eucalyptus by the white man, which may be of interest to relate.

It is believed that one of the first white men to look upon this species of tree and make any particular mention of it was the famed explorer,

Captain Cook, in the year 1770. Authorities state that Captain Cook when on one of his voyages to the Australian coast dropped anchor in a small bay surrounded on three sides with a magnificent growth of trees and flora consisting of many different plants, among them being a very tall and graceful tree from whose trunk exuded a quantity of reddish substance much resembling gum. This gum was soft and sticky when fresh, rather sweet to the taste, and a hard crumbly lump when dry. The men of the party quite naturally began referring to them as Gum Trees and such has been their common name even to the present time. A description of the trees by those who were with Cook states that they were of tall and graceful stature with a drooping habit and pendulous branches, making them look like weeping willows. Generally they bore large masses of white blossoms topping the crown, but often one saw a tree with pinkish or cream colored flowers. The trunk was tall and slender, with stringy slabs of bark curling off at times to hang on in long pendants before dropping to the ground.

The actual botanical name which the tree now bears was given it by a Frenchman named L'Heritier de Brullette, who was the first man to describe them in an accurate botanical manner. He called them Eucalyptus, which is a Latin-Greek term meaning "well hidden," referring to the way in which the flower is concealed in the calyx or fruit body by the tight clamping down of the little operculum or lid which covers it.

The opinion of authorities as to the actual number of existing species differs greatly, but a general acceptance of perhaps 200 different kinds is thought to be fairly accurate; of these approximately seventy-five are under cultivation in California, and only a few of these are generally known by the public.

Quite a wide variance of characteristics seems to exist between some of the species, yet the gradation from one to another is so gradual that it is often a very difficult task to distinguish them in the field. As an example, one species grows to be the tallest tree we have in existence; mainly one, *Eucalyptus regnans*, which has attained the height of 331 feet. Another, *Eucalyptus erythronema*, is a dwarf and grows only ten or twelve feet high. Some kinds of eucalyptus will exist under a maximum temperature of 156° Fahrenheit, and live naturally in the very hottest desert lands of Australia. Yet another thrives in a minimum temperature of 18° Fahrenheit in the colder mountainous regions. Then there is one tree which has a fruit calyx hardly larger than the head of a pin, and another whose fruit is one and a half inches in diameter. Some trees have a bark which is smooth like polished leather, as in the case of the Lemon-Scented Gum (*Eucalyptus citriodora*), and in others it is rough and deeply furrowed, an example being the Pink Iron Bark (*Eucalyptus sideroxylon rosea*). Thus, with such a large scope of trees which differ so greatly from each other, we may, if we like, take from the species of eucalyptus alone, a tree which will grow and be happy under many climatic conditions.

Described in the following paragraphs are some of the more common varieties that we see in Cali-

fornia, and a few of the characteristics by which they may be known readily in the field. While no attempt at an accurate botanical grouping is made, the most striking and picturesque trees are noted, and the descriptions are so made that it will not be difficult for anyone to recognize the different types of eucalyptus trees as he sees them growing about him.

The Blue Gum (*Eucalyptus globulus*) is perhaps the most widely planted and most popular of the Gum Trees, and may generally be known by its lofty habit and the blue glaucous coloring of the younger leaves. In general the mature leaf of this tree is dark green in color and shaped like a sickle, being long and thin like a lance point, curved, and with rather thick prominent veins. The younger leaves, however, grow close to the stem and are opposite each other with heart-shaped bases overlapping, and they have a distinctive bluish gray coloring which is a prominent determining characteristic.

One of the most striking habits of this tree is its extremely rapid growth, some specimens growing to a height of 45 or 50 feet in five years' time. The wood of the tree is not very durable when exposed to the weather, for it rots away in a short time, hence it is not so useful as it is picturesque when used to make garden features.

It was believed at one time that this tree, together with other species of eucalyptus could be planted on the barren hills of Southern California in an effort of reforestation, and many acres of the trees were planted. The result was a complete failure from a timbering standpoint because the nature of the tree prescribes that it have a plentiful supply of water, and as our annual rainfall is not suffi-

cient for timber production the trees failed to grow. We do find quite a number of wood lots and these have produced an abundance of firewood and have to an extent proved profitable to their owners. One thing in great favor of the trees is that they sucker from the stumps very quickly and it is only a few years before a new crop of trees is ready to be cut from the stumps of the older trees that have been removed.

There are many specimens of Blue Gum trees in Southern California which have grown to a height of 150 feet or more, and this in about thirty years, which trees are still growing, and to all appearances are quite healthy and vigorous.

The beauty of the Blue Gum from a landscape point of view is very striking and it is the most planted tree of the *Eucalyptus* family. However, it needs plenty of space to grow in and an abundance of good soil surrounding its roots, for it is a gross feeder and when planted too near other trees or shrubs will soon crowd them out. I have known of special cases where the roots of a Blue Gum have extended themselves one hundred feet away from the base of the trunk and have sapped the soil from other types of trees at that distance. It also has a great tenacity for water, seeking out any hidden supply that is anywhere near, often entering faulty sewer pipes and completely clogging them with countless small rootlets.

The greatest beauty of the tree is seen in a hilltop or in a field where it stands as a silhouette against the sky with the beautifully graceful limbs drooping their leaves in a pendant manner. It also makes a splendid windbreak when planted in rows, for it helps to hold the soil and break the force of the air when in constant

motion. This is the reason why the Blue Gum has been planted in such large numbers along roads and fence lines in days gone by.

The flowers of *Eucalyptus globulus* are large, cream-colored, sometimes white, generally occurring in the axils of the leaves in groups of threes, they stand on very short thick stems and the seed capsules are thick and woody, more or less ribbed and warty, rarely being smooth, and about one-half to three-fourths inches in diameter. The little cap that covers the flower stamens, botanically called the operculum, is rather flattened, coming to a sharp little peak in the center; this is thick and warty also. Very often a second operculum is found in this species, which lies inside of the primary one. The stamens which comprise the flower, grow on the inner ridge of the calyx or seed vessel and are all fertile. The fruit is hemispherical, and has ribs on the side, the top showing a double rim with holes or valves opening out. These seed capsules, or fruit, have in days gone by, been used to make portieres, which were hung in the opening of doorways as ornaments, and at one time were quite the fashion in interior decoration of California homes.

The Red-Flowering Ironbark (*Eucalyptus sideroxylon* var. *rosea*) is another fine tree and coming more and more to be planted in Southern California. In shape it is tall and slender suggesting a ragged Lombardy Poplar, but not stiff and formal. It occasionally attains the height of one hundred feet and is very graceful in outline. The flowers range from a very deep rose, almost a red, to a faded pink, blooming in winter and attracting myriads of honey-bees. They are fairly large and occur on a

slender elongated pedicel appearing in heavy clusters. The fruit calyx is small, about one-tenth inch in diameter, with the operculum equal in length to the calyx (cone-shaped, with the ovary flat-topped. The fruit does not persist on the branches but drops to the ground soon after it has ripened.

The young leaves are similar in shape to the mature ones but are slightly smaller. The normal leaves are silvery gray in color, lance shaped, under six inches long with the venation fine and indistinct. The bark on the trunk is roughly furrowed and becomes blackened as though scorched by fire upon aging.

The landscape values of this tree are numerous for it takes well to street or highway planting, enduring drought and flood quite well. It is not a wide spreading tree but keeps its compact upright habit through maturity. It is particularly fine when planted in small groups in the open where its true grace of outline may be seen. It is also a rapid grower and will endure considerable cold in the lower altitudes.

This tree is considered by many to be the most ornamental of all the eucalyptus, and perhaps the most useful, for it grows in most any soil, will endure many different climatic conditions, will stand lots of water or will grow with very little, and it attains a moderate height when mature, thus being suited for a great many purposes. As a street tree or an individual it can be highly recommended both for its adaptability to conditions and the attractive color of its flowers.

The Lemon-Scented Gum (*Eucalyptus citriodora*) is quite a noteworthy tree, getting its name from the deliciously fragrant, lemon-like odor

of the leaves and fruit when crushed in the hands.

This tree is very picturesque, growing into a tall, sparsely branched, slender and graceful outline and when mature makes a splendid silhouette against a clouded sky. The flowers appear on the ends of the branches during the winter and show their creamy white stamens for about two months before the fruit begins to form. The fruit hangs in clusters in the axils of the leaves with a hemispherical calyx slightly cylindrical and about one-eighth inch in diameter; the stems supporting the fruit bodies are short and angular, hanging on to the branches for a long time. The little cap covering the flower stamens is also hemispherical. The leaves are shaped like a lancehead, and are about six inches long and one-fourth inch wide with the venation finely marked.

The coloring of the bark on the trunk of the tree is the characteristic most striking to the eye. Each season the old bark scales off in small pieces and leaves a very smooth and shiny underbark which fairly shines in the sunlight, and I know of one particular specimen which seemed to have a pinkish cast to the coloring, making it a very unusual and beautiful specimen tree.

From the landscape point of view this tree is strictly a specimen type, which should be well grown for shape and posture. In groups or clumps the outline of the individual is lost. As planted on the seashore or in some open space where one may look through the branches at a distant landscape the effect is extremely beautiful. Few trees will lend the texture of outline as does the Lemon-Scented Gum.

As a tree it is tender to frost and

will sometimes break in the wind if poorly grown. There are only a few true type trees of this species in Southern California, but if you should stumble on to one of them it may be quickly recognized by the white glossy trunk and the lemon-like odor of the leaves when crushed between the hands.

The Scarlet Flowering Gum (*Eucalyptus ficifolia*) is a species quite different from the general types of the genus in that it has a strikingly brilliant scarlet flower appearing twice during the year, once in spring time when the flowers are comparatively few in number, and again in August and September when the best forms are ablaze in an orange-scarlet crown of color. The type is rather slow growing compared to others of the family, and rather small in stature, rarely exceeding thirty or forty feet. The bark is rough and furrowed, stringy in texture and a reddish brown color. Often the trunk of the tree attains quite a large circumference on maturity, but the height of the tree increases very little. The shape of the tree is low and spreading, making a good street or avenue tree where it can be given the proper care.

A disappointing fact concerning this tree is that it hybridizes badly and does not always produce the very desirable scarlet flowers; more often they are a muddy pink or even a white. This feature cannot in any way be remedied, but can be avoided by selecting the color after the tree has flowered, for it has the good grace to burst into bloom when very young, quite often doing so even in the nursery containers; or you may buy the grafted plants.

Its landscape uses are primarily as striking color specimens, as novelty

street trees, or as high color notes in a quiet landscape. Being somewhat tender to frosts its use is limited to the warmer sections of the state. It prefers good soil and is quite heat resisting, being tolerant to considerable drought. For a showy and brilliant coloring effect, this type of *Eucalyptus* may be highly recommended.

During the blooming period the flowers show brightly in large many-flowered groups, deep vermilion to a dirty white in color, depending on the amount of hybridization of the parent tree. The fruit is large, urn shaped, with the lid nearly flat covering the flower stamens. It is very woody and from one to one and one-half inches across, being sometimes used to make pipe bowls.

The Sugar Gum (*Eucalyptus carynocalyx*) is a striking tree of approximately 150 feet, effecting an erect and rapid growth; it thrives well near the coast or in very hot climates, being quite resistant to drought and shallow soils, but of course grows much better when given a good soil and an ample water supply. Its form is very picturesque and in groups on hilltops or near the seashore where a distant vista is seen through the branches it makes a beautiful picture. This is the tree we most commonly see in photographs or paintings of California landscapes, for the sparse graceful branching and mottled trunk make a lacy outline against the sky or distant seascapes; for this reason it is quite a favorite tree.

Cold temperatures are not favorable to the Sugar Gum as it is injured by 20° to 25° frosts, and branches will sometimes break in strong winds. The top should never be cut back when growing, as this will ruin the whole beauty of the tree for the best shapes are gained by allowing it to

grow naturally as it seems to have a peculiar tendency to assume a form of grotesque branching all its own.

As a street or highway tree it is very good but due to the height, is not strongly recommended for city use. As a highway or fence line planting in the country it is excellent. In the landscape skyline it plays an important role and on large estates where the distant skyline is very dominant in the picture of the grounds it is most effective.

The Manna Gum (*Eucalyptus viminalis*) is one of the larger types of the genus. Its huge handsome trunk is very impressive when one stands beside it and peers up into the branches. Being very rapid of growth it is second only to the Blue Gum and in looks quite resembles that species from a distance. The branches droop gracefully much like a weeping willow, in fact, "*viminalis*" means drooping. The derivation of the common name of Manna Gum can be easily traced to the white gummy substance which oozes from the bark, which on drying forms a sweet crystalline solid soon falling to the ground. One need not have a very vivid imagination to see that a white man finding it in a foreign continent where the country is more or less a desert, could easily call it manna as a gift from heaven.

The tree attains a great height, growing to three hundred feet or more and seems to do very well in California. Considerable frost does not seem to harm it for it grows in the interior valleys and at quite a fair altitude. In fact this hardiness is really its greatest asset, for it may be planted and will grow where many others of its brothers and sisters will not exist.

The trunk of the tree assumes a great girth on maturity, often being

five or six feet in diameter, which is quite common. A peculiar characteristic of the bark of the tree is its tendency to shed very long slender strips of old bark, sometimes twenty feet long, leaving a smooth greenish or reddish brown under-bark; while this is a common feature of all eucalyptus it is more marked in this variety.

The flowers are white and occur high upon the tree and if one desires any specimens it is almost necessary to shoot them down with a high-powered rifle, they seem so far away. The seed cases are top-shaped or nearly globular and the valves of those whose seeds have fallen out protrude conspicuously. It is rather difficult to describe a simple way for the inexperienced to determine this tree in the field because it has no striking characteristics as does the Lemon-Scented Gum or the Sugar Gum, but if you should become acquainted with one tree, then it is fairly easy to recognize the same species when you see it again. The most prominent points are the long strips of bark which it sloughs off and the tall stature of the tree with its large trunk. It is quite similar to the Blue Gum in outline but does not have the characteristic bluish color to the younger leaves.

Where a fast growing tree is desired with possibilities of assuming great size, and there is plenty of room about it, the Manna Gum makes a splendid tree.

The Yate Tree (*Eucalyptus cornuta*) is a moderate sized rather low-branching tree with a dark, black and white mottled bark sometimes rough and sometimes smooth, fine shade tree for Southern California, which may be characterized and easily determined by the horn-like operculum or

cap that covers the flowers. The name "*cornuta*" describes the cap and has the Latinized meaning of horned, which is very appropriate as it looks exactly like the tiny horn from a miniature cow. These horn-covered flower panicles occur in groups of ten to fifteen on the flower branches and have a peculiar appearance of the head of a spiked or horned club, and when the fruiting bodies have developed, this bludgeon is even more prominent. Especially is this marked in *E. Lehmannii*, which is considered by some to be a variety of *cornuta*. The flowers are greenish white and not very conspicuous, appearing in June and again in October.

Its landscape uses are quite numerous for it is successfully planted as a roadside tree in the country or as a city street tree and is especially good in poor alkaline soils, resisting heat, drought and low temperatures. Some splendid examples of roadside plantings may be seen in the vicinity of the Whittier hills near the Rio Hondo river; it also makes a good specimen shade tree with graceful drooping branches and is splendid as a background or framing subject for a small house.

Red Gum (*Eucalyptus rostrata*) is a tree which attains a height of one hundred feet, with narrow lanceolate leaves of a livid green or reddish color, a graceful branching habit and a pretty tree.

The most noteworthy facts about this tree are its great powers of resisting drought for it seems to endure tremendous heat and dryness. It grows well in the intense temperatures of Imperial Valley. On the Colorado desert it seems to resist frosts even better than the Blue Gum, alkaline soils do not affect it greatly, and in places where the ground has been in-

undated for a considerable time it makes a good growth. The growth in height is not so rapid as other species but it assumes a fair size in a short time. Considered as a landscape tree its greatest assets lie in the drought resisting qualities for by this it may be planted where many other trees will not grow, making a splendid forest covering in many situations. As a shade tree and windbreak, or street tree where conditions are poor, it is splendid. For a large acreage of trees for water preservation and prevention of run-off there can be no better choice than the Red Gum for when the tree matures it can be cut with good profit for the wood to be used as posts, hard wood, or furniture. Especially is it suitable for the ravines and hillsides of Southern California.

The Desert Gum (*Eucalyptus rudis*) is a splendid tree and quite well suited for many uses in Southern California. It is a tree not unusually tall, although sometimes reaching eighty feet under favorable conditions. In its natural habitat it is found on river banks and around swampy land, blooming in the fall, from September to October. The flowers are inconspicuous, being white and in numerous small clusters. The tree can be most readily determined by the prominent ridge that exists between the lid that covers the blossoms and the tube of the calyx or fruit body; this is not seen in any of the other species.

Great powers of cold resistance are to be seen in the Desert Gum for it will easily endure 17° Fahrenheit, and is successfully planted in the interior valleys of Central California. It also endures drought and the extremely high temperatures of the desert. Its uses are numerous, being planted for street and highway trees,

specimens, windbreaks, and for woodlot timber growth for firewood. Principally it is used as a street tree for under the severe conditions of abuse by automobile exhaust smoke, narrow growing quarters and general city conditions, it does very well and seems to be quite happy, showing its bright green leaves all the year around under all weather conditions. Its height also is favorable because it does not grow into the telephone and electric wires so readily as do some other faster and taller growing types. With the building of many new homes on the desert and mountains in and around the Coachella Valley, the desert gum will be well worthwhile as a landscape tree for these homes, and will repay in beauty and hardiness all the care that need be spent on them to give them a good start.

Eucalyptus erythronyma forms a large shrub or a small tree, being one of the dwarf types and very useful in landscape planting for this reason. It is quite ornamental having a globular shape with bright green leaves. It is best adapted to fair soils and moderate moisture, growing well under these conditions. Its flowers are reddish but not striking, appearing in the spring. As a background for perennial and shrub plantings it is quite ornamental, and when planted with acacias and other trees, lends variation and interest to mass plantings. As a street tree where moisture is plentiful and a low tree is desired it may be used with good effect but only when the street is narrow, for on wide boulevards or avenues it would be way out of scale and the effect would be dingy and small. As a bank cover it may be highly recommended for where a rough steep bank or unsightly area exists a covering may soon be obtained by a thick plant-

ing of this species. As a natural screening hedge along property lines with shrubs in front, or as a means to plant out a river wash or ditch, it is fine. One especially noted use of this tree I once saw was a combination planting with *Acacia floribunda* and *Acacia latifolia* along the side of a railroad right-of-way that passed through a very fine residential community. The trees were all planted close together not more than six feet apart and in two years from the time they were planted they had grown together and were high enough to completely shut out the view of the unsightly tracks and telephone poles. This type of eucalyptus is not widely known among the general planters and should become more generally used as time goes on.

The Red Box or Australian Beech Tree (*Eucalyptus polyanthemos*) is a highly ornamental tree with a globular head of dense almost round silver-gray leaves. The flowers are white, appearing in small clusters in the early spring, supplying abundant honey for the bees. The trunk has a brown or gray bark, persisting, and quite rough on the older trees, the top is thickly branched and is often distorted in heavy winds making it quite picturesque. Its spreading habit makes a desirable shade tree for lawns or parkways. It grows best with moderate moisture, but will withstand considerable dryness and heat, also fairly low temperatures.

As a landscape tree we find it on lawns, as specimens, in the country, as windbreaks, and in the city as a lovely street tree. At its best it is seen near a house as a specimen, framing the sides of the building. From a distance, with its silver foliage dancing in the wind, it lends an aspect of secluded animation to a

vista, for its picturesque shape seems to take the hardness out of the building lines and softens them to a misty gray appearance, adding that feeling of distance to an otherwise very apparent object.

The growth is not rapid but it does not take long to make a fair-sized tree, and if planted where moisture is easily obtained it will soon attract attention.

While the foregoing trees in no measure include all the different spe-

cies of eucalyptus trees, they do represent some of the more striking types, particularly those that are now grown and can be purchased locally for planting in the layman's garden. If the botanical descriptions do not quite run true to the ideals of the technical botanist, I nevertheless feel that if in the preceding paragraphs I have in any way enabled the tree lovers who have the desire but not the time to become better acquainted with this wonderful species of tree, I will be more than pleased.

