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Robert Taylor

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Peach Blow

Hedges for North America

DONALD WYMAN, *Arnold Arboretum*

Everyone interested in gardening considers the planting of a hedge at one time or another. There are times when only a privet or barberry hedge is contemplated, possibly because these varieties make up the hedges used on neighboring properties. On the other hand, when one of the better materials like hemlock is used in a hedge and planted in a situation where it thrives consistently, then there is interest and beauty derived from that hedge for years. In fact, there is no better nor more beautiful hedge available than one made of well-grown hemlock. It is satisfactory as a hedge and beautiful as an ornament three hundred and sixty-five days each year. Fortunate is the person who knows this and uses it. Many ornamental shrub and tree varieties can be grown in hedge form. In order to make hedges more beautiful by using interesting and diverse plant materials, let us consider some of the important factors to be contemplated at the time the hedge is being planned, and then let us consider the many, many plants which can be utilized for making good hedges in this country.

A hedge is a line of plants grown in an unnatural clipped form, hence there should be some good reason for growing them in this way. A line of well grown shrubs or trees allowed to grow in their natural form unquestionably results in a much more beautiful line of plant material. One of the foremost reasons for using plants in a clipped hedge is to form a barrier in order to keep people and animals within (or without) the property limits particularly on the small property where space is at a premium. Some-

times a background is needed for a perennial border or as a formal line of demarcation between one part of the property and another; or sometimes a long flowering hedge is desired to mark the limits of a property. Regardless of the purpose for which the hedge is planned, it should be very clearly defined before the hedge material is selected, for there are plants which can be chosen to best serve each special purpose.

There is a second reason for giving the purpose careful consideration at the start. If a three-foot barrier hedge is to be used, then the mature width of the hedge should be planned to be at least three feet. If a fifteen foot screen planting is desired, in order to have a hedge that is well grown, a space on the ground nearly fifteen feet wide should be allowed for the hedge to grow sufficiently wide for that height. Even a hemlock hedge might be allowed only three feet in width if it is to be kept three feet high, whereas the same hedge might need nearly fifteen feet of ground space if allowed to grow fifteen feet in height. This matter of allowing sufficient width for the hedge is a very important matter. It is of the utmost importance to understand it thoroughly before the hedge is planted in order to allow sufficient space for future growth. Many of us have seen old Norway spruce hedges allowed to grow ten to fifteen feet tall, and only allowed a three or four foot space to increase in width. The result is a narrow hedge that soon gets open and devoid of branches at the base and there is nothing that can be done to coax more branches from the base. One

must, therefore, select a hedge which at maturity can be kept well within the limits set for it.

A windbreak or screen frequently is given considerably more room than a formally clipped hedge, for the windbreak or screen is frequently allowed to grow unclipped.

When the purpose for the hedge is known, then its height and width can be determined, and not until then. It is only after these items have been definitely decided that the plant material can be selected and the hedge can be placed. As an example, take a paved walk through the garden along which the hedge is to be planted. Should the hedge be three or six feet from the edge of the walk? If a three foot yew hedge is desired, then the ditch might be dug two feet from the walk. Know the purpose the hedge is to serve, its desired height when fully grown, then determine its exact location. One other very important point is never to plant a hedge exactly on a property line. If this is done, some disagreeable neighbor might, at some future time, chop down that half of the hedge on his property. He would have a legal right to do so. If, however, the hedge was so planted that at maturity all plants were within the property line, then the owner would have full jurisdiction over it at all times.

Planting

In planting hedges it is best to dig a ditch. In general, the ditch should be about 18 inches wide and from 12 to 18 inches deep for small hedges, but for larger hedges and evergreens these dimensions might well be doubled. If the soil is poor, make the ditch larger, fill it with good soil, fork in some well-rotted manure or other humus, spread the roots, cover them carefully with soil and firm the soil until the surface is almost up to the surrounding grade. If the plants are set

a trifle low, water will flow towards the hedge. A surface mulch around the plants prevents the soil from drying and baking. As in any other transplanting operation, the tops should be cut back considerably to compensate for the roots lost in digging. The young hedge plants should be cut back to within a foot of the ground at least if they are deciduous, preferably more if possible, because the lower the plant stock at this time, the sooner it will become bushy and well branched at the base. After planting is completed, the entire hedgerow should be well watered.

Hedges should be planted in well-drained soil and so situated to receive a maximum amount of sunlight. This is most important, for, though certain types of hedges will withstand shade better than others, shade is one of the chief reasons why some hedges are scraggly and uneven.

Spacing

Individual plants may be spaced from 18 to 36 inches apart, depending on the kind and size of the plants, and the quickness of effect desired. There is no necessity for planting closer than 18 inches except possibly with some of the dwarf types.

Since privet and barberry are cheap, most people can well afford to place them close together, at 18 inches. On the other hand, evergreens cost considerably more; but, in order to meet the increased expense of this type of hedge, the home owner can space the plants farther apart, at 36 inches, and wait several years for a permanently close and compact hedge. If he is in a hurry for the permanent effect, he buys larger plants and spaces them 18 inches apart. The important point to remember is that in a few years the ultimate effect of both hedges will be the same. The only difference will be that the closer planted hedge will look its part a few years sooner.



Dwarf box as grown in one of the many gardens at Mount Vernon, with Buxus sempervirens bordering the garden

A flowering hedge, Syringa persica, which can be clipped only once a year, and that immediately after flowering

Another method of obtaining quick results in a hedge is to plant two rows, 18 to 24 inches apart, the plants in one row being opposite the spaces in the other. This, of course, makes a wider hedge and insures the filling in of the bare spot made by a dead plant.

One of the purposes in planting a hedge is to keep dogs off the property. This object is easily accomplished by a mature, closely planted, thorny hedge, but the same thing can be done with a young hedge which is not thorny and where the plants are spaced far apart. A strip of chicken wire, from 2 to 3 feet high, is staked up through the center of the young hedgerow, and by the time the wire begins to disintegrate, the plants will have grown sufficiently to present a barrier themselves. If a hedge must be grown in a shady place and the resulting growth is always more or less open at the bottom, it is a good plan to keep a strip of chicken wire in position in this way. It is not seen, and it keeps the animals out.

Some hedges of white pine, hemlock, beech, spruce, and other tree types, fifty years old and only about 5 feet tall, which were originally planted 18 inches apart, are still in perfect condition, fully demonstrating that tree types can be closely planted in hedge form and still be effective after half a century.

Care

Fertilizing is often unnecessary, since the more hedges grow, the more often they will have to be sheared. However, if the soil is poor or a young hedge needs added stimulus to attain the desired height, a mulch of well-rotted manure can be placed around the base of the plants or worked into the soil. This can be done either in the fall or in the spring. A mixed fertilizer (5-10-5) could be applied at

the rate of 5 to 10 pounds for each 100 feet of row depending on the size of the plants. For old, mature plants it may be possible to make an even stronger application, but this should be done only after a previous trial application.

Most deciduous hedges can be treated far more ruthlessly than they have been. When they grow old and open at the base, it would be far better to cut them down to within a few inches of the ground than to try to force additional branches by the use of fertilizers and added care. The cold winter of 1933-34 clearly demonstrated this important point to many home owners. All privet hedges and even barberry hedges were injured in many sections of New England and New York. Other plants had their tops killed entirely. Most of these plants came up again from the roots, many of the hedges that were cut back to the ground in the early spring were more dense and more compact at the end of the first growing season than they had been for many years. Consequently, an old and worn-out deciduous hedge should be cut in the early spring before the buds begin to swell, leaving only a few inches growth at the base. A bushy, vigorous hedge will result in short order. This does not apply to evergreen hedges, for they frequently do not respond to such vigorous treatment.

Pruning at Planting Time

Many shrubs can be trimmed so that they will grow into good hedges. Various hedge demonstration plots are sufficient evidence that this is true. In the hedge demonstration plot at the Arnold Arboretum there are at least 80 of the 115 hedges which can be classed as good. Some kinds of plants require more trimming than others, but only those that are easily trimmed make good hedge plants. There are enough



Young white pine hedge just beginning to become dense

Prunus Laurocerasus used widely in the South makes a very dense, glossy-leaved hedge

of these to make hedge planting a very interesting and varied—part of landscape work.

Trimming should start with the very young hedge. Usually it is advisable to start with plants three feet or less in height, for such plants are easily trained to grow in proper hedge form. The ideal hedge plant is one that branches directly from the base, each branch being clothed with lateral branches from the ground to the top of the plant. This makes for a very dense habit of growth and a good hedge. Many plants do not have this form when bought from the nursery for they are frequently grown with a single stem or trunk, with many of the lateral branches removed. Such plants will grow satisfactorily, but the growth will be all at the top, and not at the bottom near the ground. It is in this area that the side branches must be forced while the plant is yet young, for as it grows taller and older, it becomes increasingly difficult to force adventitious buds at this point.

Consequently, it is usually a good practice, especially if all plants have been purchased, to cut off the tops of the hedge plants at six inches or a foot above the ground as soon as they have been planted. Admittedly this is very hard for most gardeners to do, for it means cutting off a great deal of what they consider "good specimens." However, a "good specimen" is not wanted in hedge making. A hedge plant is grown differently, as explained above, and the best time to start growing properly branched hedge plants is at the beginning.

Suppose a hawthorn hedge has been decided upon. Five-foot specimens are obtained from the nursery and when they arrive, it is noted that all are grown with a single trunk and no lateral branches on the trunk for the first two feet. If such plants are not

pruned at planting time, there may always be that two-foot space at the bottom of the hedge where there are no branches. In addition, the single trunk may become injured to such an extent that the entire top part of the plant may die. If these same plants are cut off at six inches or a foot above the ground as soon as they are planted, side shoots would be forced out from that part of the trunk remaining, or from the ground in such a manner that the plant eventually would have several main stems clothed with lateral branches from the ground on up.

Most of the deciduous shrubs and trees recommended for use in hedge making are of the type that will respond to such a severe type of pruning. I have cut off the trunks of such trees as beech, pin oak, sycamore, Norway maple, Lombardy poplar, the Asiatic elm and others—trees that were six to eight feet tall with a trunk diameter of at least two inches when they were received for hedge planting—cut them off six inches from the ground, and, during the first growing season, many buds were forced out from each trunk, so that they later developed into well branched bushy hedge plants.

Unfortunately, it is not often possible to treat evergreen hedge plants in this manner. They are slower in their habit of growth, and frequently seem unable to form new leaf buds on wood that is old or large and devoid of foliage. It is a good policy never to prune evergreens back to wood that has no leaves, for if this is done, the chances are that the branch or stub may die. In buying evergreen plants, for hedge making, it is essential to have them well branched at the base, thus avoiding a great deal of trouble later.

Shape

The shape of the hedge is very important, for many an otherwise good

hedge is spoiled because the owner tries to keep it too narrow at the base. In general, all hedges should be wide at the base and narrow at the top. This is especially true of evergreen hedges. Unfortunately, there are many Norway spruce hedges in this country which are excellent examples of how not to prune a hedge. It may be that they were planted too close to walk or road, then as they increased in height, they were clipped perpendicularly and were forced to grow within too narrow limits. When this is the case, the lower branches die because of lack of light and air and practically nothing will bring out new branches in their place. The result is a very poor hedge, open at the base and sometimes open as high as the eye level. Such hedges should be removed and replanted in such a way that the new plants will be allowed to grow nearly as wide, as the mature hedge is high.

Anyone familiar with pruning trees knows that it is usually the shaded inner branches which are weakest and often need to be cut out. Such is the case with hedges, especially with evergreens. Hence it is always advisable to trim them so that the lower branches receive some light, and this is most easily accomplished by having them wider at the base than at the top. There are certain vigorous growing hedge plants like the privets and the Japanese barberry, which, when growing in good soil can be trimmed with perpendicular sides and still remain well branched at the ground level. However, even these when growing in poor soil will make better hedges if trimmed so that the lower branches are wider or longer than the upper branches.

Personal preference dictates the actual shape of the finished hedge. Some like a more or less rounded hedge, others may prefer a triangular hedge with a flat top. This type is easier to

trim than the rounded form, but there is the possibility, in regions where the snowfall is heavy, that the rounded form may shed the snow better with less injury resulting to the plants.

When to Trim

Many a gardener has vigorous growing privet in mind when he thinks of trimming. Such plants grow so fast that they must be trimmed several times a season. However, all hedges are not like this. There are many which need be trimmed only once each year and some which only need trimming once every two or three years! It all depends on the age of the hedge, the kind of plant material and the general purpose for which the hedge is grown.

As has already been explained, the deciduous hedge is best cut to within six inches or a foot of the ground immediately after planting. The first year of growth the plants are left unmolested in order that they may make a maximum growth. The second year, some may need a heavy pruning, but most certainly all will need a pinching back of the branches in order to force lateral growth which makes for density. Especially is it important at this time to keep the terminal shoot or leader restrained. Trees like beech, maple and sycamore have strong leaders, and these must be restrained in order to make the plant become more dense at the base. If the leaders are not restrained at this early date, the plant will grow high rapidly, but lateral growth (which is necessary for dense foliage especially at the ground level) will be retarded. The third year of growth, most plants will need a normal trimming.

Evergreens should not be cut back harshly. Hence, the pinching back of terminal shoots is most essential in order to produce lateral growth. Most

evergreens have strong leaders, and these must be restrained in order to make the hedge become bushy. Once the small hedge has become fairly well filled in at the base, then it can be allowed to grow moderately in height.

The amount of growth to trim off depends on the kind of plants used and their age. For instance, one would expect to trim off more material from a privet or honeylocust hedge than one would from a boxwood hedge. If the plants have not reached the height at which they are to be permanently maintained, then more growth should be left on.

If the hedge has reached the height at which it will be maintained, then it may be trimmed back to within an inch (or less) of the previous year's growth. Even this is impossible to keep up indefinitely, for it is obvious that under this condition the hedge will still enlarge. Sometimes it is necessary to cut back to two-year or three-year-old wood. One should be very cautious in doing this, as some plants will not respond to such severe trimming as well as others, but a little experimenting on this score, with the particular type of hedge grown, will soon show whether or not this severe pruning can be done. With deciduous hedges, at least, it is usually possible to cut them back to near the ground level when they become overgrown, and thus a new hedge is started again.

A young hedge which has not yet reached its full height is best trimmed during the actual growing season in late spring, for as elongating shoots are pinched back, lateral buds are forced into immediate growth.

For the mature hedge, trimming can be done at any time, but during or immediately after the actual growing season is best. This is often in late June or very early July in the northern United States. At this time the growth

is over for a period at least and so on one trimming will suffice for a long period. Then, too, any further growth which takes place will have sufficient time to harden off before cold weather. If trimming is done in late July or August (in the northern United States) such young growth as is forced out may be too tender and so be killed during the winter, leaving unsightly dead spots in the hedge. Certainly any heavy trimming, especially that done to evergreen hedges, should be done in the spring. Shaded branches are frequently the least hardy, and a heavy fall trimming, resulting in the exposure of a number of shaded branches, might result in serious winter injury to the hedge, whereas the same heavy trimming given in the spring would leave plenty of time for young shoots to grow and harden off properly before winter. The same caution should be taken in heavily trimming a hedge just prior to a long hot, dry spell in the summer. Such a trimming had better be advanced a few weeks into late spring in order to allow new growth to develop and shade the most vulnerable spots.

Trimming once at the end of the growing season is usually sufficient for all but the most vigorous growing hedges such as privet, honeylocust and osage orange. It may be that a few shoots will grow and need trimming here and there before fall, but these would not be sufficient to necessitate a heavy trimming in the fall. In any event, the object of each and every trimming is to remove the terminal buds and so force lateral buds into growth, thus increasing the density of the foliage of the entire hedge.

Kinds of Hedges

The selection of the proper kind of plant material for the hedge will save much trimming. For instance, if it is



The hedge experiments on the grounds of the Experiment Station at Ottawa, Canada, include many hedges, some of which are fifty years old

Acanthopanax Sieboldianus or Five-leaved Aralia is one of the best hedge materials for growing in the very trying city conditions. Here is a hedge growing in the heart of downtown Boston opposite the Hotel Statler

desired to have a hedge four feet high, *Euonymus alata compacta* would be ideal, for, once established, it only needs a slight trimming *once every other year* or so. Privet, honeylocust, linden, beech, all need considerable pruning to keep them in proper form at this height. Some hedge materials that need little clipping are *Cornus racemosa*, *Taxus media Hicksii*, *Berberis Thunbergii erecta*, *Thuja occidentalis*, "Little Gem" and several others.

There are some plants used in flowering hedges such as forsythia, Chinese lilac, Van Houtte spirea, which are kept unclipped until the flowers have faded when they are given a single annual trimming. After this clipping the branches are allowed to grow untrimmed the rest of the year, resulting in branches a foot or so long by the end of the growing season; it allows sufficient time for the formation of many flower buds, so that in the spring these hedges are covered with long graceful shoots of flower clusters. Such hedges can only be considered as "formal" immediately after they are clipped. They do take up considerable space, hence their use is limited, but when fully clothed with flowers they are outstanding indeed.

In completing this discussion, one other possibility should be presented. A Canada hemlock hedge can be one of the most beautiful of clipped hedges, or it can be allowed to grow for a year or two without any clipping and become one of the most graceful of the informal or unclipped types. The long, arching branchlets which grow quickly in a year or two will easily be two feet long and lend a very beautiful and graceful effect to the entire hedge. When they grow out of proportion, then they may be sheared off and the hedge once more becomes "formal." In this way a hemlock hedge (and some others likewise) may be "formal" or "informal" at the

owner's whim, thus affording a landscape feature which of its very nature yields varied interest for years.

Hedges for Different Purposes

Accompanying this article is a list of 184 plants which can be used in making good hedges. Not all are hardy in all parts of the United States, but some can be found in every area except the extremely warm parts of the country. An additional list of 88 evergreen hedge plants is included for these particular subtropical areas. It is impossible in the allotted space to give all the information concerning such a very large group of plants.

The method taking the least space is merely a listing of the plant names and a recording of numbers after each name showing some of the uses to which that particular plant may best be put. It should be definitely stated here that all the plants listed (with the exception of some recommended for shelterbelt planting) can be used in clipped hedges. Those listed as dense make the best clipped hedges. Plants which have been found to be unsatisfactory in hedge making for particular reasons are not included. One example is the Mugo pine, which really makes an excellent low clipped hedge, but it is so susceptible to scale infestation that it has been eliminated from this list. An example of a plant with which one should be very careful is *Ribes alpinum*. The staminate form does not carry the white pine blister rust. The pistillate form does and should not be used. Both forms make excellent low clipped hedges.

Hardiness is a topic which had to be entirely omitted. The reader will have to rely on his own knowledge for this. *Abelia grandiflora* makes a marvelous hedge, evergreen in some sections of the South and deciduous in others, but not satisfactorily hardy north



Two types of pruning. The hedge on the left being wider at the base usually results in a hedge with dense branches all the way to the ground. Notice how the larger hedge, trimmed with perpendicular sides, has no branches whatsoever touching the ground. This could have been corrected if it had been trimmed so that it was wider at the base than at the top

Quercus imbricaria, Shingle oak, makes an excellent dense hedge. Its glossy, green leaves turn to a golden brown very late in the fall

of New York City. Everyone knows the meritorious characters of *Buxus sempervirens* as a hedge but some may be unfamiliar with the fact that *Ilex crenata convexa* is the best substitute for this in New England. Many such interesting items as these have had to be omitted, but it is hoped that the list of plants and a few of the purposes for which hedges are planted, as given, will be sufficiently stimulating to the reader so that in making his own selections from them, he will use every precaution in determining the hardiness and the best growing conditions of the plants he selects.

The numbers after the plants in the following lists will refer to the following general groups:

1. **Evergreen:**—Plants in this group keep their leaves most of the winter in those regions where they are normally used.
2. **Dense:**—Plants in this group grow dense foliage with a minimum amount of care. These naturally make the best hedges.
3. **Thorny:**—Either stems or leaves thorny, making good barrier hedges.
4. **Low:**—Can be grown as very low hedges with a minimum amount of clipping.
5. **Flowering:**—Because of profuse flowers, these hedges can be grown as informal flowering hedges, with trimming once a year (or even once every other year if desired.)
6. **Colored Fruits:**—Trimming removes the majority of the flowers and fruits, yet the plants in this group have so many bright colored fruits that, with the right trimming, some fruits will remain to give color and interest.
7. **For Poor Growing Conditions:**—Some hedges must be planted where growing conditions are difficult and plants in this group may succeed where the others would fail.
8. **Narrow, Columnar and Upright:**—Naturally growing this way, not all make good hedges for the terminal growth is so strong that often it is difficult to force lateral branches at the ground level.
9. **For trying situations in the Mid-west:**—A special group found to be best suited to the extreme heat, cold and drought conditions of the mid-west.
10. **Windbreaks and Screens:**—A special group of tall-growing vigorous plants, many of which are not suited for low, clipped hedges but which will grow rapidly into a windbreak or screen and can be kept clipped or unclipped.
11. **For the coldest parts of the United States and Southern Canada:**—These plants should be used in the coldest parts of the country where most of the other plants listed may be injured by the extreme cold.
12. **For Shelterbelts on the northern Great Plains:**—Plants for a particular type of windbreak in a very difficult area. Many plants in this group will not make low clipped hedges, and are only mentioned here for this special type of windbreak.
13. **For Southern Gardens:**—The farther south one goes, more kinds of plants can be used. Many not listed in this group will do very well in the South. Most of those in this group are not reliably hardy north of Philadelphia. (*Tsuga caroliniana* is an exception).



Syringa Prestonia as it is grown at the Experimental Farm in Ottawa, Canada, makes an excellent flowering hedge. This particular one is not clipped and it is easily seen that because of the uniform growth of the plants, it makes an ideal "informal" flowering hedge.

White pine does form a good hedge when it is properly clipped. It is one of the most difficult plants to clip properly.

List of Hedges for the United States and Canada

(Except the Subtropical Areas)

- Abelia grandiflora* 5, 13
Abies concolor 1, 2
Acanthopanax Sieboldianus 2, 3, 7
Acer campestre 2
Acer Ginnala 2, 10
Acer negundo 12
Acer platanoides 10
Acer platanoides columnare 8, 10
Acer platanoides Schwedleri 10
Acer rubrum columnare 8, 10, 11
Acer sacharum monumentale 8, 10, 11
Amelanchier alnifolia 12
Aronia arbutifolia 6
Berberis aggregata 2, 3, 6
Berberis buxifolia 1, 2, 3
Berberis buxifolia nana 1, 2, 3, 4
Berberis circumserrata 2, 3, 6
Berberis Darwinii 1, 13
Berberis dictyophylla albicaulis 2, 3, 6, 13
Berberis Gilgiana 2, 3, 6
Berberis Julianae 1, 2, 3
Berberis koreana 2, 3, 6
Berberis mentorensis 2, 3, 6
Berberis stenophylla 1, 2, 3, 13
Berberis Thunbergii 2, 3, 6, 7
Berberis Thunbergii erecta 2, 3, 4, 6, 7, 8
Berberis Thunbergii minor 2, 3, 4, 6, 7
Berberis triacanthophora 1, 3
Berberis verruculosa 1, 2, 3
Berberis vulgaris 2, 3, 6, 7
Berberis vulgaris atropurpurea 2, 3, 6, 7
Betula populifolia 2
Buxus microphylla japonica 1, 2, 4
Buxus microphylla koreana 1, 2, 4
Buxus sempervirens and vars. 1, 2
Buxus sempervirens suffruticosa 1, 2, 4
Caragana arborescens 7, 9, 10, 11
Carpinus Betulus 2, 8, 10
Celtis occidentalis 11, 12
Chaenomeles japonica 2, 3, 4, 5
Chaenomeles lagenaria 2, 3, 5, 7
Chamaecyparis pisifera vars. 1, 2
Cornus alba 6, 11
Cornus mas 2, 6
Cornus racemosa 2, 6, 7
Cotoneaster lucida 4, 6
Crataegus crus-galli 2, 3
Crataegus Oxyacantha 2, 3
Crataegus Phaenopyrum 2, 3, 6
Cryptomeria japonica Lobbii 1, 2, 8, 13
Cupressus sempervirens, 1, 2, 8, 13
Elaeagnus argentea 11, 12
Elaeagnus angustifolia 3, 7, 9, 12
Euonymus alata 6
Euonymus alata compacta 2, 4, 6
Euonymus Fortunei radicans 1, 4
Euonymus Fortunei vegeta 1, 4, 6
Euonymus japonica 1, 2, 13
Fagus grandifolia 2, 10
Fagus sylvatica fastigiata 2, 8, 10
Forsythia intermedia and vars. 5
Fraxinus pennsylvanica lanceolata 11, 12
Gleditsia triacanthos 12
Hibiscus rosa-sinensis 1, 5
Hibiscus syriacus 5
Hippophae rhamnoides 3, 6, 7
Hydrangea arborescens grandiflora 5
Hydrangea macrophylla 5, 13
Hypericum species 4, 5
Ilex aquifolium 1, 3, 6, 13
Ilex cornuta 1, 3, 6, 13
Ilex crenata and vars. 1, 2, 13
Ilex vomitoria 2, 6, 13
Juniperus chinensis and vars. 1, 2, 6, 8, 10, 12
Juniperus scopulorum and vars. 1, 2, 8, 10
Juniperus virginiana and vars. 1, 2, 6, 8, 10, 11, 12
Lagerstroemia indica 5, 13
Larix laricina 11
Ligustrum amurense 2, 4, 5, 6, 7
Ligustrum japonicum 1, 2, 4, 6, 7, 13
Ligustrum lucidum 1, 2, 4, 6, 13
Ligustrum obtusifolium Regelianum 2, 4, 5, 6
Ligustrum ovalifolium 2, 4, 5, 6, 7, 13
Lonicera fragrantissima 2, 6



The Canadian hemlock eventually makes a splendid hedge. Here are young plants recently set out which will grow together to form one continuous mass of foliage.

A Canada hemlock hedge on the campus of Vassar College. Note the exquisitely dense foliage.