A Portfolio of Peony Species

In presenting the series of charming photographs by Silvia Saunders that follow, the Society is not only fortunate in having her excellent portrait studies of the peonies, but the privilege of having them made in the garden of her distinguished father, Professor A. P. Saunders of Clinton, N. Y., who has devoted many years to their cultivation and study, not only from the point of view of the horticulturist but that of the scientist who

has had to examine many of the species with critical care to be sure that they represent the name they bear.

Since this means, in many cases, the growing of innumerable seedlings and a comparison of the results with the widely scattered writings on the subject, the readers of the magazine have here a share in the work of years for which the editorial staff expresses its great satisfaction as well as its gratitude.



Silvia Saunders

Paeonia Beresowskyi

Flower faintest pink, 3 inches across, May 31



Silvia Saunders

Paeonia Brownii

Flower dark mahogany red, 1-2 inches across, May 18



Silvia Saunders

Paeonia corsica

Flower purplish pink, 4 inches across, May 20



Silvia Saunders

Paeonia cretica

Probably a form of P. arietina
Flower very pale pink, May 20



Silvia Saunders

Paeonia decora (red)

Flower very dark purple-red, 4-5 inches across, May 20



Silvia Saunders

Paeonia decora alba

Flower pure white, 4-5 inches across, May 18



Silvia Saunders

Paeonia Forrestii trolloides

Flower yellow, 2 inches across, May 30



Silvia Saunders

Paeonia lobata

Flower vermilion red, 4-5 inches across, May 31



Silvia Saunders

Paeonia lutea

Flower bright yellow, 2-3 inches across, June 17



Silvia Saunders

Paeonia lutea (erect form)



Silvia Saunders

Paeonia macrophylla

Flower thick, waxy cream-white, 4-5 inches across, May 17

This is now probably *P. tomentosa*, Stapf



Silvia Saunders

Paeonia microcarpa

Flower dark magenta pink, 3 inches across, May 30



Silvia Saunders

Pæonia Mlokosewitschii

Flower pale sulphur yellow, 4-5 inches across, May 18



Silvia Saunders

Paeonia obovata alba

Flower pure white, 4 inches across, May 18



Silvia Saunders

Pæonia, Otto Froebel

Flower satiny, bright salmon rose, 4-5 inches across, May 30



Silvia Saunders

Paeonia tenuifolia

Flower deep crimson, 3-4 inches across, May 17



Silvia Saunders

Paeonia tenuifolia flore plena

Flower very deep crimson, 4-5 inches across, May 20



Silvia Saunders

Paeonia triternata

Flower very light wild rose pink fading lighter, 3-4 inches across, May 19



Silvia Saunders

Paeonia triternata

Flower dull magenta, 3 inches across, June 1

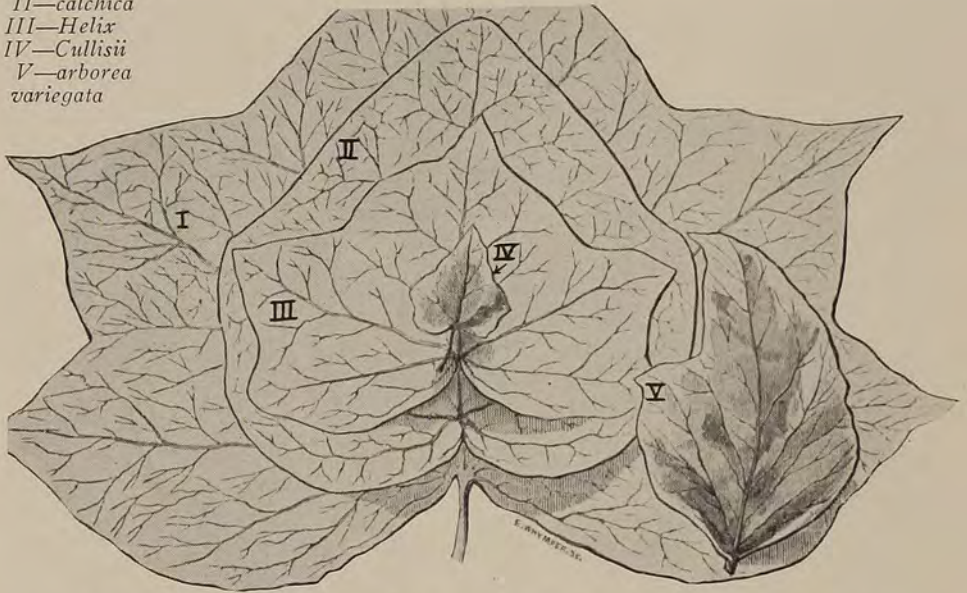


Silvia Saunders

Paeonia Woodwardii

Flower dull pale pink, 3 inches across, May 20

I—*hibernica*
 II—*calchica*
 III—*Helix*
 IV—*Cullisii*
 V—*arborea*
variegata



Group of ivy leaves, to show a few of the extremes of variation.

The Illusive Ivy. III

BY ALFRED BATES

Probably no genus of plants has been more abused by the plant-namers than that of *Hedera*. Not only has every nurseryman, florist and gardener who has had any interest in ivies named and renamed each slight variation—and then seemingly lost the label just to create the opportunity of adding another name to the confusion, and this holds for America as well as for Europe, for here with no *Hedera* native to this hemisphere we find listed a "*alleganiensis*" and a "*California Ivy*"—but botanists themselves have not always agreed as to the species of this genus, both as to the naming and as to the ranking of plants as such.

Once every form, variety and species of *Hedera* as we now know the genus, was considered to be some sort of a variation of the one species *Helix*—but even then there were some botanists who did not accept this unity. Now the genus is universally conceded to consist of several species; five as a minimum or nine as a maximum. As each species exists in both its juvenile or scandent (vining) form and its mature, or arborescent (shrubby) form, there must be ten names at the least or eighteen names at the most to start with. In so variable a plant as the one under consideration one expects to find a long list of named forms but nothing

like the huge number that a full check on the nomenclature discloses. Dr. Tobler's list of garden forms, published in 1927, shows a total of 236 but his cross check of references adds at least ten more names and there are a number which for some reason or other were not included in this list. Allowing for synonyms, it would be safe to say that the record would be as high as a hundred.

Dr. Tobler made a noble attempt to weed out the synonyms and to establish authentic names; but his interest in the genus was more from a scientific rather than from a horticultural point of view so he does not give a description with the name. That being the case it was deemed advisable to attempt to form a check list based on the priority of name before accepting any or definitely saying that any particular plant should be known under a definite name. Or in other words, to find first what each name stood for and then fit a plant to the name rather than to describe the plant and then try to find the right name for it. To do this necessitates a long and thorough search through botanical and horticultural books and magazines, both English and foreign, to find that first use of each name. Now many of the names were first published in nursery catalogs and did not make their appearance in more permanent horticultural literature until many years after their initial use; and to complicate matters more, when they did appear in this more permanent and more accessible medium, the description accompanying them is too short and undetailed to be of much help. So far, in the literature which I have examined, many of the names cannot be found to have an original botanical christening, if I may use such a term, yet botanist and horti-

culturist alike have accepted them—sometimes, seemingly, very much too vaguely. A name creeps into lists and gradually becomes current; yet when an effort is made to trace it back to find out just what that name stood for in the beginning its origin has been lost.

To illustrate: Tobler's list gives as references for the variety "conglomerata," "Haage and Schmidt's" catalog of 1875; "Nicholson's Dictionary of Gardening," 1886; "Kew Handlist," of 1925, the first really authentic description (that is by a botanist or horticultural writer) being Nicholson, where an excellent illustration is given. Incidentally this illustration and the description which accompanies it does not correspond in any way with what Tobler, himself, calls "conglomerate," but it does agree with the plant we know under that name here in America. Research through the literature available here adds the following references: Working back from the present, we find this name described by W. J. Bean in his "Trees and Shrubs Hardy in the British Isles," first edition of 1915 and all subsequent editions; by A. E. Bowles in "My Garden in Spring," 1914, page 259 (no description but useful); in "Revue Horticole" of 1890, page 163 (with a poor illustration); in "The Garden" of May 12, 1888, page 432 (a clear if not full description); in "The Gardeners Chronicle" of June 10, 1871, page 744, where a report of a Royal Horticultural Society meeting reports this name as a "new ivy for the rockery;" in the "Journal of the R. H. S." of the year 1872, page LXXXI, reports a lecture given by a Mr. Berkeley on June 7th, 1871, in which he showed the plant; "A new variety of Ivy under the name of *Hedera conglomerata*, from its dwarf compact habit, prom-

ises to be an acquisition for many purposes." Here we are up against a solid wall; "dwarf compact habit" is surely vague enough without adding that it was "an acquisition for many purposes." Index Kewensis does not help us nor does the Index Londinensis.

It is only through so detailed a search that a correct establishment of a name and what it stood for when it was first given can possibly be substantiated. If such a search does not unearth the first use together with a good and understandable description then the consensus of the nearest descriptions to that first use of the name will have to be accepted.

BIBLIOGRAPHY OF WORKS ON HEDERA

Before proceeding with the logical train of thought of this discussion it is necessary to give a condensed bibliography of the genus. Taking the present time as a starting point and working backward, those who have given any detailed attention to *Hedera* are as follows:

1. Dr. Friedrich Tobler published in 1912 what is really a monograph, though he modestly disclaims this title for his work, entitled "Die Gattung *Hedera*" which was followed up with an article, "Die Gartenformen der Gattung *Hedera*" in *Mitteilungen der Deutschen Dendrologischen Gesellschaft*, of 1927. These form the most comprehensive scientific work which we have on the genus.

2. In "Trees and Shrubs Hardy in the British Isles," first published in 1915, W. J. Bean gives a considerable list of species and varieties with condensed but excellent descriptions of each. As the Assistant Curator of the Royal Botanic Gardens at Kew he had access to both the herbarium there and the plants

themselves; a fact which should be borne in mind when consulting his work.

(I am purposely omitting Dr. Alfred Rehder's list as, for the moment, I wish to confine myself to European writers only who are dealing with native material.)

3. In 1909, Camillo Karl Schneider published his "Illustriertes Handbuch der Laubholzkunde," which was principally a digest of what had been said about the ivy by writers before him including their mistakes.

4. In the "Revue Horticole" for 1890, page 162, is a fairly long list with descriptions which was compiled by E. A. Carrière.

5. In George Nicholson's "Illustrated Dictionary of Gardening," 1886, a list is given which is both well illustrated and adequately described. As Nicholson has left us many herbarium sheets of ivy which are in the Herbarium of the Arnold Arboretum all of which bear out his descriptions he must be accepted as authoritative.

6. We now come to Shirley Hibberd's book, "The Ivy, its History, Uses and Characteristics," printed in 1872, which has been accepted as a "popular monograph" on the subject and which contains both black and white and colored drawings of the leaves of some sixty forms. Of this book more will be said later.

7. In 1870 William Paul, an English horticulturist, published in the "Florist and Pomologist," page 270, a descriptive list of 40 ivies which he considered distinctive forms and in December of that year, Dr. Karl Koch republished this same list, with some comments of his own, in "Gartnerei und Pflanzenkunde," page 403. It is to be regretted that neither of these lists included any illustrations. As Dr. Koch and his father had de-

voted some time to the study of this genus, his father, Dr. Caspar Koch, having named the species *H. colchica*, which he had discovered in the Black Sea regions while on a botanical exploration with his son, attention must be given to the fact that Koch accepted this list of Wm. Paul's and the names which were used. This same list of 40 ivies had been previously published by Wm. Paul in "The Gardeners Chronicle" of 1867, page 1215, and republished in the German floral paper, "Hamburger Garten- und Blumenzeitung," of 1868, page 17. The only difference in these two English lists is the arrangement of the listing which arrangement each German list follows respectively: In the latter list there is a more detailed arrangement than in the earlier one where green-leaved and variegated forms are not separated from each other.

As two years had elapsed between the first publication and the appearance of Dr. Koch's article, it is not unreasonable to surmise that the doctor had become familiar with the plants themselves, if he did not already know them. And to go a step further, can we also surmise that Paul and Koch had been corresponding and that at the botanist's suggestion the nurseryman had made the corrected classification? I have so far found nothing to bear this out; but neither have I found anything to the contrary.

The arranged classification of 1870 is as follows:

I. *Hedera Helix* L. European Ivy.

A. Climbing plants.

- a. leaves green throughout.
- b. leaves variegated with white.
- c. leaves variegated with yellow.

B. Plants of shrubby or bushy habit.

- a. leaves green throughout.
- b. leaves variegated with white and yellow.
- c. leaves variegated with yellow.

II. *Hedera canariensis* Willd. African Ivy.

A. Climbing plants.

- a. leaves green throughout.
- b. leaves variegated with white.
- c. leaves variegated with yellow.

B. Plants of shrubby or bushy habit.

III. *Hedera colchica* Koch. Asiatic Ivy.

A. Climbing plants.

- a. leaves green throughout.
- b. leaves variegated with white.

B. Plants of shrubby or bushy habit.

Koch in reprinting the list threw both types of color variegation together which was only natural for a botanist and probably indicates that, if my theory that he was familiar with the plants themselves is true, and that he had suggested the reformed classification, William Paul had tried to better the doctor's outline by separating the white and yellow variegated forms only to meet with Koch's disapproval.

8. Pushing back a few years more we find that Dr. Berthold Seemann after years of work on a classification of the whole plant order of which *Hedera* is a genus had discovered distinct but microscopic features which definitely made three species of what was then known as *Helix*. He found that the downy, rather felt-like appearance of the tips of the young growth, on the pedicel

and calyx of the flowers was composed of stellate hairs which were different in arrangement and in form in the three species then known to him. For the present all that need be said of this discovery is that Seemann, because of it, positively established in specific rank these three:

H. Helix, named by Linnaeus in 1753;

H. canariensis, named by Willdenow in 1808;

H. colchica, named by Caspar Koch in 1859.

At the same time, Dr. Seemann removed from the genus *Hedera* about 85 plants which earlier botanists had placed under this genus and this removal still stands. His work was published in the "Journal of Botany, British and Foreign," Vol. II, 1864, and republished in book form under the title, "A Revision of the Natural Order Hederadeae," in 1868.

Before this little seems to have been done by botanists, at least English botanists, in the naming of various forms of the ivy. Hooker, Bentham, Keakin, Loudon, Withering and Miller give practically nothing; what names they do give will be dealt with in the check list.

As can be seen from the foregoing, two men only have given this genus such extensive study as to have been able to devote a book to it: Dr. Tobler in 1912 and 1927 and Shirley Hibberd in 1872. Dr. Seemann's work covered the whole order of which *Hedera* is a genus and does not go into the horticultural and natural forms to any great extent.

DIVISION OF THE WORK

With so large a list of names to cover I have decided to divide the work into two parts. By forming a check list based upon the names given

in Hibberd's book and also including those which had been used previous to the time of his publication (1872) but not included in his book, the task becomes simpler and the question of his authority—for there is a question of it—can be settled.

SHIRLEY HIBBERD

If we are to accept Hibberd's work as a milestone along the trail of ivy nomenclature we must know something about the man in order to justify our rejection or acceptance of the names he has used. This knowledge becomes the more important because of his book being the only English work upon the subject and is still obtainable at quite a nominal price and many people who have this volume try to base the naming of their ivies upon it. To rightly judge the value of this book and to decide just how much we can rely upon his conclusions, for he played havoc with current nomenclature and created new names to suit his convenience, we must first know the man—his place in horticulture, his method of work and his idiosyncrasies.

Horticultural Standing. He was a mid-Victorian Englishman, a gardening gentleman who wrote several garden books and was the editor of the "Gardener's Magazine," "The Floral World and Garden Guide"—both gardening journals—and "The Gardener's Oracle" which was a year book quite like our garden almanacs. He was a member of the Linnaean Society for he read a paper on ivies before that society and was also a member of several horticultural societies. But I cannot find anything to denote that he was a botanist in the strict sense of the word. With this much knowledge of him and knowing the mental attitude of the

mid-Victorian gentleman it is not rash to suppose him to have had a strong class prejudice which biased him against foreigners and those Englishmen whose social standing he considered to be beneath his own. No other conclusion explains his arrogance toward Dr. Seemann or his ignoring of William Paul's list of ivies.

Method of Work. He states very clearly in his book in the opening paragraph: "The author has, for some fifteen or more years past, given especial attention to this subject, and has by various means, such as ivy hunting in the woods, purchase from gardens, and the practice of cross-breeding, obtained upwards of two hundred varieties of the plant . . ." but not one word is said about checking back through horticultural literature for any information. But he does say on page 2, that before he sold a collection to Mr. Charles Turner, a nurseryman, in 1869 "a careful revision of the names, and a close comparison of all known garden ivies was made, in order to eliminate from the catalogue a mass of confusing jargon . . ." In the next paragraph he observes that it is proper "to indicate to what extent the author is indebted to other than his own labours and resources." But he refers to none but his own in the lines which follow. Later on he thanks several nurseries for plants they contributed but still no mention of the William Paul collection which had been twice published in other garden journals than his own. He rather boasts of changing the nomenclature, giving as his reason that he considered it clumsy and absurd. It is true that in his day many cases of long strung out names were current in catalogues but I have failed to find even a handful of them given

any sanction by the botanists of whom he complained. But he also changed even the simplest of names. "Commemorative names are simply useless as aids to identification, and geographic names are nearly useless when good; and as they are generally bad, they are also generally objectionable." A perfectly silly statement for a man to make in defense of his egotism. So he wiped out everything regardless of botanical priority. That many of the pre-Hibberd names still persist in spite of the circulation of his work both in magazine and book forms shows that his innovation was not sound. Of course, he drew down the wrath of botanist and gardener alike and there were many scathing remarks passed back and forth in the garden papers of that day. Much as I should like to include all this controversy the limits of my space forbid and only such parts as bear directly upon the points to be stressed will be used.

It is always easy to criticize—and may I meet with the same harshness which I am showing—but the following facts and observations must be given. The first record of his interest in ivies which I have been able to find appeared in the first volume of "The Floral World and Garden Guide," 1858, under the title "About Ivy." Much of this article is used verbatim and in his book and the drawing which appears on page 60 of the book is also given here. But while in the book nothing is said about it except what is printed beneath the cut, in the article an explanation of it is given. I consider this a case of careless and unscientific workmanship. For those who have the book and have been wondering, like myself, what the leaves were and because it establishes some

leaf-forms I am giving the drawing with the names of the leaves added to the photostat of it. I quote from the article: "in the diagram the third in size is a leaf of the common helix but it varies much in the shape of the leaves, the largest of the outlines is the well known Irish Ivy—" (that is *hibernica*; he also remarks that he could have shown a leaf twice the size)— "H. Regneriana is represented lying immediately on the large leaf—" (the correct name is *H. colchica*). The strange part about this name is that it was known in gardens as early as 1850 under various spellings but was never published, as the editor of "The Gardener's Chronicle," 1851, notes that he "cannot find this plant mentioned in any work on systematic botany" and was finally published under the name *colchica* in 1859 by Caspar Koch after having seen it in its native land—"H. arborea variegata on the right of the diagram— The only remaining fancy variety in my possession is *H. V. Cullisii* of which the smallest leaf in the engraving is a copy—."

In this article nothing is said regarding the length of time he has spent in the study of ivies. If we take the "fifteen, or more years past" which he gives in the preface to his book to mean from the date of publication then he is just beginning his term. This is probably correct because of several things he says. He rather vaguely lists ivies as being "British varieties;" —*Helix, arborescens, digitata, foliis variegata, foliis aureis and vulgaris* (this last is but a synonym, which he later on says himself, of *Helix*). Then he speaks of those five which are shown in the drawing, one of which has already been listed, which brings the total up to ten; but he says, after speaking of the Irish Ivy, "Among the

hardy kinds there is only one other worth special notice, and that is *H. taurica*, introduced in 1841," (this is the only mention of any date of introduction which I can find in any of his work), which brings the total number of the ivies known to him in 1858 up to eleven.

In 1864 he again comes into print; Vol. VII of the same magazine, "The Floral World and Garden Guide," gives an abridgment of a paper which he read before The Central Society of Horticulture. Again the material of the article is re-used almost word for word in his book. Remember that this is the year in which Dr. Seemann's discovery regarding the hair-formation which is the final mark of distinction between the species was first published, yet Hibberd says: (but this is not included in his book) "There are strong probabilities in favor of considering the majority of the so-called species merely as forms of one specific type. That *H. canariensis* and *H. Helix* are so related is now generally admitted; but there are good reasons for regarding *H. Regneriana* and *H. cordifolia* as scarcely entitled to be regarded as species, for in their several varieties they approach so near to varieties of *canariensis* and *Helix*." I cannot understand why a man studying a group of plants would not make it a very vital point to become informed of what was going on about him along the lines of his own study. Then follows a list of 52 varieties with descriptions of each; one of these, however, is not an ivy at all but a "tree or shrub." What is most noticeable is that he is still retaining the nomenclature of the day save that he does not list, even as a synonym, the authentic name of *colchica* which had been published by Caspar Koch five years

before, and that he uses the word "marginata" before the current name of several variegated forms, a use which I can find nowhere else. Notice that there is an increase in number from the eleven of 1858 to fifty-two during these six years.

In the "Garden Oracle" of 1870 appears another paper, also an abridgment, which he had read before the Linnaean Society in 1869. In this paper, his "reformation" of the nomenclature is offered for the first time; but strange to say he still retains some of the least sanctioned botanical names of the arborescent forms. Also some of his descriptions are better and more detailed in this list than in his book. This list contains only fifty items; so that we must judge that the years between 1864 and 1869 were barren years indeed. The list given in his book contains sixty-five. One thing upon which I wish to lay great stress is that he still ignores Seemann's work on this genus which was published five years before; the question in my mind is whether he deliberately ignored it or did not know of its existence. Either explanation is equally damning.

HIBBERD'S BOOK ON THE IVY

We can now consider the book which he wrote. In the first place I wish to recall that much in it is reprinted verbatim from his earlier writings on the subject. Fifteen years of "study" has not given him a fuller knowledge of his subject except to desire to change names. Secondly, I wish to recall attention to the fact that the two color plates in the text are transposed and that references to them through the text must be reversed, always reading the one for the other. This error is also made in the listing of the plates in

the front part of the book where "The Plate facing Page 62" should read page 78 and vice versa. However, we may lay that blame upon the printer's shoulders. But we also find that "Plate facing Page 62" (read 78) "contains portraits of seven varieties" which it does but only six are listed in the notes which follow and only by searching through the text do we find that marginata grandis, page 78 of text, is the seventh portrait on that plate and that this variety is also shown in black and white drawing on page 85 although the description of this form which is given on page 78 contains no reference to that drawing. These are things which force us to question the thoroughness and the carefulness of a writer.

Hibberd is not clear as to just what he means by the names which he gives in the parentheses after the names which he lists under the chapter headed "Descriptive List of Garden Ivies." He says that they are synonyms; but he also includes names of garden usage and names under which he had received plants from nurserymen. Now these last two classes are not synonyms any more than if I should receive a "La France" rose from a nursery under the name of "Ville de Paris" I would be justified in saying that "La France" was a synonym of "Ville de Paris." I maintain that his idea of, and his use of, "synonyms" is altogether unscientific and deceiving.

Under the chapter headed "Descriptive List of Garden Ivies" are catalogued sixty-five names according to his change in nomenclature. At the head of the index occurs this note which I quote in full:

"The entries in small capitals represent names adopted in this work; entries in italics represent synonyms

under which many of the varieties may be found in garden catalogues. The letter (H.) implies that the author of this work is responsible for the names to which the letter is appended. The addition of (Hort.) to a name implies that it is an established garden name."

At the date of his writing, and if he had only worked more scientifically, he could have very easily given the author of the names which he assigns to (Hort.); now sixty years later the task of finding that authority has become much more difficult and in some cases perhaps impossible. To one name only does he assign authorship and that is to *Helix* where Linnaeus is given credit. Let us analyze the remaining sixty-four.

We find that he allows ten of this number to retain the names then current. Of the remaining fifty-four, eleven are absolutely new forms of ivy which he had found or obtained from crosses (a statement which I doubt for he had no distinct species to cross) and these eleven names may stand, for the present at least, although it seems that two of them—"marginata" and "variegata"—had been used before for other plants and also with combining words. Even among these eleven several have other names in parenthesis, but as I can find no use of them in the literature which I have examined so far, I am surmising that they were very loosely used in error and so give him the benefit of the doubt. This reduces the list to forty-three.

Of these Hibberd deliberately takes the credit for the names of four even though these names were then valid and in constant use among botanists. There is absolutely no excuse for this.

Of the remaining thirty-nine, all of them having names more or less

loosely sanctioned through current usage, I find that if we are to follow priority of nomenclature as approved of by the Botanical Congresses at least fourteen of these names must remain and Hibberd's names are void. Of the remaining twenty-five, some are still in question, either because I have not yet found a positive lack of description, or that I question the plant's differing from another, or that I am still uncertain as to just what Hibberd means to imply by his description. I want to call attention to the fact that Hibberd, with but few exceptions, wiped out the nomenclature of the William Paul list which had twice been published and that many of these names had even been used by Hibberd himself in his paper of 1864.

Thus far we have been judging Hibberd's work from his own writing upon the subject and under the favorable conditions which the magazines he edited would afford him. Current adverse criticism through the medium of other horticultural papers will now be cited.

As there were no changes of nomenclature in his paper of 1864 no comments were made as far as I can find. But it was different with the paper of 1869. This was reviewed in "The Gardener's Chronicle" of December 4, 1869; according to this magazine it was not read by Hibberd but was "communicated by Mr. W. Robinson" before the November 18th meeting of the Linnaean Society. In the next issue of this journal, December 11, page 1281, Dr. Seemann replied at considerable length; all that he says is so pertinent that I find I shall have to quote his remarks in full. He refers to the brief abstract which had been made in the previous number and says that he has "also seen the full report. Mr. Hib-

berd does me the honour of adopting, though without acknowledgment, my interpretation of the genus *Hedera* and the species composing it, as published in my 'Revision of *Hederaceae*,' pp. 29-36, illustrated with woodcuts and plates. He tells us that, during the last 15 years, he has assiduously collected and studied the species and varieties (so-called), representing the three well known types, viz., *H. Helix*, L., *H. canariensis*, Willd., and *H. colchica*, C. Koch." (He then speaks of the work he has done disentangling the different species.) "That these three types are well known, as Mr. Hibberd asserts, may be doubted, though I have tried hard, both by description, woodcuts and plates, to make them so. I could find no specific character in the form of leaf, and had to rely in *H. colchica* upon the scaly covering of the calyx and pedicel, in *H. Helix* and *H. canariensis* upon the nature of the stellate hairs covering the same organs * * * I have no fear that any transitions between the scaly and the stellate-haired Ivies will be discovered, but it is quite within the range of possibility that some may turn up which may obliterate altogether the characters relied upon for distinguishing *H. Helix* from *H. canariensis*. A careful study of our garden Ivies might thus prove of direct scientific value, and I was in hopes that Mr. Hibberd's paper would have been the result of such a study. But I cannot help thinking that he has been ill-advised to submit his researches in their present raw state to the consideration of the Linnaean Society. He is altogether wrong, as every botanist will tell him, to change well established names—absolutely unassailable as far as their right of priority is concerned—because they do not harmonize with

the system of nomenclature set up for his varieties. Who would dream of following him in rejecting the name of *colchica* for that of *coriacea* (all ivy leaves being coriaceous), and that of *canariensis* for the (relative) name of *grandifolia*? Nor do I think that the author has any very clear notions of the object and character of classification. He puts the varieties of the different species in four divisions. This, of course, would be a convenience to any one searching them out by diagnosis arranged under these headings. But unfortunately, the different divisions break down, so that some varieties, as he tells us may be classed under several of them. The scandent Ivies may become fruiting and arborescent if you wait long enough, and the arborescent have an inclination to become scandent if opportunity presents itself (proximity of an old wall, rich soil, etc.). This should have taught Mr. Hibberd that his classification is absolutely useless, and that he ought to try to find in another direction more reliable characters for his purpose. At all events that is the lesson it would convey to botanists. To lead in any question it is necessary to make oneself acquainted *with all that has been written thereon*, and then endeavor by additional study to advance it. [The italics are mine.] I do not think that Mr. Hibberd has done this. There are many observations about the varieties of ivies of which he does not seem to have taken cognizance and hence his paper is not up to the mark. He is perfectly mistaken, for instance, in considering the Irish Ivy of gardens as a variety of *Hedera canariensis*; it remains yet to be shown that it is aught else but a variety of *H. Helix*. He has evidently confounded it with the

sharp-leaved Irish Ivy which is a form of *canariensis*. It is, therefore, most reprehensible to change the name of *H. canariensis* for *H. grandifolia* when this large-leaved, quickly growing form of *H. Helix* has nothing whatever to do with *H. canariensis* true. Again, about *H. Helix poetica*. Is not this *H. poetarum* (*H. chrysocarpa*, Walsh, in Hort. Coc. Trans. 1826) which has yellow fruit, and is the classical Ivy of Kissos, the plant of which Pliny speaks as *Ederae* genus *chrysocarpon*? And why is it placed amongst Mr. Hibberd's scandent, non-fruiting division? What strikes one as singular is that some varieties, of which (if I understand Mr. Hibberd aright) the flowers have never been seen, are classed under *H. Helix* and *H. canariensis*, respectively. Now, as the flowers are absolutely necessary to distinguish the species, how does Mr. Hibberd manage to classify his varieties under these two species? If the characters I have relied upon for distinguishing the three species hold good, the most simple way of classifying their varieties would be to divide them in the first instance into black-fruited, yellow-fruited, and white-fruited kinds, and then again into subdivisions, characterized by the form and nature of their leaves and general habit. I have never been able to find out, and perhaps some of your correspondents may be able to answer the question, whether Ivies with white blotched leaves have white fruit, and those with yellow blotched leaves have yellow fruit. If so, it would materially simplify the classification. Biologically, too, some of the varieties may be distinguished, some being liable to be killed by a temperature which others will stand without any ill-effects; and again, while the tints of the leaves of some

are not affected by temperature, others undergo a perceptible change as soon as the thermometer sinks below a certain degree. All this and a great deal more will have to be fairly met before we are in a position to deal definitely with the classification and nature of our garden Ivies. Mr. Hibberd, I trust, will not be discouraged by this and kindred criticisms from pursuing the subject, but rather regard it as a spur to a further series of observations, which may help to set a question at rest in which scientific botany and horticulture are alike interested."

The next week's issue of the same journal ("The Gardener's Chronicle," December 18, 1869, p. 1308) contained a reply from Hibberd which began: "Not having seen Dr. Seemann's Revision of *Hederaceae*, and hearing of it now for the first time, it was simply impossible that I should, in my paper on 'Garden Ivies' acknowledge my indebtedness to him." He then goes on to ask if the doctor had not gained information from papers which he, himself, had written and attempts to justify himself in his suggested changes by suggesting two sets of names, one for the gardener and one for the botanist. Then he makes a bad mistake in his Latin by maintaining that "marmorata" "does not mean veined or colored like marble, but hard and cold like marble," and later on some one else takes him to task for this error which no schoolboy would have allowed himself to make. But he concludes his defense with: "I do not expect that my classification will endure for all time, but I maintain first, that it is my own, and the result of much observation and some little hard work; second, that it is calculated to be useful to cultivators, and perhaps suggestive to the botan-

ists who appear to be too often prepossessed with the idea that plants were made for their names, whereas in truth their names must be made for the plants."

That was the end of the Seemann-Hibberd controversy for the Doctor sailed for the Pacific Ocean on a botanical exploration from which he never returned; but Hibberd lived to publish his book in the form which he had intended for it and without the further study which Seemann had suggested.

Idiosyncrasies. As I maintain that to judge the value of his work on Ivies, which Dr. Tobler seems to take more seriously than I now do, one should take into consideration the idiosyncrasies of the man, I feel that the conclusion may safely and fairly be drawn from the foregoing that he

was self-opinionated, very proud of what he considered his accomplishments, set in his ideas even unto stubbornness and thoroughly unscientific. These are qualities which prevent a serious consideration of any work which proposes to stand as authoritative. However, I wish to say this for his work that because it was written from the gardener's point of view there are many cases where his descriptions are better and clearer than those of the botanist. Therefore his book on *The Ivy* falls back into its place as merely one of those prettily illustrated parlor books on gardening whose chief value to us is in the record of Ivy names prevalent in that day and in those of the illustrations which may prove to be unexaggerated.

(To be continued)

The Forms of Pine—IV

By ARTHUR D. SLAVIN

DWARF FORMS

We now arrive at what, at least in our present plantings, appears to be the most popular type of coniferous materials. As may easily be seen by the popularity of herbaceous plantings, selections of small plants are now the vogue. This is rightly so and for many reasons, the most important of which in my mind is the opportunity that the use of these plants offer in our small private areas to create maximum effects. Let us go on—and as we become better acquainted with our opportunities we shall make equal use of both woody and herbaceous plants.

The dwarf conifer, regardless of the genus it may represent, has a very definite place in ornamental work. At the present time, it is most commonly used for foundation planting. In our better rockeries, we are ever observing an increased employment of these plants. About the only place where it does not appear to be well employed is its use as a dwarf evergreen in specimen planting. In this last instance, it is only common in vast plantings or in scientific collections where it has been so placed to observe its character and reaction to the surroundings rather than as an object whose primary purpose it is to display beauty. Let us hope that as we become more plant-minded, we will make better use of our opportunities in this direction.

Some faults may be found with the present uses of small or slow growing conifers especially in relation to their

selection and placement in garden groupings. A fine tree in good health is in most instances an object of beauty regardless of its immediate surroundings. With the smaller materials such is not always the case. There must be a certain consonance or relation between it and its surroundings. A small plant set out in the midst of a large lawn and backed by a structure of some size cannot be accepted as an example of good planting; neither can a large tree planted as foundation material close to the house where it covers windows and prevents the admission of light be considered as good design. All plant materials must be chosen with care, and most important of all, there must be ever present a mental picture of how the layout will appear when it reaches a fairly permanent degree of development. Set rules cannot be laid down for any plant and only suggestions may be given. At best even these are flexible. I cannot think of any method which surpasses that of knowing the character of the plant itself and its reaction in the particular location where it is to be used.

One general suggestion may be offered. The dwarf pines are particularly adapted to rock garden work, their low bulkiness and quaint appearance making them especially useful for this purpose. The garden must be of some size to accommodate more than a few and except in rare occasions they should not be placed at the highest points of elevation where they may cause a top-heavy or barren

appearance. Some exception may be made to this later statement with those forms which depict the gnarled, unsymmetrical habit so common with the dwarf oriental forms.

Pinus strobus nana is a good beginner for a list of these materials. It belongs to the White Pine family and has a distinctly descriptive name, the word *nana* meaning small. This variety is not well known in cultivation and several distinct forms under the same name are in distribution. The true *nana* in so far as I am able to determine is the same plant as that often known as *brezifolia*. Surely if anyone wants a job including a multitudinous amount of book research, let him take up the work of straightening out the names of the dwarf conifers. In this instance, if one is fortunate enough to have the right thing, he will find it well named. It is a small, irregular form with several main branches and small leaves which seldom exceed two and a half inches in length. A plant at Rochester is perhaps a bit more than eighteen inches tall after ten years. Mr. Clarence Lewis has a beautiful little plant about fifteen inches high at his home at Sterlington, New York. A specimen under the same name and growing at the Arnold Arboretum, is I judge, ten feet tall. Whether they are all the same thing I cannot say. The plant at Rochester appears to be quite tender and makes little growth. The specimen at the Arnold Arboretum is broad and bushy in habit.

Pinus strobus umbraculifera appears to be a far better form. The habit is spreading or umbrella shaped and the height of the plant appears to vary. This later condition is dependent upon the type of wood taken for propagation. If grafts are made from terminal wood, a specimen of erect character is obtained; while if

lateral branches are used as scions the growth is pendulous or prostrate. This is the only solution I can offer for the presence of both erect and prostrate forms unless we admit the possibility of the specimen having been pruned to shape, a practice not common in the propagation of this type of plant. The foliage really makes this plant. It is of average length, three to four inches long, and is arranged in dense, drooping tufts on the branches. The largest plant I have seen is now about three and a half feet high and more than two feet through. Hornibrook in his "Dwarf and Slow Growing Conifers" shows an illustration of a plant from his garden in England. This specimen more than ten years ago measured five feet tall by four feet through. If this variety can be made to thrive with us it should be useful in the rockery while small, and afterwards can be used elsewhere as a specimen plant.

A choice little fellow for the rockery or, in fact, where ever a low plant is desired is *Pinus strobus prostrata*. This variety reaches the minimum as regards height in dwarf pines. It is entirely prostrate, the branches spreading from a common crown along the ground in all directions. The foliage is of regular size and with a little training of the branches an excellent ground cover is obtained. Such forms as this are particularly desirable for rock falls and a pine of such character is sure to be an attraction. Place the plant in good soil with plenty of room for root development and so arrange the rocks that the branches will grow over and down the sides. This is only a bare hint of the many possible uses of this little fellow. Where there is danger of severe cold or late winter frosts it is best to afford a winter covering of leaves and boughs as a means of protection

against browned foliage and frozen buds.

A fourth form of *Pinus strobus* is the form *contorta*. This was originally found growing in Seneca Park at Rochester and was described in the Proceedings of the Conifer Conference, Royal Horticultural Society, London, 1931. It is characterized by the twisted, contorted arrangement of its branches, which, in a plant of medium size, result in a specimen of irregular or oval shape with the branches and foliage extending in many planes. The leaves are of normal size and color. The age of the type tree is unknown but it has passed at least the two score mark. It is now sixteen feet tall and nine feet through. It may seem from these dimensions that it should be placed in some other than the dwarf group, but as only those specimens which have reached great age may be expected to reach tree size it is best mentioned here. The first plant to be propagated from the type was grafted thirteen years ago and is now but little more than four feet tall.

In the White Pine group we have also one species which, in cultivation, develops dwarf tendencies. This is *Pinus aristata*, the Hickory Pine, found in Colorado, Arizona, and the drier sections of California. In the wild it is recorded as a tree sometimes attaining forty-five feet but is most generally found as a bushy form. When cultivated in our Northeastern States the later condition appears to prevail throughout. Plants six to ten feet high and of about the same breadth may be considered as average size. It is rather spreading in habit with generally three or more main branches ascending from a common base. The branchlets are not long, and after making their growth, they take on a light orange color.

Its foliage is its most valuable character. It is short, seldom exceeding one and a quarter inches in length, stiff, and dark green with minute white specklings over the entire surface. This later condition is caused by minute excretions of resin which crystallize and have a whitish appearance. When viewed from some distance the leaves appear a grayish or bluish green this being caused by the close mixing of the dark green color and whitish spottings. The accompanying illustration shows a specimen seven feet high and broad which has been planted about thirty years. No undue apprehension need be caused by its slow growth. It is a prize even when small and in conjunction with this statement it may be said to develop at a good rate until three or four feet tall whereupon it becomes more complacent and settles down to a slower rate of growth. Its possibilities are many but it will always be most popular as a specimen plant. It is sufficiently irregular to remove any danger of a too formal or straight line planting and if placed in fertile soil it needs only moderate protection against sweeping winds and winter sun. While young a few stakes surrounding it and interwoven with branches or evergreen boughs will afford an excellent guard during the winter until it becomes established.