- Lonicera Maackii* 2, 6
Lonicera Maackii podocarpa 2, 6, 10
Lonicera nitida 2, 4, 13
Lonicera tatarica 2, 5, 6, 7, 9, 12
Maclura pomifera 2, 3, 7, 9, 10
Mahonia aquifolium 1, 3, 5, 6
Mahonia Fremontii 1, 3, 5, 6, 13
Morus alba 10, 13
Myrica cerifera 1, 6, 13
Myrtus communis 1, 2, 5, 13
Nerium oleander 1, 5, 13
Pernettya mucronata 1, 2, 4, 13
Philadelphus coronarius 5, 7
Philadelphus Lemoinci "Avalanche" 2, 5
Philadelphus Lemoinci erectus 2, 5, 8
Physocarpus intermedius parvifolius 2, 9
Physocarpus monogynus 7, 9, 11
Physocarpus opulifolius and vars. 7, 11
Physocarpus opulifolius nanus 2, 4, 7, 11
Picea Abies 1, 2, 10
Picea Abies Maxwellii 1, 2, 4
Picea glauca 1, 2, 9, 10, 11, 12
Picea glauca conica 1, 2, 4
Picea Omorika 1, 2, 10
Picea orientalis 1, 2
Picea pungens and vars. 1, 2, 9, 11, 12
Pinus nigra 1
Pinus resinosa 1, 10, 11
Pinus Strobus 1, 2, 10
Pittosporum Tobira 1, 2, 13
Poncirus trifoliata 3, 7, 13
Populus alba 7, 9, 10, 11, 12
Populus alba pyramidalis 7, 8, 9, 11, 12
Populus berolinensis 10, 11, 12
Populus laurifolia 10
Populus nigra italica 7, 8, 9, 10, 11, 12
Populus Simonii 7, 9, 10, 11, 12
Populus tremuloides 10, 11, 12
Prinsepia sinensis 2, 3, 11
Prinsepia uniflora 2, 3
Prunus americana 12
Prunus Laurocerasus and vars. 1, 2, 10, 13
Prunus tomentosa 5, 6
Prunus virginiana 11, 12
Pseudotsuga taxifolia 1, 2, 9, 10
Pyracantha coccinea Lalandii 2, 3, 5, 6, 13
Pyracantha crenulata 1, 2, 3, 5, 6, 13
Quercus Ilex 1, 2, 10, 13
Quercus imbricaria 2, 10
Quercus macrocarpa 11, 12
Quercus palustris 10
Quercus phellos 2, 10
Quercus robur fastigiata 8, 10
Quercus virginiana 1, 2, 10, 13
Raphiolepis umbellata 1, 13
Rhamnus cathartica 2, 3, 7
Rhamnus Frangula 2, 6, 10, 11
Rhododendron obtusum amoenum 1, 4, 5
Ribes alpinum (staminate form) 2, 4, 9, 11
Rosa multifolia 2, 3, 5, 6
Rosa rugosa 2, 3, 5, 6, 11
Rosa setigera 3, 5, 6
Rosa virginiana 3, 5, 6, 11
Salix alba 11, 12
Salix pentandra 12
Spirea arguta 5
Spirea prunifolia 5
Spirea Thunbergii 5
Spirea Vanhouttei 2, 5
Syringa chinensis 5
Syringa Josikaea 2, 5, 10, 11, 12
Syringa persica 5, 9
Syringa villosa 2, 5, 10, 11, 12
Syringa vulgaris 5, 9, 10, 11, 12
Tamarix odessana 5, 13
Tamarix parviflora 5, 13
Tamarix pentandra 5, 13
Taxus baccata and vars. 1, 2, 6, 13
Taxus baccata erecta 1, 2, 6, 8, 13
Taxus baccata fastigiata 1, 2, 6, 8, 13
Taxus baccata repandens 1, 2, 4, 6
Taxus canadensis stricta 1, 4, 6
Taxus cuspidata 1, 2, 4, 6, 8
Taxus cuspidata nana 1, 2, 4, 6
Taxus media Hicksii 1, 2, 4, 6, 8
Thuja occidentalis 1, 2, 8, 10
Thuja occidentalis "Douglas pyramidalis" 1, 2, 8, 10
Thuja occidentalis "Little Gem" 1, 2, 4
Thuja occidentalis robusta 1, 2, 10
Thuja orientalis and vars. 1, 2, 10, 13



A Japanese yew hedge is one of the best of evergreens for this purpose and may be maintained from one foot or so to cover ten feet in height.

An eight-foot yew hedge in Wellesley, Massachusetts

Tilia cordata 10
Tsuga canadensis 1, 2, 10
Tsuga caroliniana 1, 2, 10, 13
Ulmus pumila 2, 7, 9, 10, 11, 12
Viburnum dentatum 6

Viburnum lantana 2, 6
Viburnum lentago 2, 6, 11
Viburnum Opulus nanum 2, 4
Viburnum prunifolium 1, 2, 6, 10
Viburnum tinus 1, 13



The native rose, *Rosa virginiana*, grown in the Arnold Arboretum as an unclipped flowering border. Unfortunately, it is usually not sufficiently dense to crowd out all grass and weeds so that some hand weeding must be done to maintain it properly

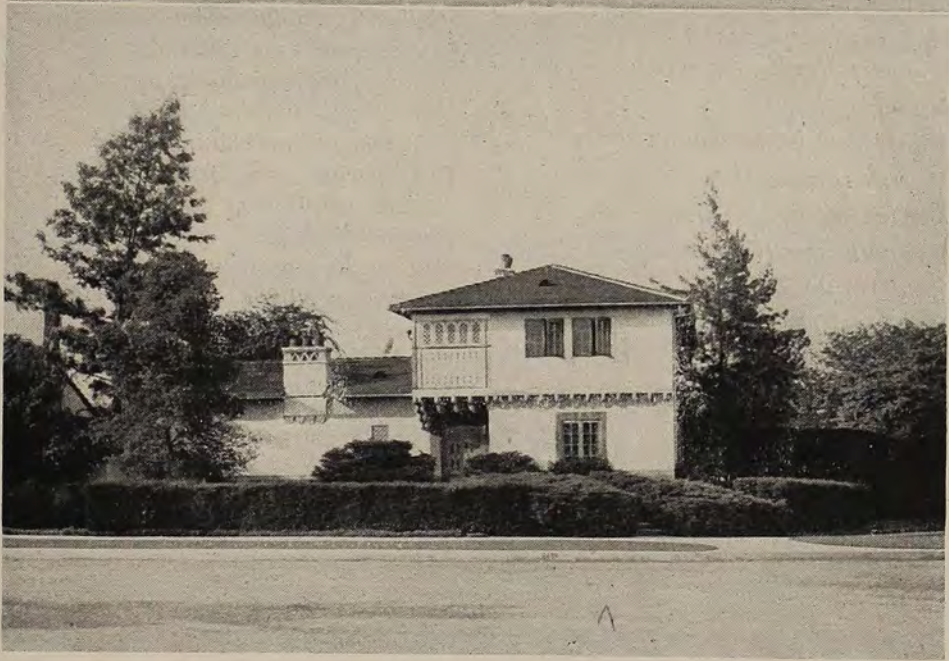
Evergreen Hedges for the Extremely Warm Parts of the United States (Southern Florida and Southern California)

Dwarf

Berberis buxifolia nana
Buxus microphylla japonica
Buxus sempervirens suffruticosa
Cuphea hyssopifolia
Euonymus japonica microphylla
Lonicera nitida
Myrsine africana
Punica Granatum nana

Medium

Acacia armata
Acacia longifolia
Acacia verticillata
Berberis Darwini
Berberis pruinosa
Berberis stenophylla
Berberis xanthoxylon
Carissa edulis



In the South, Hedera Helix, the English Ivy, is frequently grown over wall or fence to make an interesting covercrop. (Los Angeles, California)

Carissa grandiflora
Diosma ericoides
Escallonia macrantha (in trade as *F.*
rubra)
Escallonia Rockii
Eugenia uniflora
Euonymus japonica
Feijoa Sellowiana
Grevillea Thelemanniana
Griselinia lucida
Hebe buxifolia
Hebe cupressoides
Hebe elliptica
Hebe Traversii
Ilex aquifolium
Ilex cornuta
Ilex crenata
Lantana Camara
Leptospermum laevigatum
Ligustrum japonicum
Mahonia aquifolium
Mahonia Nevini
Mahonia pinnata
Myoporum acuminatum
Myrtus communis
Myrtus Ugni
Osmanthus aquifolium
Pittosporum Tobira
Psidium Cattleianum
Rhamnus alaternus
Rhamnus californica
Teucrium fruticans
Viburnum suspensum
Viburnum tinus
Viburnum tinus lucidum

Tall Broad-leaved Evergreens

Buxus balearica
Buxus sempervirens
Catha edulis
Ceratonia Siliqua
Cocculus laurifolius
Coprosma Baueri
Coprosma robusta
Dodonaea cuneata
Duranta repens
Eucalyptus polyanthemus
Eugenia paniculata
Eugenia paniculata australis
Eugenia Smithii
Ligustrum Henryii
Ligustrum japonicum
Ligustrum lucidum
Ligustrum ovalifolium
Metrosideros robusta
Myrica californica
Olea europaea
Phillyrea latifolia media
Pittosporum crassifolium
Pittosporum eugenioides
Pittosporum tenuifolium
Pittosporum undulatum
Pittosporum viridiflorum
Prunus caroliniana
Prunus ilicifolia
Prunus Laurocerasus
Quercus agrifolia
Quercus chrysolepis
Quercus Ilex
Quilliaja Saponaria

Conifers for Tall Hedges

Chamaecyparis Lawsoniana
Cupressus macrocarpa
Libocedrus decurrens

The Decorative Onions

HELEN M. FOX

Some of the decorative alliums are exquisite in their daintiness and come in charming hues. *Flavum*, *pulchellum*, and *caeruleum* brighten the rock garden when the spring refulgence has become dimmed; while *glaucum*, var. *senescens*, with its silvery pink blossoms, is harmonious with the greys in the rock garden as is the grey-white *tuberosum*. Here in North America the native onions form part of the colorful spring tapestry of western meadows along with brodiaeas, calochortus, camassias and erythroniums or are found springing up in woods.

Though almost all people in the whole world like the flavor of onion in their food, the odor is not popular in gardens. Gardeners describe the odor of allium with unpleasant adjectives and nouns and bar it from the garden. It is true all flower garden alliums with few notable exceptions, such as *tuberosum* and *flavum*, smell like their cousins, leek and garlic. Even the enthusiast for the decorative members of the allium family must admit it would be unpleasant to have a whole garden smell of them, yet a whiff here and there between the spice of carnation, the tang of savory and sweetness of the rose has the virtue of contrast. Moreover, with a few exceptions, onions do not give off their smell without first being touched. However people who do not know the decorative onions are always surprised when told they are cousins of the leek and it is the smell that convinces them, so it has its place.

The onion family increases rapidly under cultivation and many species are so hardy they are likely to become

pests, but it is a simple matter to dig up superfluous clumps. Just the same, as with all plant collecting, it is difficult to procure certain species. So often a form of something already present in abundance comes up when a rarity has been ordered and waited for with breathless suspense. This is one of the hazards of eclectic gardening that causes the final attainment of a rare species to be all the more appreciated.

Many species alliums bloom the second summer after being sown and some are biennial and have to be renewed from seed and almost all of them can be increased by dividing the clumps. Instead of ripening seeds, some of the onions form little bulblets where the flowers should be. If these bulblets are planted, the new plants will in all likelihood again bear a harvest of knotty, green lumps instead of flowers. So beware of these.

The comparatively few species grown by me did not seem sufficient for an article to interest the public so I have searched among other gardeners to find onions they thought attractive and have consulted the following authorities among whom is Louise Beebe Wilder, who in her book, *Adventures with Hardy Bulbs*, records a thorough piece of research as well as her experiences in growing many of the bulbs herself. In addition, for American onions I consulted notes in Ira N. Gabrielson, *Western American Alpines*; Joseph E. Harned, *Wild Flowers of the Alleghanies*; Leslie L. Haskin, *Wild Flowers of the Pacific Coast*; and Anderson McCully, *American Alpines in the Garden*. For European onions Hippolyte J. Coste, *Flore des-*

criptive et illustrée de la France, de la Corse, et des contrees limitrophies was consulted; and for scant but accurate notes Clarence Elliott, Rock Garden Plants; as well as Reginald Farrer, The English Rock-Garden; and of course L. H. Bailey, Hortus; as well as The Herbarium and botanical literature at the New York Botanical Garden.

Onions grow wild over the northern hemisphere. The slender spears rising from bulbous roots are among the earliest greens to appear in woods and meadows in spring. Later in the season, stems grow up bearing umbels either round or flat, full or sparse, with more or less colorful flowers. Certain wild onions besides *Allium Cepa*, the usual table onion, leek, garlic, chives, Welsh onions and ciboule have been gathered for food. Some of the wild onions are sweeter than others but this article is concerned only with the decorative members of the family.

There are some charming native American onions. Among the North Western species is the handsome *Allium acuminatum*, Hooker's onion, often so prevalent it is like a weed in dry sandy soil, in sage brush slopes and open meadows from British Columbia to Idaho and California. It is undoubtedly hardy as is true of so many western plants, only where there is no winter wetness. The bulb coats are netted, the flower stem 8-15 inches high and near its base grow the short leaves. The flower heads are in good proportion to the scape which is one reason the plants are so good looking. The umbel is composed of numerous bell-like flowers with the tips of the segments slightly reflexed, colored purple, varying to soft pink and on stalks slightly longer than the perianths. According to Ira N. Gabrielson they cover mountains and plains with the purple mist of their bloom in June and

July. Two papery bracts of iridescent pink and white enclose the flower clusters before they open. As the blossoms age they fade to a lighter tone. They last long after being cut and those left standing in pastures and along hill-sides retain their bright color after the summer grasses have dried.

Also from the North West, Washington, Colorado and south to New Mexico and Texas, grows *Allium Geyeri*, a woodland onion partial to high altitudes. The bulbs have fibrous coats, the leaves are very narrow and two-thirds the length of the scape which is about 10 inches or more high. From June to September the heads of blossoms tinted rose, some say flesh colored with broad, oval segments and awl shaped filaments, are born on fleshy pedicels a little longer than the flowers.

From the same region and similar to *Geyeri* is *Allium falcifolium*, only that it grows in full sun, blooms the end of May and has very differently shaped leaves. These are 6 inches or so long and twist along the ground as do leaves of some species of tulips. The flat scape carries an umbel of purple-tinged-pink blossoms, held erect, with prominent white anthers not longer than the sepals which are slightly reflexed. The leaves disappear before the flowers mature.

A species partial to dry hillsides growing in coarse granite sand in California and Nevada, is *Allium atrorubens* with a habit of sending up one leaf only. The scape is 5 inches high with umbels almost 2 inches across, composed of stalks the same length as the flowers, which are reddish, tinged with a deeper purple tone.

An upland bog plant is *Allium brevistylum* blooming in June in the high mountains of Utah, Wyoming, Montana and Colorado. The rootstock ends abruptly and is crowned by one or

more bulbs with many dead coats. The scape is 1-2 inches thick, and obscurely winged. The narrow leaves are half as long as the scape, which is from 12-15 inches and carries a showy umbel of roseate pink, born on pedicels twice their length. The filaments are deltoid at their bases. Since it requires moisture *brevistylum* might be grown at the edge of streams.

In California and lower California grows the fairly tall *Allium unifolium*, which is probably not hardy. It is described as 2 feet high with bright umbels of many fairly large rose pink flowers borne on pedicels twice their length. The leaves are shorter than the scape.

According to Leslie L. Haskin, *Allium attenuifolium* of the Pacific Coast is the most beautiful of wild onions and grows in many types of situations, thought another writer, Anderson McCully, says it needs dry soil and sun. The outer coats of the small, round, truncated bulbs are marked with tiny V's on the network. Two radical grass-like leaves with scabrous margins sheath the base of the scape, but leave it close to the ground. The scape is round, about 1 foot high, smooth and glaucous and minutely speckled. A photograph of the plant in Mr. Haskin's book shows a globe-shaped crowded umbel with 50 or more flowers, each with sepals separated and star-like. The flowers are described as campanulate-rotate. The stamens are as long as the sepals and in color the blossoms vary from white to bright pink.

In April in the Mojave desert and nearby mountains and also in San Bernardino County of California, *Allium fimbriatum* grows abundantly and is said to be one of the outstanding attractive Westerners. Since it grows in hot dry situations it is not likely to be hardy where winters are wet, drainage poor or cold intense. The thick bulb

coats have rectangular markings; there is a thin solitary leaf longer than the scape which is not higher than 2-8 inches. When the scapes are their shortest the crowded deep rose to purple umbels are sometimes as big across as their support is high. Flower stalks are twice as long as segments while stamens are shorter than sepals. Even in a dried state on a herbarium sheet, the plant looks charming, partly because of the large size of the umbel in relation to the stem.

Another low growing onion, *Allium Nuttallii*, frequently not over 5-6 inches high, sometimes reaches 10 or even 15 inches. It blooms from March to June in rocky prairies from Texas and Arizona to South Dakota. The bulb has a reticulated coat, there are a few slender leaves growing from the base of the scape, while the umbel is few flowered, dainty and colored rose or white.

Six onions have grown particularly well in my garden in southern New York and can be recommended for their beauty and hardiness. *Cernuum*, *senescens* var. *glaucum*, and *tuberosum* increase yearly while *flavum* and *pulchellum* are biennial. *Caeruleum* has not been as long lived.

Almost unique among onions because of the sweet fragrance of their flowers are *tuberosum* and *ramosum*. Formerly both came under the heading of *odorum*. They are native to Northern Asia. In Hortus, Dr. Bailey says *ramosum* is distinguished by having hollow leaves, shorter than the scape, the white flowers have a reddish midrib and pedicels 2-3 times as long as the segments. Of *tuberosum* he says it differs from *ramosum* in not having hollow leaves and that the flowers are expanded instead of funnel form, the segments reflexed and marked with an inconspicuous greenish midrib. From seed I have grown plants to 2 feet high which quickly form large clumps and

bloom from July to September and bear umbels of starry white blossoms, but look grey white from the distance. I find them handsome because the grey-like blossoms standing on their tall stems form accents among the greys of herbs such as artemisias and lavenders and as a cut flower they are charming with red foliage plants and pink annuals. I call these plants, which came to me as *odorum*, *Allium tuberosum*, because the leaves are not hollow, the flowers are expanded and on the back of each segment is a greenish lavender line. The bulbs of this onion are cream white with a thin brown sheath. The grey-green leaves of different lengths are linear, thick and all joined, one inside the other and stand up to 1 foot or a little more like flat narrow green ribbons and are $\frac{3}{16}$ inch across. The flower umbel, $2\frac{1}{2}$ inches, is subtended by a paper like bract, and carries about 40 flowers, $\frac{1}{2}$ an inch across on stalks of 1 inch or so. When examined closely the flowers are greenish-white, have pointed sepals, and the anthers are brown when ripe. The flowers ripen quickly but other umbels keep coming along so the bloom lasts fairly long. To me, as well as to Mrs. Wilder, the blossoms have a fragrance reminiscent of heliotrope, but only if one smells them without touching, for as soon as this happens, the odor of onion pervades the air.

Spread over the whole of North America and variable in height, shape of leaves and color of flowers, is *Allium cernuum*. The narrowly clustered bulbs are oval at the base and have reticulated coats, tinted tan-rose. Plants growing in Rocky Mountains have narrow channelled leaves while in the East they are broad and flattened. My seed came from the West so the leaves are slightly concave, and narrow and from $\frac{1}{4}$ inch high. They are pointed at the apex and held in place by brown ma-

genta bracts. They cluster around the base of the scape and all leave it at the same point about 1 inch above the ground. The tallest and biggest plants 12-18 inches high come from Virginia and the Middle West. The scape is ridged, $\frac{1}{8}$ inch wide, flat and two-sided. In my garden the bell-like flowers $\frac{3}{8}$ inch long bloom in September, in the Middle West from July on to September. They grow in nodding umbels on dark, green pedicels $\frac{1}{2}$ an inch or more long. The 3 inner segments are shorter than the outer. The color has been described as rose lavender, but in mine the buds begin pale green, then are overcast with violet and lastly open to a lovely tone of pale pink. The whole inflorescence is graceful and lasts a long time in flower.

In contrast to all the pinks are 2 yellow onions, *Allium flavum* and *Allium Moly*. I have never been able to procure Moly though I have sent repeatedly for seeds and bulbs. It comes from southern Europe, is hardy and has been an old world garden plant for centuries. The bulb is ovoid, the leaves are 2 inches wide, and the flowers golden yellow with the perianth enclosing the ovary. A sketch of the plant in Coste's book shows it to have few-flowered umbels of starry flowers.

Also from southern Europe, comes the exquisite *Allium flavum* forming dainty clumps in the flower border or rock garden and blooming in July in full sun with flowers fragrant of lily-of-the-valley. The brittle glaucous blue-green scapes, 1 foot high, grow out of long hollow or semicircular leaves that envelop the base. Before the umbel emerges it is enclosed in an ecru paper-like ribbed envelope. After the envelope opens the tips of it, like 2 insect feelers, turn down and a cluster of tiny yellow bells appear, born on stalks of different lengths, yellow in color but with a green tinge. The bells

hang down or stand up with the still unopened buds among them and give the effect of a minuscule windblown fountain. The umbel measures 3 inches across, each floret $\frac{3}{16}$ inch. Stamens and pistils protrude beyond the flowers. The whole umbel, because of the pointed feeler-like tips of the bracts, seems to be in motion. *Flavum* sets seeds readily and a new batch is grown every year.

Except for its color, *Allium pulchellum*, from southern Europe and western Asia, is very like *flavum*. In my garden it blooms in July and August and is renewed from seed. The scapes are 1-1½ feet high, glaucous, blue-green as are the leaves which clasp the stalk at the base and are rounded at the tips. The flower head is fountain-like, more dome shaped than in *flavum*, and opens out of two spathe-like leaves, one shorter than the other which persist and stand out at fantastic angles. The umbel is 4 inches high and 2½ inches across. The stalks are colored like the flowers, a roseate lavender or, according to Ridgway's Color chart, "mallow purple" shaded "phlox purple." The effect is a Victorian color, a dusty light plum. There is no scent until the flowers are touched and then!!!

The scape and umbel of *Allium caeruleum*, formerly called *azureum*, and coming from Siberia and Turkestan, is bright steel blue, a most unusual color. In shape, the plants resemble chives. The triangular leaves are yellow green, long and linear and lower than the scape and grow almost parallel to it. In my garden plants were 18 inches high but Dr. Bailey says they grow to 4 feet. Sometimes two flower stalks grow out of one spathe. The rounded umbel is 1¾ inches across. "greyish violet blue" is the color of the segments but the presence of many unopened buds on green

stems gives a slaty tone to the whole. The stalks of fully open florets are violet tinged and much longer than the blossoms which are ¼ inch across. A dark line runs down the centre of the segments. Though unpleasant to record, the flowers smell of a combination of onion and perspiration. They bloom in June and are handsome to have in a distant corner perhaps close to pink beebalm where the scent will quiet the hard effect of the onion, and the colors delight the eyes.

Coming in August and September and therefore doubly welcome, is *Allium senescens* var. *glaucum*. The bulbs are ¾ inch or more across, tinted purple, with a thin integument and form thick clumps in a few years. The leaves grow in clusters, are concave twisted, as if made of two thicknesses, about ¼ inch across and 12 inches or less long. The scapes are ridged and hollow and rise to 2 feet carrying heads of dusty lavender or mauve pink. In the var. *glaucum* the flowers are more campanulate and the umbels denser than in the type. The umbels of my plants measure about 2 inches across and are spherical. The pedicels are longer than the flowers which measure ⅜ inch across. These flowers open violet and fade to pale pink and give the effect of being "pale amparo purple." The anthers are dark lavender before the pollen ripens when they turn yellow and since they project beyond the flowers they help color the whole umbel as well as to give it a feathery lightness. The plants are odorless until they are touched.

Two south European onions to be grown where the climate is warm and dry sound entrancing. The first *Allium narcissiflorum*, also known as *pedemontanum*, is described as the showiest of the family with nodding fairly large flowers of brilliant purple born on scapes 1 foot high. It blooms

in July in limestone mountains of south and eastern France and north western Italy. The roots make large clumps and are covered with dense fibre. The upstanding leaves are strap-like, broad, numerous and 6-9 inches high. They sheath the base of the scape and leave it at the same point about $\frac{3}{4}$ inches from the ground level. The flowers 2-10 in an umbel, grow on short pedicels and are companulate, shaped somewhat like *Campanula carpatica* with points at the center of the wide segments which overlap at their bases. Each flower measures from $\frac{3}{4}$ to $\frac{1}{2}$ inch across.

The other south European onion, *Allium Neapolitanum*, also called album-santi, blooms from March to May. Before the war it was picked, tied into bunches and exported to England for decoration. The plants smell faintly and the flowers, in loose heads, are shaped like open cups with wide obtuse segments overlapping at the base. The bulbs have numerous coats, the leaves are flat and wide, oval-obtuse at their tips and similar to daffodil leaves. They are almost as high as the scape which rises to 1 foot and are rough on the margins. The flower pedicels are all the same length and 3

times as long as the blossoms. Stamens and pistils are enclosed in the perianth.

The giant onions are so striking they draw the eye from every other plant in the garden and for that reason I have never grown them. But they are planted oddly enough in rock gardens or along stream beds far enough away not to get their roots wet. The hardy *Allium albopilosum* from mountain regions in north Persia and westward in Asia Minor flowers in mid June, with scapes reported 3 feet high. The leaves $1\frac{3}{4}$ inches wide are hairy on their under surfaces, and strap-like. The umbels are huge, from 8-1 inches across, and composed of starry lilac flowers which Mrs. Wilder says have a metallic sheen. The pedicels are 2-3 times as long as the perianths.

From the Himalayas comes the giant of them all, rising to $4\frac{1}{2}$ feet, *Allium giganteum*, with leaves 2 inches wide, likely to lie on the ground and a scape bearing globes of bright lilac flowers.

This ends the account of onions with blossoms qualifying them to an honored place in the garden. The ones described are not all hardy in cold, or wet regions, but there are enough pretty onions for every gardener who so chooses to have a variety of them.