Let us now leave the five-needled group which, despite their usefulness and beauty, must often be left out of the garden because of their several diseases which prohibit their being obtained. The remainder of the dwarfs have not this restriction and thus may be employed as one desires. The first is a form of our native Red Pine, *Pinus resinosa globosa*, a roundish dwarf form. This little conifer was, I believe, first found at the Arnold Arboretum. It is a densely



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Pinus aristata

branched, strong growing plant of generally globose habit. The foliage is that of the species but more crowded and so arranged as to appear somewhat tufted. If my memory serves me right, the specimen at the Arnold Arboretum is now more than

eight feet high and about twelve feet in diameter. Entirely hardy as is the species, it asks nothing more than good soil in which to grow. Due to its eventual size, although as a young plant it maintains small dimensions, it can hardly be recommended as a



A. D. Slavin

Pinus resinosa globosa

material for foundation planting unless the buildings are of large proportions. It may well be employed in irregular groupings to act as a shelter or low windbreak for small materials especially of the herbaceous type. Where there is room, specimen

planting, judiciously arranged, is perhaps its best adaption.

Another form of the same varietal name but of a different species is *Pinus densiflora globosa*. An old favorite of Japanese gardens where it was first found, this dwarf Japanese Red



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Pinus densiflora globosa

Pine has proven hardy throughout our Northeastern States. In habit of growth, it is similar to but more narrow than the globular Red Pine just described. The best designation would be to consider this form globu-

lar and the *Pinus resinosa* form sub-globose. In outline it is quite regular with closely set branches ascending and somewhat spreading. Definite characters of the branchlets make for easy determination. These are orange

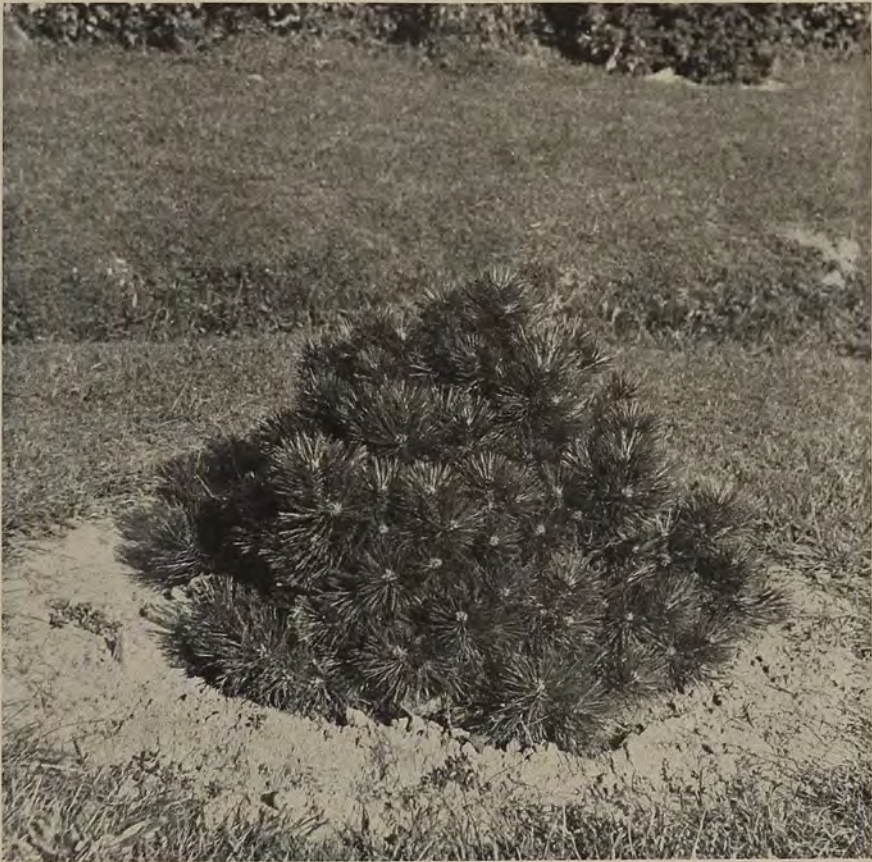
yellow and covered with a pale bloom. The foliage in some respects simulates that of the native Red Pine but is shorter, more slender, and generally tufted. It is also a brighter green. To enumerate the uses of this variety would be to repeat what has been said of *Pinus resinosa globosa*. The principal cultural requirements are a good, well-drained soil and some protection against severe blasts and late winter sun. How large this plant will grow is not within my power to forecast. I know of excellent specimens eight feet high and of equal breadth.

The second of the Japanese Red Pine forms is the variety *umbraculifera*, known also by its native nomen as the "Tanyosho Pine" and sometimes sold under the name *Pinus Tanyosho*. Its habit of growth is characterized by a broad flat crown made up of densely arranged somewhat plicate branches. The foliage and color of the branches are the same as in the variety *globosa*. As its name indicates, it is umbrella-like in shape with a broad flat growth which appears at the top of a gnarled and twisted trunk. Specimens which I have seen would tend to demonstrate an average height and breadth of about three and a half feet. The late Dr. Wilson may be considered an authority on the possible dimensions of this plant having seen unlimited numbers of them in Japanese gardens. In his "Conifers and Taxads of Japan," he mentions two to four meters as the size of this variety. In the rock garden it is always useful, its picturesque habit making it an essential plant where ever the oriental aspect of ornamentation is to be especially considered. Cultural rules are the same for this variety as for the other forms of the species.

The Black Pine, more commonly known as the Austrian Pine, although

really not the same tree, is not widely represented nor known among the dwarfs. For this reason and also because it is so hardy in our climate, varieties of this species are particularly envied by the more exacting gardeners. The first to be mentioned is *Pinus nigra prostrata*. I know of no specimens in America and it is presumably a form found in Europe. It is true to name in habit of growth with irregular wide spreading branches. The foliage is about half the size of that found in the species. If this form is present in this country, means should be found for its distribution. As a rock garden plant or low ground cover in foundation planting it would prove popular not only for its utility but for its oddity as well.

A second form which originated in the Bureau of Parks at Rochester is interesting. I have named it *Pinus nigra Hornibrookiana* for Mr. Murray Hornibrook, the noted English Authority on dwarf conifers. (Proceedings Conifer Conference, Royal Horticultural Society, London, 1931.) The development of this little fellow is at least entertaining. On one of the Austrian Pines growing in one of the local parks, there was noticed, some years ago, what is known to horticulturists as a "Witches Broom." This being a sport growth which in most instances assumes the appearance of a dense mass of branches and foliage. It is generally conceded that such growths are caused by abnormal physiological conditions or insects which induce an abnormal growth of grotesque appearance. Most of our ornamental plant oddities which are not found as seedlings are developed in this way. Scions were taken from this growth and grafted on seedlings of the Austrian Pine. This occurred thirteen years ago. The result is now



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Pinus nigra Hornibrookiana

a group of plants of low, irregular globose habit with dense branching habit and typical Austrian Pine foliage except in the length of the leaves which measure only about two and a quarter inches long. At the present time the average height of the oldest plants is twenty inches with a cross section of about three feet. They are most hardy with a growth tendency which is directed more towards denseness than increase in size. In rockeries to sufficient size to accommodate this plant there is hardly anything more picturesque and as a material for foundation planting it leaves little

to be desired. There is no danger of its growing above windows and its bright green foliage, almost matted together, is sure to afford either a foreground or back of such sufficient fullness that it will never appear scanty.

Approaching the climax of our discussion, we now prepare an attack, though by no means with enmity, upon those small conifers which are more common in our gardens. With few exceptions all are obtainable in the trade and here probably lies the only criticism which can be cast upon them. They are, for the most part,



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Pinus mugo mughus

the only dwarf pines which one may obtain without considerable plant hunting into the forgotten nooks and test gardens of the nurseryman.

The Mountain Pine and its slow growing varieties are perhaps the most common of this group. *Pinus mugo* is the specific name and although itself generally a dwarf, it is also represented by such geographical tree forms as *rotundata* and *rostrata* already described. It would be difficult to say just exactly what form of growth is represented in the type without going back to the original description. The plant most often sold by nurserymen is really the va-

riety *mughus*. It is my opinion that the true Mountain Pine is found in the higher altitudes of the French Alps and is globular or elliptic in shape with erect or ascending branches reaching an average maximum height of about twenty feet. It is reported that this same tree is found eighty feet tall but such specimens are probably to be seen only at lower altitudes. The leaves are arranged in sets of two's and are quite stout, dark green and one and a half to more than three inches long. This form to which I refer as the type is not common in ornamental work and I have seen but few specimens of it. Several plants



A. D. Slavin

Pinus mugo compacta

at Rochester are about six feet high after thirteen years.

The form, *Pinus mugo mughus* which, as previously stated, is often sold as *Pinus mugo* is a more distinct dwarf. Its popularity in the trade is due to its coming true from seed when such material is collected in its native habitat. It is a truly ornamental shrub and the fact that it is more common than the other dwarf pines should not discourage its use. It is most easily identified by its rather irregular and spreading habit. The branches in most instances are horizontal, lie close to the ground and ascend abruptly towards the ends for a distance of several feet. The foliage is identical with the type. Older speci-

mens are recognized by their symmetrical cones. Little need be said regarding cultural requirements of this group. They are all hardy in most sections of the country and if given good soil and drainage will seldom fail to give satisfaction.

Pinus mugo compacta, an introduction of the D. Hill Nursery Company, Dundee, Illinois, is, in my mind, the best small pine now commonly available in the trade. As a rockery plant or in foundation planting, it fulfills its purpose admirably. It is of a most distinct, shrubby habit and globose form with thickly set branches and dark bluish green leaves one to two inches in length. Probably no one knows how large this variety will



A. D. Slavin

Pinus mugo Slavini

grow, albeit there is little danger of it reaching more than several feet. Specimens in the Highland Park Pinetum at Rochester planted out in 1922 are now slightly more than two feet and three feet in breadth. As an additional feature, this pine should adapt itself well to formal work such as borders and even low clipped hedges. In the later case extreme care would be necessary for success and disbudding rather than clipping is the proper procedure to maintain plants of good appearance.

The last of the Mountain Pine forms is of low, spreading habit.

Close observation will show it to be related to the variety *mughus* which is only true, it being a seedling of that form. It was found in the Durand Eastman Park Pinetum some years ago by my father, Mr. Bernard H. Slavin, and was given the name *Pinus mugo Slavini* by Hornibrook. Dwarf and spreading in habit with almost procumbent branches and erect branchlets which are covered with dense bluish green leaves measuring one to almost two inches in length, it forms a low, widespreading shrub. It may well be mentioned as a diminutive of the variety of which it is a seedling



A. D. Slavin

Pinus sylvestris Watereri

wherein the lack of size is compensated for by the density of its growth. The type specimen now measures two feet tall and a little more than six feet in breadth. Its location on a slope of fair grade suggests one of its most useful adaptations, also for covering banks and terraces where a grass turf cannot be obtained nor is desired. In a rock garden where space is available, it makes an excellent ap-

pearance if left to creep over flat, ragged boulders. For foundation planting let it suffice to say that it fulfills its purpose excellently.

Pinus sylvestris Watereri belongs to both the color and dwarf groups. As a well developed specimen both it and the columnar form *fastigiata* are probably the best ornamental examples of the Scotch Pine. Known most commonly in Europe as variety *pumila*



A. D. Slavin

Pinus sylvestris nana

and described by continental and English authorities as a small, generally globose shrub with glaucous foliage, it is mentioned by Rehder of the Arnold Arboretum as a dense columnar form with short, steel blue foliage. For my part, I prefer to take a middle course and say that it is a dense shrub, globose or almost so when young, becoming oblong and straight sided with age. How tall it will grow I am not prepared to say, but that it is not a small shrub may be easily understood when the following dimensions are given; specimens in the Pinetum at Durand Eastman Park whose age does not exceed twelve years now measure from five to six feet high and are still making vigorous growth. Hence, the suggestion that this variety may reach fifteen or more feet is not impossible. I would not, however, care to describe it as a tree form. The breadth of the specimens mentioned above is four to five feet. The branching is of course dense and also ascending with the branchlets having a tendency to become erect. The reddish brown color of the branches is not noticeable as in the species because of the dense

foliage covering. It is present, however, and may be used as a means of identification. The leaves, a beautiful soft bluish green, contribute the final characteristic of this form. As a plant material in ornamental work I can think of no better conifer where a small specimen plant is desired. Its habit of growth and foliage combine with almost any color arrangement and it is most hardy. For good growth we need only repeat two things, good drainage and rich soil.

The last form to be mentioned is similar in some ways to the preceding but differs to an extent that makes its mention necessary and its uses worthwhile. Known as *Pinus sylvestris nana*, it is of irregular or somewhat globose habit with short horizontal or ascending branches. The foliage is bluish green but not as distinctly so as in the preceding variety. The leaves are also shorter seldom measuring more than one and a half inches. A good specimen offers a stocky, rather quaint appearance and is invaluable for foundation work. Growing steadily but slowly, plants of fair age measure three to four feet high and generally one foot less in breadth.

The Persian ("English") Walnut in the Eastern States

By H. F. STOKES

Like most things that have fallen under the thralldom of man's desire, the Persian walnut has had a varied, far-flung and oftentimes romantic experience. Originating somewhere in Asia it was evidently carried along the caravan routes of the Orient and was thus established entirely across the continent at a very early period. The Greeks knew it well before the Christian era. The early Romans dubbed it *Juglans regia*, the royal nut, and it was apparently a camp follower of the imperial legions throughout Europe. Spanish missionaries brought it to California by way of South America, while the eastern states have many seedling trees from nuts direct from Europe.

As might be expected from its wide distribution, the tree, with its fruit varies widely in its characteristics. Some strains from warm climates are almost sub-tropical in their sensitiveness to cold; others, from more severe climates, withstand temperatures of many degrees below zero without injury. Some trees bear nuts of great size; others bear nuts almost as small as filberts. Some have thick, hard shells; others have shells that can be crushed between one's fingers. The kernels of some strains are dark, shrunken and made bitter with a tannin-laden pellicle; others are bright, plump and sweet.

While ordinarily there is wide variability in the seedlings, where human selection has been practiced for long periods, seedling nuts of well fixed characteristics have been the result. Most of the European varieties are of this class. The Santa Barbara soft shell, which goes to make up

the greater part of the California crop, is also a seedling nut of this type. Great advance in the art of propagating walnuts by budding and grafting has been made in recent years, so at the present time practically all new commercial plantings are being made with grafted trees.

Soil requirements for the Persian walnut are the same as for the American black walnut, the ideal being a deep, rich, moist, well-drained soil, neutral or slightly alkaline in reaction. When once established, however, the tree will persist under very adverse conditions. The writer has in mind a twenty years' old planting on a very poor sandstone ridge on a north slope of the Alleghany mountains in Virginia.

Some of these trees, which are of the Rush variety, grafted on American black walnut roots, are little more than shrubs, but they continue to live on and produce annually a light crop of very excellent nuts.

Persian walnuts seem to thrive best in a summer climate, not too hot and a winter climate, not too cold. While California produced the bulk of the American crop, the nuts of Washington and Oregon command the top price.

There seems never to have been a serious effort made in the East to grow Persian walnuts on a commercial scale, though the writer is of the opinion that if the problem had been attacked with the same vigor, intelligence and openness of mind that has characterized horticultural progress in the West, they would be a commercial product of the East today. With the exception of the far

South, it may be stated that they may be grown with a fair degree of success wherever peaches can be grown, and some of the more hardy sorts well outside the peach belt. The Broadview variety, originating in British Columbia, is said to withstand temperatures of 30 degrees below zero with injury. The Crath, introduced by a missionary by that name, from the Carpathian Mountains of Russia, seems perfectly hardy in Toronto. The Rush, Hall and Alpine are mentioned as being hardy in New York State. The two latter are of mammoth size, the Alpine being rather the better nut of the two.

It is noteworthy that the performance of named varieties on the Pacific Coast is no criterion as to what their relative performance will be under Eastern conditions. Of the better grafted varieties grown commercially in the West, Franquette, Mayette and Eureka are generally recommended for eastern planting. All are late-blooming sorts, blossoming at the same time as the Thomas and Stabler American black walnuts. The Franquette has proven disappointing with the writer because of late fall growth and winter killing of immature wood. Mayette has proven hardy but a rather shy bearer. Tests of Eureka are not yet conclusive.

Of all varieties tested under Virginia mountain conditions, the Payne appears the most promising. This remarkable new variety of California origin foliates a week or ten days earlier than the Franquette; grows riotously until the first of June, ceases growth for six weeks while the nuts are developing, makes another rapid growth for six weeks until late in the fall, but so far has never shown any winter killing of immature wood. The tree begins bearing at a very early age and produces heavy crops of large, high

quality nuts. So far as the writer knows, it has not been tested in the East except in the mountain section of Virginia.

Quite in contrast with the growth habits of the Payne is the performance of the northern Crath variety mentioned above. It foliates at the same time as the Payne, finishes its growth and forms its terminal buds in July and does not start again that season.

Of the many seedling trees scattered throughout the East, some have attracted attention because of hardiness or the excellence of their nuts. It is quite possible that varieties best adapted to eastern conditions may be developed from such seedlings.

It may be noted that the Persian walnut readily accepts the pollen of the American black walnut. Hybrid trees from such cross-pollinated nuts usually resemble the Persian walnut in appearance but are frequently of more vigorous and rapid growth. The nuts, however, are disappointing. Instead of fulfilling the hybridizer's dream of a nut with the thin shell of the Persian and the plump, full-flavored kernel of the American, the shell is usually heavy and the kernel of little worth.

For eastern planting trees grafted on rootstocks of the American black walnut are recommended.

It appears that Pacific coast plantings are adequate to supply the American market, especially as the younger orchards come into bearing. It would hardly seem wise to attempt commercial planting of the Persian walnut in the East except experimentally and for local consumption. However, by selecting proper varieties, almost any one can have this ornamental and useful tree growing in his own dooryard.

Roanoke, Va., 1934.

The Jones Hybrid Hazels

BY MILDRED M. JONES

The first work of my father, the late J. F. Jones, in breeding hybrid filberts took place in 1919 when he made a considerable number of artificial crosses between the Rush varieties of American hazel and certain varieties of European filbert. The small plants when reset from the nursery row were placed 5 × 8 feet apart, with the thought in mind of taking out every other plant in the rows when they began to crowd. It was assumed that only a small percentage would bear nuts worth keeping longer than necessary to observe the type and general character. The pistillate, or nut-producing parent, was in all cases of the Rush variety. The first lot of plants resulted mostly from the crosses. They began bearing in the fall of 1924.

The main object was to produce, if possible, a variety, or varieties, which could be made commercially successful here in the East. Only secondary thought was given to matters of probable quality or flavor of kernel. The main purpose was to combine the hardiness of the American hazel with the general merit of standard varieties from Europe and, incidentally, to get away from the corky substance adhering to the kernels of most filberts. As commonly grown in the East, Barcelona, the leading commercial variety of the Pacific Northwest, has a considerable quantity of this unattractive and probably indigestible substance. With hardiness, fruitfulness and fair merit once established, such desirable characters of large size and superior

quality and flavor of nut could be developed by subsequent crosses.

As filbert blight was not known to exist in the neighborhood, minimum thought was given to disease resistance. Probably if blight had been present that factor would have been considered more seriously.

The method used in crossing was to remove the catkins on the pistillate plant some days before they began to mature and shed pollen. Branches with liberal quantities of catkins attached were cut in advance and held under controlled conditions as to temperature, moisture and light until the Rush pistillates first appeared receptive. They were then placed in a warm room and exposed to the sun for a few hours, which soon caused the pollen to become profuse.

Barcelona, which is one of the first of all varieties to bloom, always comes well ahead of Rush and consequently had to be retarded. Italian Red, Cosford, Du Chilly and Bolwyller, on the other hand, bloom later than Rush and therefore were forced by removing branches and placing them in a sunny window. Branches cut for use in cross-pollination work should be quite large, as the stored up starch in the wood furnishes more material for the catkins and pistillates to draw upon. Apparently filbert catkins and pistillates develop entirely from stored up starch in the wood and do not draw on the roots at all. This being so, it was believed that they would develop just as well off the bush.

The last crosses made by father took place in the Spring of 1921. Du Chilly pollen was used that year exclusively. The catkins appeared to be normal, so branches were cut and their stems placed in bottles of water in a warm cellar. The catkins did not respond promptly to warmth, but upon investigation it was found that they were drying up and becoming stiff. Being especially anxious to use this variety, father soaked both the branches and catkins in water for a time and then later re-exposed them to the sun. Some of the catkins swelled a little at first but presently appeared to cease swelling. The soaking process was accordingly repeated until the catkins had been under water for several hours, after which they were again exposed to the warm sun. This time, the great majority developed nicely after this treatment. However, as the catkins still on the plant outside dried up and turned black, it was thought probable that the pollen treated as described and used had not been viable, but, the hand-pollinated flowers developed promptly and the plant produced a large crop of nuts. Presumably these catkins had been injured in the winter, and it is therefore surprising that they were made to develop artificially and that the pollen should have proved effective.

Results of the experiments have disclosed that Rush \times Cosford crosses made the largest nuts of any combination used, although the kernels were not of the best quality. Rush \times Italian Red appears to have resulted in the best combination of size of nut and desirable kernels. However, among the Du Chilly crosses there are a number of highly promising plants not yet fully tested.

Judging from the way local customers buy the nuts from these hy-

brid trees, the eastern trade prefers filberts of oblong rather than those which are roundish or spherical. The public seems willing to accept round nuts only when the long type can not be had.

Last May efforts were made to propagate several of the most promising of these hybrids by grafting on small layered Barcelona plants which had been bought from other nurseries and lined out in April. Out of 200 graft unions so attempted there are now but 16 nice plants from 18 to 24 inches tall, or an 8 per cent stand. As the stocks upon which the grafts were inserted died also, and as so many of the ungrafted plants had a hard struggle to survive, it would appear that the reason for this poor stand was that the stocks had not become well enough rooted. However, by another spring the stock should be in fine condition and the experiment will then be renewed.

There are several very promising hybrids in the oldest block of bearing plants, one of which, the Buchanan (No. 92) was named for President Buchanan, the only President of the United States who was born in Pennsylvania. Mr. Buchanan spent his last years in Lancaster and was buried there. Another plant, No. 200, is also an excellent variety and was regarded by father as one of the best in the collection. This is now being named Bixby in honor of the late and much lamented secretary of the Northern Nut Growers Association, Mr. Willard G. Bixby, of Baldwin, L. I. The nuts of both Buchanan and Bixby have much the same form as Italian Red. There is little or no corky substance on the kernels, the flavor is good, and the plants bear well. Another promising plant is tentatively called B, after the desig-

nation used for seed nuts mixed together by mice. This tree also bears well.

In the youngest block of plants, there are several highly promising individuals, but they will be tested further before being reported upon in detail.

Considerable leaf burn on the foliage has shown itself on many plants in all blocks since the severe wind and rain storm of August 23. This storm knocked off quite a few nuts but the loss was not serious.

Editor's Note:

The work of Mr. Jones in crossing the native roadside hazel, *Corylus americana*, with choice varieties from Europe is thought to have been the first of its kind ever undertaken. This work may easily prove to be to the filbert industry of the East what the work of the late Dr. W. Van Fleet was to the rose industry. It fully equals the work of Doctor Van Fleet with the chestnut, which without blight and weevils might have revolutionized the chestnut industry of the East.

When Mr. Jones began his work of filbert breeding, he tried reciprocal crosses at the same time, but in no case did he find Rush pollen effective with a European variety. Working with but two Rush plants, and continuing for only three years, he grew more than 600 plants. Four hundred of these bore nuts for several years before his death in January of 1928, and were more or less carefully observed by him. He discarded at least a quarter of the lot. Those of the 1921 crosses came into bearing in 1929, and have since been closely observed by Miss Jones aided by the Bureau of Plant Industry. Here also the great majority are being discarded.

These plants are most highly fruitful, but this is no doubt largely due to the profusion of pollen from other hybrids in the planting. Planters should keep in mind the fact that, so far as known, all European varieties of filbert are self-sterile. The same may be true of these hybrids.

Lancaster, Pa.

Seeds and Seedlings

By E. H. M. Cox

It is odd how some gardeners, skilled practitioners at raising annuals or vegetables from seed, take fright if they are given a packet of seed of some plant for the rock garden or shrubbery. After all a seed is a seed and a plant a plant whether it is a cabbage or a Magnolia: the seed has to be sown in some kind of compost; the same process has to go on within the seed; and the cotyledons have to appear before the seed becomes a young cabbage or a young Magnolia. The raising of plants from seed only varies in details not in the natural processes that go on.

One of the fundamental points over which beginners stumble is that they are inclined to forget that seeds of many plants take a long time to germinate and that the subsequent growth of the seedlings may be slow. Most of the seeds of plants listed in the average seedsman's catalogue are of annual flowers or of vegetables, in any case of plants that come speedily to maturity. Even those which we are advised to start in pans or flats are usually quick growing and their life in the frame or greenhouse before the final planting in their flowering positions is of short duration. Our main object is to hasten their growth and they have no period of rest in the seed pan or flat.

Another point of difference is that the seed from the average seed list is plentiful and cheap. The percentage of fertility is very high and more often than not we have to thin and discard a varying proportion of the

seedlings raised. Seeds of rarer plants are often scarce and their viability may be very poor. Thus it may be a question of nursing and saving every seedling.

Again, with seeds of ordinary garden plants we are dealing with known quantities. Our knowledge of the requisite treatment is more or less complete, and if we do not know it first hand there are innumerable authorities to whom we can apply for information. In the case of new introductions or rare plants from the wilds we are working more in the dark. We may be told how they grow in nature, but however full the descriptions may be of plants in the wilds it necessitates a great deal of experimenting and of intelligent guessing to try and reproduce conditions as near as possible to those they are accustomed to in their homes.

Thus we may know that the natural processes that go on are more or less the same in all plants and that it is only in details that they vary, yet these details are of the utmost importance, and it is quite impossible to lay down hard and fast rules.

As I happen to be an enthusiastic grower of out-of-the-way plants from seed, let me describe what we do in our garden. When the seeds arrive we try to find out all we can about the plant, the climate under which it flourishes, its associations and any other details available. If we have had no previous experience with the genus we examine the seed, which I

am presuming to have arrived in the fall. Again it is impossible to generalize, but usually if the seed coat is very hard it means that germination will be slow and we sow at once; or, if the seed has a fleshy covering, like the Magnolia, the life of the seed may be short and here also immediate sowing is advisable. In almost all other cases we prefer spring sowing, as we find that it is more difficult to keep young seedlings through the winter than through the summer, as a check in growth during the first months of their lives is often fatal.

We always sow in porous earthenware pots or pans, usually the latter about 4 inches deep and 8 inches across, either round or square. They are thoroughly scrubbed and dried before use. A few broken crocks are placed over the drainage hole and a layer of half an inch of dry sphagnum moss or leaves is placed in the bottom. Our sowing compost rarely varies. It is composed of a third sharp sand, a third granulated peat moss and a third powdered fibrous loam, well mixed and passed through a fine sieve.

A number of growers advise sterilizing the soil, but that has its drawbacks, principally because if the compost is thoroughly sterilized any beneficent bacteria that are always present will be killed. We find it sufficient to plunge the loam alone in hot water a few degrees below boiling point which will kill wire worm or any of the ordinary garden pests.

We prepare our seed pots and pans and plunge them in cold water the day before the seed is sown, allowing the surplus water to drain away over night.

Seed should always be covered with an amount of soil equal to the

size of the seed. If the seed is large, do not bore holes and drop the seed in, as that may leave an air space under the seed. In the case of large seed, do not fill the pots so full to start with and lay them on the surface; then fill up to the required height. The compost must always be firm and not left loose, either below or above the seeds. In the case of small seeds we do not cover with soil but with the requisite amount of sharp sand. We always finish our seed pans with a covering of sand. It looks more tidy, stops soapwort and moss from growing and germination is also more easily seen.

Where seed is known to be of slow germination we try and freeze the pans but this is a point on which American practice is far ahead of our own; in other cases they are placed in a moist greenhouse in a temperature of about 65 Fahr. and covered with sheets of newspaper. If the air is dry they are covered with panes of glass to prevent evaporation.

A number of successful growers in this country raise all their seedlings in cold frames, but I think on the whole a greenhouse is better for speedy germination as the temperature is controlled. When seeds are raised in a cold frame the sudden variation between a warm day and a cool night checks growth. So long as the seedlings in their youngest stage are not drawn, it is usually better to grow them on as fast as possible.

An extremely important point is that seed must be sown thinly. When the seed is very small and thin sowing becomes difficult, we mix the seed with fine dry sand and then sow.

As soon as germination takes place

the paper is removed and the pans are given as much light as possible, but not direct sunshine.

Both before and after germination care must be taken over watering. The usual fault is to overwater. Pans sown with fine seeds are better plunged, and in any case watering from a can must be done with a very fine rose. The water should always be the temperature of the greenhouse and not taken straight from the tap. A good plan is to tap the pans with a tiny wooden mallet. With a little practice you can soon tell by the sound of the tap whether the pan wants water or is too wet. If too wet it has a dull sound and if too dry it has almost a ringing sound.

We usually prick off the seedlings into larger wooden boxes as soon as growth has advanced beyond the cotyledon stage. It requires neat fingers to move seedlings as tiny as that and is more tiresome, but early pricking off has its advantages; the root system is not sufficiently large to have become a tangled mass and the tiny plants are not drawn by being too crowded.

Our seedling boxes are usually 2 feet by 1½ feet by 5 inches deep. As the seedlings may have to remain a considerable time in these boxes, considerable pains are taken in their making and filling. Of first importance is drainage, so the bottoms are never made solid. Narrow boards are used with a half inch space between the boards; or better still is the plan in which wood is dispensed with; in its place is used wire netting of small mesh, either ½ inch or ⅜ inch, what we call rat netting. This is stretched tightly across the bottom and is nailed on firmly to the sides. On the bottom is placed a layer of dry leaves or of sphagnum moss at least ½ inch thick to keep

the compost from escaping. The compost is nearly the same as in the seed pans with a little less sand, usually 2/5 granulated peat, 2/5 powdered loam and 1/5 sharp sand. This is pressed down firmly about an inch from the top of the sides, smoothed over, watered thoroughly and then allowed to stand for an hour or two before planting.

It is most important not to dig holes with a pencil or other sharp instrument in which to plant the seedlings, as so often this means an air space around the roots which will cause numerous fatalities. It is much better to make a miniature furrow the full length of the box, lay the seedlings in the line of the furrow and then firm the soil carefully round them with fingers and thumb.

It is difficult to generalize about the distance apart that seedlings should be planted, but as a general rule 2 inches either way will be found to be satisfactory. It is much better to have too much space than too little, as it is not always possible to judge the exact size that they will be planted in their final positions, nor exactly how large they may grow in these boxes.

When the seedlings have been pricked off we give them a gentle watering and place the boxes in moderate heat and in shade for about a week to prevent check and to make the roots grow as much as possible; then by quick degrees they are given more light and are moved as soon as the weather is favorable to cold frames which are either shaded or are not in full sun. There they spend their youth until they are large enough to plant out.

Watering is done methodically according to the weather and the amount of moisture in the atmos-

phere, but overwatering must be avoided. If they show signs of damping off, that obscure disease about which scientists can tell us so little, we usually water for several days with water just tinged pink with permanganate of potash. If the heat is excessive and the air extremely dry, it is a good plan to erect a covering of that light woven jute cloth that we call scrim. If this is thoroughly soaked from time to time it helps to keep the air moist. Even with us in Scotland the value of frames facing north and completely sheltered from the south, east and west is noticeable, and in the United States it must be even more important.

Again it is impossible to generalize over the time seedlings should remain in their boxes. We pay more attention to the time of year and climatic conditions than to the actual size of the seedlings. As a rule we try to plant out when danger from real cold is over and the real drought and heat (which we experience even in Scotland: last year we suffered from unexampled drought and had only three inches of rain from June to October) has not yet commenced. That limits us to May and the first two weeks of June. Our other season is from about the first of September to the end of the first week in October. That is for young plants of under one year's growth.

If the weather is unsuitable or they are obviously too small, we winter them, if possible, in their boxes in a cold frame (it does not do to coddle them); then we are not particular when we plant out in spring and usually do it at the first sign of good weather.

These notes sound as if they were only a slight elaboration on the usual instructions given for annuals, which is really all that they are. The unknown factor is time: in usual garden flower seeds you know within a day or two just how long they will be in pots and flats. In seeds from abroad time is an unknown quantity. For instance we never throw away ungerminated pans unless they show no signs for three years. Rhododendrons, Primulas and Meconopsis are usually fairly rapid, at least under three months. Gentians are often very quick, in a week or two, but they may be very slow. A lovely white species from New Zealand, *Gentiana saxosa*, only germinated with us after two years, and then not freely; but New Zealand seeds are as a rule poor germinators. Irises from China are sometimes very slow; some Pyrus are poor and slow; so are many Composites; and so on.

That is why such attention has to be paid to the question of drainage and compost. The soil in pans and flats may have to remain sweet for several years.



B. H. Chandlee

Dryas Drummondii growing in stony bar in Norman River

Collecting Plants Beyond the Frontier in Northern British Columbia

BY MARY G. HENRY

PART III

The evening of August 4th found us encamped on the Norman River. This was a very beautiful river, for many of the stones along the shores and bars were colored pretty shades of flesh pink and cream color. The effect was really lovely, and to add to the beauty there were detailed designs, frequently like lacework or sometime like crossword puzzles, on the stones, the designs mostly in cream color on pink.

Here, as on many of the river bars, were great gray green mats of *Dryas Drummondii*. In fact they had formed

a huge carpet, in places many hundred feet long, in various widths in which there was scarcely a break; and the thousands upon thousands of soft, silky, fluffy, tawny orange seed tassels held about 8 inches high, were each over 3 inches across. It had been rainy and cloudy all day, but when the golden late afternoon sun cast its rays almost horizontally through them they looked positively luminous, and the floor of the valley fairly glowed.

The following morning we were called about 5. It was a bright and



Mary G. Henry

Mt. Mary Henry in the far distance at the head of Norman River

frosty morning, the first clear day we had had for nearly a week. I hurried to the river, but before I reached the water I had to stop for a few minutes. Even my morning ablutions and breakfast had to wait while I admired the never to be forgotten sight before my eyes.

The veil of clouds had lifted from the western end of the valley, and in doing so laid bare the most beautiful snow covered mountain I had ever seen. The shining sun made the snow very white against the deep blue of the sky above, and the dark green of the spruce trees that framed it beneath; and the Norman River flowed in nearly a straight line almost from its very base. I stood and gazed in

wonder at this unexpected magnificence, and as I went to breakfast I was so thrilled I was quite elated and felt as though I was treading on air. I returned to the river and took a photograph. The black and white picture could only partly reveal the beauty of the scene. But in my mind's eye the mountain will always be as splendid, the sky will always be as blue, the snow as white, the trees as green, and the river will always run with the same crystalline sparkle it was running that wonderful morning. I called to McCusker to come and see the mountain and he only said he did not know it was there.

The following day, August 6th, we

forded the Tetsa River, then climbed up a hill through burnt timber. We passed about 15 plants of *Aconitum delphinifolium* with pure white flowers. These white monkshoods were peculiarly beautiful, for they were semi-transparent and quite ethereal looking and were undoubtedly one of the loveliest white flowers I had ever seen, and although not as striking as the deep blue ones their rounded white hoods were most quaint and unusual.

Just a short distance beyond them we ran into an encampment of Sikkanni Indians. The old chief and two others greeted us and shook hands with great dignity. They invited us to remain and camp with them for a few days before going on. Time pressed, however, and we continued our way, accompanied by Charlie, the old Chief's son, who was familiar with the country and knew where the hot valleys were and where we could find grass for our horses.

The finest forest I saw on our trip was along this river, and hour after hour we rode along its brim through the handsome spruces; some of these had trunks $3\frac{1}{2}$ feet in diameter and a height of 125 feet. A few black poplars were growing among them with a similar trunk diameter but not quite so tall. Every now and then there were large patches containing literally hundreds of *Cypripedium passerinum* growing where the shade was not very dense.

I was looking intently at the splendid trees about us when suddenly McCusker called to me, "There is your mountain." I glanced up and through the tree trunks and across the river I could see a great white mountain which had just come in sight between two lesser mountains. McCusker is a man of few words. I understood. We had just come around

it, and the mountain I had so loved and admired at first sight, a great 9,000-foot pile, crowned with ice and snow, was now mine and would bear my name forever! And so, far, far north amidst a chaos of wild and rugged mountainous country, Mt. Mary Henry¹ stands forth pre-eminently, its snow covered summit towering above the others, the highest mountain we saw all summer. It is only visited by the untamed things who make their home there and who, for years to come, will still roam this region in peace.

The Tetsa River was full of splendid trout. In one pool we caught 17 averaging about $2\frac{1}{2}$ pounds not counting the largest one which was a $6\frac{1}{4}$ -pound Dolly Varden, caught by Howard, the youngest member of the party but a most enthusiastic fisherman. We continued following up the Tetsa River for two days, gradually of course rising higher. The mountains were largely bare rock with little vegetation and very rugged, and the scenery became more wild and desolate than anything we had yet seen and was magnificent beyond words. The vegetation under foot, too, was exceedingly interesting. Cassiope was growing in profusion, also *Rhododendron lapponicum*, 10-12 inches tall, *Dryas integrifolia* and a *Zygadenus*. The river was only a creek here and towards evening we came to its source, St. Paul's Lake.² It was a beautiful lake of course, for lakes in the mountains are always beautiful. It was clear as crystal and smooth as a mirror, and I gazed longingly at the mountains on either side. We camped a few miles beyond it where the horse feed was better. The

¹The Geographical Department of the Canadian Government has done us the great honor to say that these names, given by McCusker, the topographer, are to remain.

²For St. Paul's School, Concord, N. H.



K. F. McCusker

Howard with his big trout

mountains here and along the Tetsa were of limestone.

Early next morning, August 8th, I walked to a stone slide that had some vegetation on it, near the foot of a mountain. The stones were fairly well covered in places, with a rocky debris on which grew moss and lichen. *Rhododendron lapponicum* grew in abundance, also *Potentilla fruticosa*, *Arctostaphylos rubra*, *Dryas integrifolia*, dwarf Juniperus, dwarf Salix, and best of all the prettiest harebell, *Campanula rotundifolia alaskana*, I ever saw. It bore lovely spreading bright blue flowers about an inch across, and the leaves were of quite a reddish color and were waved and dented along the margins.

This day's ride was even more beautiful, if possible, than that of the

day before. It was all so wonderful and wild and picturesque I hardly knew which way to turn, and every minute gave me a thrill. We descended into the valley of the McDonnell Creek. After making our way through some spruces we came to a wide stony river bed with little growth of any kind, but where a scant bit of rocky waste or soil had accumulated, there were occasional spruces and often an exceedingly beautiful prostrate juniper. I walked for many miles here in an effort to gather some ripe fruits, but evidently they were well liked by squirrels and birds and I had little success. To my surprise I found a number of *Cypripedium parviflorum* growing in full sun in very hard, dry, baked soil. There were also many plants of *Rhododendron lapponicum* and these, too, fre-



B. H. Chandlee

Our camp on the Racing River

quently, were at home in the same hard dry soil, sometimes even on the bare exposed edges of dry banks, where little else could get a foothold. Later on there was more soil and more moisture in the valley, and *Rhododendron lapponicum* grew in great masses. I saw hundreds of luxurious bushes 2½-3 feet high and well over 3 feet in diameter, many of them perfectly symmetrical specimens. The bloom was weeks past, but the seed was not yet ripe.

We travelled down the valley for some hours. The sparkling clear water of the McDonnell Creek as it ran musically over the stones, the imposing mountains on either side of us, and the interesting vegetation made

this ride an unforgettable one for me.

We rode until 5:30 when we reached the Racing River and found a suitable place to camp. This, our most northerly camp, was evidently the site of an old and much used Indian encampment. The Racing River was well named and we were all quite fascinated as we watched its fast gray stream go purling by.

The valley we were looking for lay only a few miles away. Shortly after leaving camp next morning we passed through a natural mountain gateway, the mountains rising high on either side of the river. As we neared the junction of the Toad and Racing Rivers, we passed some *Amelanchier florida* trees in fruit, also *Ribes ox-*



S. H. Clark

The river looked exactly as though it were striped

yacanthoides, *Cornus stolonifera* and some raspberries; the latter were delicious. *Aster Lindleyanus* in lavender and *Castilleja Raupii*³ (new sp.) in pink, were blooming.