Primula Poisoning

WALTER C. BLASDALE

Primula obconica was introduced into England from China in 1800 and soon became a popular house plant, although much inferior in its ornamental features to the plant now sold by florists under that name. It reached the United States shortly thereafter and attained popularity within an even shorter interval. In 1888 there appeared in the May issue of *Garden and Forest* (11) an article by James C. White of the Harvard Medical School, author of a book on *Dermatitis venenata*, in which he reported that he had been consulted by a Boston florist regarding an annoying rash which afflicted him and certain of his employees. Since the only plant recently added to those sold at this establishment was *P. obconica* this species was assumed to be the probable cause of the rash. The victims of it soon recovered. In February of the following year Mr. White reported in the same *Journal* that an equally troublesome outbreak of the same rash had appeared at the same establishment, which followed the handling of a second consignment of *P. obconica* plants. Similar observations, made in both the United States and Europe, provided overwhelming evidence that this plant was the cause of the rash described by Mr. White.

It is now known that the disease results, in most if not in all instances, from direct contact of the skin with the leaves. The first symptoms are reddening of the skin associated with, or followed by, intense itching and the formation of small red papillae. This may be followed by spreading of large serum-filled blisters and some-

time by swelling of the face and eyelids. Finally the outer epidermal layer disintegrates and is eliminated in small fragments. In nearly every particular it closely resembles the rash caused by a number of species of *Rhus*, especially those known as poison ivy or poison oak, although in most cases its attacks cause the victims less suffering.

Specific information as to the cause of the disease has been obtained by the experimental work of a number of European chemists and botanists. Very little of this information seems to have been reported in American publications devoted to either horticulture or medicine, presumably because the journals in which this work was published are available only in the larger libraries. For this reason I am listing at the end of this paper the titles of some of the most important articles, whose contents will be summarized.

The first important contribution to our knowledge of primula poisoning was made in 1900 by A. Nestler, who worked at the Institute for Plant Physiology at Prague (8). He definitely associated the source of the poison with the minute three- to six-celled, gland-tipped, hairs found on both upper and lower leaf surfaces and in greater abundance on the leaf and flower stalks. These hairs, when mature, are easily identified by the yellow or brown contents of the terminal gland. Nestler studied their development and their production of the secretions as shown in Fig. 1, a, b, c. The larger eight- to fourteen-celled hairs (Fig. 2) found especially on the larger veins, scapes, and petioles, are but rarely

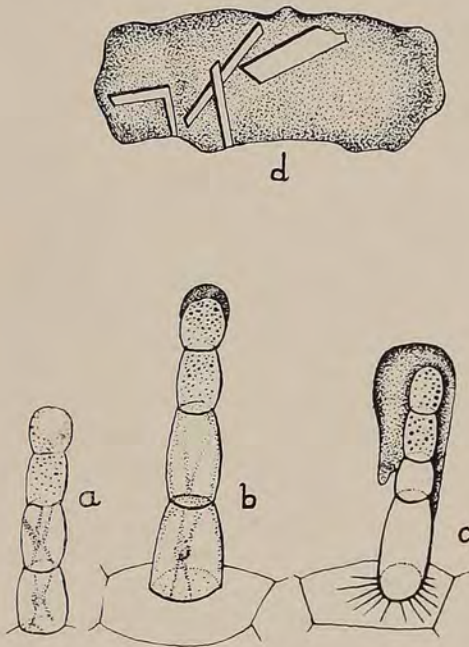


Fig. 1. Gland-bearing hairs of "*Primula obconica*," reproduced from Nestler (8). Young stage (a), all cells showing protoplasmic contents; older stage (b), secretion is beginning to collect outside the gland; secretion (c) now covering the three upper cells; solid secretion (d) in which crystals of primin have separated.

gland tipped. When the lower leaf surface was pressed against a glass slide and the slide, after removal of the leaf, examined with a microscope, Nestler found minute yellowgreen drops or small semi-solid fragments of the secretion. Upon standing, yellow needle-like crystals separated (Fig. I, d). Both the secretion and the crystals were readily soluble in alcohol, ether, chloroform and strong sulfuric acid but insoluble in water. By rinsing a leaf with ether and allowing the solution to evaporate crystals separated, which closely resembled in color, form, and solubility those which separated directly from the se-

cretion. He next found that a small quantity of the secretion picked up from a slide and transferred to the skin of his lower arm gave, after several hours, a severe inflammation which lasted for eight days. On the other hand, some of the longer hairs, cut from a leaf and bound against his fore arm, gave no rash. In another experiment he applied a strip of the epidermis separated from a petiole to his forearm; this gave a rash after twenty hours, and the diseased skin did not begin to heal until the seventeenth day.

In a later paper (9) Nestler was able to report another important fact. He had noted that some of the crystals, left on a glass slide at room temperature for four days, entirely disap-

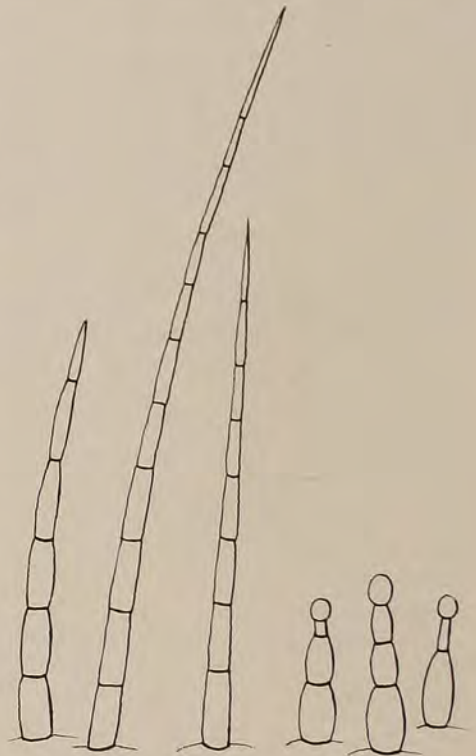


Fig. 2. Long, glandless (left) and short, gland-bearing (right) hairs of "*Primula obconica*."

peared. This led to the discovery that they sublimed from 110° to 115° C and therefore could be purified by this treatment. A minute quantity of the yellow crystals, purified in this manner and transferred to his arm, produced the usual eczema. This marked the final step in his proof that the yellow crystals are the poison, in pure form, to which primula poisoning is due. Discovery of the volatility of the yellow crystals also led Bircher (2) to discover that they could be obtained by direct distillation of the dry plants.

Isolation of the poisonous principle of *P. obconica* made possible the important discoveries of two other scientists, Dr. Bloch and P. Karrer, who worked together at the Botanical Museum of the University of Zurich (3). Karrer did the chemical work. By utilizing the leaves from 2000 plants he was able to prepare 0.1 gm. of the pure yellow rhombic crystals. They were insoluble in water but readily so in organic solvents, melted at 62°-63° C and gave molecular weights and analyses corresponding to the formula $C_{14}H_{20}O_3$ or $C_{14}H_{18}O_3$. As it was not possible to determine the structural formula with the small amounts available Karrer gave the compound the name "primin". A second batch of plants yielded sufficient primin to enable Bloch to make a lengthy series of experiments on the sensitivity problem. In this work he classified as "normal" those individuals who showed no obvious reaction after a leaf of *P. obconica* had been in contact with the skin, usually the forearm, for twenty-four hours. When, however, the skin of these persons was treated with an ethereal solution, which left a minute quantity of primin distributed over its surface, all showed some reaction. Three out of the eight submitted to the treatment showed

severe eczema, the others only slight reddening of the skin, some itching and formation of minute blisters. A more surprising result was that individuals of the normal class, who had developed some inflammation with pure primin, now showed some reaction when again treated with an *obconica* leaf. On the other hand, those individuals who responded to the application of the *obconica* leaf, to whom he applied the term "idiosymkratischer" (sensitive ones) developed a serious rash, which sometimes extended over the wrist and fingers forming large blisters and not healing until the end of three weeks. From one-fiftieth to one one-hundredeth of a milligram was sufficient to give severe infection. The net results of these experiments was the conclusion that all persons are sensitive to some extent subject to primula poisoning but most persons are normal, that is, do not react to the amount of poison communicated to the skin through contact with a single leaf. Expressed in the more modern terminology, most persons are not allergic to primin unless the dosage is sufficiently large. Sensitivity to primin depends upon physiological peculiarities of the individual.

One question not discussed in any of these investigations is the possibility of infection without actual contact with primin. I have met persons who were convinced that a plant of *P. obconica* in a room is capable of causing the rash to appear on sensitive persons present in the room. It is conceivable that, since primin is appreciably volatile, even at room temperature, infection might take place through the vapor of primin, especially if large masses of it were present in the room and the temperature was high. Nevertheless, I find nothing in the reports of those who have worked on

primula poisoning to confirm this suggestion. A similar belief concerning the transmission of the eczema caused by species of *Rhus* has been common in the United States and I have had detailed accounts of experiences which support that belief. On the other hand carefully executed experiments, described by James B. McNair (7), show that this poison is not capable of being transmitted by currents of air. The purest form of the poison obtained by him, to which he gave the name "lobinol", consists of an oily viscous liquid not appreciably volatile at room temperatures. Furthermore, this poison is present in the sap of nearly all tissues of the plant. It accumulates in "resin canals" which penetrate the phloem of the fibrovascular bundles of the roots, stems, leaves, and fruit.

The gradual accumulation of accurate information regarding the poisonous property of *P. obconica* has led to discussions on the advisability of legal restrictions on the sale of the plants. In 1903 a member of the German Reichstag requested the Imperial Health Officer to prepare a report on this subject. The request, so far as I have been able to learn, was not acted upon. In 1931 a similar agitation was initiated in Holland by a prominent dermatologist, which gave rise to much public discussion but the gardeners and florists were able to convince the public that the sufferings caused by this plant were too small to justify eliminating a source of so much enjoyment to householders of all classes. No other plant of such outstanding beauty, rapidity of growth, and adaptability to the living rooms of the average citizen was available.

The final decision as to whether there is justification for such legislation must be based on a variety of considerations. Perhaps the most important

of all concerns the percentage of normal as compared with sensitive persons, and on this subject we have little specific information. The matter was discussed at a meeting of the Prussian Gardeners Association held in Berlin in 1902. A number of unusually severe cases of poisoning had been reported, but it was suggested that some of these were accompanied by rashes caused by other diseases. One member expressed the belief that thirty percent were sensitive but one, "Garteninspector Perling", estimated only five percent were sensitive and opposed police regulation. It is stated that in 1907 Ulbrich and Eitel estimated the sensitive persons at six percent but I have not had access to their publication. In dealing with this matter it should be noted that most of the cases of primula poisoning reported relate to individuals employed in establishments in which they are obliged to come in contact with many plants, and the percentage of such persons who acquire the rash is clearly greater than that of those who, though near the plants are not obliged to handle the foliage.

Although public opinion has had little interest in, or has not been willing to restrict, the sale of *P. obconica* there is much merit in an attempt to avoid whatever suffering is caused by it. To this end efforts have been made, especially in Germany, to discover or develop races of the obconica which lack the poisonous property, or to develop hybrids between it and non-poisonous species which might be non-poisonous. Experiments directed toward these objectives were undertaken at the Institute of Plant Culture at the University of Berlin in 1929 by Maurer and Storck (6). Their first task was to ascertain what variations existed in the primin content of the varieties then in cultivation. Their

attempt to achieve this end by counting the number of poison-producing hairs per unit area of tissue surface derived from corresponding organs of the different varieties proved tedious and failed to yield convincing evidence that such differences were constant. Further, it is evident that this method does not necessarily fix the yield of primin per unit area unless it is assumed that all the hairs produce the same amount of primin. The quantitative separation of primin from plant tissue, even by use of methods based on its volatility, is both inaccurate and extremely time-consuming. Maurer and Storck were able however to develop a procedure based on a qualitative test for primin discovered by Nestler (10). They later found that treatment of a very dilute solution of primin in ether with concentrated sulfuric acid gave a series of color changes, from yellow, to green, to blue, and that the intensity of the blue finally attained was proportional to the amount of primin present. By using leaves of approximately the same surface area and also exactly the same quantities of reagents, and by allowing the mixtures to stand for the same time intervals, they were able to estimate the relative amounts of primin produced by different leaves. By this test they established the fact that different leaves from the same plant gave the same color intensity and also that leaves from different plants of the same variety, grown under identical conditions, gave similar color intensities. When this procedure was applied to plants of twenty-seven different varieties, all grown in the same greenhouse during the same time interval, it was found possible to classify these varieties into six categories. Study of this classification shows that varieties of the grandiflora type. (Fig. 30, which were introduced in 1894, ap-

peared most frequently in the low rather than the high primin content classes. Those of the gigantic class, introduced in 1906, were with one exception in the high or very high primin class. None of the varieties examined was entirely free from primin.

The gigantea varieties are distinguished by greater vigor of foliage, sturdiness of flower scapes, size and intensity of flower color. The German horticulturalists believe they all came from a hybrid between *P. obconica* and *P. megaseaefolia*, a rare species from the Caucasus Mountains. The detailed account of how this hybrid was obtained by Herr Arends, a plant breeder of Ronsdorf, Germany, seems convincing, and such hybrids are known in Germany as *P. Arendsii*. On the other hand, English and French horticulturalists believe (1) that the gigantea varieties arose through mutation of *P. obconica* alone. They base their brief on the facts that varieties of this class appeared in English and French greenhouses where there were no plants of *P. megaseaefolia*; that they show none of the distinctive botanical features of that species; and that attempts to produce hybrids between these species have failed. Since *P. megaseaefolia* does not produce primin the greater primin-content of the supposed hybrids somewhat discredits the hybrid theory. Finally, cytological studies of the gigantea varieties do not disclose any evidence of a hybrid origin.

Although the results of Maurer and Storck show decided and constant variations in the primin content of all the obconica varieties they also suggest that the more highly bred varieties produce more primin. This does not lend encouragement to the hope that plants of high ornamental value combined with a low primin content can be produced.

The creation of a poison-free obconica hybrid may prove to be a difficult undertaking. Although only two of the 450 known species and subspecies produce primin the formation of hybrids between these species is, so far as we have accurate information, limited to combinations of species belonging to the same section of the genus. Further, membership of a pair of species in the same section is no guarantee that they can be made to form hybrids. The Obconica Section includes nine species and an equal number of subspecies, most of which have never been cultivated. In 1913 Professor Bailey Balfour suggested (1) that *P. sinolisteri*, which he classed as a subspecies of *P. obconica*, might be developed into a satisfactory substitute for the obconica. This is an annual species (Fig. 4) from the Tali Plateau of Yunnan, China, known to be easily grown and, since its foliage is nearly glabrous, probably not a producer of primin. This suggestion was not acted on but George Ahrends conceived and acted on the idea of hybridizing the cultivated varieties of *P. obconica* with it. After one hundred cross pollinations he succeeded in 1933 (6) in harvesting a single capsule from a plant of *P. sinolisteri* pollinated with a grandiflora obconica, which capsule gave a single hybrid plant. This was back crossed with *P. sinolisteri* and a number of second generation hybrids obtained, all of which showed features suggestive of both the parent species. Six of them were sent to Maurer and Storck who tested their poison-producing properties by applying their leaves to the arms of persons previously found to be sensitive to obconica poisoning. Two of the six gave strong reactions, two others weak reactions, and two no reactions.

The leaves of *P. sinolisteri* produced no rash nor did they give the color test

for primin with sulfuric acid. Although even the best of these hybrids were decidedly inferior in sturdiness of foliage and scapes and in abundance, size, and beauty of their flowers, they might be classed as reasonably successful stages which might culminate in a poison-free primula of the obconica type. Further reports on the progress of Ahrend's work have not, so far as I know, been made public.

A third suggestion for dealing with the problem of primula poisoning was to improve the ornamental features of *P. malacoides* to such a degree that the public would accept it, at least in part, as a substitute for the obconica. Many cases of poisoning were attributed to this and other species of primula by correspondents of the Gardener's Chronicle (London) for the year 1914. Since that date tests with persons sensitive to obconica poisoning failed to show any reaction from the leaves of *P. malacoides*, and the sulfuric acid test does not show any evidence of the breeding programs were begun in Germany and Switzerland (5) for the purpose of improving this species and notable progress has been made. Some of the newer varieties make remarkably fine pot plants but the extent to which the public will be willing to substitute them for the obconica has yet to be determined.

Still other species of primula have been reported to be the cause of eczema. Most of these reports have been based on meager or doubtful evidence. At present only two species, in addition to *P. obconica*, have been positively shown to be poisonous. Nestler (8) found that the leaves of *P. sinensis* bear a few gland-tipped hairs, from which he was able to isolate a small amount of a greenish yellow secretion as well as yellow crystals having the characteristic form of primin crystals. He also experienced a slight eczema



Fig. 3. *A white-flowered plant of the grandiflora type of the obconica; Height eight inches, Berkeley, Calif., March 5, 1939*

after handling the leaves. This species is one of the most beautiful of greenhouse plants but it is rarely sold by florists at present. Several correspondents of the *Gardeners Chronicle* (London) have reported it to be the cause of poisoning.

In his paper of 1908 Nestler (10) reported *P. mollis* to be a third poisonous species. This is a native of the Himalayas which has attractive cineraria-like leaves and weak, free-flowered scapes. Although it has been in cultivation as a greenhouse plant for many years it has never been popular.

Nestler obtained ample evidence of its poisonous properties by experiments upon himself. He found its action fully as severe as that of the *obconica* and that its poison came from gland-tipped hairs. He was unable to separate this poison in pure form but showed clearly that it differed from primin in some of its essential properties.

There is nothing to indicate that the people of the United States have ever seriously concerned themselves with the subject of primula poisoning. Many of the hospitals of California and some of those of Oregon and Washington

refuse to permit plants of the obconica to be taken into the rooms of their patients but I know of no proposals to legislate against its sale here or in England. The sensitivity of different individuals is a physiological peculiarity, presumably associated with racial characteristics such as the texture of the skin, the color of the eyes, hair, or skin. The many races represented in the population of this country might give rise to wide variations in the sensitivity proportion in the different regions of our wide domain. I am inclined to believe from such information as I have been able to acquire, that this proportion is less for this locality than in the areas of Germany for which we have some data. Consultations which I have had with many physicians in this neighborhood make it clear that the number of cases brought to their attention is extremely small; frequently only a single case could be cited during the course of several years of active practice. It is probable that many cases were of so mild a nature as to pass unnoticed or to be disregarded, as is the common practice with the more frequent cases of Rhus poisoning. Conversations with managers of greenhouses, in which obconicas were grown in large numbers, brought information of importance. In one establishment I was told that four out of eight employees, working with obconicas, suffered from the rash. At least four other establishments considered the four-to-eight ration of sensitive persons entirely too high. There was complete agreement in the belief that the rash caused much less discomfort than that of poison oak, and in no instance were the afflicted workmen obliged to give up their accustomed duties.

Another question related to that considered in the preceding paragraph is whether the obconicas grown in this country are as virulent as those grown



Fig. 4. A young plant of "*Primula sinolisteri*": height four inches, Berkeley, Calif., May 28, 1928.

and tested in Germany. Since nearly all the modern named varieties grown here originated in Germany or England and since most of the seed used here, up to the time of World War II, came from these countries the same differences in the primin contents of the varieties grown here as those used by Maurer and Storck might be anticipated, unless differences in the conditions under which the plants are grown here are sufficient to materially affect their primin production. At present, however, most of our florists are obliged to raise their own seed or to depend upon seed grown by inexperienced plant breeders. This has made it impossible for me to obtain either plants or seed of standard named varieties. I have made tests on single leaves of many specimens secured from a number of commercial greenhouses and on some grown by myself. In only a few instances was it possible to associate these specimens with standard named varieties and it was not always

possible to decide whether a specimen belonged to the grandiflora or the gigantea class. In general however the conclusions of Maurer and Storck were confirmed. Plants of the more diffused habit of growth, with smaller flowers, especially the white-flowered specimens, showed less primin than the more compact, larger flowered, especially those with the deep red flowers, of the gigantea class. Plants of the Wyaston Wonder variety, of which I was able to obtain authentic seed, showed a rather large primin content. Plants of the double pink variety called Portland Beauty, an American variety of the grandiflora class, showed a low primin content. It should be noted that these statements concern only the relative amounts of primin in the particular series of plants whose leaves were tested. These tests give no specific information regarding the amounts found in these plants as compared with those found in the German-grown plants tested by Bloch.

There is need of accurate information as to the sensitivity of our population to the obconica plants which appear in our florists shops. To acquire such information would necessitate experiments on a large number of individuals, similar to those made by Bloch and Karrer, as well as estimations of the primin contents of the varieties commonly sold. These experiments would require the facilities of a bio-

chemical laboratory as well as a greenhouse in which large numbers of plants could be grown under constant conditions. It is a project worthy of the attention of some agency of the Federal government or of some of our Agricultural Experiment Stations.

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The Herb Society of America

MARTHA GENUNG STEARNS

In August of this year, the Herb Society of America will celebrate the 13th anniversary of the day when a group of seven women, under the chairmanship of Mrs. Albert C. Burrage, Jr., met in Boston and formulated a plan for these purposes: "To further the knowledge of herbs, and to contribute to the records of horticulture and science the results of the experience and research of its members." The Society was incorporated May 14, 1935, and adopted as its seal a design by Mrs. Florence Bratenahl of sprays of thyme, after a woodcut in Gerard's Herbal, with a phrase from another herbalist, John Parkinson, "For Use and For Delight."

Much of the great volume of the world's knowledge about useful plants had been forgotten by the public, and herbs had sunk to the level of a hobby among a few growers of "old-time gardens." Consequently one of the most intensely practical and rewarding branches of horticulture was being neglected, and its tremendous potentialities for pleasure and profit being missed.

Dr. Edgar Anderson, our first President-at-large, once made the statement that "a large bulk of our botanical knowledge was not accumulated by scientists but that enthusiastic amateurs had contributed enormously to the growth of knowledge." The members of the H.S.A., therefore, went quietly to work in their gardens and their libraries, and in these years they have contributed a goodly volume of information to the subject of herbs, in its three main classifications of medicinal, aromatic and flavor-plants.

The Society has never had a drive for membership, nor been interested in mere numbers, and has refused to allow itself to be used by those whose interest is mainly what we may call sentimental. The first group was slowly enlarged, by invitation, to include those seriously interested in the horticultural, botanical or utilitarian phases of herb growing. In its By-Laws the eligibility of a member is gauged by results shown in work or research, or creditable achievements in the growing and use of herbs. Among these are a surprising variety of activities, as many people may each have a different approach to the subject. It may be a literary approach, the study of old herbals, the making of bibliographies or compilations, or practical, like experiments with perfumes, cordials, dye-plants; or it may be the fundamental job of raising herbs out of the soil, developing new strains, collecting varieties, or comparing notes with other growers, for a great correspondence is growing up between compatible people on their common interests. The Society as such does not engage in commerce, although it is definitely interested in the possibilities of private and commercial herb growing as a national resource.

The original group is now called the New England Unit in a nation-wide membership; to it have now been added six other Units: those of Philadelphia, New York, St. Louis, Western Reserve, California and Oregon. There is also a large number of scattered individual members. The reports from these Units show activity and growth even through the war years; in fact the war has brought out many uses for

herbs, in substituting our native flavor-plants and condiments for some of the foreign imports, and in discovering a new pleasure in their fragrance and quiet beauty and their easiness to grow.

A brief survey of our records indicates something of the many-sided fascination of these plants, often so modest and sober-hued, often growing along our roadsides, but with so much to contribute. ∴

The first appearance of *The Herbarist*, our annual publication, was in 1935. That year's edition, being rather small, is now out of print and has become a collector's item. Many well known names are on the list of contributors, with a wide range of subjects, and the circulation goes on, with a continued and growing demand from all over the United States and Canada, as well as England, France, Australia and New Zealand. It makes its 12th appearance this year, and the first ten numbers have been carefully indexed.

In 1937 the infant Society already had several achievements to its credit. One was a substantial gift toward the publication of the Aztec Herbal, better known perhaps as the Badianus manuscript, which was discovered among the great collections of the Vatican Library by Dr. Charles Upson Clark and translated by Dr. Emily W. Emmart, a member of the Society. At the Massachusetts Horticultural Society's spring flower show in 1936, the H.S.A. exhibited an "Old-world Bee Garden," which was rated 100% and awarded a gold medal. In January, 1937, the Society launched a three-year project for the study of some culinary and aromatic herbs grown under different soil and climate conditions, to determine the varieties and methods yielding maximum quality and quantity. That there might be a uniform basis of comparison, plots of 100 square feet were used and data kept on soil, fertilizer,

source of seed, harvesting and drying, and the findings of these tests are among the Society's printed publications.

A large Bibliography made by a member and since kept up to date is to be found in the Library of the Massachusetts Horticultural Society in Boston, with a cross index giving author, title and subject for ready use by writers, students and researchers. This includes not only books directly about herbs, herbals, horticultural expeditions, native remedies, and so on, but it gives many references to literature, magazine, articles, even cookbooks.

Also available to the public at Horticultural Hall is the Society's Herbarium of dried specimens, arranged in the botanical order given in Bailey's manual of Cultivated Plants and Gray's New Manual of Botany. It has now reached the sizable dimensions of 2,399 sheets and more than 1,286 species, and is often visited by botany and nature classes. Its curator has arranged exhibits from time to time in glass cases which attract much favorable attention; for example, a demonstration of ragweed for school children who volunteered to help eradicate this undesirable plant. The Herbarium, like the Bibliography, is a project which can never be considered as completed. The curator reports correspondence with 28 Colleges of Pharmacy, 46 Gardens, numerous herbaria, botanical gardens and parks, with exchanges of lists and photographs.

A large collection of books with a special bookplate in memory of one of the Society's founders, Mrs. Charles L. Norton, is constantly growing, and the Society is collecting slides which it hopes to incorporate into its educational program with accompanying lectures.