The Toad River was a beautiful very deep sea green color and the water was clear and transparent. The effect of this river as it joined the Racing River was very remarkable, for the colors remained entirely separate as they flowed side by side for a considerable distance down stream before they intermixed. In fact the river looked exactly as though it was striped, one half being deep green and the other half pale gray!

On the hill that rose on the west side of the river was an Indian graveyard. It was surrounded by a little picket fence and contained several crosses. The fence and the crosses

were all painted bright vermilion red and stood out conspicuously against the pale blue sky. As was quite frequently the custom in the Indian graveyards, several white flags were flying. Charlie, the Chief's son, said that five men were buried there.

We had crossed a number of rivers, but the Racing River carried the fastest water we ever saw. Unfortunately the river-bed was composed of large round boulders that frequently washed down the river and rolled if they were touched. The men were afraid the horses might fail to get over. So when we stopped at the junction of the rivers, Norman and Norman, Jr., blew up our little pneumatic boat and rowed us safely across, although we tossed like a cork on the fast and turbulent waters.

I heaved a sigh of relief when

³Pennell, ined.



B. H. Chandlee

We called the largest hot pool the "Arctic Bath Tub"

everyone was safely over the river. We then took up the trail that led towards the far famed so-called "Tropical Valley." At first the trail was good but this did not last long, for soon we came to burned and fallen timber. The trees here had been large spruces and when they fell, as usual, they fell in every direction. Sometimes we found it necessary to walk along on one tree after another, often six feet above the ground with several others criss-crossed beneath. The rotten logs had a habit of giving away rather suddenly, and several times I landed on the ground after bumping on the logs beneath as I fell. It was slow work, and it took us quite a while to get to the Hot

Springs only half a mile away. My heart sank, for I saw that the valley it had taken us thirty-nine days to reach, had been devastated by fire. Charlie said it had burned over nine years ago.

The valley was small, about $\frac{3}{4}$ of a mile long and $\frac{1}{4}$ mile wide. A rank growth of delphinium often over 8 feet tall, *Cornus stolonifera*, *Prunus demissa*, *Symphoricarpos racemosa*, *Actea rubra*, *Ribes oxycanthoides*, raspberries, roses and vetches, was growing in the thickest and most luxuriant tangle I ever saw, and very difficult to penetrate.

There were a number of hot springs; the largest one had formed a pool about 9 feet in diameter. The

water was clear as crystal and the sides were raised about 18 inches above the ground by the continuous overflow of the mineral waters which left sulphur-forming concretions. The inside of this "Arctic Bath Tub" was shaped like an inverted cone. We enjoyed the only warm bath we had on the trip and judged the temperature of the water was about 90. It probably felt warmer than it was as we bathed daily in whatever river or lake we happened to be near. Some of the other springs were so hot they were almost boiling, and in several good sized areas the ground was warm and moist. A plunge in the clear, cold Toad River felt good after the hot bath and a short sun bath later was pleasurable. After exploring the little valley, a storm and approaching nightfall induced us to leave before I was ready.

Next day I climbed the nearest mountain to our camp, and on its side I found some dwarf amelanchier bushes about 1-2 feet tall and these bore the most delicious fruit of any amelanchier I ever tasted; in fact, I might say the only ones worth eating I ever ate; and as there are hundreds growing on our Chesapeake Bay farm I have tasted a good many.

The following morning, August 11th, we started on our return journey. To be honest I must admit I did not want to turn homeward. Our trip had all been so wonderful and so interesting that I should have liked to have just kept on going indefinitely, not caring where I went so long as I was in the mountains and heading north. Therefore it was with a heavy heart I started on the homeward journey.

The sun came out and we enjoyed a pleasant balmy day, a nice change from the wet ones we had had lately. Owing to the heavy rains the creeks

had risen considerably and the horses had difficulty keeping their feet while fording.

The next day was dark, dismal and much cooler. Rain set in right after breakfast so we packed up and started off in a downpour at 7:45. We were constantly climbing higher and every minute it became colder. We went on foot most of the time in an effort to keep warm. At first we were careful and tried to keep dry. We mounted our horses crossing streams, or stepped over them, when we could, on stones, but as hour after hour went by and keeping either warm or dry was obviously impossible, for the rain persisted, we found ourselves wading without caring, through all the streams that happened in our way. A raincoat, even when the wearer is sopping wet, still has the virtue of being windproof, and for this we were thankful. My belt was the only article on me that was even fairly dry, some of the others did not even have a dry belt. At the end of four hours we stopped for lunch.

I always watch with admiration the man who is able to make a fire in the pouring rain. A real woodsman does it to perfection and always with the assurance that it will burn, and it always does. McCusker made a big fire in less time than it takes to tell about it.

I had seen some orchids, *Cypripedium passerinum*, near this spot on my way north, so although I was very cold I left before the fire was well started for I knew I would be tempted to remain if I once felt the heat.

I soon found the plants I wanted and was thankful they were growing in soft, sandy soil for my hands were so numb I could scarcely grasp the trowel. By the time I rejoined the



Josephine Henry

Cypripedium passerinum

others it was time to move on. The rain continued all day in a regular torrent, which caused me great disappointment, for our ride was all along McDonnell Creek and I had wanted to stop and photograph the splendid bushes of *Rhododendron lapponicum* that grew there.

After 11 hours on the trail a halt

was called at the eastern end of St. Paul's Lake. We all agreed it was about the most uncomfortable day we had ever had in our lives. The men were soon busy at their routine work except Charlie, the Indian, who built a huge fire, and in a little while we all forgot how cold we had been.

August 13th I climbed the moun-



Josephine Henry

Papaver radicatum on mountain north of St. Paul's Lake

tain north of St. Paul's Lake, accompanied by McCusker, who kindly piloted me up these mountains. This suited him very well for it was necessary for him to climb a mountain frequently to take the readings off his barometer and to "throw a bearing" now and then, in order to obtain the information to put on the map he was working on. There were numerous Rhododendrons at about 4,800 feet altitude, and higher up a number of plants of an extremely pretty composite, *Chrysanthemum integrifolium*, which formed tight spreading 2-inch mats of grass-like foliage, and bore large white daisies on 6-inch stems. Near it *Silene acaulis subcaulescens* was studded with deep rose blossoms. On the bleak, wind-swept mountain top were growing tiny, stunted plants of that pretty although common fern, *Cystopteris fragilis*, also *Papaver radicatum* and a Saxifraga. A tiny creeping willow absolutely prostrate with leaves and catkins about $\frac{1}{2}$ inch long, rose less than 1 inch from the stones. It was *Salix polaris* (new sp.). The alti-

tude of this mountain was 6,700 feet. Much of its surface was composed of loose, broken limestone rock.

Toward the north we could see the valley of the Liard River and the great wilderness of Yukon Territory beyond.

In about half an hour we started down, but turned aside, at about 5,500 feet altitude, which was still far above timberline, to explore a little valley. Here, near a tiny streamlet, an exceedingly pretty *Zygadenus*, which had a bright orange zone instead of the customary green one, caught my eye and my fancy, too.

I dug up from near St. Paul's Lake several *Campanula rotundifolia alaskana*, and a couple of a very pretty small *Solidago* sp. that produced a tiny veritable bouquet of yellow flowers at a height of three inches, a perfect replica in miniature of our large native goldenrod.

The next day we came to the Tetsa River and followed it all day. It was so beautiful I regretted every step that took me away from this magnificent country. We continued

our way beside the river, and as we rode along a moist, sandy bar there were the footprints of four large wolves running beside our trail. Charlie said, "Indian meet wolf, scared wolf. Indian meet two wolves, scared Indian. Indian meet three wolves, dead Indian." I enjoyed riding through the splendid forest along this river, once more. There were many plants of *Viola renifolia Braunardii* growing in the moss under the trees. This is a pretty white violet.

We were all sorry to see the last of Charlie and his people. It is said that his is about the only pure bred tribe of Indians left in North America. Quite probably this is true. These Indians also have the reputation of being a very high principled tribe. Their numbers have been sadly decimated by hunger, poverty and disease. From a tribe of about 1,500 only a few short years ago, there were, when we left them, but 30 or 40 souls remaining. "Not much," as Charlie sadly put it, "but kids and pups left."

This little handful of a once powerful tribe is making a brave last stand, and I earnestly trust that Canada will do something for these, her true offspring, before their book of life is closed forevermore. They ask nothing and need little, and as Charlie said, "If one Indian has food, everyone has it"; and later on when I told him I would send clothing and asked to whom to address it, he replied that once a year they went to Fort Nelson, a Hudson Bay Trading Post, and I could send it there. He said it made no difference to whom the package was sent for in any case the things would be divided and given to those who needed them most. For here among these Indians, the Golden Rule is practised and not talked about, and they share all they

have with each other! Would that there was more of this sentiment among the so-called civilized people of all lands.

The old Chief's wife wanted us to leave Howard with her, and assured us, through her son, he would have the best of care!

Charlie fulfilled our ideas of the highest type of an American aboriginal and by this time we considered him one of our best friends.

We had only ridden about four hours and we still had a long way to go.

We had come to the parting of the ways and with deep regret we said "Goodbye" to our Indian friends, and they too seemed sorry to see us go.

August 16th was a memorable day for two reasons. The first reason came at dawn. The days were now much shorter and it was just getting light when Cliff called breakfast at five, while in the far eastern horizon was a long red streak. Our tent flaps had been, as always, thrown wide back all night. I am glad Mary and Josephine also liked them thus; it was so glorious to look out and watch the mornings come. While we dressed the mountain tops grew pink and in a few minutes they turned to red, that gorgeous, glowing red that only the sun can make when it first touches a mountain after dawn. For a short space of time the mountains were a magnificent spectacle. Such a pinnacle of beauty could not last. Life is ever changing, but memories of moments such as these will not fade easily.

The second reason that caused us to remember the day was that we had to cross over one of the worst muskegs we had to cope with all summer. We really did not go *over* it we literally went *through* it, wading wallowing and stumbling through



B. H. Chandler

Aug. 18 Camp on Henry River

it all. Unfortunately it clouded over and rained most of the day. The ground was wet everywhere and the muskegs we passed over two weeks ago were much worse. The holes that were quite bad then were very bad now. After Chum bogged down until almost half his body was in the mud, I got off at every bad place to try and help him through these terrible mires. Six of the horses were almost buried in a hole at one time, and it took what seemed to be an age to get them safely through and on firm ground again.

That afternoon we crossed the Norman River and once more I saw Mt. Mary Henry. I longed to see it more closely but alas! that could not be, for I had no opportunity to get nearer than about 20 miles.

Being anxious to explore the source of the Henry River, I made a side trip on August 19th accompanied by Josephine, McCusker and Clark. The first day's ride brought us to Lake Mary where we camped for the night. It was about six miles long and lay among the mountains, filled with shining deep jade-colored



Mary G. Henry

Lake Mary

water which contrasted well with the fine yellow sand of its beach; very, very beautiful Jo and I agreed.

It was quite dark by about 9:30, and I saw, that evening, the first star I had seen on our entire trip this summer!

Next day we went to Lake Josephine. A little larger, a stony shore, and all the mountains around it higher, made this lake more ruggedly picturesque than Lake Mary. On the shores of both the lakes and along the upper part of the Henry River, grew a very fine form of *Salix*

brachycarpa. It had pale gray silky foliage, and the pistillate catkins were a lovely shade of old rose. I filled several of my cans with these pretty shrubs.

Josephine and I were ahead by ourselves and I was on foot leading Chum close to the shore, when Josephine, who was riding near me, called softly that there was a grizzly bear nearby, and so there was, about 75 feet from us; but he went on his way and we went on ours. It was all so inspiringly beautiful and I was enjoying myself so thoroughly that



Mary G. Henry

Josephine on the shore of Lake Josephine

I led my horse all day and never mounted him once during the 16 miles we covered over hills and mountainsides. Along the valley in several places were the picturesque remains of those who trod these paths with moccasined feet. About thirty years ago I thought it was, judging by the vegetation growing on the camp sites. Sometimes the framework of a lodge remained standing but more often the bare poles lay prone. A log or a single stone about the size of a small foot-

stool, which probably formed the backstop for an Indian's fire, was invariably in the centre. Many thoughts came to me and I could almost see the shadows of those long since gone to their "Happy Hunting Grounds." Sometimes they trod the trails before me and sometimes they were stepping in and out of their lodges. I had plenty of time to dream and I liked to think of past days and the picturesque people of long ago.

Above Lake Mary, in hard stony



B. H. Chandlee

Mattresses by night, boats by day

soil, grew a most delicate and handsome *Artemisia* with silvery foliage—it was *A. frigida*. Some trees of *Amelanchier florida* grew along the edge of the lake, but the forest was composed of spruce and white poplar.

We regained our main camp on the Henry River the evening of the 21st. We had now camped in various places on the Henry River for seven nights. It was a most beautiful river with magnificent scenery all along, and carried water of a particularly fine deep blue green shade. As it flowed over its rocky bed the white foam it made and the white caps that crested its ruffling waves, tended to accentuate the richness of its fine deep color. Norman was greatly pleased with his river.

The evening of August 24th brought us once more to the Howard River where we remained for the night. The river was much lower, for at this late date the nights were cold, so there was little melting of the snows and glaciers. The days had shortened greatly, and it was dark quite early.

After our daily swim came supper, and then a number of the men joined us in a game of poker which lasted long.

Later on, from our sleeping bags, the girls and I could see by the bright illumination on the clouds that the moon would soon rise, and sure enough, in a few minutes it came slowly up from behind the big, black mountain opposite to us and glided into the dark sky. It was nearly full and shone with an astonishingly white brilliance, brighter than any moon we had ever seen, anywhere, before. But we were sleepy and even the bright moon, shining full in our faces, failed to keep us awake.

On August 26th we recrossed the Musqua River. *Viburnum pauciflorum* was bearing its handsome glossy red fruit, and its foliage was beginning to be tinged with glowing colors, too.

We camped on the north side of the Prophet River the next day.

August 29th I climbed a mountain north of the river, "The Mountain of the Gods," according to the local



B. H. Chandlee

Howard fording the Howard River

Indians. It rained a few minutes after I started and kept it up almost the entire day. I wore only a light jersey for protection, but the exertion kept me warm in spite of the cold, even when I was above the snow. There was little to be seen in the way of view or flowers.

We crossed the Prophet River on the 30th. It rained pretty steadily all day and as bad luck would have it, we had a nasty stretch of muskeg to cross. It was easy to see the men were all anxious, for everyone was serious and scarcely spoke a word. We were ahead of the pack as usual and after numerous struggles, having come through the morass safely ourselves, we stopped just beyond the worst place for lunch. After a while the others all came by. No, not all, for poor Nig, a splendid big pack horse, lost his life in that awful bog. We were sorely distressed.

We climbed to the Caribou Ridge on August 31st. There was not a flower to be seen and the pass was almost bare save for lichens, dead grass, and the dying stems of some of the marvelous flowers I had seen weeks ago. I was glad of this, however, for I was able to gather some seeds. My hands were so stiff from cold, I could scarcely get the seeds into the envelopes I had brought for the purpose, and as envelopes were getting scarce I tied some in one of the corners of my handkerchief. The girls and I took only large handkerchiefs with us, and they were forced to serve many purposes. Sometimes they played the part of a towel when we could not reach our duffle bags. They made excellent napkins at meal times, and when our guns were wet, they were gun rags. Sometimes, too, they were bandages. But mine had an added responsibility and I was always prepared for it by carrying

several. They were most useful in seed collecting. It was so easy to tie the seeds in a corner, and in the rain they were far safer there than in envelopes. With two handkerchiefs I could keep eight kinds of seeds safely, each in a separate corner.

In the hollows and protected places about the mountains thousands of little *Betula glandulosa* had decked themselves with all the shades of autumn, and resembled a vast size Persian carpet more than anything else I could think of.

We had hoped for two weeks in which to hunt, and we could have had it, had we returned from Redfern Lake by plane instead of by the slower method we were now using. It had been a tremendous disappointment when the air transportation company of Edmonton refused to send in a plane for us, saying it was too hazardous an undertaking. Of course our trip this summer was not a hunting trip, but by hurrying as fast as we could on the way home, we had saved up several days. We split up, therefore, on September 1st into several small parties for two days in the mountains.

Josephine and I went off accompanied by Bill Beckman and Ben, an Indian. We packed lightly, not much besides a small "fly tent" and sleeping bags.

At first we back tracked on the trail north about two miles and then we turned west and went up over a ridge to a high plateau, altitude 6,000 feet. The wind caused us to feel the cold, for up on this vast level area it was blowing very hard. *Cassiope* sp., *Campanula lasiocarpa*, *Rhododendron lapponicum*, and *Myosotis alpestris* were growing here but not plentifully.

After crossing the plateau we dropped down into a ravine where

there was some timber, good grass, and a pretty stream, a nice place to spend the night, so we stopped and the men unpacked the horses. Anxious to get off, we left Ben to make camp and started on foot with Bill, after eating our mid-day sandwich. Not one of us had a watch, we just glanced at the sun occasionally and guessed the time.

A mountain lay just west of us and we were aiming for a high basin beyond. After a short mile or two we came to the mountain and started up the nearest side. The sky had been overcast all day and in about an hour it began to rain. Much of our way was over the rough, broken, sliding stones that covered so many of these mountainsides and which took much time and patience to negotiate. When we came to solid rock it was very steep and frequently necessitated the use of our hands and knees. Sometimes with only our finger tips catching in a crack and our toes barely holding on a narrow ledge, we made our way carefully and slowly along the mountainside.

When we were at a lower altitude it was cold but there was no wind, however as we climbed higher it became much colder, blowing harder every minute. High up above all trees and other vegetation on the mountain among rugged bare gray rocks, where not even a spear of Alpine grass could get a footing, *Arctostaphylos rubra* formed mats of furious red. So bright were these splashes of color against the sombre background, it seemed, almost, as though some wild thing had shed its life blood on the stones. An examination showed that the mats, usually 6 inches high and 2-4 feet across, were composed of many prostrate woody branches bearing quite symmetrical rosettes of foliage, and

that the deeply indented veining of the leaves added to the beauty of the plant. The urn shaped pale creamy pink flowers come soon after the melting snows, and the glossy red fruits, 1/3 of an inch in diameter, decorate the plant about midseason. But it is in autumn when flowers and fruit are both past that this gorgeous dwarf shrub is at its best, and each time I saw it I was surprised anew by its bold and startling beauty.

Jo and I with only thin jerseys over our shirts were far from being warm and the driving rain stung our faces and bare hands. The stone slides were wet and slippery and the narrow rocky ledges were harder than ever to cross.

Sometimes when I turned around and looked down over where we came up, I was glad we were mounting and not descending. It always seemed more awkward to climb down a perplexing place and a slight misstep might have caused any of us to descend in a precipitous drop of perhaps a thousand feet.

On the summit, altitude 7,000 feet, was a great perpendicular ridge of jagged rock. We crept around the south side holding on "by the skin of our teeth" until we looked into the big basin beyond. This high valley, except for where a stream had its outlet, was completely hemmed in by steep mountains. It was about six miles long and two miles broad in the widest place. We searched with our glasses but saw no sign of life anywhere, so we started to gradually make our way down into the valley. There were masses of big broken rocks in our way and as it was very steep we traveled slowly.

Suddenly we stopped. Not far off we could see the splendid horns and beady black eyes of a magnificent ram, but that was all. Undoubtedly



Josephine Henry

Salix reticulata on Caribou Pass

he was a wise old sheep for he did not let us see more than the upper part of his head for a second or two, while he inspected us carefully but swiftly before he vanished behind some rocks. We heard a few stones roll down the mountain after which there was absolute silence, and the landscape was as empty and void of life as it was two minutes before.

The mountains hold their secrets carefully and those who seek seclusion, shelter, home or hiding place

on their vast rugged and often fortress-like expanses, do not seek in vain.

The big ram was safe. We who would have disturbed his peace meant little to him, for we were half way down the mountain and it probably took him but a few short minutes, after fleeing, to reach the top. Perhaps we were disappointed but we could not deny that his life was as precious to him as ours was to us,

and after all, had we the right to choose?