One more New England project has been the Harvard Herb Garden planted

and landscaped on the site of the Gray Herbarium in Cambridge, which was offered to the Society by Dr. E. D. Merrill, head of the Botany Department of Harvard University. The labor shortage during the war had a discouraging effect on this garden, but it was for some years a green and fragrant place much enjoyed by residents in its neighborhood. The Society as a whole has been active in similar plantings, notably the Philadelphia Unit, which developed a fine medicinal herb garden at the College of Physicians there, as a memorial to Dr. Wharton Sinkler, with wonderful educational possibilities and beauty. The Western Reserve Unit started an herb garden as a part of the Cleveland park system; one of our members designed and gave the herb garden at the Cloisters, New York City; another, Mrs. Bratenahl, designed the exquisite little Cathedral garden in Washington, D. C., and later created a beautiful place out of a wild tract in Bethesda, Maryland, The Weathered Oak Herb Farm. Two other members were consultants in the reconstruction of the kitchen garden at Mount Vernon. The New York Unit has collaborated with the New York Botanical Garden in several herbal projects, and this Unit also has an herb bibliography.

News-Letters are circulated as a means of keeping the far-flung Units and members in touch. About 500 letters of inquiry are received in the course of a year, from remote corners of the globe and from small towns in America, and it has been necessary to send out printed information sheets on the sources of herb seeds and plants, reading lists and other data.

By 1940, the war was changing the aspect of the world and affecting the steadiness of the herb trade. The commercial product has for many years been imported from Europe because of

the cheapness of labor there; but with the devastation and impoverishment of the soil now, as well as the cessation of labor other than for war purposes, America may find herself able to recapture the herb trade tossed back to her. We have seen wars before, when drug plants were urgently needed, condiments ran short, substitutes for tea and oils were searched for. *The Herbarist* published war-time numbers in 1940, '41 and '42, rallying our members to work out and report on certain problems. The Society has also made reports on seed strains, fertilizer tests and growing conditions, and is glad to make its results available to the public. Many of our members have sent quantities of seed abroad, notably the Oregon Unit, who responded to a request from England.

We cannot close without referring to a few more individual projects which have established valuable results. Thanks to one of our members, who brought a little plant of the true Cretan Dittany home in her pocket-book, many people can now recognize and own this survival from the classical past, unknown before in this hemisphere. It was carefully nurtured, seeds and cuttings secured, and its distribution across the country has been due to the efforts of our Society. A member in Australia has sent generous packets of seed in letters and thereby introduced new varieties to American gardens. A member is collecting old prints and plates for a "pictorial history" of herbs of past centuries, which will be priceless some day. Another made successful experiments in vegetable dyeing from our native plants and worked out a wide range of shades; her lichen dyes especially stood drastic tests for permanency. Still another has specialized in Indian medicinal plants, and another has done quite sensational things in dehydrating plants so as to

preserve them in three dimensions instead of pressed flat.

Many of us have worked out acceptable recipes and by becoming adept in herbal flavoring and seasoning have done something toward relieving the dullness of war-time cookery. We shall be content if, in the years to come, our researches result in the acquainting of American cooks with the subtle and interesting effects of our own native

seasonings, and the adding of herb uses to the food habits of America. As one of the Society's members said in the early days, "Herbs in a way have the same relationship to plants that folk-songs have to music. They possess a naive homely charm which smacks of the soil, and their study ramifies into all kinds of interesting by-paths in the arts, customs and history of the different nations."

Gardening in Shade

LOUISE IHLDER

In every community there are gardens where shade of one sort or another is the element that determines all the development possible. Such a problem came up for consideration and study in the Georgetown Garden Club of Washington, D. C., and the Horticultural Committee* decided that it would make a formal report to the club.

Shade itself is something that has to be considered since there are various degrees of shadiness and various causes for shade. The most solid shade is that which is cast by buildings and if the buildings are tall enough and large enough, even the passage of the sun in summer may not allow even an hour or two of sunlight to all on the earth. Shade from trees, on the other hand, may be dense as that which comes from maples for example or broken like that of locust trees; but in either case, the shadow cast by the tree moves during the hours of the day and the earth and the plants growing there may

have some hours of sunlight. Shade from trees causes definite reactions which may be further complicated by the factor of the root competition of the trees resulting in a particularly difficult combination.

The Georgetown Garden Club works in many city gardens, where in addition to the factors mentioned there is the further difficulty of poor air movement, due to the houses themselves and in many cases to the free use of garden walls, which not only cast shadows but which impede air movement.

Recognizing these factors, the club has brought together the following suggestions from their practical experience.

The Committee wishes to point out that there are some spots in which it is useless to attempt to grow plants, such spots as those at the base of north walls, airless corners shaded by house or wall or trees where no sun ever reaches. These should be given a different treatment, paving them with flagstones, brick or even gravel and designing an area large enough for use, with chairs or benches for sitting, a shelter open as in a pergola or a garden

*The Horticultural Committee: Mrs. Charles Bittinger, Chairman, Mrs. J. Hanson Boyden, Mrs. H. H. Donnally, Miss Katharine A. Dougall, Miss Nan Hollerith, Mrs. John Ihlder, Mrs. B. H. Meyer, Mrs. Frank A. West, Mrs. R. F. Whitehead.

building for tools or other work purposes, useful in the smallest garden.

Some of the members have been very clever in treating their shade problems. One of the newest members in treating her square back yard, made a large circle in the center, covered it with gravel and treated the balance of the yard, kept at a level of a wall two bricks higher than the gravel area, with a mass of shrubs and plants that are shade tolerant. As there are two large trees in the garden it is truly shady but it has been made into a beautiful place.

Potted plants are useful in shaded gardens and vines planted where the roots have sun can be trained into the area where it is shady. A wall fountain or a wall bird bath, a small pool for reflections, a shelf for potted plants, or a built-in bench can be made the feature of such a shady place. You may even build a simple fireplace for burning all garden litter that cannot be transmuted into humus! But don't abandon humus making for a place can be found for it, behind shrubs or behind some built in feature. And don't forget that the fireplace can be elaborated into the popular "barbecue" if you still yearn to cook!

Another useful device in planning the shaded area, is to give up the idea of a border at the foot of a wall, and put the path next to the wall and the border out into the sun. A difference of only 3 or 4 feet is often enough to make a success of the border since there it will have both sun and air, the air often being the more important.

There are suggestions for spots that hardly ever get sun, there are those places under shrubs or trees (high shade) which get sun in the spring but none once the trees are fully leafed out. Here early flowering bulbs like winter aconite, snow drops, scillas (*sibirica* and *campanulata*), leucojums, erythroniums and species crocus do well; and if the

ground be interplanted with ferns, these will hide the space and the dying leaves of the bulbs. They serve also to cover the areas devoted to many wild flowers most of which disappear after blooming. Personally I believe that ferns are not used nearly enough. The common ones, lady fern, cinnamon, Christmas do well almost anywhere. Nursery catalogues that specialize in native plants will tell you what to do, what to plant and where.

The success of all these schemes will depend on good soil, good soil preparation and good drainage; loam, sand and plenty of humus. In fact the committee feels that where soil is properly prepared many plants will grow in what appear to be inauspicious places if soil and drainage are right but one cannot expect any plant to grow in soil as hard as iron or filled with builder's rubble.

Another difficulty results from the combination of shade and root competition already mentioned. Sometimes it is possible to encircle a big tree with a well designed bench, with gravel or paving before it, thus reducing the area to be treated.

Since grass is always difficult in this climate, if your space is difficult, give it up. Use some other surface, decorating it with beds and borders where feasible, potted plants otherwise, furniture, small architectural details; look upon the area as a room and treat it as such. You may prefer and long for a panel of perfect turf, but there is a comparable beauty in the pattern of paving, brick or stone, however simple. This to me is the answer to the difficulty of the small enclosed garden. You cannot have "masses of bloom" but you can have order and intimate beauty and peace.

The Committee has compiled lists of plants that are shade tolerant varying in size from ground covers to small trees which it hopes will be useful. It

is not considered a complete list of all data which can be compiled by any one from the literature followed by a period of trial and error. Whatever else is forgotten remember that every growing thing needs some sun and air, and if not sun an abundance of light.

Ground Covers

Pachysandra is recommended in all books but is considered as particularly uninspiring by the Committee. Needs a fair degree of moisture. *Ivy*: use the small leaved forms for ground cover, reserving the larger leaved forms for climbing!

Periwinkle, *Vinca minor*, grows well in shade but blooms sparingly. Bowles' variety blooms more or less all season. In muggy weather myrtle is attacked by a fungus which must be controlled by any good fungicide sprayed regularly.

Wild Ginger. This will really cover the ground but gets shabby in summer unless watered. The evergreen species with variegated (marbled) leaves is best for year round effect.

Bugle, *Ajuga reptans* in blue, white and pink flowered forms grows in shade but needs sun to flower well. In shade it does not overrun everything.

Annuals

The committee is inclined to pass this by, especially the book lists but tobacco, torenia and browallia all bloom in shade and forget-me-nots and impatiens treated as annual will also perform.

Perennials

From the several lists presented and studied, the following are chosen:

Begonia evansiana, hardy begonia is excellent here and planted with ferns makes an excellent combination. Late flowering. Also late appearing in Spring, so don't dig up.

Funkias or *plantain lilies*. There are many of these, with differences in leaf size and color, size and color as well as season of bloom. One of the few plants that seem actually able to compete with tree roots.

Anemones, *Japanese and Chinese* and *platycodons* make excellent combinations and can be reinforced with bleeding heart or Dutchman's breeches. Then there are all the other things that might go here, many of some fewer of others: foxgloves, snake root (*Cimicifuga*) violets, mertensia, *Phlox divaricata*, pulmonarias, epimediums, sweet rockets, eupatoriums both blue and white, meadow rues, the Missouri evening primrose, snakesbeard (*Ophiopogon*) and its smaller allies, and all the new varieties of our native *Tradescantia*.

Lily-of-the-valley needs a paragraph apart, and it also needs a good fertilizing in late summer when the flower buds are forming not forgetting and occasional thinning when the root competition gets too strong!

Hemerocallis appear in many lists but do not flower well here, save the old faithful *fulva* and its double form.

Strawberry begonia or *geranium* which is none of these things but *Saxifraga sarmentosa* will grow in sun or shade or "betwixt and between." Nice in low rock walls where its "cute" little rosettes form at the end of the wiry runner.

Arum italicum is one of the handsomest leaves in the garden with beautiful, if fleeting, great pale green spathes in early spring. The fruits are brilliant scarlet, like those of Jack-in-the-pulpit. There is a lesser growth of leaves in the autumn.

Heuchera, *anchusa* and *polemonium* are a good trio but they need half sun and moisture.

Lilies. These prefer partial shade: *L. auratum* (Gold banded), *Hansonii*

(Hanson's lily), *Henryi* (Henry's lily), *japonicum* (Kramer's lovely pink). The Eastern *philadelphicum*, *Grayi*, *superbum*, and *canadense* also fare well. And don't forget to prepare the soil well with plenty of humus and good drainage, etc. Look up details for lily planting and do a good job.

Galax and *Shortia*. A local horticulturist says that they do extremely well in half shade, even in deep shade under oaks. His galax proves it, but the shortia is never in stock long enough to be certain. In neither case allow them to go bone dry in summer.

Tuberous Begonias if your garden will stand the opulence of their flowers when well grown, but whatever else don't plant them where the light is limited, and the moisture should be constant in whatever degree of wetness you attempt.

Shrubs

The list here is longer and more varied and the knowing gardener can choose as he or she may wish, with emphasis on evergreen or deciduous species or with emphasis on flower and fruit or on mere greenness.

Rhododendron, azalea, laurel (*Kalmia*), huckleberries, leucothoe, *Nandina* (strictly a town shrub in this climate), *Viburnums* *Carlesi*, *Burkwoodii* for evergreens, *dentatum* and *lantana* for deciduous. All *viburnums* are slow to come into good blooming in these conditions of shade. *Hydrangea arborescens* and *H. quercifolia*. Naked jasmine and Japanese maples, *suffruticosa* box, *Pyracanthas* which will grow but not flower and fruit in shade, *cochorus* or *Kerria*, various privets, figs, which are most decorative and will fruit with a little warm sun, *rhodotypos*, the holly like *osmanthus* which will tolerate dense shade, bayberry, mahonias which need sun to fruit however, *Chimonanthus praecox* or wintersweet, hardy

orange (*Poncirus trifoliata*) which is an excellent town shrub but does not fruit without some sun, pomegranates, which flower well enough in protected even if shady places, and the slow growing Hungarian laurel (*Pseudocercasus*).

Trees

Here again we have a considerable list which will have to be studied in accordance with the size they reach and the problem which may result from the shade they will add to the already shaded garden.

Shadblow (*Amelanchier*), Judas tree (*Cercis*), Dogwood, Spicebush (*Lindera*), all magnolias but perhaps the native *Magnolia virginiana*, witch hazel, all hollies, both small and large, *Ilex crenata* and its forms, *glabra* if you like it, *cornuta* which is slow growing; fringe tree, *Halesia* if there is room, and the larger Japanese maples.

Conifers

Nearly all the yews will do well, and depending on the site, our hemlocks which may suffer from red spider if the place is too confined and hot.

Vines

Euonymus will grow anywhere, but one has to maintain a constant guard against scale insects. Clematis, in three species grow and flower sparingly; *virginiana*, *montana*, *paniculata*. All ampelopsis and their kin grow well and are dearly beloved by the Japanese beetle. Wisteria will tolerate roots in shade but its tops must reach the sun to flower, and in small gardens needs ruthless pruning to keep it in bounds. Another shrub that will respond well to wall treatment is the forsythia particularly in its species *suspensa* which comes closer to being a vine in habit and will flower moderately well in some shade. Naked jasmine has already been mentioned. Even a few of the

climbing roses like Mermaid, Mary Wallace and their ilk will yield a few flowers in the shady garden.

As a parting thought, it is wise to remember there frequently is a new

beauty in the more delicate growth that shade induces. The plant appears to reach up and spread out, instead of becoming dense, bushy, robustious, all of which gives a new attractiveness.

Water Gardens

ALFRED J. PROEBSTLE

One of the most amazing things about water gardening is that so many persons deprive themselves of the pleasure to be afforded by the garden pool. Here in Brazoria, Texas, which is in Zone 7, it is probably the simplest and certainly the most satisfying form of gardening.

To begin with the construction of the pool I find that we need a little more depth of water over the crown of the plants, due to our long summers, and recommend that there be allowed twenty to twenty-four inches, depending on the degree of shade over the pool, and incidentally I have found that a high shade, such as that afforded by pecan trees, is no detriment to the production of fine flowers. As we have no frost to speak of, the pool can be constructed with a minimum of steel, although some is necessary to take care of the contraction of the ground during a prolonged drouth. The size and shape of the pool depend entirely upon the surroundings but once that has been decided upon the fun begins, and it is my firm conviction that no garden is too small for some sort of pool. Even tub gardens give a reward far beyond ordinary expectations. I might mention that baleful eyed health inspectors sometimes descend upon one in cities shouting that pools breed mosquitoes, but that is simply not so when there are fish in the pool. Fish eat mosquito larvae at once, and when there are no

wiggle-tails in the pool there will be no mosquitoes.

Water gardeners have a tendency to overcrowd their pools so to curb that inclination in one of my pools I excavated places for stationary containers, but it didn't work, for I found myself putting plants in tubs between the stationary urns. However this form of construction had one advantage, it saved quite a lot of digging, in as much as I did not have to excavate the entire pool to the depth of the bottom of the pots, each of which is two feet in diameter. In mixing soil for the pots I use a good garden soil with well rotted cow manure and about a quart of bone meal to the bushel of soil. Be sure the bone meal is ground, not cut with acid, the kind used for stock food being acceptable, even if a little more expensive than plain bonemeal.

Having built the pool and filled the containers one has the difficult task of choosing plants to fill them, difficult only because there is such a wealth of material that it is hard to confine one's self to a given number of plants. Thanks to Mr. George H. Pring, of Missouri Botanical Garden, there are colors to suit every taste, and if one finds it impossible to stick to one color, there are even by-colors. Mr. Pring's work in hybridizing tropical lilies has put all water gardeners in debt to him. I have found that tropical lilies give so much more in the way of flowers that



Robert Taylor

Yellow Star



Robert Taylor

Persian Lilac

I have given up growing hardy lilies long since.

In order to retain the maximum bloom throughout the summer it is well to feel the plant from time to time during the growing season. I find bonemeal thoroughly soaked in water applied to the surface of the containers to be a good slow, long-lasting fertilizer. For a quicker feeding a tablespoon of bloodmeal wrapped in tissue paper and thrust into each tub will produce miracles. This should be repeated every week to ten days.

Tropical lilies are to be had in day or night blooming varieties, and the day blooming lilies come in viviparous (bearing small plants on the leaves) or non-viviparous varieties. The day blooming varieties come in all colors but red, although there are some very deep rose shades which will do nicely until a good red is produced. The night bloomers are in various shades of red, and white.

The viviparous varieties are completely fascinating because of their habit of reproduction, the plantlets occasionally setting tiny flower buds before becoming detached from the parent plant. In these Bagdad has become a favorite, with its pale wisteria blue flowers and magnificent bronze leaves. Peach Blow is a lovely clear pink at the tips of the petals, shading to yellow below, one of the new bi-colors, Talisman being the other, amply described by its name. Wild Rose has also done well in our pools. Sunbeam is a good clear yellow.

In the newer non-viviparous varieties I have found Midnight to be an exceptionally fine blue, and Director George T. Moore is the answer to prayer for the small pool, as it produces worlds of rich purple flowers, smaller than the older types, to be sure, but so many more of them. Persian Lilac has done well here, with its pink-lilac flowers

and light green leaves. In yellow, African Gold is much more vivid than St. Louis (the first of the yellows to be produced) even if it is a little less dependable, and Yellow Star is a good variety. It would be rank ingratitude to fail to mention that old favorite, General Pershing, in the list of non-viviparous lilies that have given me pleasure, for year in and year out you can depend on the General with the beautiful pink flowers that become more beautiful with their deepening of color as the cool nights of fall come on. I find that most of the lilies become more beautiful in the fall, and frequently they bloom all the year round.

I have found only one lily to be temperamental as to the water in the pool. That is Victoria Regia, and it flatly refuses to grow in the well water we have here. I have a special pool for it, which I keep filled with rain water, and that solves the question. This year Victoria has bloomed from June 17th through November, but that is because we have had no frost during that time. The first frost usually kills this plant, which we treat as an annual. This is the only plant that does not winter outside here, however it produces many seeds and I have not had to buy new stock since my first crop of seeds, some ten years ago. Victoria is a night flowering lily, opening pure white on the first night, and pale pink the second. Each flower blooms only twice, but the flowers are produced in rapid succession so that there are few nights without flowers. Even if it did nothing but produce the magnificent leaves with their turned up edges it would be worth whatever it takes to have it. The fragrance is indescribable, some say it is like crushed pineapple, preceding the actual opening of the flower by several hours, so that those who know and love it are fre-

quently heard to exclaim "Vicky is going to bloom tonight."

For the rank amateur the Zanzibar lilies are still good ones with which to experiment. They come in all shades of blue from the pale washed out shades to a royal purple, and in similar shades of rose. Their only drawback is that the seedlings get to be a problem, for they are very prolific, and here we sometimes have three generations of plants in a summer.

The night flowering lilies are the flowers for the person who works day-times, opening as they do after dusk and remaining open until mid-morning.

Missouri is, to my mind, the finest white, with its beautiful fluted-margined leaves. For a red lily I suspect Frank Trelease is the old reliable, but there are others such as H. C. Haarstick, Mrs. Geo. C. Hitchcock, Sturtevant, etc., which add greatly to the beauty of the pool. I find that it takes a little more heat to bring the night blooming varieties into flower, so that they are usually a couple of weeks later than the day blooming lilies.

Someone has said that a landscape without water is monotonous, to which I add that a pool without lilies is sacrilege.

A Key to the Cultivated Hostas

EDGAR T. WHERRY

The Plaintain-lilies, widely known to horticulturists as Funkias, are now classed by botanists as members of the genus *Hosta*. About ten species are believed to be in cultivation, but the nomenclature of these and their variants is in a rather confused state. Some species are distributed under several different names, while certain horticultural-variety names may get applied to variants of almost any species. Repeated requests for identification of garden material have led the writer to look into the literature on the group. The chief modern taxonomic studies are those by Bailey (*Gentes Herbarum* 2:119, 1930 and 2:433, 1932) and by Stearn (*Gardener's Chronicle* 90: 27, 47, 88, and 110, 1931). The keys presented by these authors being somewhat unsatisfactory, a new one has been prepared; and this has proved sufficiently helpful in identifying cul-

tivated plants to make its publication seem worth while.

One species, *Hosta plantaginea*, is so different from all the rest as to constitute a distinct section, *Niobe*. The remainder of the genus was divided by Bailey (op. cit., p. 121) into two sections on the basis of differences in corolla-shape. Since, however, there is complete transition from sudden to gradual expansion of the corolla-tube, this plan is not accepted here.

The accompanying key provides for 10 presumable species believed to be in cultivation. In it, after the accepted name of each, there are given the more important or frequently used synonyms. Then come the horticultural varieties ("h.v.") definitely assignable to one or another species; many names used in the trade could not be included because their application is indefinite. The original representative of each

species, customarily termed "the type" in horticultural writings, is here for uniformity designated "*h.v. typica*."

Since Hostas vary in stature, leaf-size, etc., in response to cultural conditions, it is to be understood that the data given in the key represent average or "normal" values. There is also variation in blooming period from place to place; the dates given correspond to normal growing seasons at latitude 40° in easternmost United States.

While the key is in general dichotomous, the intermediates between the recognized species are, for simplicity, merely inserted between the lines leading to their relatives. Whether they are really hybrids, or represent stages in evolution of one entity into another, can not be decided at present.

The entities comprised in the key are for the most part those recognized by Bailey and Stearn, and the nomenclature of the latter author is adopted

here. However, the plant entered as No. 10 is not very widely cultivated in American gardens, and is not mentioned by either author. Since its valid epithet under the rules of botanical nomenclature can not be ascertained until study of Asiatic literature and specimens becomes practicable, one of its horticultural epithets is here used.

In Reginald Farrer's famous work on the English Rock Garden only one member of the group under discussion was classed as "fitted in stature for our realm." This was assigned the name "*Funkia tardiflora*," but as that writer used epithets which happened to suit his fancy, with disregard of their validity or applicability, it is not now possible to tell to what plant he was referring. Actually, various forms and intermediates of the entities assigned numbers 8, 9, and 10 in the accompanying key are all well adapted to rock garden culture.

FLOWERS over 8 cm. long, horizontal to ascending, nocturnal, pure white, very fragrant; height of foliage-mound 50 cm.; leaf-blade ovate-subcordate, to 30 cm. long and 20 cm. wide, acutish; Aug. to mid-Sept. (NIOBE)

1. *H. plantaginea*.

Syn., "alba"; "subcordata." Corolla-length variants:

9 to 12 cm., *h. v. typica*.

12 to 15 cm., *h. v. grandiflora*.

FLOWERS under 8 cm. long, horizontal to declined, diurnal, violet or lilac to white, faintly fragrant. (HOSTA proper.)

COROLLA expanding more or less abruptly from a slender tube to a campanulate throat; hue tending to be deep; leaf-blade basally truncate to cordate.

LEAF-TIP obtusish, subapiculate; blade to 15 cm. long; inflorescence to 60 cm. high; late July to late Aug. _____ 2. *H. decorata*.

Syn., "Thomas Hogg." Leaf-color variants:

solid green, *h. v. normalis*.

white-bordered, *h. v. typica*.

(LEAF-TIP, blade-size, and blooming-period intermediate; "*H. ventricosa* *h. v. marginata*," etc. _____ Intermediates of No. 2&3.)

LEAF-TIP acuminate; blade to 25 cm. long, late June to mid-July; inflorescence to 1 m. high _____ 3. *H. ventricosa*.

Syn., "caerulea"; "ovata"; "speciosa."



Three Hostas

1. *H. plantaginea*; the flowers tend to ascend.
2. *H. decorata*; the corolla expands abruptly.
(The leaves in the background are *H. glauca*.)
3. *H. "albiflora"*; leaves oblong, obtusish; flowers white.

COROLLA expanding more or less gradually, the throat subcampanulate to funnelliform.

BASE OF LEAF-BLADE more or less cordate; peduncle bearing lanceolate scales.

INFLORESCENCE 60 to 100 cm. high, much exceeding the 20 to 40 cm. high foliage-mound; leaf-hue bright green; flowers spaced, sub-abruptly expanded, rather deep-hued; July.....4. *H. fortunei*.

Syn., "sieboldii." Habit variants:

delicate with leaf-blades to 15 cm. long, h. v. *typica*.

robust with leaf-blades to 25 cm. long, h. v. *gigantea*.

Leaf-color variants:

solid green, h. v. *typica*.

white-bordered, h. v. *marginato-alba*.

(INFLORESCENCE, leaf-hue, and flower-features intermediate; variously named..... Intermediates of No. 4&5.)

INFLORESCENCE 50 to 60 cm. high, scarcely exceeding the foliage-mound; leaf-blades to 25 cm. long, strongly glaucous; flowers crowded gradually expanded, pale-hued; mid-June to early July.....5. *H. glauca*.

Syn., "cordata"; "sieboldiana."

BASE OF LEAF-BLADE tapering to the petiole; blade-shape elliptic-ovate, lanceolate or oblong.

WIDTH OF LEAF-BLADE over 5 cm. and total number of veins 11 to 19; petiole manifestly winged; peduncle leafy; flowers 4 to 5 cm. long.

BLADE asymmetric and undulate, to 15 by 8 cm., centrally white-striped (or in late season pale-green); late June to July 6. *H. undulata*.

Syn., "univittata"; "variegata."

BLADE symmetrical and flattish, to 20 by 12 cm., green; July

7. *H. erromena*.

(WIDTH OF LEAF-BLADE, veins, petiole, peduncle, and flowers intermediate; "H. lancifolia h. v. fortis," "H. sieboldiana," "H. lancifolia h. v. albomarginata" of Stearn, not Hooker, "H. aoki," etc.

Intermediates of No. 7&8.)

WIDTH OF LEAF-BLADE mostly less than 5 cm. and total number of veins 7 to 11; petiole obscurely winged; peduncle bearing scales.

BLADE-OUTLINE elliptic-lanceolate, acuminate; flowers lavender to lilac.

PETIOLE to 20 cm. long; flowers 4 cm. long, spaced; Aug. to Sept.....8. *H. lancifolia*.

Syn., "japonica"; "lanceolata." Leaf-color variants:

solid green, h. v. *typica*.

white-bordered, h. v. *albomarginata*.

(PETIOLE, flowers, and blooming-period intermediate; "H. lancifolia h. v. tardiflora" of American horticulturists, etc.

Intermediates of No. 8&9)

PETIOLE to 10 cm. long; flowers 3 cm. long, crowded; Oct.

9. *H. tardiflora*.

BLADE-OUTLINE elliptic-oblong, obtusish or acutish; flowers white; Sept.....10. *H. albiflora*

Bamboos in American Horticulture (IV)

ROBERT A. YOUNG¹

The preceding three contributions² to the knowledge of bamboos in American horticulture have been devoted entirely, with the exception of some general introductory remarks, to consideration of the characteristics and habits of some of the more important or well-known hardy, running bamboos of temperate eastern Asiatic origin that have been introduced at one time or another into the United States. In the present paper some bamboos of the "clump," or sympodial type, from tropical and subtropical regions, will be considered.

The Clump-forming, or Tropical, Type of Bamboo

In habit of growth, as was briefly indicated in the first paper, in the issue of July, 1945, the clump type of bamboo differs conspicuously from the running type (with its much-elongated horizontal rhizomes) in that a new rhizome always grows directly from the underground base of a developed culm and, immediately or with a very short intervening horizontal growth, turns upward to form a new culm. There are often several buds on the culm base and so there may sometimes be two or three new culms arising from the base of a single culm. From each of these newer culms, again, one or more others arise, and so on indefinitely. An illustration of the basal portion of a very young clump of this type, showing the general mode of development, appears on another page. It will be seen that the rhizomes giving rise

to the 3d- and 4th-year culms first grew deeper before turning upward to form the culms.

The clump bamboos that have been successfully introduced into the warmest parts of the United States and its tropical dependencies (the Philippine Islands are not being considered here), belong principally to the genera *Bambusa*, *Cephalostachyum*, *Dendrocalamus*, *Gigantochloa*, *Guadua*, and *Sinocalamus*. One or two species each of *Lingnania*, *Oxytenanthera*, and *Schizostachyum* have also been introduced but they are established in only one or two places and will not be considered in the present article. All of the genera named, except *Guadua*, are Asiatic or East Indian; *Guadua* is tropical American.

The Genus Bambusa

The genus *Bambusa* has a wide natural distribution in the Old World Tropics—southern Asia, the East Indies, and Africa—and contains bamboos of great range in stature and in many other characters, horticultural and botanical. No attempt to detail these here will be made, but some of the characters of horticultural interest will be referred to in considering the several species and varieties with which we shall be concerned.

Commonest among the clump bamboos in the south Atlantic and Gulf region of the United States and in the milder parts of California is the extremely variable, oriental "hedge" bamboo, *Bambusa multiplex* (Lour.) Raeusch. (*B. nana* Roxb. var. *normalis*, Makino ex Shirosawa). Because of the wide cultivation of the various forms or varieties of this species and the

¹U. S. Department of Agriculture; Agricultural Research Administration; Bureau of Plant Industry, Soils, and Agricultural Engineering; Division of Plant Exploration and Introduction.

²Natl. Hort. Mag. 24:171-195, July 1945; 24:274-291; Oct. 1945, 24:40-64, Jan. 1946.



Robert N. Jones

*View of entire lower portion of very young clump of *Bambusa tulda*, showing development from early seedling stages (extreme left) to the fourth year, when a much larger, characteristic culm (right) has emerged.*



Robert N. Jones

A clump of the type form of Bambusa multiplex, about 25 feet high, Oneca, Florida.

consequent interest that is likely to attach to them, it will be considered first and in some detail. Other species of *Bambusa* will be treated following, somewhat in ascending order of size. The forms of *B. multiplex* range in their ordinary maximum heights from 8 or 10 feet to more than 40 feet, but under very favorable conditions any of them may respond with larger growth. The species as a whole is probably the hardiest of all the bamboos of the clump type; the leaves of all varieties withstand temperatures down to about 17° Fahr. and some endure 15° with but little injury. *B. multiplex* is indigenous in southeastern Asia, and Dr. F. A. McClure has told

me of finding it in the wild in northern Kwangtung Province, China. It has long been cultivated in the East Indies, many parts of the Malay Archipelago, the Philippine Islands, and in the mildest parts of Japan.

There has been much confusion of names with reference to *Bambusa multiplex* and its various forms that have received names at the hands of botanists and horticulturists. Since there probably is nowhere at present full treatment of the subject in print, it seems worth while first to trace briefly the history of the naming of the species.

A bamboo now believed to represent the species type of *Bambusa multiplex* was described under the name *Arundo*

multiplex by the Portuguese botanist Loureiro, in 1790. It was transferred in 1797, by Raeuschel, to the genus *Bambusa*. The specific name *multiplex* in relation to the plant did not become known to other botanists, however, until the studies of Dr. E. D. Merrill, published in 1935 under the title "A Commentary on Loureiro's Flora Cochinchinensis" (Trans. Amer. Phil. Soc. n. s., v. 24, pt. 2: 83. 1935) disclosed the evident specific identity of *B. nana* Roxb. and its nomenclatural varieties with *B. multiplex*. It seems fairly certain that the bamboo described under the specific name *multiplex* represents the original wild form and it seems equally certain that the semi-dwarf, plain-green, fern-leaved garden form is the plant that was named *B. nana* by Roxburgh. Not having been aware as yet of the identity of the original wild form with the earlier-published *B. multiplex*, the Japanese botanist Dr. Tomitaro Makino named it

var. *normalis* under *B. nana*; this was published (in Japanese, but with Latin scientific name) in 1912, by Yoshio Shirosawa. However, in connection with this treatment of the plant, it was stated parenthetically by the author that, although the Latin name would imply that the plant *B. nana* was the "mother" species, it was in reality a variety of the one that was being named var. *normalis*.

It will perhaps be useful before more detailed discussion of the recognized and named horticultural varieties, or forms, of *Bambusa multiplex*, to list them in tabular form, with very brief characterizations and with some of the botanical or horticultural synonyms by which they have been designated in the literature and in nursery catalogs. The order of listing is somewhat arbitrary but is based mainly on stature and the character of the foliage of the several forms. The list follows:

Bambusa multiplex (Lour.) Raeusch.

Forms of the species	Some Botanical or Horticultural synonyms
Typical form	
Plant plain green, leaves normal, culms up to 35 ft. tall.	<i>Bambusa nana</i> var. <i>normalis</i> ; <i>B. argentea</i> ; <i>B. nana</i> var. <i>argentea</i> .
Horticultural Varieties	
Variety Silverstripe (some leaves yellowish or white striped; internodes of culms often with slender yellowish stripes; up to 40 ft.)	<i>B. argentea striata</i> ; <i>B. nana</i> var. <i>argentea-striata</i> ; <i>B. nana</i> var. <i>variegata</i> ; <i>B. argentea</i> var. <i>vittata</i> ; <i>B. nana</i> var. <i>normalis</i> f. <i>vittato-argentea</i> .
Variety Alphonse Karr (culms yellow, prominently green striped, up to 35 ft.)	<i>B. alphonse-karri</i> ; <i>B. nana</i> var. <i>alphonse-karri</i> ; <i>B. verticillata</i> .
Variety Willowy (plain green; culms and branches slender, drooping; culms up to 20 ft.)	None.



P. H. Dorsett

A mature, spreading clump of Variety Silverstripe of Bambusa multiplex, growing in deep sandy soil and fully exposed to sunlight at Gotha, Fla. Height about 25 feet.

- | | |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Variety Fernleaf (plain green; usually dwarf, culms rarely 20 ft.; foliage fernlike) | <i>B. nana</i> ; <i>B. disticha</i> ; <i>B. nana disticha</i> . |
| Variety Stripestem Fernleaf (foliage green, fernlike; culms yellowish, green striped, up to 10 ft.) | <i>B. disticha</i> ; <i>B. striata</i> ; <i>B. nana</i> f. <i>viridi-striata</i> . |
| Variety Silverstripe Fernleaf (somewhat dwarf; foliage fernlike, with some leaves white striped). | <i>B. nana</i> f. <i>albo-variegata</i> . |

B. multiplex. Hedge bamboo. Typical form: This form of the species, a clump of which is shown on page —, is considered, as already stated, to represent the original wild plant from which all other forms have arisen. It is normally plain green throughout. Its maximum height is about 35 feet where soil and moisture conditions are suitable and winter temperatures do not often fall lower than 17° Fahr. The

branches range in number from several at the lowest branching node to 30 or more at some of the higher nodes. At each of these nodes there is a primary branch of considerable length, with a pair of sub-equal smaller ones—one on each side—arising from two of the extremely crowded basal nodes of the primary branch. Along with the growth of these three branches, a varying number of small to diminutive



A more upright clump of the same variety as on page 261, about 37 feet tall, growing in heavy rich soil, partly surrounded by other tall growth, on the McIlhenny estate, Avery Island, La.

branches and twigs develop successively within a year, from the much-crowded basal nodes of the earlier ones. This branching habit is common in its essentials to all forms of the species. The primary branch and sometimes the two succeeding ones also give rise to branchlets at some distance from the base. The lanceolate to narrowly oblong leaves, vivid green above and strikingly bluish glaucous or silvery beneath, range from about $1\frac{1}{2}$ to 5 inches in length. This silvery under-surface gave rise to the specific or varietal name "argentea" by which the typical form of the species has often been known. The culm sheaths of the type form are devoid of special color markings and the auricles at the base of the rather long sheath blade are

poorly developed or absent. The sheaths of all the forms are tardily deciduous. Depending upon temperature and moisture conditions, the new culm shoots of *B. multiplex* (and of its different forms) appear from May to July in the various latitudes in which the species grows in the continental United States—about as far north as Beaufort, S. Car., on the Atlantic coast. Local weather conditions also influence the time of sprouting. Late-sprouting culms commonly do not extend their branches until the following spring but remain as bare poles during the autumn and winter. Although the young shoots have not generally been considered edible, the very young ones—before they emerge from the ground—are reported to be eaten in the Dutch East



A young clump, 15 feet in height, of Variety Alphonse Karr of Bambusa multiplex at Mr. E. A. McIlhenny's estate, Avery Island, La.

Indies (Ochse, P. J. Vegetables of the Dutch East Indies (English ed.), p. 302, 1931). The culms, which are rather slender and seemingly not very tough, do not appear to have important industrial uses. The species and its varieties are valuable chiefly for ornamental plantings. In hedge use they respond well to pruning when this

is desired. The type form is growing on the island of Oahu, Hawaiian Islands, according to specimens received some years ago from Mr. Edw. L. Caum of the Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu. To the synonyms of the typical form in the tabular list of varieties may be added *Leleba multiplex*.



View of a hedge 20 feet high of Variety Willowy of Bambusa multiplex at Hillcrest Cemetery, Savannah, Ga.

(The validity of the genus *Leleba* is not generally recognized.) The Japanese name of the species is Horaichiku.

B. multiplex, Variety Silverstripe. Silverstripe hedge bamboo. Photographs of two handsome clumps of Variety Silverstripe are reproduced on pages 261 and 262. Marked differences in growth habits probably are to be accounted for by the very different environments of the two clumps. The low spreading clump, beside a small lake at Gotha, Florida, is in very sandy soil, with full exposure to the sun, while the taller one, at Avery Island, La., is in heavy rich soil and is largely surrounded by other tall growth. This variety differs essentially from the type in the yellowish to white striping of the lower leaves on most of the branches and twigs and the thread stripes of the same yellowish color on the culms. Considerable variation is found, and forms occur in which the

striping of the leaves is much more profuse than in others. The variety Silverstripe is a little more vigorous than the type, occasionally attaining heights of 40 feet or more. On a trip that I took with Dr. H. Harold Hume in central Florida some 20 years ago, we observed a clump in rich moist soil that we estimated to be 45 to 50 feet in height; it was much taller than any other clump of *B. multiplex* that I have ever seen. The branching and the leaf characters in this variety, other than the striping of the leaves, are much as in the type. The culm sheaths, green at first and with numerous yellowish stripes, dry to a dull straw color, with the stripes becoming brownish. To the list of Latin synonyms previously given may be added *B. multiplex* f. *vittato-argentea* (name only) and *Leleba multiplex* v. *variegata*. The Japanese name is Hoshochiku.

B. multiplex, Variety Alphonse



View of a maturing clump of Variety Fernleaf of Bambusa multiplex at the Florida Experiment Station, Gainesville, Fla., with a tall palmetto in the background.

Karr. Alphonse Karr hedge bamboo. This might be called the Golden striped hedge bamboo if another name were wanted. It grows to 35 feet or more tall, about the same height as the type, as far as I have observed, though the late Henry Nehrling wrote of a height of more than 50 feet attained by a large clump at Oneco, Fla. The variety differs from the type mainly in the coloring of the culms and branches. These are usually at first bright golden yellow with conspicuous longitudinal green stripes of different widths irregularly spaced on the internodes. The leaves, commonly much like those of the type, are sometimes larger, and I have seen them up to $7\frac{1}{2}$ inches in length. A view of a developing clump of this variety at Avery Island, La., is shown on page 262. The habit of growth changes with age, and I have seen a more mature clump at Avery Island, in which the upper parts of most of the culms carried heavy masses of foliage resembling those shown in the clump of Variety Silverstripe at Gotha, Fla. The fresh culm sheaths are yellowish, with green stripes, just the reverse from the condition in Variety Silverstripe; they dry to pale brownish, with the stripes becoming straw color. Besides the three synonyms given in the table, the following botanical and horticultural combinations for Variety Alphonse Karr have appeared in print; *B. nana* var. *normalis* f. *alphonso-karri*; *B. multiplex* var. *normalis* f. *alphonso-karri* (name only); *Leleba multiplex* f. *alphonso-karri*. The Japanese name is Suochiku.

B. multiplex, Variety Willowy. Willowy hedge bamboo. The varietal name of this form of the species was suggested by the habit of growth of mature clumps. The entire plant is plain green except for the silvery glaucous under-surface of the leaves; the leaves are slender, $1\frac{1}{2}$ - $4\frac{1}{2}$ inches long by $\frac{5}{16}$ - $\frac{3}{8}$

inch wide. The culm sheaths dry to a dull straw color. Heights up to 20 feet, with culm diameters not exceeding $\frac{3}{4}$ inch near the base, are attained; the branches also are very slender. Culms that approach the maximum height tend strongly to droop or bend, even without the masses of foliage that cause excessive bending in other varieties. In younger clumps, with culms up to 10 feet high, the drooping tendency does not appear, even though the stems are slender. The lowest internodes are solid and the higher ones thick-walled, which would account for the erect growth during the early development of a clump. A view of a hedge grown to full height, at Hillcrest Cemetery, Savannah, Ga., is shown on page 264. My first acquaintance with this form of *B. multiplex* was made at Mr. E. A. McIlhenny's place, Avery Island, La., in 1932, just before the hedge at Savannah was closely observed and photographed. The variety had not previously been reported in the literature, so far as I know, and it was first listed (with a brief descriptive note) as a horticultural variety in the second edition of Standardized Plant Names.

B. multiplex, Variety Fernleaf. Fernleaf hedge bamboo. A clump of this somewhat dwarf variety, growing on the grounds of the Florida Experiment Station, Gainesville, Fla., is shown in a view on page 265. A moderately low, well-trimmed, bamboo hedge, long grown at that Station, is also of this variety. This demonstration hedge shows the entire practicability of using such a bamboo for the purpose. The fern-leaved character of this variety results from the increase in number and reduction in size of the leaves from the normal numbers and sizes in the type. The number of leaves on a branch or twig doubles or triples, and the size of the individual leaf may be reduced



Side view of a 9-foot hedge of Variety *Stripestem Fernleaf* of *Bambusa multiplex* at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

by two-thirds or more from that in the type, with the leaves crowded toward the end of the branch or twig. This gives a conspicuously 2-ranked

or distichous, effect which is reflected in the horticultural name "disticha" that sometimes has been used for it. The entire plant is plain green and dif-

fers little from the type except in its varying degrees of dwarfness and the change in foliage characters. The culm sheaths dry to a dull straw color. The variety is not stable but frequently reverts to the type in respect both to stature and character of foliage. In some instances, in soil not very rich, a clump may keep its varietal characters perfectly for several years before beginning noticeably to revert. Reversion occurs more frequently when the fertility of the soil is increased or when small plants of the variety are planted in richer soil than that in which previously grown. However, the culms may sometimes grow considerably taller and still retain the fernleaf type of foliage. An example of this was observed many years ago at the water tank on the Florida Experiment Station grounds. The clumps of bamboo were growing in deep sandy soil but received light irrigation from the tank. They had reached a height at that time estimated at about 22 feet and still kept the fern-leaved foliage, except that a one-fourth section of one of the 4 clumps had reverted to the normal foliage of the type form of the species. The variety Fernleaf, as stated earlier, is understood to represent the plant originally described under the name *B. nana* by Roxburgh. The Japanese name for it is Ho-o-chiku, meaning "phoenix bamboo." This variety is growing in Hawaii. To the list of Latin synonyms already given should be added *Leleba floribunda*.

B. multiplex, Variety Stripestem Fernleaf. Stripestem Fernleaf hedge bamboo. A view of a 9-foot hedge of this variety, growing at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga., appears on page 267. As the varietal name indicates, the culms are striped and the foliage is of the fernleaf type. There are 10-20 leaves, $\frac{5}{8}$ -1 $\frac{1}{2}$ inches long,

on a twig. Yellow is the ground color of the slender culms and the green stripes are irregular in width and in number on the internodes. The culm sheaths dry to a dull straw color. The variety closely resembles the wholly green variety Fernleaf except in the color markings of the culms and in its usually more dwarf stature. The culms and branches tend to be erect in habit except where forced otherwise by density of the growth. The masses of small foliage in the hedge form a perfect screen. Such a hedge or a much lower one could be pruned to a formal shape if it were so desired, with results as satisfactory as obtained with Variety Fernleaf at Gainesville, Fla. Frequent pruning probably would be necessary during the warm months. Like the ordinary Fernleaf variety, this one also develops culms in the course of time that bear the larger, normal leaves of the type form. Dwarfness and the fernleaf character probably are best preserved when the bamboo is grown in soil not high in fertility. The variety Stripestem Fernleaf, under another horticultural name, "*B. disticha*," came to attention in the southeastern states through the propagation of it by Mr. C. E. Pleas, Chipley, Fla., in the early twenties. He had obtained his first plant earlier from an unnamed source in South Carolina. Some years later it was learned that the same variety under the name "*B. striata*" was in the nursery trade in southern California. The earliest known record of the variety in literature is in the excellent work (in Japanese, with color plates) Chikurui Zufu Kaisetsu (Monograph of Bamboos; 1st ed. 1914), by the famous Japanese horticulturist and bamboo specialist Mr. Isuke Tsuboi. In collaboration with the botanist Dr. T. Makino he described the plant and published for it the scientific name *B. nana* var. *typica* f. *viridi-striata*.



D. A. Bisset

End view of a 9-foot hedge of the Chinese goddess bamboo, at the Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

Another Latin synonym is *Leleba floribunda* f. *viridi-striata*. The Japanese name is Beni-ho-o-chiku.

Bambusa multiplex, Variety Silver-stripe Fernleaf, is a sixth form of the

species that has received recognition by being named. It was described from Japan by Makino in 1917, under the name *B. nana* f. *albo-variegata*. No record of its introduction into this

country has been found but specimens of fernlike foliage, with 14-20 diminutive lanceolate leaves on a twig, the basal ones definitely white or yellowish striped, have been received twice in recent years from Miss Lisa von Borowsky, Supervisor at the Chinsegut National Wildlife Refuge, near Brooksville, Hernando County, Fla. These are understood to have been taken from a clump that, except for a few branches on one or two culms, was the ordinary Variety Silverstripe, with much larger and many fewer leaves. Indeed, a specimen of this normal type from the same plant was sent with the first fern-leaved specimen. The facts recited seem strongly to indicate that the form with partly striped fernlike foliage arises as a bud variant of the one with normal-sized foliage that is partly striped. The form *albo-variegata* was stated to be like the one then known as *B. nana*, which we now call Variety Fernleaf, except that it had some white-striped leaves. Other synonyms of this form are *B. floribunda* f. *albo-variegata* and *Leleba floribunda* f. *albo-variegata*. The Japanese name for it is Furi-ho-o-chiku.

Bambusa sp., P. I. No. 77014. Chinese goddess bamboo. This is another hardy, fern-leaved, hedge bamboo, from southern China, collected in cultivation, in 1927, by Dr. F. A. McClure for the U. S. Department of Agriculture. A view of a hedge and a close-up of the foliage are shown on pages 269 and 271. The number of little leaves on a twig is 12-20 and they are commonly $\frac{5}{8}$ -1 $\frac{1}{4}$ inches long, though rarely up to 2 inches. The plant is known to the Chinese as Koon yam chuk and is much grown as a pot or tub plant, as well as for hedges. It may attain a height of 10 or 11 feet in the open. In foliage and culm-sheath characters the Chinese goddess bamboo so strongly resembles the fern-leaved forms of

B. multiplex that for a time it was assumed to belong to that species. Two observed characters that now seem to set it off clearly from *B. multiplex* are the invariably solid culms and the stability of the fern-like type of foliage. The foliage type has not been observed ever to change. Other differences noted are the more strongly recurved twigs and the consistently more graceful, somewhat drooping, habit of the plant in all stages of growth. It appears to be slightly more cold resistant than any known variety of *B. multiplex*. The Chinese goddess bamboo has been found recently by Dr. McClure to be very similar to and perhaps identical with a bamboo described in great detail from Algiers by A. Rivière, in 1879, under the misapplied name *Bambusa scriptoria* Dennst. It is hoped that a proper specific name for this interesting and attractive little bamboo may be determined upon in the near future. It merits attention from bamboo lovers in all the milder parts of the country where temperatures below 15° Fahr. are of only rare occurrence, and elsewhere in fully lighted conservatories. Direct sunlight is necessary for indoor growing.

All of these hedge bamboos that have just been discussed, but especially the smaller ones, are very useful for decorative and screen plantings about residences and public buildings. An example of the latter use is shown in a view on page 272 of one of the buildings of the Louisiana State University, at Baton Rouge, planted with the varieties Alphonse Karr, Fernleaf, and Willowy of *Bambusa multiplex*. These and the variety Silverstripe were also used effectively in plantings around other new buildings of the University. It was desired to make plantings that would be immediately effective and that would rather quickly make further development. Clumps of fairly large size with



D. A. Bisset

A close-up view of the fernlike foliage of the Chinese goddess bamboo, Bambusa sp. P. I. No. 77014.



View of one of the buildings of Louisiana State University, Baton Rouge, La., recently planted with variously developed clumps of different varieties of Bambusa multiplex.

no cutting back of the tops were judiciously placed, and the results in general, as those shown in the photograph, seemed very satisfactory.

Bambusa textilis McClure is a medium-large and fairly hardy bamboo from southern China. It was collected at Heunglokeuk, Kwangtung Province, by F. A. McClure, who was then with Lingnan University, Canton. A view of a 9-year-old clump about 40 feet high, at the Federal Experiment Station in Puerto Rico, at Mayaguez, is shown on page 273. The culms were of diameters up to 2 inches. *B. textilis* is cultivated in China for its thin-walled but tough culms, which are split and extensively used in the weaving of mats, hats, and baskets and for making rope. The species is among the hardiest of the clump bamboos, being excelled in this respect only by the hardier varieties of *B. multiplex* and by the Chinese goddess bamboo. It

has withstood temperatures down to about 17° Fahr. at Savannah, Ga.

The culms of *B. textilis* are erect and unusually straight, with nodding tips. The culm sheaths, stiff and somewhat brittle when dry, are glabrous, and they dry to a brownish tan; the apex of the sheath proper is wide and forms a nearly symmetrical arch from both edges, the arch extending a little lower on one edge, and the ligule is low. The blade is very broadly lanceolate, nearly as wide as the apex of the sheath, and somewhat broadly subcordate at the base; the base is extended on each side as two rather small, unequal, delicately fringed auricles. There are 6 to 10 branches at a node and they differ less in size than do the branches of most related bamboos. The foliage is attractive and distinctive, the leaves on the primary branches being up to about 8 inches long and an inch wide, while the others rarely exceed 6



F. A. McClure

*View of a developing clump of *Bambusa textilis* at the Federal Experiment Station, Mayaguez, Puerto Rico; at this stage (in 1943) it is nearly 40 feet tall. Note the exceptionally straight culms.*



F. A. McClure

View of a large clump of *Bambusa ventricosa*, about 40 feet tall, at McKee Jungle Gardens, Vero Beach, Fla. At right are tall culms of *Sinocalamus Oldhami*, at left unidentified bamboo.

inches by $\frac{5}{8}$ inch. The adult culms are free of branches to a greater proportional height than in almost any other bamboo. A bamboo such as this, with straight, light, and tough culms, with non-prominent nodes, seems to possess high potential value.

Bambusa ventricosa, McClure, a splendid 40-foot clump of which, at the McKee Jungle Gardens, is shown on page 274, is another comparatively hardy bamboo from southern China. It was collected in cultivation at Canton by F. A. McClure for the U. S. Department of Agriculture, in 1925. It has withstood temperatures down to about 20° Fahr. in this country. In China it is commonly grown as a pot or tub plant, because in the early stages of development of a clump, and persistently in the dwarfed growth induced by pot culture, the internodes of the culms and many of the branches are quite

regularly shortened and enlarged in a curious manner that gave rise to the Chinese (Mandarin) name Fu-tu-chu (Fat-t'o'chuk in Cantonese), meaning literally, "Buddha's belly bamboo." The characteristic distortion is shown on page 275. The shorter name "Buddha bamboo" has been in use in this country for several years, but a number of travelers who have acquaintance with Oriental tradition and thought have felt that this unnecessarily obscures the significance of the original name. There is something to be said for this view and, reversing an earlier opinion, I shall not regret it if the more expressive full name comes into general use for this unique and handsome bamboo.