We examined the surrounding mountains carefully but saw no moving thing of any sort, either on foot or on the wing, and as dusk was approaching we turned around and started towards camp. We had to travel fast although the way was rough, for we had a long distance to go. By this time the rain had stopped. We knew, however, from past experiences how hard it was to find the way in the dark so made good time, returning around the base of the mountain, a longer way, still difficult, but much faster traveling.

It was almost pitch black when we got back after thirteen hours hard going, but Ben had a big fire which made a fine beacon, so we easily found our tiny tent staked right beside the stream.

I had completely forgotten that there was a six foot vertical drop to the stream. After picking up my towel I inadvertently stepped backward and promptly found myself lying flat on my back and staring up at the tall black tree tops high overhead. Luckily for me wet moss covered the rocks where I fell.

We had a ptarmigan for supper and, as always, enjoyed it immensely. We overheard Bill telling Ben that today's climb was the worst he had ever taken in his life.

After a comfortable night spent on soft moss and a satisfying breakfast of caribou, toast and cocoa we were again ready for a long strenuous day. Another cold, sunless morning dawned. We wandered many miles and saw one sheep in the distance. We thought we could approach him but never saw him again.

There was not much variety in the vegetation in these high valleys. Growing with the grasses were pole-

moniums, myosotis, aconitums and in some places a few stunted salices. I dare say that were I fortunate enough to be up there earlier in the season, I would see other additions to the above short list. Growing in the rocks around the base of the mountain, above the trees which were mostly pines, were many prostrate junipers and they were clothed with the finest textured foliage I ever saw on a juniper. The needles were very short and grew very thickly along the branches giving them a prettily tufted appearance. After another day of over thirteen hours on the trail we returned to our hospitable little ravine.

We sat on the ground around the "dinner table" which consisted of a canvas pack cover spread on the most level place we could find, and as the fire was right beside us, everything was piping hot. When our meal was about half finished it began to rain quite hard. We had no shelter overhead so our food was slightly diluted. This did not bother us as we were hungry. I did regret not having my hat on for I soon felt little trickles of water running down my back. As it continued to pour all evening, we retired rather early and the pleasant sound of rain tapping on the canvas of the tent soon put us to sleep.

Next morning we started out early as usual. We saw some caribou on a distant sky line and approached them by a roundabout way. There was a small outcropping of rocks and a few of the small, stunted *Abies lasiocarpa* nearby. These made a fine shield and we were able to come within a stone's throw of them. They were only cows and calves, but it was fun to see their surprise when we came out in the open. They stared at us quietly until our scent was wafted their way, then they shook



Josephine Henry

Polemonium acutifolium

their heads and scampered off as fast as their legs could carry them.

We had taken our horses with us but as it was still cold and windy we led them all day, except on occasions when we left them tied to one of the stiff, small balsams that grew at this altitude.

We found a large excavation made by a grizzly recently, but saw nothing more of interest.

Once more we rode down the magnificent Caribou Ridge. I never tired of looking at these splendid mountains and no matter which way I turned the view was simply glorious. I gazed at the snow topped summits that crowned these massive peaks, and then at the bare and forbidding rocks and wide stone slides, below them, miles of Alpine turf, grassy sloping pastures, and then the little *Betula glandulosa*, thousands and thousands of them, only a foot or two high, in every gorgeous autumn shade that nature produces, no two alike, and then came the forests.

We followed down the trail we had come over three days ago. We approached a little open grassy place. It was vacant except for a small light

brown spot in the centre. Alas! it was all that remained of poor Flossie, a sick and forlorn little sorrel pack horse. She had been unable to keep up with the others, and the men were unwilling to abandon her to face her death alone. An axe had ended her unhappiness and in about ten days all the grizzlies in the neighborhood would be feasting.

We returned to camp to find the boys back already. Unfortunately two days was too short a time to accomplish any real hunting. They had seen and followed two grizzlies but had not had time to pursue them.

Smoky soon rode into camp and dropped on the ground before us two magnificent sheep heads. Mary had killed them both. They were running shots, fired at about 300 yards. We were all immensely pleased and rejoiced at her good luck and well placed shots. According to William C. Sheldon they are the darkest known variety of the Stone Sheep (*Ovis Stonei nigra*), the Rocky Mountain sheep of this part of the country.

(To be continued)

A Book or Two

Gardens of Delight. By Eleanour Sinclair Rohde. Hale, Cushman and Flint, Boston and New York, 1934. 308 pages, illustrated. \$5.00.

Chance, of course, is responsible for the fact that this book is reviewed in the same issue as the Garden Notebook (Putz) and comparison is thought of only because this book also is organized in chapters month by month. Here all similarity ends.

This volume, from England, is literary in style, discursive and charming. Much that it contains is not for us in this country. On the first page one meets *Garrya elliptica* from our own Pacific Coast and primarily for that coast. Indeed, the whole January chapter is full of things not for us, and so is much of the rest of the book.

One wonders a little how much the author gardens, for one questions how she could pass by the delightful fragrance of the flowers of *Allium Ostrowskianum* or fail to say more about the extraordinary leaves of *A. karativiense*. The notes on iris, pages 100-101, seem scanty and for us unimportant and partly incorrect. *Pyracanthas* came in for scant attention, as do cotoneasters, and the notes on fruiting of barberries are for England and not for America. But in spite of these carping criticisms, the book is recommended as pleasant reading and as providing many interesting points of departure for gardeners here, who still turn to English texts with interest and affection.

Landscape Architecture—A Classified Bibliography with an author index. Compiled by Katherine McNamara, Librarian, The Schools of Landscape Architecture and City Planning, Harvard University, Cambridge, Mass., 1934. 209 pages. \$2.00 pressboard bound; \$2.50 cloth-bound. Photo-Lithoprint Reproduction, Edwards Brothers, Inc., Ann Arbor, Mich.

It is extremely difficult to review a bibliography, and no attempt is made here. It is better to say that the classification followed is that of Henry Vincent Hubbard and Theodora Kimball of 1920, which is given in summary outline in the beginning of the book.

There follows the elaboration of the scheme with a prodigious number of entries and a valuable number of cross references. Although it might appear to the general reader as too technical for everyday use, it is believed that its clarity and organization will make it quite as valuable to the amateur and garden club member as to the professional designer.

The Story of Gardening. By Richardson Wright. Dodd, Mead and Company, Inc., New York, 1934. 475 pages, illustrated. \$3.00.

No gardener who cares for anything more than the mere cultivation and arrangement of his garden plants can fail to be interested in this book, for our gardens and our plants, like most of our conventions, have many and varied origins. Remem-

bering this, Mr. Wright has gone back to source material and traced for us the growth of gardening through history in all the countries that have contributed to us, as well as through its development in our own country.

As might be expected, even in a book of 475 pages, much has been condensed, much is barely touched upon, but for the captious there is an excellent bibliography that will take them farther afield.

The American garden world has much to thank Mr. Wright for, but hardly for anything more than this useful and pleasant book.

An Account of the Genus Meconopsis.

By George Taylor, New Flora and Silva, Ltd., London. 130 pages, illustrated.

Mr. Taylor's excellent treatment of this group is largely botanical, except for one chapter of 14 pages in which he discusses the cultivation of the species introduced into Great Britain.

Of the 41 species described, one is a native to western Europe—the others are all confined to south-central temperate Asia. Twelve outline maps, each occupying half a page, show the distribution of most of the series, and 29 good half-tone plates illustrate the growth habits of several of the more ornamental species.

Five pages are devoted to a descriptive key to the species, based largely on plant characters that are easily discernible. Under each species are given extensive bibliographical data, synonyms, a formal detailed description, and a full discussion of the botanical relationships. The text is followed by a complete index to the botanical names. The book will be most useful, from a hor-

ticultural standpoint, to gardeners in the Pacific Northwest and parts of England where some of the meconopsis are able to thrive. P. R.

The Toxicology of Plants in South Africa. By Douw G. Steyn. Pp. 631 & XII. 135 illustrations. Price £2 6s 6d. South African Series—Vol. XIII. Central News Agency, Ltd., South Africa, 1934.

The annual toll of poisonous plants to livestock is tremendous, and on the open range the loss from poisonous plants is much greater than that of infectious diseases and predatory animals combined. The poison plant problem is very important in South Africa, where the grazing of livestock is a big industry and where poisonous plants seem to be exceptionally numerous. Dr. Steyn has brought together in this book not only the results of his own work but also all pertinent material of other investigators which he cites copiously. At the end of the text is a list of 661 references. Those plants which are reputed to be poisonous but which have not been experimentally proved are not mentioned. However, those plants which have been reported to be poisonous and have experimentally shown negative results are given. The text is divided into two parts. The first and most valuable part to the layman is a general discussion of toxicology, and the toxicology of poisonous plants in particular. The problems involved are discussed in all their phases, the scope of which can best be indicated by the chapter headings:

1. History
2. Definition of a poisonous plant
3. Classification of poisons
4. Absorption of poisons

5. The fate of plant poisons in the body
6. Modes of action of plant poisons
7. The toxic principles of plants and their physiological significance
8. Detection of poisonous plants and their active ingredients in the body
9. Diagnosis of plant poisoning
10. Prognosis of plant poisoning
11. General principles of treatment of plant poisoning
12. Factors concerned in the determination of the toxicity of plants
13. Conditions giving rise to accidental ingestion of poisonous plants
14. Eradication of poisonous plants
15. Prevention of plant poisoning
16. Legal aspect of plant poisoning
17. Investigation of plant poisoning in the field
18. Methods of ascertaining whether the plants are toxic or not
19. Reasons for negative results in experiments with suspected plants
20. Reasons for positive results in experiments with suspected plants
21. Losses due to plant poisoning
22. Action of poison on foetuses
23. Indirect poisoning of human beings

The second and by far the bulkier part of the text is devoted to the special toxicology of plants. There are four short chapters which discuss poisonous foodstuffs, photosensitization, food rashes and fungi in relation to health in man and animal. The last and longest chapter (378 pages) is given over to the poisonous plants themselves, arranged by families in their natural order. About 160 species are discussed, the space

allotted to them varying with their importance. For each species, the common names, distribution, active principle and toxicity are given. Also the symptoms of the poison, the post mortem appearances of the animal, the histology, treatment and prevention of the poison are given when known.

There has been no attempt to write the text in a popular fashion and the descriptions and histories of the various poisons and their effects are couched in a professional vocabulary which is no doubt beyond the understanding of the average raiser of livestock. However, for the scientist interested in the toxicology of plants, it is, in the opinion of the reviewer, the most authoritative and well written book so far published.

The last half of the book, devoted to specific poisonous plants and their effects, has a limited practical application to the United States, as none of the species mentioned are of importance in our grazing lands and very few even occur in the United States.

C. O. E.

A Review of the First Installment of the Supplement to Elwes' Monograph of the Genus Lilium. By A. Grove, illustrated by Lillian Snelling, 1933. Published by Dulau and Company. Price two and one-half guineas.

This supplement is in the monumental size of the original monograph and one has either to spread it out on an empty table or, failing that, lay it on the floor and get on one's knees to read it, and perhaps that is the proper position from which to approach this fine study. Since Mr. Elwes' time many new species have been discovered and twenty-four are to be included in the

present supplement and it is expected to add others to a final part. Dame Alice Godman has edited the supplement admirably. It is the kind of publication one does not read but studies and goes over again and again, so rich is it in information. For instance, the note that the bulb of the *Lilium hyacinthinum* dies after the plant has flowered starts one wondering whether perhaps this may be the explanation for the short lives of other species.

In his introduction, Mr. Grove mentions the great English lily growers he has consulted, but never says a word about growers on this side of the Atlantic. This is typical of many English garden writers. While many of our horticultural achievements are not worth mentioning, in regard to the lilies, it is strange to omit names such as Isabella Preston, Dr. Griffiths, and Dr. Guterman.

Sargentiae is a new lily portrayed and described, as are all of them, in the same format as the original monograph. Mr. Grove says it is not easy to keep and that has also been my experience and I wish I knew why. Some years ago, I saw thousands of this species of lily growing in the Horsford Nurseries at Charlotte, Vermont, and there was a great deal of variation amongst them in color. *Henryi* is another lily new in this book. I have not found that it needed support as Mr. Grove says it evidently does in England, for it makes huge upstanding clumps and is one of the easiest from the point of view of culture and of raising from seed. Mr. Grove has always paid much attention to the chemical composition of the soil in his writings on lilies in the Gardener's Chronicle and along with many other

growers I do not think this is an important fact to success with them. Provided the soil is not heavy and clayey, I find lilies will grow in almost any friable, exceedingly well drained soil. *Lilium rubellum* is another lily described and Miss Snelling has made an exquisite plate of it. It is a difficult lily and as Mr. Grove says only a fleeting visitor to the garden. *Cernuum* is the fourth plate, described as a rosy counterpart of the tenuifolium but not as floriferous. This lily, too, comes readily from seed, but has been somewhat slow to flower for me. Twenty more plates are to come, and if they are as good looking and the descriptions as interesting as the ones at hand, it will be a most valuable addition to the library for the lily grower.

HELEN M. FOX.

The Garden Notebook. By Alfred Putz. Doubleday, Doran and Company, Inc., New York, 1933. 217 pages, illustrated. \$1.50.

This informal handbook is arranged in sections that follow the calendar year with chapters for each week and with topics that include every conceivable phase of gardening indoors and out. The calendar chosen is that planned for persons living along latitude 40 (approximately that of Philadelphia, Indianapolis, Kansas City and Denver) and must be interpreted earlier or later as one lives south or north of that line. The information is elementary and direct. The illustrations, for the most part, are simple and effective though not particularly beautiful and occasionally sufficiently indistinct as to be inaccurate or without due regard for comparative sizes when various plants are included on one sheet. House plants and their care, tools in

winter, sowing of seeds, bulbs, rock gardens, lawns, weeds, fertilizers, pruning suggest enough of the topics to indicate what the author touches upon.

Year Book, New England Gladiolus Society, 1934. 160 pages, illustrated. Published by the Society, Clark W. Brown, Secretary, Ashland, Mass.

After opening pages, devoted to business of the Society and reports on the year's activity, the Yearbook gets down to the business of discussing the flower itself in all its many phases, remembering both the beginner and the advanced grower. There is a review of New England introductions, while a series of short and rather personal notes, including many from abroad, many brief reports, color charts, fertilizers, and a very interesting discussion of the relationship between the Fischer Color Chart and Ridgeway's Classification.

Pioneering With Wild Flowers. By George D. Aiken. Published by the Author, Putney, Vermont, 1933. 122 pages, illustrated. \$2.00.

This little book on wild flower cultivation comprises chapters on who should grow wild flowers, on methods of cultivation and propagation, and on a large number of individual species or groups worthy of the gardener's attention. Such headings as "Color on the hillside," "The glory of the bogs," "Nature lays a carpet," and so on have a strong appeal, and the text descriptions of the plants give a good idea of their features. Here is a typical example of the author's style: "PURPLE TRILLIUM (*Trillium erectum*). The earliest eastern *Trillium* to blossom is *Trillium erectum*,

which poets delight to call wake-robin, but which the small boys of the local country schools call Bloody Benjamin. It is a lusty grower to a height of twelve to fifteen inches with flowers that are ox-blood in color. Its fragrance might be called an odor." There are over a hundred excellent illustrations of the plants covered.

Unfortunately, however, many of the data included are unreliable, and attention should certainly be called to some of the more serious slips made. For instance, in Chapter 3 Foam-flower is included in a list of those which demand very acid soil, whereas it often forms splendid colonies in rich woods where the soil is non-acid. Again, the remarks about how easy it is to cultivate native orchids may boost the sales of these plants, but is certainly not in accord with general experience. The statement that the little bog-orchids "move easily and safely to any good moist garden spot" is quite untrue. Good garden spots are rich in plant foods and neutral in reaction, and such conditions will kill these plants in short order. To plant *Pogonia*, *Calopogon*, or *Arethusa* in a garden soil is pure wild flower destruction, and will be opposed by every conservationist.

Most violets need little attention from any wild flower preservation society, but Birdsfoot Violet, which does not produce cleistogamous flowers, and which requires sterile if not acid soil, is greatly in need of protection. Accordingly it is disappointing to find it listed among those with cleistogamous flowers, and falsely stated to be the most common native species in cultivation and to "grow in almost any location."

On page 35 a new technical name, *Trillium flavum*, is proposed for a

plant which "does not seem to be classified by our botanists." Had the writings of botanists been consulted, its name would have been found to be *Trillium luteum*. Evidence of misidentification of species appears two pages further on, when *Cimicifuga racemosa* is said to bloom later than *C. americana*, whereas the plants correctly so named reverse this sequence of blooming. On page 20 a picture of some species of *Baptisia* or *Thermopsis* is incorrectly labelled *Lupinus perennis*.

For some reason the genus Phlox presents numerous difficulties to scientist and amateur alike, and this book contains a full share of misinterpretations of the members of that genus. Thus, the plant described under the name *Phlox amoena* is not a native of the southern Appalachians, but a garden hybrid; the native to which that name belongs is more difficult to grow, is taller, and blooms later. The Blue Phlox is stated to range from New York southward, but is actually listed among the native plants of the very state in which this book was published. The accepted name of the Creeping Phlox is not *P. reptans* but *P. stolonifera*, as indicated in Standardized Plant Names, which is said to be followed as to nomenclature.

The Smooth Phlox is not as stated the tallest member of the family, being much exceeded by *Phlox paniculata*. The Mountain Phlox does not resemble the cultivated Phlox, as claimed. Moss Phlox is quite erroneously interpreted as an introduced plant: "This immigrant has so thoroughly naturalized itself in eastern United States that it should be mentioned." Actually, though naturalized in New England, this plant is native in a dozen of our eastern States. Finally, *Phlox maculata* grows in two

or more states north of Pennsylvania.

An error in identification appears on plate 24, where the western *Pentstemon torreyi* masquerades as the eastern *P. hirsutus*. Both on plate 26 and in the text *Physostegia virginiana* is labelled by a non-recognized name, *P. speciosa*. Perhaps the most serious case of this sort of inaccuracy consists in the identification of the plant in the middle of the next plate: on page 76 *Senecio aureus* had been justly praised as a beautiful flower, but here the name is attached to a photograph of one of the most virulently weedy species of *Hieracium* known, which must be kept out of the wild garden at all costs.

Danger also lurks in the text on the following page, where in connection with *Veratrum viride* it is remarked that "The roots are supposed to be poisonous, but I understand that the young shoots are sometimes eaten as greens." Let us hope that no one will be tempted to try them, for they contain veratrine, one of the deadliest alkaloids known. Apparently this plant has been confused with poke-weed.

The statement in Chapter 25 that Fringed Gentian will not tolerate acid conditions is not correct. In Delaware it grows in the shade of blueberry bushes where the soil could scarcely lack acidity, and one of its most successful commercial cultivators uses distinctly acid soil.

Numerous misprints in botanical names could be pointed out; some of these, like "Aster linnaeafolia," which would mean Linnaeus-leaved Aster, are amusing, but many are merely exasperating. It is certainly to be regretted that such a large number of mistakes and misleading statements should mar the pages of a manual of wild flower cultivation. E. T. W.

The Gardener's Pocketbook

Notes on Growing Species Tulips

Sometime ago I began to realize that the species or wild plants are often more attractive than the garden hybrids. This is a statement with which many will disagree but I have found it to be true as regards tulips. There is something dashing and exquisite in the shapes and colorings of the wild tulips which the hybridized plants never have. These horticultural tulips are often big and strong but they have not the delicacy of color or elegance of proportion which characterize so many of the species.

Moreover, there is an element of romance and adventure in growing tulips which come from the mountains of Persia, the valleys of Turkey or perhaps some island in the Aegean. These wildlings which have been painted into the pottery and woven into the textiles of the Near East; surely their shimmering colors must have been the inspiration of the silks of Persia and India.