It is to be remembered, however, that when a small plant or clump is grown in the open and it becomes established, the habit of producing swollen internodes is soon discarded and the inter-

nodes stretch out to their normal lengths of several times as long. It should be added here that the tallest culms in the clump photographed at Vero Beach, Fla., are reported now to be 55 feet high. Without the change to an adult habit of growth, probably no heights greater than 7 or 8 feet would be achieved. In China, the plant is as yet known only in its dwarf state. The branches on normal culms in younger clumps are usually 3 at a node and unequal in size, but sometimes there are 2 or more additional smaller ones. Branches borne by dwarfed culms are sometimes single at the nodes. There are commonly 6-8 leaves at the ends of branches or on twigs, and they range up to $5\frac{1}{2}$ inches long and from $\frac{5}{16}$ to $\frac{5}{8}$ inch wide on dwarfed plants. On larger plants the size of leaf may increase to 7 inches long and $\frac{5}{8}$ inch wide. The normal culm sheaths are long for their width, noticeably unsymmetrical, coriaceous, glabrous, with the veins on the dry sheaths prominent and giving a striate effect; the apex of the sheath proper is rather wide, gently arched near the center, and the ligule is low. The blade is distinctly unsymmetrical and as wide as the apex but is a little constricted near the base, which is slightly extended to form two diminutive and unequal auricles. A much more detailed account of the dwarf phase of this strange bamboo accompanies the original description and publication of the species in *Lingnan Sci. Journ.* 17: 57-62. Canton. 1938. The qualities of the culms of *B. ventricosa* have not been determined.

Bambusa longispiculata Gamble is a medium-large bamboo, closely related to *B. tulda* but reaching heights of only about 45 feet. The culm sheaths strongly resemble those of *B. tulda* but the pair of auricles is more nearly equal than is usual in the latter species. The leaves are fairly large, ranging from



Robert Taylor

Section of culm of *Bambusa ventricosa*.

about 3 to 9 inches in length and from $\frac{1}{2}$ to 1 inch in width. The species is being used in a hillside planting for erosion control at the Federal Ex-

periment Station in Puerto Rico. Culms up to 40 feet tall have been produced. Some of the original plants, grown from seed received by the U. S. Department of Agriculture from Dehra Dun, India, in 1931, were under close observation at the Station during the early years of their growth, and it was noted that they soon exhibited marked differences in growth habits and in details of some of the vegetative organs, including the culm sheaths. This experience has served to emphasize the fact that such differences frequently do occur among bamboo seedlings as well as in other types of plants. *B. longispiculata* is about equal in hardiness to *B. tulda*, the critical temperature for both being about 27° Fahr.

Bambusa tuldooides Munro, a magnificent clump of which is illustrated on page 277, is believed to be native in southern China, and it is said to be the most important economic bamboo in that region. It has long been in cultivation in some of the mildest parts of southern Europe and in many mild-wintered localities in the southern and southwestern United States, until recently under the horticultural name *Bambusa Thouarsii*. It is semi-hardy, withstanding temperatures down to 20° Fahr. The species apparently was introduced very early by world navigators into southern Brazil, for by 1883 it had so well established itself that it was described by the botanist Doell as an indigenous bamboo and named *Guadua pallescens*. It is now widely cultivated in Brazil, northern Argentina, and adjoining countries.

B. tuldooides is a handsome medium-giant bamboo growing to 55 feet in height, with remarkably slender culms, the tallest only about 2¼ inches in diameter near the base; they are fairly thick walled. The branches are several at a node and the number of leaves on a branch or twig ranges from 5 to 12. The dark-green leaves are variable on

the twigs and branches, as in all bamboos, but they average medium large; they range from 2½ to 10 inches in length and from ⅕ to 1 inch in width. The culms are extensively used in China for propelling small boats, or "punts," in rivers and streams. In allusion to this use, the English common name "punting-pole bamboo" was proposed by Dr. F. A. McClure in *Standardized Plant Names* (2d ed.). The Chinese name is *Chang ko chuk*.

As already indicated, *B. tuldooides* has been known under various names in different regions. The use in this country and in Europe of the horticultural name *B. Thouarsii* for it, when there was already a published scientific name *B. thouarsii* Kunth, a synonym of *B. vulgaris*, gave rise to misunderstanding that resulted in the publication of an illustration of a typical clump of *B. tuldooides* mistakenly captioned *B. vulgaris* in U. S. Department of Agriculture Bulletin 1329 (1925). Later attempts, before the synonymy was fully worked out, to determine and bring into use the correct scientific name of *B. Thouarsii* Hort. led first to the mistaken use by the present writer in correspondence of the name *B. longispiculata* (which name was involved in the synonymy) and then the use of the synonym *Bambusa pallescens* (Doell) Hackel (*Guadua pallescens* Doell). The identity of *B. Thouarsii* Hort. with *B. pallescens* was established through an exchange of specimens by the U. S. Department of Agriculture with Dr. P. Campos Porto, Director of the Instituto de Biologico Vegetal, Brazilian Department of Agriculture, Rio de Janeiro, in 1934; and in 1936 Dr. F. A. McClure determined the identity of both with *B. tuldooides*, which seems to have closed the chapter on these questions of name. Another synonym is *B. guadua*.

Bambusa vulgaris Schrad. ex Wendl. is one of the most widely grown of all



Large clump of Bambusa tuldooides, 55 feet tall, at Mr. Julian Nally's place, Gotha, Fla.; Mr. Nally in center.

bamboos in tropical and subtropical regions of both Hemispheres, though the chief reason for this seems to be its large size—up to 70 or 80 feet high—and ease of propagation and cultivation in all nearly frostless localities; it suffers some frost injury at 30° Fahr. and at 28° usually is killed to the ground.

Its original habitat is not definitely known but is generally believed to have been India, though one author has suggested its spontaneous appearance also in other regions, including Java and Madagascar. At its best, the species makes an attractive, though rather too-open clump; the culms usually are dis-

tinctly arching. The open-clump habit results from the horizontal growth of the rhizomes for distances up to about 2½ feet before turning upward to develop into culms. A view of a clump clearly exhibiting this character is shown on page 279.

The culm sheaths of *B. vulgaris* are highly characteristic and the lower ones are much shorter than broad; the apex of the sheath proper is very wide, with the center arching gently, and the ligule is of medium height, with finely notched, shortly ciliate, margin. The sheath is at first covered on the outside with short, appressed, stiff brown hairs, most of which gradually fall off. The blade of the lower sheaths is short and broad, and much narrower than the apex of the sheath, but a pair of prominent fringed auricles extends to the edges of the sheath; the inside of the blade is at first densely brown-hairy but much is lost on drying. The sheath dries to a pale brown. The leaves are fairly large, 4-9 inches long and ½-1⅛ inches wide. Largely because of the effects of even light frosts, a fully satisfying clump is exceedingly rare in southern Florida.

The wood of *B. vulgaris* is rather soft and, from the standpoint of quality, is one of the least valuable among large bamboos. Notwithstanding this, furniture and other articles can be made from the culms, and some extensive investigations in this field have been made in recent years in Puerto Rico. Because of the size of culms and ease of growing, the species has been used for paper pulp. A paper mill was erected in the Island of Trinidad 10 years ago to utilize the culms from an area said to be about 500 acres in extent of this species, that had been planted 20 years earlier. The mill closed later, at least for a period, when the price of paper became too low.

Bambusa vulgaris var. *vittata* A. & C. Rivière is smaller than the type and

differs otherwise in having yellow culms with longitudinal green stripes on the internodes. It is of Asiatic origin. The variety has been grown at a few places in southern California and southern Florida. A synonym is *B. vulgaris* var. *striata*.

Bambusa polymorpha Munro is a handsome giant bamboo said to reach heights of 75-90 feet, with culm diameters up to 6 inches. The wood of the culm is reported from the Federal Experiment Station in Puerto Rico to be very dense and exceedingly hard—almost flintlike. The species has attained 40 feet high there. A view of several clumps rather near together, at the Canal Zone Experiment Gardens, Summit, Canal Zone, appears on page 280. The characteristic extremely close growth of the culms, with entire absence of branches on the lower parts, is clearly shown. The branches and twigs are long and slender, and the leaves are among the smallest and slenderest of any of the clump bamboos, except the fern-leaved types, that are being considered. They range from 1½ to 7½ inches long and 5/16-7/16 inch wide. This results in a distinctive beauty of the foliage that is only partly revealed in the present photograph. The culm sheaths are distinctive in having very prominent auricles, profusely margined with long, stiff bristles. The sheaths are exceedingly stiff and are densely covered with fine appressed stiff hairs, rather easily rubbed off, giving them a silvery gray appearance when dry. There are few living specimens of *B. polymorpha* in southern Florida but probably the best is one at the McKee Jungle Gardens at Vero Beach. Its present height is about 30 feet.

Bambusa tulda Roxb. is a giant Indian bamboo reported in its ordinary large form (there are two or more smaller ones) to attain heights up to 70 feet or more. It does not endure



E. L. Crandall

Characteristic open clump of Bambusa vulgaris, at Mr. W. J. Matheson's place, Biscayne Key, Fla.

temperatures lower than about 27° Fahr. The adult culms are straight, robust and very thick walled, and the wood is fairly dense. There are the usual 3 larger branches with several much smaller ones at a node, with 6-10 leaves on each. The leaves are often large, ranging from 3 to 10 inches in length and from $\frac{1}{2}$ to $1\frac{1}{8}$ inches in width. The lower culm sheaths have a broad, short blade, with a pair of prominent auricles, one of which usually is prolonged over and adherent

to the "shoulder" of the sheath and is distinctly wavy, or crinkled.

A near view of a clump of *B. tulda* nearly 6 years old at Culebra, Canal Zone, is shown on page 281. The plant from which this clump grew was from the first successful introduction (P. I. No. 21002) of the species made by David Fairchild of the U. S. Department of Agriculture, from Calcutta, India, in 1907. A plant of the same introduction was sent to the Federal Experiment Station at Mayaguez.



James Mitchell (OFAR)

Medium-sized clumps of Bambusa polymorpha at Canal Zone Experiment Gardens, Summit, C. Z. Note the unusually compact growth.

Puerto Rico. It is not possible to state with certainty whether the plant at Mayaguez survived, as the record is not entirely clear, but, at least, one of similar type received apparently near that time, did become established

and has thrived. A third specimen plant of the 1907 introduction was sent to the late Henry Nehrling, at Gotha, Fla., and is still growing on the place, now owned, as previously mentioned, by Mr. Julian Nally. It



Courtesy Acting Superintendent, Ancon Hospital

*5-year-old clump of Bambusa tulda at Ancon Hospital, Culebra, Canal Zone.
(Photographed in 1913.)*

was a noble clump 60 feet or more high, with culm diameters of over 3 inches, when I visited Gotha in 1937, although it had been frozen to

the ground at least twice, I believe, in earlier years. The species is also growing on the island of Oahu, in Hawaii.



A. G. Galloway

A giant clump of the great thorny Indian Bamboo, Bambusa arundinacea, near Auburndale, Fla. The height is 75-80 feet. This clump was killed to the ground in a severe freeze shortly after this photograph was taken.

A smaller form of *B. tulda* appeared among plants grown by the Department of Agriculture from seed (P. I. No. 74413) received many years ago from the Forest Research Institute, Dehra Dun, India. The greatest height

thus far reported for this form is about 30 feet. It cannot be stated at present whether one only or several of the seedlings were of this smaller form. It also appears to be less attractive than the normal type in certain respects oth-

er than its smaller size. Another form, understood also to be of reduced stature, with yellowish striped culms and culm sheaths, was reported in private cultivation at Coconut Grove, Fla., some years ago.

The heavy-walled culms of the normal large type of *B. tulda* are used in construction and for other purposes in India, and numerous similar uses for them will doubtless be found in the Americas. Should the production of paper pulp from bamboo prove economically possible in tropical and subtropical America, this species may well be found one of the more valuable sources of raw material for growing in those latitudes.

Bambusa arundinacea Retz. is a very thorny, giant bamboo, one of the largest of the genus. It has been reported to exceed 100 feet in height. A photograph taken in 1927 of a great clump that stood for many years on the shore of Lake Marianna, near Auburndale, Fla., is reproduced on page 282. The clump was frozen to the ground shortly after this photograph was taken. This species, like *B. tulda*, is injured or killed at temperatures below 27° Fahr. The estimated height of 75 or 80 feet for this clump is not known to have been equaled as yet by any other bamboo in the United States. The culm walls are thick—about the same as in *B. tulda*, but the wood apparently is less dense. The primary branch at each of several of the lower nodes of the culm is elongated to vine-like length, with the secondary pair at the base of the primary modified into short, sharp thorns; the branchlets at the nodes of these lower primary branches are modified into similar thorns. Higher on the culm the branches and branchlets, or twigs, are decreasingly changed to thorns, or spines, until finally normal leafy ones only are found. With the tangle of vinelike thorny branches around the

base of a clump of this bamboo, it is well protected from larger browsing animals that might eat or otherwise destroy the new culm shoots as they emerge. (All herbivorous animals are extremely fond of young bamboo shoots in general.) The leaves of *B. arundinacea* are 5-6 on a branch or twig and rather small, averaging around 5½ inches in length and ranging from 2½ to about 7 inches, with widths of ¾ to ⅝ inch. The culm sheaths are highly characteristic in having a very dense appressed hairiness, blackish and furlike, on the inside of the sheath blade; the blade is short and very broad on sheaths at the lower nodes and is not separable from the sheath proper as in most bamboos.

The extreme thorniness of *B. arundinacea* and the great size that it ultimately attains restrict its usefulness in landscape planting to situations where space is ample. The removal of dead or old culms from a large clump, without undue injury to the branches of the remaining ones, will constitute something of an engineering problem. This giant bamboo develops rapidly from small vegetative propagations and, barring the thorniness of the culms and branches and the consequently greater cost of harvesting the mature culms, it appears to offer good possibilities as a source of wood for paper pulp in tropical and subtropical localities.

Species of the genera *Cephalostachyum*, *Dendrocalmus*, *Gigantochloa*, *Guadua*, and *Sinocalamus* that are established in cultivation in warm localities in the continental United States, Puerto Rico, and the Canal Zone will be treated in the next issue.

Correction

Attention is called to the transposition of the illustrations (but not the legends) on pages 49 and 51 in the issue of the magazine for January, 1946.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Species Cyclamen

In the hills of Gascony, the country of Artagnan and Cyrano de Bergerac, I saw miniature cyclamen for the first time.

Gascony is a romantic, backward country, of stony vineyards, walled villages, and hilltop castles looking towards the Pyrenees. Here, in the seventeenth century, a house was built just for pleasure, hunting and dancing, with great rooms, huge stables, and below the terrace a formal garden. When I was there, times had changed; the parties were a dim memory, but all day the old walls rang to the laughter of children. The garden had gone wild, there were ponds and a winding stream where there had been fountains and canals; here and there a huge cedar of Lebanon, hedge trees and evergreens old and gnarled, far more beautiful than in their clipped prime; and everywhere the little cyclamen flowers, rose and white, above carpets of their exquisite ivy-like foliage.

That was years ago, but ever since wild cyclamen have symbolized for me the love of home and family. The old house is sad now, the gay children went out to die on the battlefields of the world, but the cyclamen bloom on, and little grandchildren are beginning to pick them.

Whenever I see "hardy cyclamen" seed listed, I send for it. I sow it in well-drained pans of peatmoss, soil, and sand, in May or June, when the weather is turning warm. The seed is fairly large, but should be sowed on the surface and lightly covered with peatmoss; it does not germinate quickly, it requires six weeks more or less; then a

little round corm appears, followed somewhat later by the first leaf. The corm likes to be above ground, and the soil should be moist, but not soaking. There is very little trouble, practically every seed will grow, though slowly. The little plants could stay in their pans a year, however I usually put them in individual pots sometime during the winter slack season, using much leafmould, less soil, a little sand, and bone-meal; the third summer they bloom, and the season is from May to November. When grown under glass there are few or no leaves at blooming time, but all winter the foliage is lovely. In the wild, the blooming season is August and September, and flowers and leaves are carried at the same time.

I know that species cyclamen are hardy in southern Massachusetts, but I have never had the courage to put mine out; I grow them in pots and long window boxes on the north side of a cool greenhouse. I don't believe they mind cold, but I think they are fussy about drainage, and just the right amount of moisture, sun, and shade. In Gascony they are hearty and abundant where found, but very local; there they grow in almost pure leaf-mould over limestone, never in complete shade or full sun, and where there is a good supply of underground moisture; the summers are warm and dry, the winters cool and wet. They multiply greatly, always from seed, therefore they grow close to the surface. In cold climates they have to be planted deeper, which complicates the drainage problem. Eventually the corms grow to tremendous size, and one of them will produce up to one hundred flow-



From a drawing by Emily Winthrop Miles

ers in the course of a season. They appear long-lived, I have lost two or three from over-watering in summer; two or three from galls; there is a bit of trouble with *Aphis* spring and autumn—the same brownish-yellow horrors that relish lilies—that is all. Of course from time to time they have to be shifted to larger pots. They have no objection to acid soil.

All this refers to *Cyclamen europeum* and *Cyclamen neapolitanum*. These two are very similar, *europeum* being a little better in leaf and flower; both come in white and shades ranging from nearly pink to nearly lilac. They are said to cross freely, so some careful seedsmen will not state which variety they are supplying. Probably there are also local variations. All are good. *Europeum* is the one which grows in

Gascony; *Neapolitanum* I have never seen growing wild.

There are other cyclamen species about which I would like to know more. Once I bought a package of mixed seeds—it was not very good, but one *Cyclamen coum* appeared, and five or six other things that looked to me like antiquated florists' plants, but may have been true species for aught I know.

This solitary *Coum* is satisfactory, a winter-bloomer with small royal purple flowers on long stems, round leathery leaves, red below and uniform dark green above, retained virtually the year round. I bought three plants more; they were expensive, small, and came from far away; only one survived the journey; the leaves are mottled, and the only flower to appear so far is much

paler than those of my seedling. I have never seen seeds offered. Last year I allowed my young plant to produce one capsule, and arrived on the scene just in time to see a songsparrow gobble it up. I am trying again this year.

The unknown quantities have typical florists' foliage, the whole plant is small and chunky, the flowers much larger

than the other species, frilled and lacinated, very pretty and are winter-blooming. Last year they produced no seed, nor did the plants come through the summer any too well.

I offer my usual plea for information and advice.

ALIDA LIVINGSTONE,
Oyster Bay, N. Y.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

The soil reaction preference of Rhododendron roseum

Reference to the soil regarded as suitable for the cultivation of the Fragrant Pinxter-bloom, *Rhododendron roseum*, in two recent works suggests the desirability of placing on record some observations made over 20 years ago, while the writer was collaborating with Dr. Frederick V. Coville in his studies of the cultivation of acid-soil plants. In Dr. Van Dersal's "Ornamental American Shrubs" we read (p. 83) that "It tolerates a rather wide range of soils." Mr. Graves, in "Trees, Shrubs, and Vines," page 165, gives as one of its merits its "indifference to soil requirements." These statements trace back to a statement which appeared in the Arnold Arboretum Bulletin of Popular Information many years ago, to the effect that this species, unlike other Azaleas, will grow in limy soil.

When this publication came to the attention of Dr. Coville, he called me to his office, and asked if I could look into the matter, since his acquaintance with *Rhododendron roseum*, which dated from his boyhood days, had led him to believe that it was one of the

most acid-preferring of all the native species.

First, inquiry was made of Professor Sargent as to the source of the data on which the published statement was based, and he referred me to John Dunbar, then in charge of the horticultural work of the Rochester, New York, park system. On May 1, 1924, I paid a visit to Mr. Dunbar, and he kindly drove me out to a locality of the azalea on a hill to the northeast of the village of Leroy. The name of the nearby railroad station was Limerock, and there could be no doubt of the presence of lime, for one of the largest quarries in New York state was actively cutting away the hill. The bright pink bloom of *Rhododendron roseum* in the open woods above the quarry could be seen from afar, so up we climbed.

Tests of the soil-reaction of the humus soil shaken from the roots of the shrub, made with the then newly developed indicator dyes, soon showed, however, that the situation was not what it had seemed: all the shallower roots were penetrating material of mediacid reaction ("pH" 4.5) and only a few of the roots which extended downward reached a layer showing any neutralizing effect of the underlying



Robert Taylor

[See page 288]

Rhododendron tephropeplum

limestone rock. The rock fragments at the surface were indeed not limy at all, but consisted of chert and other siliceous rocks which have no effect on soil reaction. *Rhododendron roseum*

here as elsewhere had occupied an acid area, and must still be classed as an acid-soil plant.

The way in which misunderstandings, once they appear in print, get

faithfully copied by one compiler after another is familiar to all scientists. The true facts in the case rarely if ever catch up, and the writer does not entertain any hope of success in the present instance. Since, however, this column is read by numerous horticulturists, it has seemed worth while to call attention to the conclusion: So far as soil acidity is concerned, *Rhododendron roseum* should be treated like any other native Azalea.

E. T. WHERRY,
University of Pennsylvania.

Rhododendron tephropoplum

This spring in the continuous and apparently hopeless task of trying to learn more and more, the editor (of the Magazine, not this Section) bought some species of rhododendrons from the Pacific Northwest. Although they were small Mr. English was good enough to send a plant of this species which had a fat flower bud! All were potted and put into the cold pit with the Indian azaleas which represent the main devotion here among the tender sorts. In due course and in spite of its journey, the flower bud developed and the resulting group was recorded by carrying the whole plant to the studio for its portrait. Such a recording has absolutely no value other than that it may give to others as it does to me, a permanent record of the appearance of this particular young plant, for the details are sharp enough so that one may study practically all of the gross details.

One can consult books, for lack of first hand information, and there he will find the species assigned to the Boothii Series with notes that suggest that it may not be too easy to handle. Quoting from Bowers (p. 244) one finds it a "charming small bush, growing on limestone cliffs, blooming abundantly after it becomes a foot or so tall." Its flowers are said to be "vivid

magenta rose with crimson purple tube." Those of this plant were much lovelier with a rather fine clear pink faintly on the lavender side. In our cool early March weather, they lasted remarkably well and caused no end of talk. Since all our Spring has been slow and cool and for us, remarkably rainy in the last weeks, the plant has continued to flourish in spite of its pot but the test may come in late summer when nothing here will remind it of the reported 14,000 feet altitude in its traditional home. Then perhaps it may languish as many another Chinese or Tibetan species has languished or it may flout traditions and produce more buds for another spring, perhaps happier in that no railroad journey will intervene.

It is to be hoped that some one of the members from the Northwest where all these rhododendrons are truly "at home" will correct these notes and tell how well the plant does with them, not leaving it to the poor Easterner to do the best he may.

Takoma Park, Md.

The Glandular Azalea (See page 289)

This common or English name has a strangely pathologic sound, but it is far more fitting than many and if you are captious enough not to believe it look at the stems and calyces of the uppermost flowers in the illustration and see the little insects that have been trapped on the glandular hairs that cover these parts of the flowers.

In July 1938, page 208, the magazine published a picture of what we thought at that time was typical of this azalea in its first described form with the split corolla lobes and the narrow foliage, but we have since seen the true plant and realize that that illustration was not correct for the species, which has very narrowly linear leaves and a less well developed corolla. The present illustration of the form more common-



Robert Taylor

[See page 288]

Rhododendron linearifolium macrosepalum

ly found in the wild in Japan, has to be known as *Rhododendron linearifolium macrosepalum* and while the leaves are far from linear, the sepals in this case are very long. Indeed there

is one stage as the inflorescence develops when one wonders if any sort of corolla is going to emerge from the long green and very sticky calyx.

The azalea is a rather nice thing al-

though it has been in the garden too short a time to give any indication of its ultimate intentions as to height or spread. The plants all raised from seed have been more or less straggling in habit without the dense twiggy nature that we have come to associate with an azalea bush. Here it is practically deciduous not keeping very many of the "winter leaves" that usually protect the flower buds for the coming spring. A few of them can be seen below the inflorescence and to the left of the picture are some of the type of leaves that develop with shoot growth in the spring. The flowers were in full bloom the first week in May which is definitely mid-season for these parts. The color is a lavender tinted pink, which carries in the garden scene as one of the varieties that have to be classed as

lavender. Certainly to preserve its best beauty it must be far from any of the strong salmons or reds. The dots that make up the patch on the upper lobes are dull crimson and have the same clarity of design that one finds in the Korean azalea, *poukhanense*. Other than this there is no resemblance between the two for this plant has a rather better color.

According to Rehder and Wilson (Monograph of Azaleas) there are many forms in Japan, some named. None of these are known to the writer save one called *Usuyo*, which if true to name is a plant that does not suggest this species but rather some garden hybrid. It flowers earlier and has a rather different color and shape. It will be described and figured in some later issue. Takoma Park, Md.

Narcissus Notes

B. Y. MORRISON, *Editor*

Narcissus, Grand Monarque.

It seems as if tender *Narcissus* should flourish as well under pot culture as many other tender bulbs yet one seldom sees any reference to the practice at least in this country. Great numbers of Paper White and a few others are forced, by amateurs, largely in water to be thrown out after blooming as of no further value.

We find the scent of Paper Whites over strong, so we never grow them for ourselves but last year I grew a dish of Paper White and a pot of Grand Monarque for a blind neighbor who has to satisfy her love of flowers through their scent since she cannot see them. The Grand Monarque looked so healthy and vigorous after blooming that I suggested that I take

them and experiment with them. I knew that the lovely triandrus-tazetta hybrid, Silver Chimes would bloom for at least several years in a pot.

All the experimenting amounted to was to water the bulbs occasionally until the foliage ripened and then again when they started growth in late fall. The bulbs were not even repotted though I did intend to give them fresh soil. They were grown very cool and developed slowly but have just finished blooming (March), fully as freely as last year and the plants seemed just as vigorous. I take it that the cool conditions and allowing them to develop naturally with no attempt at forcing is the secret of their vigor.

Grand Monarque seems to us much preferable to Paper White. The flow-



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Narcissus, Moonshine

ers are of better shape and substance and to us the scent is more agreeable. The individual flowers are round and shapely, about one and a quarter inches in diameter. The small neat cup is about three-eighths inch in width and a little less in depth, and is brightened by the orange anthers. The flowers are creamy white, the cup somewhat deeper in tint, but before they fade they are nearly pure white. There are ten or twelve flowers in a cluster, the stalks reaching about sixteen inches in height, and the foliage is tall and strong.

In his Handbook of Narcissus, E. A. Bowles says that Grand Monarque "has the largest and best-formed flowers of the citron-cupped" tazettas. He says also that it is the only one of these that he has found satisfactory for growing in the open, but that is in Old England, not New England.

RACHEL CAUGHEY,
Antrim, N. H.

Tulsa Daffodil Show

Tulsa, Oklahoma's, first daffodil display was staged as a "one-man" show by Miss Eleanor Hill on March 24, 1946. As the climate of Oklahoma is particularly suited to daffodils this show was staged in the effort to interest people in something better than King Alfred which does not do well in this climate.

The early yellows trumpets had been stored which accounts of the large number exhibited. White trumpets were new to many visitors and very popular with them. All the red cups attracted attention as did Tunis, Loveneest, Rosabella, Sublime, Coverack Perfection, St. Egwin, Orange Queen and *juncifolius*.

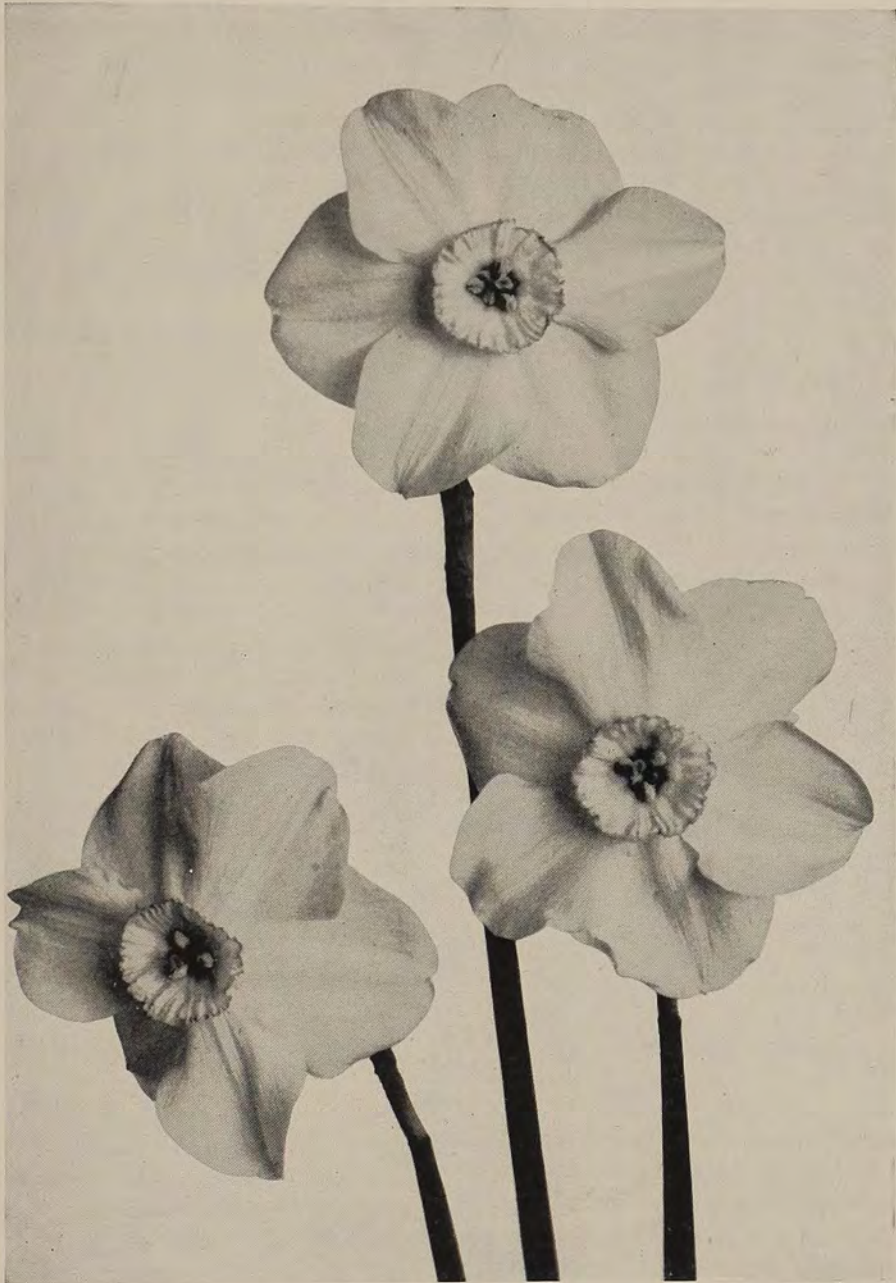
Ten arrangements were displayed.

Six hundred and fifty-two visitors viewed the show in three and one-half hours on Sunday afternoon.

The following varieties were shown: *Yellow trumpets*, Bulwark, Diotima, Forerunner, Elgin, Golden Harvest, Sorley Boy, Kandahar, Lord Wellington, Moongold, Principal, Robert Sydenham, Royalist, Statendam, Winter Gold; *White trumpets*, Beersheba, Cantatrice, Eskimo, Mrs. E. H. Krelage, *moschatus*, Rosabella, Roxane; *Bicolor trumpets*, Ebective, Immense, Jack Spratt, Loveneest; *Yellow perianth Incomparabilis*, Bokhara, Carlton, Co-carde, Copper Bowl, Crowned Beauty, Dunkeld, Fortune, Fortune \times Torrid (Guy Wilson), Garibaldi, Havelock, Helios, Jubilant, Killigrew, Merkara, Odessa, Rustom Pasha, Saint Egwin, Sonja, Truan, Whiteley Gem; *White perianth Incomparabilis*, Bodilly, Coverack Perfection, Carmencita, Fransiscus Drake, Galopin, Hades, Irene Bordoni, Milford Haven, Mistinguett, Monique, Polindra; *Yellow perianth Barrii*, Alcida, Market Merry, Treskerby; *White perianth Barrii*, Forfar, Calcutta, Galata; *Giant Leedsii*, Carnlough, Brunswick, Daisy Shaffer, Mitylene, Pinkeen, Pink Lustre, Silver Wedding, Still Waters, Sublime, Truth, Tunis; *Small crown Leedsii*, Fairy Circle, Mrs. Nette O'Melveny, White Lady; *Triandrus hybrids*, Moonshine, Thalia; *Cyclamineus hybrids*, Beryl, March Sunshine, Mite; *Jonquil hybrids*, Gen. Pershing, Golden Goblet, Lady Hillingdon, Lanarth, Lintie, Orange Queen, Tullus Hostilius, White Wedgewood; *Poetas*, Glorious, La Argentina, Scarlet Gem; *Poeticus*, Actea; *Double*, Twink; *Species and miscellaneous*, *Bulbocodium*, *caniculatus*, *cyclamineus*, *gracillis* var. *tenuoir*, *juncifolius* and *jonquilla simplex*.

In addition there were displayed snowflakes, Lenten and Christmas roses, *Tulipa Clusiana*, *T. oculis-solis*, Heavenly Blue muscari and *Tritelia uniflora*.

From the newspaper reports it would



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Narcissus, Fairy Circle

appear that our Regional Vice President, Miss Hill, staged a show that was not only a credit to her excellent gardening but which opened new vistas of

garden possibilities to the throngs that attended.

This is an example of the type of show that might well be staged as a

first show in any community, leaving all the difficulties of setting up a competitive show until all the members of the club are entirely familiar with the material. Even after competition is in order, a show that will review for the visitor all the range of the family is well worth while as has been shown repeatedly in the shows of the Garden Club of Virginia.

Notes from Alabama

Since you asked me to observe my daffodils this spring and give you the names of my favorites I shall do so. In the first place I have too many!

From childhood I have loved *biflorus*. I love its fragrance. It is the last of the Narcissus Family to bloom in my garden, and I have it in two forms, one with prim precise placement of the perianth segments and another later, with ruffled segments. Hera is another favorite; Mystic with its cup edged with a thin line of such deep dull orange that it seems almost brown; Glorious and Fleur are also favorites in the clustered types and Lady Hillingdon in the yellows. Tunis is one of my favorites, not only because it is beautiful but because it shows well in the garden.

Another prime favorite is Dick Wellband. The contrast between its white perianth and the orange red of its beautifully ruffled cup is startling. I like Red Cross because it is late and helps to prolong the season.

Above all I believe I love the whites. White Nile because it comes early, Lovenest because it is so beautiful and long lasting. Eve and Kantara make such nice clumps in the garden that I have to give them a special place in my affection. I was intrigued by Mrs. Backhouse, new in my garden this year. It is a lovely thing but as it aged the cup became deeper in color until it was a deep rose with a hint of

purple in its composition extending the full length of the cup. I wondered if it became deeper in other gardens.

Among the deep yellows I believe my favorite is Golden Harvest, new to me this year. King Alfred is the general favorite in Birmingham. I like Diotima and Ben Hur also although they have not behaved so well in my garden.

Usually I do not care for double flowers as much as singles but I do like Cheerfulness and the little double Poeticus, *Albus plena odorata* which as Ma Perkins would say is "too sweet for words."

I am always thrilled at the ethereal beauty of Thalia with its little heads bowed like nuns at prayer and I know that I could love *triandrus albus* if it would just bloom for me. I couldn't think of leaving out jonquilla simplex the most fragrant of Narcissus. Indeed I may as well admit that I love them all.

MRS. JOHN THOMAS HACKNEY,
Birmingham, Ala.

Mrs. Hackney also sent the schedule and awards from the Birmingham Show, of which we hope to have a note in the Daffodil Yearbook when that is possible.

From Texas

Four years ago I bought six bulbs of the daffodil called "Lovenest," As a general rule the large flowering daffodils do not grow consistently in this section of Texas. The warm winters do not give the bulbs enough rest and they split up. In spite of this Lovenest has bloomed every year and kept to very good size. I took up the bulbs last year and found that I had eleven where there had been six. Ten of these are in bud and bloom at the time of this writing. (March 1.) Not having had the opportunity of seeing daffodils in bloom in other parts of the



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Narcissus, Seraglio



country I do not know whether this is anything to boast about but I do know that it is an exception for San Antonio territory.

MRS. PAUL A. KANE,
San Antonio, Texas.

Report on Narcissus from Arkansas

Although we are several hundred miles from ocean water and the *Narcissus* is said to do its best in a water bound environment, I am about to decide that it would be difficult to find a place where the genus does better than it does here.

Perhaps we are water bound after all. We are surrounded by goodly creeks and water is not far down from the ground surface and generally plenty of it over head; therefore we are "bound" to have enough for most any plant. We have a long, cool, wet spring, with enough moisture in early summer to mature a fine growth of foliage.

Bulbs, if properly handled come

through the summer, hard and healthy, and about our only trouble is noted where drainage is very poor.

Having noted years ago how the different species lived and thrived and bloomed and multiplied under neglect and abuse, I decided that it would be well to investigate the family and see what might be done.

Result—joy and amazement at what had been done and continued pleasure as each new type was introduced into our gardens, taking up their residence quietly and without fuss, and with few demands on the time of the gardener.

Every type has now been tried and all seem happy in their environment—thriving and multiplying normally.

The bicolor Trumpets are least hardy of the lot. At least we have had nearly all of the small amount of trouble we have experienced, with them, and we understand that is common experience of all.

The tender members of the clan do quite well here outdoors in a protected place and hardly ever get completely killed down, but unprotected, Paper White and Soleil d'Or sometimes get cut to the ground by a mid-winter freeze that catches them in bloom.

Once had a nice planting of Soleil d'Or that I had grown from a thousand bulbs in a protected place. Made the mistake of planting them, 8,000 strong, on a terrace in the open field. In full bloom at Christmas, they were cut to the ground by Old Man Winter, who took a second swing at them in February and practically destroyed the lot. I managed to save about my original thousand.

I am perhaps most deeply intrigued by the Poetaz, but shamelessly admit a fascination for the Big Trumpets, yellow, white and bicolors. Although I grow a great many thousands of bulbs, my collection is quite limited,



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Silver jonquil, Narcissus gracilis

having only a few specimens of each type, which condition I hope to remedy as soon as markets loosen up somewhat.

JOSEPH B. YOUMANS,
Emmet, Arkansas.

From the Editor's Garden

The war years have brought the usual change of program that such times bring and no new varieties have been had for some years. It seems not amiss however, to make a note of some of the varieties that have done well through it all. The notes that follow are not a report in any sense of the word but rather notes to accompany the pictures in the section, which were gotten with others in the hope that we can have a new Daffodil Yearbook to which all members are invited to contribute their experiences, even if they have not yet had a personal letter to that effect.

Only four sorts have been chosen for illustration and they were chosen not because they were the "one and only" of their respective types but rather because they are of types not often met in shows and well worth growing in the garden.

As a more or less regular attendant at shows it has seemed curious that many of the sections are represented year after year by the same varieties even when others are available with a little searching. One wearies of seeing for example, only dozens of *Thalia* in the triandrus section. *Thalia* is a very nice narcissus and when not too well fed so that the flower head is crowded with blooms that almost jostle one another is a very graceful flower. When it is too well grown, the large number of flowers get in each other's way and so destroy the nodding grace that should be the chief characteristic of any triandrus. Moonshine, the va-

riety shown here is not new. In my garden it rarely gives more than two flowers to the stem and they come into bloom together so that one does not have the stepped appearance that shows in the larger heads. It is tough and easy, but like all the triandrus prefers a well drained warm place rather than a cooler moister one as I have learned to my sorrow with *Niveth* an even lovelier variety which was moved too far down my garden hill where it has promptly languished.

Fairy Circle is a nice variety on the line that separates the poets from the small Leedsii varieties. As the picture shows it is essentially like a poet but the cup is white with a faint hint of green in the tube and a thin line of pinkish orange on the margin.

Seraglio is an old Barrii but one seldom meets it. It flowers as many Barrii do in midseason and so does not always make the shows. When fully matured, the flowers have a white perianth which is tinted in the earlier stages with green and yellow near the cup. So don't cut young blooms to show or some cantankerous judge will score it down. The great beauty of the flower lies in its symmatry.

The last of the quartette is the old species or perhaps hybrid, which is known as the silver jonquil and is more likely to be had from one's friends than from catalogues, *Narcissus gracilis*. This is one of the very last to bloom, the picture being taken on April 30. The color is a very pale citron yellow that turns almost silvery as the flowers age. The great charm is in the scent which is unlike that of *N. jonquilla* but just as strong and just as delightful.

All the photographs have been taken natural size and from garden grown plants that were not grown specially for exhibition, but rather for garden pleasure.

Lily Notes

G. L. SLATE, *Editor*

Some Random Lily Notes

Ralph Warner's success with *Lilium japonicum* is striking and his article on the culture of this "capricious" lily agrees perfectly with all that Wilson has to say of the same lily in its native habitat. However, our experience with this lily indicates that it grows as well in a lean dry soil that is highly acid as it does in the moist location generally recommended. Consequently, it would seem probable that this lily is much more adaptable than is generally supposed. Mosaic, to which it is highly susceptible, has unquestionably accounted for the loss of thousands of plants in the past. Too, the fragile bulbs do not travel well, are easily injured and become infected with the various bulb-rots much more quickly than do most lilies. Any apparently sound bulb may have on it minor abrasions and spores of one or more fungi acquired from rotting bulbs that were travelling in the same case. On this account, disinfection with Spergon, Arasan or formalin is a wise precaution before planting. No disinfectant that contains mercury should ever be used on lily bulbs. This qualification includes several of the best-known and most commonly-used disinfectants.

Speaking of dry, humus-hungry soils, it has been our experience that a number of lilies are not nearly so hardy in this type of soil as they are in a soil that contains a great deal of humus and, consequently, a much higher moisture content. The arid soil conditions do not permit the bulbs to readily make their necessary physical adjustment to severe weather and weather changes. Some lilies, particularly young bulbs, cannot take the

severe winters of central Vermont under any circumstances in a lean soil, but are winter-hardy in soils that have ample amounts of humus. Other lilies, generally reliable any place on our grounds, have not survived one or two severe winters in poor soil while in soil rich in humus have come through our bitterest weather. In our climate a mulch does not appear to affect the situation one way or the other; we use mulches to keep bulbs dormant in spring—not to protect them in winter.

L. speciosum var. punctatum

In the 1935 Royal Horticultural Society's Lily Year-Book the late Dr. Fred Stoker classifies this lily as *L. speciosum* f. *punctatum*. It seems sufficiently distinct to us to deserve a much higher rank than that of form. The lily we know today as "punctatum" may conceivably not be identical with the lily originally described under that name; but it is the lily generally accepted by specialists in England, Japan and this country as "*punctatum*."

Our bulbs were collected in the wild. We do not know where. They were free of mosaic so far as we have been able to determine and, when they flowered, we found that a few bulbs of *L. tigrinum* and *Maximowiczii* had also been collected along with the lot. This in itself is significant for, though the color is not consistent, the ordinary bulb of *L. speciosum* is a dull reddish brown while both of the other lilies have bulbs that are nearly white. All bulbs of "*punctatum*" that we have seen have been much paler in color than those of the type. They also tend to be smaller and somewhat more conical

in shape and we have never seen one that was split or caespitose.*

The plant of "punctatum" is generally taller than the type and the stem does not have the precise rigidity of the other varieties of *L. speciosum*, rather it is a graceful, slightly arching stem. Though there is an occasional variation, the leaves are definitely arranged in two ranks, one on each side of the stem, from top to bottom. They flower from two to three weeks earlier than the type. Most colored forms of *L. speciosum* do not flower with us until September 1st and the white forms are later still. "Punctatum" has always been in good flower by the end of the first week of August. The blooms are of more delicate color than most, generally a pure white flushed slightly with pink and spotted a soft rose. Only one plant showed deeper markings for us.

The early-flowering habit makes it a valuable lily for northern gardens where the late-flowering forms are apt to be nipped off by frost or, where at best, they flower so late that the new bulbs scarcely have time to make size and mature before cold weather sets in. In other gardens it extends the flower-season of one of the most popular groups of lilies by several weeks.

ALAN AND ESTHER MACNEIL.

From Washington State

I find we have overlooked mailing in our dues for this year so far, which I now enclose, hoping that we have not missed receiving any of the material. It is always interesting to get your reprints and hear of other folks' experience with lilies. In your letter of February 16, you ask for correspondence, so I will jot down a few notes of our limited experience. I do not know

whether there are other correspondents living near us or not, but if not, perhaps you may be interested in hearing from the Olympic peninsula none the less.

The last issue of the U. of W. Arbo-retum Bulletin has a most interesting article by E. P. Breakey, entomologist at the Puyallup Experimental Station. We are always glad to find such material, since most of the printed literature seems to concern the East and New England, where snow blankets the ground and the summers, once started, come on quickly and definitely, whereas we have very indefinite seasons and almost never any snow—balmy days all year round and long periods of damp, clammy coldness. We are on Puget Sound, on a steep, clay hillside, facing East, with much cold fog and rain in the fall and winter, and a sharp North wind in the summer. There is considerable shade from tall firs.

We plant everything in terraces, because of the slope and the thin soil, which washes badly. We use much coarse peat moss, bonemeal and all the compost we can make. Even at that the soil is sticky. We do not water except to irrigate once or twice if the summer is too dry. Tests show insufficient phosphorus and potash (which is difficult to obtain now) and a slightly acid condition which seems to suit rhododendrons, azaleas, primroses and most of the spring bulbs and perennials such as lupines, columbines, oriental poppies, etc. We must use lime to grow most of the vegetables.

With lilies, so far, our best results are with the so-called "easy Sunset lily," *pardalinum giganteum*. Of ten original bulbs planted in 1940 we now have hundreds, all of which bloom robustly on four to six foot stems. They have no pests except for the numerous slugs which chew the initial spring growth, if there is any damp growth

*The caespitose character of many bulbs is frequently associated with severe mosaic infection. It can also occur from too close cutting, especially among the Martagon-shaped lilies.

of chickweed or bunch grass to encourage them. The plants lean out to the sun, so must be staked to prevent wind damage and poor appearance. Their shiny red petals are very spectacular against the evergreens and the whorled foliage is interesting. A flat of loose scales (removed in replanting), set in peat moss, in a dark corner of the greenhouse in November, showed many tiny bulbs in January when it was brought into the light, and now in March there are four-inch green leaves showing.

The smaller *pardalinums* are equally healthy, but not so prolific or so striking.

The Regals are nice, but we are not satisfied that we grow them properly, since bulbs from many different sources all grow only moderately well. Perhaps they need lime. Flats of seed all germinate freely with bottom heat, but after being put out-of-doors, the seedlings vanish. The same is true of *tenüfolium*, which is supposed to be so easy. We have never gotten them to bloom. We love *cernuum* with its dainty blooms, but gluttonous slugs finally ate out the sprouts (on their way to the slug bait) and the bulbs disappeared. We are awaiting the appearance of newly purchased bulbs from the ground and will try to control the slugs this time.

The *candidum* are huge, healthy bulbs, but due to the cold, damp spring, the foliage never fails to blight, despite spraying. We have not tried cutting off the old leaves in spring as is advised. Neighbors on higher ground grow beautiful *candidum*, no doubt partially because their soil is less acid. Also they are farther from the water.

One bulb of *L. Humboldtii* is a dependable bloomer and has grown larger and more handsome despite two moves. Inspection this week showed a fat, red bud, two inches out of the ground. We

have kept crossed seeds from it several times, but cannot seem to make them germinate. Do we get too impatient?

Several huge dumps of supposed *umbellatum* were transplanted from a friend's garden in full bloom because her grounds were needed for another purpose. The clump stood the shock with ease. Set carefully with peat and bone meal and watered with Transplantone they continued to bloom brilliantly for several weeks against a background of dark green evergreen huckleberry, and did not wilt at all.

We enjoyed *L. Hansoni*, which bloomed readily and seemed to have no pests, but the flowers faded so badly we moved our bed and the bulbs did not survive.

L. Willmottiae certainly has a "wandering stem." Ours wandered into the path of the shovel so that we damaged the bulbs and lost them. The scales did not form bulblets, but we did not have bottom heat at that time.

We have grown *tigrinum* but have lost it, no doubt it wants a sandier soil. We do not like the *Fl. Pl.* variety at all—too distorted. Our *speciosum* bloom but do not seem too happy. *Henryi* does very well, but is not so spectacular as we expected. We have tried to grow *canadense*, but will have to haul more sand, evidently, before we can hope to keep it from winter rot.

Spring clean-up is a difficult job if left until the late lilies are well out of the ground. By June the chickweed, blackberries and fringe-cup are rampant, and it is impossible to control all the slugs they house in their damp foliage. So we go cautiously over the beds as soon as the weed cover starts to thicken, scratching in bonemeal and trying to avoid damaging the new shoots. With the next weeding, we usually leave a mulch of coarse peat-moss to keep the ground from crusting and to discourage weeds.

Bulbs of *longiflorum* bought from a supposedly reliable source were a disappointment. We had hoped to force them in the greenhouse, but they appeared to be infected with rot and were discarded. Perhaps we did not have enough air circulation in our small house.

This year we are looking forward to blooms from *centifolium*, *testaceum*, Brenda Watts, Shukson, Edna Kean, Maxwell, *formosana*, *elegans* Alice Wilson, and the two woodland lilies, *giganteum*, and *cordifolium*. And if the Sunsets we reset last fall all bloom, we shall have more than we know what to do with.

After this year we should know whether it is possible for us to grow the varieties named well enough to justify the effort of maintaining the grounds. Otherwise we will use the space for primroses and other perennials we are sure of growing well.

You ask about companion planting. We use some columbine and thalictrum, but mostly primroses and ajuga which can be moved at will and set in full bloom after the beds are weeded, to provide a spot of color where otherwise the terrace would be naked until June or so. After blooming, the primroses are divided and reset elsewhere, and the ajuga is ruthlessly torn out, lest it degenerate to a weedy tangle with its generous runners.

We hope to try still more lilies, to satisfy our unending curiosity, among others: *japonicum*, *superbum* Norman Henry, *chalconicum*, and the improved *candidum*. We have no hope of ever being content with what we have!

Reading this over, we are a little discouraged at our lack of noticeable successes, but we have certainly learned to love our plants and are spurred on to more understanding of them.

MRS. E. A. NIEMEIER,
Suquamish, Wash.

*Lilies in Minnesota,
as a hobby*

Replying to your request for "how and why I grow lilies" will say that some 15 years ago, while driving through Northern Wisconsin, I saw in a farmer's yard a group of lilies (I have since learned that they were *umbellatum erectum*). I stopped and bought a bulb or two. I now have about 30 kinds that bloom each year. I lose a few each winter, and try out a few new ones each year.

I always try to raise as many as possible from seed. The Regals were among the first from seed, and I got stalks that had as many as 20 flowers to a stem. Some of the Regals will bloom in two years, time from seed planted in the open ground, in the spring. I have from 200 to 300 stems of the Regals. Of some of the rare kinds I have only one. Others that will grow readily from seed are, *tenuifolium*, *amabile*, *cernuum*, Crow Hybrids, *Henryi* and all the Sienographer lilies (the latter of course will not come true).

The following, as well as the above, all do well here. *Hansonii*, Fire King, T. A. Havermeyer, Geo. C. Creelman, *Browni*, *superbum*, *Davidi*, *speciosum rubrum* and Sunset.

Among the failures, *auratum* will usually blossom the first season. I have had as high as 8 blooms on a stem, of this kind, but the second season they are either poor or missing. I have had the Madonna very fine for a summer or two, but as it is liable to be diseased I am not trying it now. The *canadense* last only for a season or two. The *centifolium* bulbs do not survive our winters. The *pomponium* blossom but soon disappear. The White Martagon did well for a while, and is a handsome little lily, but does not last. The *philadelphicum* lasts only for a summer.

I am trying new for this year, *Monadelphum*, *Grayi*, and Shuksan, and hope to make a success of them.

Edna Kean, one of the stenographer lilies I like very much. A nice dark red, well shaped flower head and strong growth. I also have some seedlings from one of this group (Grace Marshall I believe) that are fine. A straw color, and a perfect arrangement of the flowers.

I have no particular way of arranging the lilies, except that when I have enough bulbs of say, Regals, I like to make a solid bed of them. Otherwise I like to see them in clumps or groups, with other flowers.

A T. A. Havermeyer seedling last summer was six to seven feet high, with some 12 blossoms. It is a fine lily.

The *speciosum rubrum*, *superbum*, Regal, *tenuifolium*, Havermeyer, and Edna Kean are our favorites.