Therefore, for all these practical reasons I began to collect species tulips and grow them in my garden. I had always grown *Clusiana*, which is a fleeting visitor and *Kaufmanniana* which stays and multiplies as does

sylvestris but there were many others I had never seen at all. So, in the autumn of 1931, in a protected place in the garden, I planted twenty-five different species, ten bulbs of each. Our soil is a heavy clay and the garden is five hundred feet above sea level and swept by all the winds that blow. There were other drawbacks to the success of the tulips, one being the fact that later in the summer I planted bedding plants amongst them and I did not lift them. The other is that I let as many as would do so, set seed. The third drawback was that in the spring of 1933 other plantings of tulips elsewhere in the garden had a severe case of tulip fire. I dug up all these tulips and planted them down away from my species, and sprayed them. This seemed to keep them well, at least I think so, for there were some blemishes on the flowers and leaves which I attributed to the spray and which may have been due to the blight. However, I can only be certain about this next spring.

Tulips species planted in the fall of 1931, redates of flowering are not the first date, but a day when they are fully out.

10 of each—	1932	1933	1934
<i>australis</i>	all came through and flowered May 15		all bulbs alive, 7 have one flower each and 5 have leaves only— May 14
<i>chrysantha</i>	May 5	May 2 formed 4 pods full of chaff	May 4 5 flowers on 1 plant 4 flowers on 3 plants 3 flowers on 1 plant 1 flower on 3 plants

<i>Clusiana</i> 50	May 15 all alive	May 8 less	very few
<i>Eichleri</i>	May 5	May 1 some set seed	May 4 7 flowers on 7 plants 3 plants have only leaves
<i>Greigii</i>	May 15	set seed	May 4 9 flowers on 9 plants 1 flower on each
<i>Hageri</i>	May 15	April 25	May 14 12 blooms on 4 plants 1 plant with only leaves 3 with two flowers 2 with three flowers
<i>ingens</i>	May 15	May 1 set seed	May 4 7 plants each with 1 flower
<i>Kaufmanniana</i>	April 19 set seed	April 19 all came up × with violacea × Lb seed pod	April 12 much increase
<i>Kaufmanniana</i> aurea	April 23 4 came up	died	
<i>Kaufmanniana</i> Gaiety		set seed	April 19 3-4 flowers on each original bulb
<i>Kaufmanniana</i> Primrose	April 30		April 19 a few did not flower 4 magnificently, 1 with 3 blooms, 1 with two, others 1 each
bulbs planted 1931	1932 May 4	1933	1934 May 4
<i>Micheliana</i>			only 4 bulbs alive only 1 has a flower
<i>Marjoletti</i>	May 19	May 16 7 have flowers 3 have leaves	May 10 9 plants alive 3 without flowers 3 with 2 flowers 1 with 3 flowers 2 with 1 each
<i>montana</i>	died		
<i>Oculis-solis</i>	all lived	no flowers botritis on leaves	no flowers but leaves

<i>persica</i>	all alive	May 12	flowered very well
		37 flowers on 10 plants	
<i>polychroma</i>	April 19	April 16	April 23
		every bulb alive and flowered	6 plants in flower 2 on 5 plants 1 on 2 plants
<i>praecox</i>	May 4	May 11	May 4
			11 blooms on 10 plants
<i>praestans</i>	April 30	April 22	end of April
Tubergen's variety		formed seed pods	flowered well
<i>Sprengeri</i>	died		
<i>stellata</i>	died		
<i>sylvestris</i>	May 15	May 15	flowered well and in- creased
		× with <i>Eichleri</i> × with <i>kush- kensis</i>	
		set seed pods of these	
<i>sylvestris</i>			May 4
Tabriz variety			2 flowers on 1 plant 8 plants with 1 each
<i>turkestanica</i>	died		
<i>violacea</i> mixed	April 21	April 19	April 23
		set seeds	all bulbs alive 8 flowers

I did not keep records of date of flowering the first years as accurately as the last, but all except where I noted "died" came through the first Spring.

In the Fall of 1933 I planted another lot in another part of the garden where there had never been any tulips. This is very exposed and the soil is even heavier. The losses were severe but it may have been due to the fact that the winter of '33-'34 was so very cold, the temperature going down to thirty below zero here. *Wilsoni* May 10, look sick
Fosteriana April 23
Kushkensis May 8
Kaufmanniana April 23
but the following died, *Kaufmanniana* Brilliant, *aurea*, *coccinea* and Handel,

linifolia, *sylvestris* var. Tabriz, *pulchella alba*, *pulchella rosea*, *Fosteriana* Red Emperor, *Fosteriana* Defiance, *Turkestanica* and *lanata*.

Meanwhile I garnered seeds from wherever I could and in all about 100 packets of seeds were planted, not all of different species, and of this lot 9 germinated. Four had been sent to the Boyce Thompson Institute. These were frozen in their ice box and then germinated. I planted mine in the fall and left the boxes out of doors in a cold frame protected by a light covering of salt hay. The soil in these flats or boxes consisted of the same mixture we use for the lilies, namely of one part loam, one part sand and one part leaf mold. The Boyce Thompson staff

germinated *Biebersteiniana*, *altaica* and *Schrenckii*. I germinated *Schrenckii*, (29 plants); *Hoogiana*, 2; *dasytemon*, 2; *violacea pallida*, 10.

Foolishly I did not count the number of seeds in a packet but as a rule there were not many. In the spring of 1934 all the hundred packets of seeds were still in their original flats. Of these *dasytemon* showed its second year's leaflets, and *Kaufmanniana* Gaiety sent out gray green tubular sprouts which seemed to pop out all of a sudden. Of my own home-harvested seeds which had also been planted in flats and kept in the greenhouse until February, and then put into a hot bed, the following sprouted: a cross, *ingens*, *Kaufmanniana* and *violacea* mixed, *praestans* and *Kushkensis* × *sylvestris*.

The *violacea* mixed looked like lily seedlings but the others send up little sprouts like round chives or onions. They were all healthy and strong, although a green mold had formed over the top of some of the flats.

I had a group germinating which had been frozen and a lot which had spent the winter in a warm place and do not know yet which is the better method.

Some of the seed took two years to germinate and some came up the first spring after planting. The average of germination for my own absolutely fresh seed was much higher than that which came from abroad. A good deal of the foreign seed I could see was not fresh but planted it anyway and this brought down my average.

At any rate, I now know that tulip species can be raised from seed under very simple circumstances and in an amateurish fashion and that the

hardy ones come through most severe climatic conditions successfully.

It is to be hoped that this lot and more to follow will prove a hardy strain of these utterly charming and attractive wildlings from the Near East and that more of them will soon be flourishing in the gardens of North America.

HELEN MORGENTHAU FOX.

Peekskill, N. Y.

Narcissus Fortune (see page 302)

In these days, when narcissus varieties are coming to our attention in numbers that threaten to rival the numbers of iris, rose and dahlia varieties that overwhelm the amateur, it is perhaps wise to call attention to some of the varieties that stand as important plants among their fellows as indicating trends in the development of the plant.

The seedling that Mr. Walter T. Ware showed some years ago among seedlings in the exhibit of the Midland Daffodil Society in Birmingham, England, has ever since made its way as an outstanding daffodil. Aside from the vigor and fine form that should distinguish all good daffodils, it had the great advantage of being a flower with a brightly colored cup that bloomed early in the season while only yellow trumpets and the first of the Leedsii were in flower. Since then it has been used almost beyond belief as a parent to produce seedlings with even more color and even finer form in a considerable diversity of shape and patterns.

The illustration shows two flowers, the upper one the older, showing the tendency of the cup to lighten in hue and to spread in width as the flower ages.

Washington, D. C.

Clematis Gypsy Queen (see page 305)

The large flowered *Clematis* is an aristocrat and probably must always remain so, for reasons that will appear later, but even so it is too little known and used in American gardens. A vine that is little subject to insect or other pests, which normally presents a pleasing foliage when not in bloom, and which blooms over a long period, should make considerable appeal despite its one shortcoming, the lack of fragrance.

Of all the large flowered varieties probably *Gypsy Queen* is the most desirable. It is not of recent introduction into the United States but is yet of such rare occurrence here that it may still be considered a novelty. Why it has not become more widely distributed and better known is just one of those horticultural mysteries that none of us seems able to explain with any assurance. Just why nine-tenths of the commercial catalogs should go on year after year, decade after decade, proclaiming *Clematis Jackmanni* the best large flowered variety when there is such a superb thing as *Gypsy Queen* obtainable, a variety that is better in every way, I have not been able to fathom. True, any of the large flowered hybrids are a bit slow of vegetative multiplication, whether by layering or by cuttings, and so they must always be relatively costly. Besides, it is common knowledge that in their nursery propagation the mortality rate is apt to be higher than with some other things, but once well established there should be no serious difficulty in their management.

Gypsy Queen is a more robust grower than most; is certainly decidedly more vigorous than I have ever seen *Jackmani*, from which no doubt it was originally derived.

There are the same large four- or five-parted flowers, but in greater profusion, and the color is not so cold, but a warmer, richer, very dark and more velvety purple.

The largest flowered *Clematis* is not very demanding as to location but would no doubt be happiest clambering over brush in the open sunlight. Being a vine, however, most of us prefer it at the porch or on a trellis against a wall, in which case an east or south exposure seems to give best results. I have grown it successfully in all exposures, but at the north of a building it will not grow quite so robust nor will it flower so freely. In any case it must be provided with something to climb upon. The climbing habit consists in wrapping slender, wiry leaf stems around any available support with which it may come in contact. Wire fencing of the electric weld type, with meshes two by four inches, makes a most acceptable support, appearance and utility both considered. Strips of this material may be hung in place and can be taken down in winter when the vines are not there to cover them, for the vines should be cut within a few inches of the ground each autumn when growth has matured and the leaves are dying; otherwise plants become leggy and produce new growth only from the upper portion the following year. Great fat buds for new growth will have been formed six or eight feet from the ground perhaps, but never mind sacrificing these. Cut the vines off near the ground just the same and others will start below.

The *clematis* is a rich feeder and will well repay some extra preparation in planting. The roots are rather fleshy, not greatly unlike the roots of *Asparagus*, and like to go



Lilian A. Guernsey

[See page 300]

Narcissus Fortune

deep in good soil. A hole about the dimensions of the orchardist's typical bushel basket should be filled with well enriched garden soil, in the composition of which there should always be an abundance of lime. In fact my own most vigorous vines are growing where there is such an abundance of lime, left buried during earlier building operations, as even to produce a chlorotic condition in the lower leaves, but despite this the growth and abundance of flowers is all that could be asked. Not that liming to this extent is desirable or to be deliberately done, but I mention this merely as evidence that they are lime-loving plants and thrive best where that element is liberally present.

The trellis of Gipsy Queen shown in the illustration is about ten feet high but the vine would have gone quite higher if the trellis had permitted.

While there are several methods of propagation none is capable of rapid reproduction of these desirable vines. Propagation by layering produces the best plants but is somewhat slow and necessarily limited because of the relatively few nodes and the long intervals between them. It is best performed by nicking with a sharp knife into the under side of the vine just behind a node and burying this part of the vine under a couple of inches of earth, pegging down if necessary. The callus formed in an effort to heal this slight wound apparently furthers the striking of roots at this point, but plants so rooted are best left two years before separation from the parent plant. Gipsy Queen may also be propagated from cuttings of summer wood, but the internodes are so long that the usual proceeding with other things is not very satisfactory. Rooting of

Clematis cuttings in sand takes place only at the cut end, consequently the cutting should consist of a single node and the cut be made close under the node so that the buds in the leaf axils will form a crown right at the top of the root system; otherwise a plant with a dangerously long collar, unsupplied with roots and with buds only at the top, will be produced. Any serious injury in this budless, rootless region means the death of the plant.

Such short, single-node cuttings strike root readily enough, but as compared with layered plants will be weaker and must be well taken care of the first couple of years till a good root system is established, but this method if successfully mastered will result in more rapid propagation since each node on a vine is a potential new plant.

Propagation by separating a portion from an old and well established plant is not impossible but is hardly to be recommended as it frequently endangers the life of the original plant.

Thus it will be seen that in the large-flowered clematis increase in numbers is unavoidably slow as compared with many other horticultural entities and that the would-be possessor must expect to pay a price correspondingly high. He may not assume that if he waits long enough the price will drop to ten cents or even a quarter, but there is consolation in the fact that Gipsy Queen is really a queen and is well worth the higher price that such handicaps in propagation make necessary.

Chevy Chase, Md. J. MARION SHULL.

Gentiana Porphyrio (see page 306)

Annie Lee Clement in the October issue of THE NATIONAL HORTICULTURAL MAGAZINE expresses my opin-

ion of the surpassing beauty of *Gentiana porphyrio*.

This gentian is a native of the Pine Barrens of New Jersey, where we cultivate cranberries and blueberries, as well as of the region about Ashville, N. C., and is one of the most slender and dainty, withal wirey and vigorous, little ladies that ever gladdened the eyes of a flower lover.

I vividly remember the first time my eyes were so charmed. The cranberry bogs had been flooded to protect them from the damage of a frosty night. While they were drying off next day harvesting operations were suspended; so father and I were at liberty to visit a neighbor's bog. In an old buggy behind a plump, brown horse we drove along a road winding its way through sparse and stunted pines. Bushes just beginning to show touches of crimson and gold pressed close to the wheels and even made two gay runners between wheel tracks and the path worn by horses' hoofs; those three meandering, parallel strips of white sand so characteristic of Jersey's fine roads before the day of the automobile.

Suddenly a glint of blue was seen. The old horse stopped and the blue beauty was gathered. A Pine Barren Gentian! It was two inches across with five, firm, almost waxey, smooth edged petals spread flat to welcome the sun and joined at the base with a wide throated bell. The upper edge of the bell between the petals was daintily fringed in a manner reminiscent of its cousin, the Fringed Gentian. Each petal near its base bore a triangle of minute, scattered, green dots and the throat was conspicuously marked with blue and buffy white stripes.

The stem, about twelve inches high, was flexible and wirey with narrow grass-like leaves set alternately in pairs. And this was the whole of the plant. The flower was of amazing size for so slender a base.

Some years later I hunted over the same ground with the purpose of marking plants from which to gather seed. The date of flowering had been forgotten, but certainly it was in the frosty fall. A diligent search was rewarded not by lovely, blue flowers (the season was too far advanced for that), but by finding one slender stem with two capsules still nearly full of seed. From the seed of these capsules and their progeny thousands of plants of *Gentiana porphyrio* have been grown at Whitesbog and rather widely distributed. We feel that this is real conservation.

The intimacy I have enjoyed with *Gentiana porphyrio* in my garden has yearly increased my love for it. It is a true perennial. An old plant will often send up eight or ten stems with one to four flowers each. I have had as many as twenty-seven flowers on one plant. The roots are pale yellow, large and fleshy, very little branched, often a foot or more long and grow straight down.

The flowers of different plants vary somewhat in their shade of blue, those of a few having a purplish cast, to my taste less beautiful than the superb blue of the type. A small percentage of plants have flowers with four petals instead of the customary five, and once I found a plant on which all of the flowers had six petals each.

The buds are slender, pointed, and neatly rolled in spiral form like the buds of a morning glory. When the flower is fully expanded the petals



J. Marion Shull

[See page 301]

Clematis, Gypsy Queen



A. Tennyson Beals

Gentiana porphyrio

[See page 303]

have a slight sidewise twist, still suggesting the spiral. Each flower opens several days in succession and each evening closes neatly. The

newly faded flowers are so accurately spiraled that they appear like buds to those not familiar with the plant. As the seeds ripen the ovary stalk

elongates and pushes the upper end of the capsule above the sheathing faded flower. The capsule splits at the tip and the myriads of tiny, slim seeds with which it is packed are scattered by the swaying of the slender stalk in the wind.

Each plant will make the largest individual growth when free from root competition, but I enjoy the lovely, blue flowers most when they push up through an evergreen ground cover which also enjoys an acid, peaty, sandy soil. For this purpose I have used *Gaultheria procumbens* and *Arctostaphylos uva-ursi*. The *Gaultheria* I especially like in this association. It never grows too rampant and is beautiful every day in the year. When the seeds of the *Gentians* have ripened the remnants of the dainty plants may be cut to the ground and the bed is perfectly neat and beautiful with the deep maroon leaves, and rosy red berries of *Gaultheria's* winter phase.

The flowers of *Gentiana porphyrio* are sometimes distorted by a grub which develops in the ovary. Just when or how the egg is placed there I do not know, but it must be at a comparatively early stage in the development of the bud. I have found that this grub can be easily controlled by gathering all the seed capsules during the late fall or winter and burning the trash after the seed has been shaken out.

In this part of New Jersey, *Gentiana porphyrio* flowers during September and is usually at its height in the second week.

Annie Lee R. Clement states that *Gentiana porphyrio* will grow "in hard baked loam when once established." Those who have secured plants at Whitesbog have also found it not too finicky in its preferences. It will doubtless respond most joyously,

however, when given the comparatively moist, sandy soil with a liberal mixture of acid peat in which it is found growing naturally. In the Whitesbog garden it tolerates light shade, but seems to be happier in full sun.

ELIZABETH C. WHITE.

Whitesbog, N. J.

Annuals and Others.

Sometimes in passing other gardens, one finds combinations of plants that particularly please and are noted against the time that they can be used in one's own garden with a thought of gratefulness to the unknown gardener who discovered them first. In such a border recently, was noted a combination that gave a charm of color and form that was perhaps accidental in the planning even if somewhat out of keeping with some garden planning. It was made up wholly of annuals, most of them coarse in themselves but giving a rather rich yet tender combination of colors. *Cleome spinosa*, *Perilla frutescens* var. *crispa* and palest pink zinnias gave the main theme. The loose branching stalks of the cleome, each shoot crowned with a loose head of rose-pink flowers fading to white, were strongly accented with the rich deep purple foliage of the perilla and the tender color of the pale pink zinnias. With these were a few plants of white zinnia with its greenish hue, and a few zinnias of the palest yellow. It was important that the zinnias were the palest of pink and the palest of yellows for stronger tones of these same colors would have marred the combination. Through these had been used some of the primulinus varieties of gladiolus that repeated the pale yellows touched with pink. In another part of the same border were a few large plants of

petunia, Rose of Heaven and deep purple that repeated the color of cleome and perilla.

Of course in such a combination the danger lies always in the use of perilla that self sows amazingly and may become a weed unless pulled out ruthlessly.

One wonders a little if the perennial *Salvia Pitcheri* or *S. uliginosa* might not have added another accent to this combination.

In another garden, was noted a use of *Lobelia cardinalis* that was new, namely as an interplanting in the edges of a bed given over mostly to Kaempfer's azalea. Although far from any bogside, this lobelia will do quite well in the deep soil, rich in humus that is needed for the azaleas and offers a bit of blazing crimson in the season when the azaleas are no more than deep green foliage. The spirelike growths also contrast well with the somewhat tiered growth of the azaleas.

A neighbor's garden also is responsible for the first sight of *Cosmos sulphureus* that looks for all the world in its early life like one of the pestiferous Bidens that infest our fields. Once August has turned the midsummer mark, it begins to show buds that open to coreopsis-like flowers of an intense orange color, that carried far in the garden picture. One can imagine this added to the zinnia border in which orange and lemon yellow predominate with other gladiolus for

stronger contrast in scarlet and any red that contains little of the pinkish undertone. *Liatris pycnostachya* and *Verbena bonariensis* with their warm pinkish purples overlap its season and the indispensable artemisia, Silver King with its gray-white foliage sets it off further. These in turn might give place to some of the gray-lavender Michaelmas daisies and even to carefully selected border chrysanthemums.

One hears often enough of the creeping *Nierembergia rivularis* with its milk-white salvers but not often enough does one find the taller and more bushy *N. frutescens* with its sheaves of slender somewhat flax-like shoots lined with narrow gray green leaves and crowned with myriads of lavender-white flowers often toned with darker lilac in the throat. It is a charming thing and flowers for so long a time in midsummer that it should be planted in some quantity to fortify the perennial borders.

Occasionally there is a plea for flowers with perfume and many are the recommendations. Too rarely practised is the advice to include somewhere in the acid soil beds a plant or two of the Sweet Pepper (*Clethra alnifolia*). This wild plant is not as showy as many of the shrubs we cultivate but its delightful perfume fills the air in late summer. A bush or two finds a pleasant home among azaleas, either deciduous or evergreen.

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