I have never had the soil tested, but we are in a limestone region. The garden originally was a foot or so of black prairie soil, underlaid with solid yellow clay. In making over the garden many loads of woods dirt have been added, and the clay so thoroughly mixed with it, that it would qualify as good loamy sweet soil, I am sure. In planting a particularly fancy bulb with a liking for sour soil I give it all woods dirt, with sand under for drainage.

As to the weather we get as low as 20 below, but not often, and at that time the ground is usually covered with snow. In the summer we have plenty of rain, and usually no very hot weather.

EARL H. WATSON,
Northfield, Minn.

Report on Lily Seedlings

The middle of March 1945 I sowed, in gentle heat, the following lilies of the so-called "quick germinating"

group: *amabile luteum*, *cernuum*, *concolor*, *pulchellum*, *Leichtlinii Maximowiczii*, *Sargentiae*, *regale*, \times *Aurelianusensis*, \times Coronation. All germinated within a month.

At the same time I sowed the following in the "slow germinating" group: *auratum* in various forms, *Cathayanum*, *Martagon* the type, *Martagon album*, *Martagon Cattaniae*, *Martagon* \times *Hansonii*, seeds said to be those of *pomponium*, *Szovitsianum*, which I take to be a still more difficult way to say *monadelphum*, and *tsingtauense*. The *auratums*, the *Martagons*, *Szovitsianum*, and *Tsingtauense* germinated through the summer and formed little bulbs, many of the *Martagons* sending up little leaves for good measure. *Cathayanum* and *pomponium* never stirred.

Later in the spring I made a second sowing of the "quick" group. In warm weather they germinated no faster, and developed less well.

This winter the "quick" group was kept in the greenhouse and potted while dormant. Now, in late February, *concolor pulchellum* is very active, and *Leichtlinii Maximowiczii* is sending sprouts from last year's bulbs, while a few seeds which remained dormant are germinating. The others are still quiet.

All of the "slow" group, including the pans with dormant seeds of *Cathayanum* and *pomponium*, were exposed to the cold until early in February; now, two weeks after being brought back into the greenhouse, all are pushing up little green sprouts, and *Cathayanum* and *pomponium* have germinated.

In November 1945 I sowed seeds of *canadensis*, a lovely yellow form collected in Connecticut last summer, *japonicum*, *speciosum erectum*, and *Monadelphum*. All of these are in the "slow" group, but *speciosum erectum*

required less than a month to germinate, briskly set about making bulbs, soon followed by little true leaves. *Monadelphum*, ever erratic, produced one true leaf February 12th.

I always feel foolish when sowing hybrid seeds, for I know the cards are stacked against me, but once I was rewarded with two superb second-generation George Creelmans and so I am hoping a few attractive colors may appear among the Aurelianensis and Coronations. In the case of *Martagon* × *Hansonii*, a reversion to either parent would satisfy me.

I am not clear about the origin of *speciosum erectum*, is it a sport, a cross, natural or otherwise, or a true form? When and if it blooms I should know, but it would be nice to have my curiosity satisfied sooner.

Among my older broods, *monadelphum* is still the most cantankerous, very slow, very uneven at all stages; I refuse to be discouraged and continue to sow seeds whenever I can lay hands on it. The two Americans, *superbum* and *Humboldtii*, are slow and steady. *Auratum* is still the best tempered, to my surprise one *platyphyllum* bloomed its fourth summer, a large, perfect, pale flower. *Cernuum* and *amabile* the type also bloomed last summer, their third. *Cernuum* is dainty and fantastic: like a flower on old Dresden china; *amabile* is well named a pleasant lily. Maxwell was taller and had more flowers; some of the *centifoliums* improved remarkably with age, the whole plant growing taller and more robust, the flowers larger and, unlike those of *regale*, well spaced; this lily behaved better than *regale* or George Creelman in a late May frost, but not so well as *candidum* and *longiflorum praecox*, neither of which suffered at all.

ALIDA LIVINGSTONE,
Oyster Bay, February 1946.

Lilium Henryi

Lilium Henryi is a handsome, reliable and very useful garden lily that should be more generally grown in the average garden. Beginners with lilies who usually start their venture with some of the more beautiful but less easily grown species might better put *L. Henryi* near the top of the list. While *L. Henryi* is not the most beautiful lily, it is never-the-less, a handsome plant well worthy of a prominent place in any garden. Moreover, it is sure to succeed and flowers in August when there is a scarcity of perennial flowers in the garden.

The flowers are nodding, or pendulous, with reflexed segments, orange in color, spotted and with a green line along the center of each segment. They vary from a few to 20 or more depending on the vigor of the plant. The stamens are orange. Frequently two flowers are borne on each pedicel. The flowers bleach badly in the hot sun, hence a shady site is preferred.

L. Henryi is a plant of great vigor the purplish brown stems growing from four to as high as nine feet in a fertile soil and are well clothed with dark green lustrous foliage. Usually the stems are lax and need staking, but if grown among shrubbery no additional support will be necessary. The leaves are scattered, broad, and just below the inflorescence are short, ovate and crowded giving the plant a characteristic appearance and making identification easy. This short crowded foliage at the top of the stem is also characteristic of many of the hybrids of *L. Henryi*. The foliage remains green until late fall.

The bulb is mahogany red in color, round and large, sometimes attaining a diameter of seven or eight inches. The stem roots form a dense mat and several bulblets are borne among them. The bulb is similar to those of the

trumpet lilies with which *L. Henryi* has been hybridized and not like that of *L. speciosum* which the flowers resemble somewhat in form.

Augustine Henry, a British medical officer stationed in Ichang, China discovered this lily in the Ichang gorges of the Yantze river in the mountains of western Hupeh and Kweichow where it grew among herbaceous plants and shrubbery in dense thickets in shade on the limestone cliffs. Herbarium specimens were sent to Kew in 1888 and bulbs a year later. In 1900 E. H. Wilson sent large shipments of bulbs to England and the United States.

The bulbs should be planted 8-10 inches deep. A loamy soil high in fertility and well-drained suits this lily much better than light, sandy or acid soils. On the latter it makes weak growth. It flowers well the first season after planting, but the plants get bigger and more floriferous as they grow older.

Propagation is by seeds which come up in three or four weeks and may flower the third season. If homegrown seeds are to be used the stems should be cut before a hard frost and ripened indoors as the seeds mature rather late in the northern states. Bulblets are borne on the stem bases and may be used for increase. More and larger bulblets will be obtained if the stem is jerked out of the bulb as the last flowers are fading and heeled in until late fall when the bulblets are removed and planted out. Natural division of the bulb provides considerable increase in the garden.

L. Henryi is better suited to a shady situation as the flowers bleach badly in the full sun. It starts growth early and the new shoots are sometimes frosted. Protection is advisable on frosty nights.

Lily diseases are not serious with

L. Henryi. Mosaic may attack it, but does not spread rapidly. Botrytis is bad only in very wet seasons and in sites where air circulation is poor. The leaf tips frequently show Botrytis lesions which are produced by the moisture on the leaves running down to the tips which dry off last, and thus provide favorable conditions for germination of the spores of the fungus. Basal rot is not a problem with this lily.

L. Henryi citrinum

This lovely variety is identical with the type except that the flowers are lemon yellow. It is very beautiful and is well worth growing when bulbs are less expensive. The stem is lax and needs support.

L. Henryi Buttercup

Under this name a bulb was received from Japan which bore flowers intermediate in color between citrinum and the type and much less attractive than the former. It has a stiffer stem.

L. Henryi Upright

Under the name of Upright Henryi a bulb was received from the Horsford Nursery a few years ago. The stem is upright, requiring no support and the leaves are larger than with the type. It flowers a few days earlier than the type and is a handsome variety that is very worthwhile. This variety and citrinum do not set seeds when self-pollinated.

HYBRIDS OF LILIUM HENRYI

L. Henryi has been crossed with the four trumpet lilies which have bulbs similar to that of *L. Henryi*. The first cross was with *L. leucanthum chloraster* sometimes known as *L. centifolium* and it was made at Kew in 1897, the plant flowering in 1900. It was

named *L. × Kewense* and was described as like *auratum* in habit, foliage, size and form of flower, but its constitution was poor and the hybrid was lost. The flowers had wide spreading curiously twisted segments with recurving tips which were creamy buff becoming almost white with age.

The description of *L. × Kewense* inspired Monsieur Debras of St. Jean de Braye, near Orleans, France to cross *L. Sargentiae* with *L. Henryi*. The hybrid, which was named *L. Aurelianense*, first flowered in 1928. The plant resembled *L. Henryi* in habit and occasionally produced bulbils. The horizontal or pendulous flowers open widely the segments tending to recurve. The petals are bright orange at the base, becoming creamy white in the upper half and the flowers are fragrant. The plant was said to be self-fertile, a valuable characteristic for the breeder.

L. Aurelianense is available in this country and is being used in producing additional hybrids. Its seedlings are being sold by lily dealers.

T. A. Havermeyer is the third hybrid of this group. It was produced in 1933 by Tom Barry of Lamberts-ville, N. J., who crossed *L. myriophyllum (sulphureum)* with *L. Henryi*. The flowers are seven inches in diameter, the perianth segments more or less twisted with recurved tips, ivory yellow in color, suffused with apricot, with a longitudinal band of green on the outside of each segment. It is a handsome and distinct lily growing to a height of seven feet when well established. The shoots come up much later than those of *L. Henryi* and thus escapes spring frosts. The inflorescence is very heavy and the plant must

be staked or the flowers will drag on the ground and the stem may break.

T. A. Havermeyer is a valuable lily for the breeder and many seedlings of it have been raised. Six of these have been named and introduced by Edgar L. Kline of Lake Grove, Oregon. Others will undoubtedly be offered as the breeders continue their efforts with this group.

L. regale has been crossed with *L. Henryi* by a breeder working at Harvard, but the published report of the work is all that the writer knows of the plants and nothing seems to have been introduced as yet.

In this group of plants including *L. Henryi* and its varieties and hybrids we have a valuable group of August flowering lilies, varying considerably in color, form, stature and time of bloom and all of easy culture. These and the future hybrids that will result from interbreeding this group will greatly enrich our gardens.

G. L. S.

1947 Lily Show, Garden Club of Virginia

Word comes from Mrs. Harrison P. Bresee, "Pembroke," Orange, Virginia, that the Lily Committee of the Garden Club of Virginia is now making plans toward a Lily Show in 1947. All members who have questions may write to Mrs. Bresee at the above address.

It is too soon to give all the details of place, time, and schedule, but it is not too early to plan your share in the show for next year.

Words of other shows will be welcomed by the Editor, 821 Washington Loan and Trust Building, Washington 4, D. C.

Cactus and Succulents

W. TAYLOR MARSHALL, *Editor*

Chiapasia Nelsonii Br. and R.

The lover of plants may look at any specimen in his collection in many different ways according to his own nature and interests. It may be the beauty of the flower for which he will cultivate even an unattractive plant patiently throughout the years. It may be the odd structure of the plant which stimulates his imagination. Or the plant as a whole, as a living creature, may be an object of study for him, in addition to his pure enjoyment of color and form. He may want to learn about the habits and modes of life of the plant and about the laws which rule its function and structure.

Chiapasia Nelsonii, the subject of this article, may easily be treated from anyone of these viewpoints and is a subject worthy of discussion in general. The type and only species of the genus *Chiapasia* (from the state of Chiapas in Mexico) which was erected by Britton and Rose in 1923, was introduced into this country rather recently. Yet it is readily obtainable, and although it is a species and not a cultivated hybrid, it adapts itself well even to living-room conditions. It is an attractive plant, more regular in growth than many other *Epiphyllanae* or orchid cacti. Its mature joints are dark green and graceful. At first they grow upright but they are not stiff and tend to hang down when they become taller. The flowers appear easily, in my home early in the year. They are of a distinctive shape and a clear purple-pink color. Usually there are five inner and five outer petals, but the number is not constant as can be seen in the illustration, in which the flower

at left has twelve petals while the one at right has the usual ten. It must be mentioned here, that the low number of petals is the characteristic botanical feature of this species which prompted Britton and Rose to establish a separate genus for it. The numerous stamens are red at the base, white at the top and hang out of the flower by at least half an inch. There are five white stigma lobes. At low room temperature the buds develop in five to six weeks from the time when they can first be recognized in the areoles. This is a short time compared with many orchid cacti. (*Nopalxochia phyllantoides* is similarly fast, but somewhat smaller in flower). The buds open at nightfall and remain fully open for two days, declining on the third day, so that they are completely wilted after 72 hours. While the flowers are not gorgeous—they are $2\frac{3}{4}$ - $3\frac{1}{2}$ inches long—and have no scent, they possess such fine shape and color and are so easily produced, that any one should find pleasure in this plant.

Another point of interest will be found in the structure of the plant itself. I have referred to the neat and fairly regular growth of the joints. When we study this growth more closely it becomes apparent, why we have the impression of neatness. In contrast to many species of the *Epiphyllanae* which produce their joints in seemingly unpredictable ways and in many diversified forms, *Chiapasia Nelsonii* brings forth its branching joints according to a well defined pattern, the fundamental rule of which is the spiral. When a new shoot sprouts from the base of the plant, it is round in the beginning like a stem, and be-



Fig. 1. Two flowers in their characteristic position at the top of a joint.

haves much like a shoot of a leaf bearing plant, producing from the areoles in regular succession side joints, which will finally be arranged around the round stem in a corkscrew pattern like so many leaves on a stem. The spiral pattern is an almost ubiquitous principle of growth (examples in addition to the arrangements of the branches and leaves in numerous plants, are the patterns of the seed-discs of sunflowers or the structure of pine cones). Many of the massive cacti show the spiral arrangement of the areoles to perfection and it would be a fine scientific task for amateurs to study and measure the many different forms which this principle of structure may take. Those cacti which have flattened joints still show an indication of this pattern in the arrangement of the areoles which are not spaced symmetrically on both sides of the joint but alternate in height, so that it is easy to imagine the spiral, which would result if the flat

paddle shape of the joint were moulded back into a massive round form.

While the spiral pattern of the areoles is therefore still recognizable in the Epiphyllanae, their ways of branching do not usually follow this pattern. In *Zygocactus* and *Schlumbergera* an entirely different principle of symmetrical branching is seen, in which joints of almost equal size are formed. *Epiphyllum oxypetalum* shows side joints coming out of the areoles of completely flattened joints as though leaves were sprouting from leaves. The arrangement of the joints in *Chiapasia Nelsonii* is the most similar to that of leafbearing plants. Fig. 2 attempts to illustrate this in a shoot which is unusually long and thin, because it was intentionally grown at a high temperature with little light. In that way the side joints became spaced farther apart than usual. Under more normal conditions the joints sprout out of the areoles at very small inter-



Fig. 2. *Chiapasia Nelsonii* joints branching from a round central joint at regular intervals in spiral arrangement.

vals, the central joint lengthening very little, so that the impression of a whirl is produced.

The pattern of growth in this species is indeed so different from other Epiphyllanae that the establishment of a different genus for it appears well justified. In addition, the species is a fine example for the fact that the same structural pattern may appear again and again in the living world, although each time it is executed by different means. The similarity between the ar-

rangement of the joints in our subject and the arrangement of leaves around a stem is striking, yet the joints are not leaves nor are they derived from leaflike structures.

E. C. ROOSEN-RUNGE, M.D.

Astrophytum myriostigma variety
Coahuilensis

To the ardent cactophile a plant in its native habitat is worth two in a garden, especially if the plant in question is his favorite species or if the species is hard to find.

I had read of the difficulties experienced by others in locating specimens of *Astrophytum myriostigma* Lemaire variety *Coahuilensis* Purpus a variety with five ribbed, columnar stems and a large yellow flower with a red center, which grows in most inaccessible districts. Quite by accident I came upon the particular area of its range here described.

While in the city of Torreon, Coahuila, I questioned some of the natives about the cacti found in that vicinity and was told of a small "organo" which grew near Ciudad Lerdo in the mountains nearby and overlooking the Rio Nazas. I was quite skeptical, as I knew of no "organo" type cacti growing in that part of Mexico (The Mexicans use the word "organo" to describe certain columnar, ribbed species of cacti). However, as most Mexicans are nature lovers and very observing, it usually pays to investigate if possible.

A highway from Torreon passes through Lerdo and continues beyond along the river and this road I travelled by car but from the road nothing resembling the described plants could be seen so I left the car and took to the mountain. After a bit of hiking the Mexican with me found a plant which he brought to me and I was happy to recognize it is *Astrophytum myrio-*



A large plant of *Astrophyllum myriostigma* var. *coahuilensis*. Other plants are *Agave lechuguilla*, *Jatropha* sp., and *Opuntia* sp. Smaller plants are sometimes hard to notice. Plant on the right is in bloom; the plants growing above are *Jatropha* sp.

stigma var. *Coahuilensis*. I had hoped to find this species but as I did not have time for extensive search feared that I would be unable to see it in its natural surroundings.

I could now understand why the natives had called it "organo" as this species is columnar and heavily ribbed although it does not grow very tall, I believe the largest recorded were two feet high while the average is eighteen inches.

Once I knew what I was looking for the search was easier for it is not unusual after first finding a plant to back track and find that one has passed many specimens without recognition that had just missed being walked on. We found many fine specimens up to eighteen inches tall but as can be seen in the accompanying pictures many of the taller plants, when growing on quite steep terrain, have leaned over and continued growth in a decumbent position.

Nearly all of the plants grew amid heavy stands of *Agave lechuguilla* Torrey and a species of *Jatropha* (possibly *J. spathulata* (Ortega) Muell.) which the natives call "sangre de dragon."

There were a number of other species of small cacti growing in the same terrain but only one other outstanding species and that was an *Echinocereus* with many, very white spines.

I now have a number of these *Astrophyllums* growing here in California and they are treasured reminder of one of the memorable hunts I enjoyed during my stay in Mexico.

ROBERT FLORES.

A Trip into Cactus Country of Cuba and Puerto Rico

Having been an enthusiastic amateur collector of cacti and the other succulents for a couple of years before entering the armed forces, the Navy's



Two perfect specimens growing together. The agave has been removed in order to get a better photograph. Large plant which has continued growing in a reclining position. The white-spined Echinocereus sp. mentioned in the article.

point system didn't hold the immediate interest for me that it did for most Navy men. While my ship was in the Philadelphia Navy Yard being outfitted for active duty in Asiatic waters, I heard rumors of a short stay in Cuba upon leaving the Philadelphia Navy Yard. Even though I had just returned to the States from nearly a year and a half of continuous duty in the English Channel, the prospect of being able to walk among the big Cereae of Guantanamo Bay, Cuba, seemed worth two more months of duty before my release.

After a pleasant trip we docked at Guantanamo Bay. From the Navy bus I saw my first big *Cereus* in its natural habitat. I left the bus at the next stop and walked back to the plant I'd seen. It turned out to be *Lemaireocereus hystrix* Haworth. Before leaving the Island, I understood what Britton and Rose had described in "The Cactaceae" as a species which was variable in the length of its spines. Within sight were three types. I found plants with spines nearly four inches long, another plant with very, very short spines and some with spines nearly an inch long; yet all three were *Lemaireocereus hystrix* Haworth.

Large plants of *Pilocereus Robinii* Lemaire and *Pilocereus Brooksianus* Vaupel were numerous. I was impressed with a large eighteen foot branched tree form of *Harrisia eriophora* Pfeiffer which had a definite trunk as the big tree types of *Cereus* develop. Two species of *Opuntia* were growing on lower ground, namely *Opuntia macracantha* Grisebach and *Opuntia Dillenii* Ker-Gawler. *Mammillaria prolifera* Miller was found growing under bushes with its long spreading roots just under the ground.

After leaving Guantanamo Bay, Cuba, I had the added pleasure of a four hour stop at Culebra, Puerto Rico,

where I found the large beautiful blue *Pilocereus Royenii* L. *Opuntia Dillenii* Ker-Gawler was also found growing here along with *Opuntia borinquensis* B.&R. and the reddish bronze *Consolea rubescens* Lemaire. One species of *Furcraea* was found. Here also I saw my first *Tillandsias* growing in their normal state. Very small ones were growing on the *Pilocereus Royenii* and very large ones of a dull grey greenish color were growing on the trees.

I feel the trip to Cuba and Puerto Rico was more than worth the extra two months I spent in the Navy.

GEORGE G. GLADE.

The Chin Cactus, Gymnocalycium

The chin cacti form a fairly large Genus, about seventy-five species, of South American plants coming from east of the Andes mountains in Brazil, Argentina, Bolivia, Paraguay and Uruguay. The name *Gymnocalycium* is from the Greek, meaning naked bud and Chin cactus is used as a common name because of the more or less conspicuous enlargement of the tubercle just below the areole which is called a "Chin."

This "Chin" seems to be present, to a greater or less degree, in all species of the genus and is an easy point for identification of them.

The flowers come from the center of the plant and are quite large, as a rule, compared to the size of the plant and vary from white through pink, yellow and lavender to red, one species, *G. Venturianum*, Bckbg. has a brilliant red flower about one and one-half inches across.

The "Giant Chin Cactus," (*G. saglione Cels.*) is the largest growing species and makes a very attractive plant when well grown. I have seen one specimen of Giant Chin which stood well over one foot tall and was all of

ten inches in diameter and when in flower the bloom formed a perfect crown for the plant. The flowers of Giant Chin cactus are a pretty pink.

The striped Chin Cactus (*G. Mi-hanovichii* Fric & Gurke) is possibly the best known of the Chin cacti and can be found in most cactus collection. It is not a large growing plant, seldom becoming more than two inches in diameter and about one and one-half inches tall, the beauty of the plant lies in the distinctive marking which runs from each areole across the body of the plant in a perfect pattern. The color of this plant is usually a dark reddish brown. The flowers of the Striped Chin Cactus are about two inches across and of a yellowish-green color.

Dam's Chin Cactus (*G. Damsii* Schumann) is another fine member of this group, the plant growing to three or four inches in diameter and two or more inches in height, with a body color of a bright fresh green and flowers two inches or more across, pure white.

Spegazzini's Chin Cactus (*G. Spegazzinii* (Br. & R.) is one of the more heavily spined plants and makes a very pretty plant of about four inches in diameter, with flowers ranging from white to pink.

These plants are very satisfactory for pot cultures, in four or five inch pots, as the plants seldom will out-grow their pot. As a rule they are solitary and do not throw offsets except in rare instances. They are very well satisfied with any good garden soil which contains coarse sand for keeping the soil loose and they appreciate an occasional feeding of cow manure or other good fertilizer.

They enjoy growing in full sun although they do well in part shade but do not flower as readily there as when grown in the sun. During the growing

season the Chin Cactus will take a surprising amount of water with no ill effect if the soil is well drained.

In climates where the winters are mild and temperatures remain steady not going below thirty above 32 degrees the plants will do well out in the open garden, but where the temperatures drop below that point it is well to give them the protection of a glass house or other shelter.

I have found this Genus one of the most satisfactory because the plants are all interesting to look at, they do not require too much special care, they do not take up too much room and above all, they flower readily and bloom continuously during the summer. I would highly recommend this group as a starter to anyone just becoming interested in a Cactus collection. There are a number of species of *Gymnocalycium*s readily available from most dealers.

H. G. RUSH.

Culture of the Orchid Cacti

Every commercial dealer has his own pet formula for soil, water and general treatment of the Orchid Cacti but we often find that the formula that is successful for the commercial grower becomes a stumbling block for the beginner. For example, both peat moss and fertilizer have caused the loss of many plants to amateurs although they are both used successfully by the commercial grower who knows just when the manure is well rotted and just how often to water the plants under all conditions; long experience has been his teacher. Most amateurs over-water, the peat moss holds the water making the soil over-acid and the plants rot at the base. Too much or too new manure burns tender roots especially of cuttings just rooting.

Orchid Cacti need extremely loose, well-drained soil. They like moisture

but not saturation, all excess moisture must drain away at once to prevent over-acidity. They grow best in tin, wooden or glazed pottery containers which should stand on two small sticks of wood to leave the drain in the bottom open and the resultant light and air circulation discourages the pill bugs and other pests that otherwise find refuge under the pots. Clay pots dry out quickly and more water must be supplied to plants in such containers. Tin cans should have the drain holes made in the sides of the cans near the base and not in the base itself.

We have made numerous experiments since our first commercial Orchid Cactus show in 1933 and we believe that the best soil contains equal parts of good top-soil, leaf-mold and coarse building gravel with a generous amount of powdered charcoal added. This soil will require the addition of well rotted manure or liquid fertilizer in the second year and yearly thereafter. Occasional blood-meal or bone-meal is beneficial.

Old growth is best for cuttings as the stronger the central woody stem the sturdier will be the resultant plant, a long cutting is stronger and blooms quicker than a short one. All cuttings should dry for one to two weeks according to the thickness. It is best to dry cuttings slowly in a cool, shady place which will result in the formation of a very tough scar-tissue which is rot resistant. Plant cuttings about one and one half inches deep using care to prevent bruising while planting. The strongest roots are formed when cuttings are watered sparingly for the first month.

If rooted cuttings are purchased, it is generally safer to start them in a very dry soil and withhold water for three days and then water sparingly until new growth is observed. This

method prevents rot and starts the plant off to hardy growth.

If it becomes necessary to re-pot be sure that the soil is dry in the pot and remove the plant carefully to prevent bruising, divide it if advisable and plant in pots with dry soil. Replant in the same sized containers for best blooms and withhold water for a week then water sparingly till reestablished.

Orchid cacti need some sunshine, but will produce flowers in shade if there is an abundance of reflected light. They are always a semi-shade plant.

MRS. CACTUS PETE.

Hunting that New Plant

What interesting little plants? Where did you get them? Will we be able to get some of them? These are but a few of the many inquiries about the plants which we obtained while on an expedition into the mountains of northern Mexico that took us through portions of the states of Sonora, Sinaloa and Chihuahua. Much of the area covered in this expedition was practically virgin territory as far as botanical research was concerned and as a result much interesting information was uncovered.

Hunting for plants in the great wide open spaces has many aspects other than just the gathering of a representative group of specimens. When you get a new plant from your dealer, do you ever consider what the explorer experienced to obtain the original specimens? Only rarely can new material be found very near the well-traveled thoroughfares or along the safe well-beaten paths. More often they are discovered only after many weary miles of travel by horseback and additional miles of foot work in scrambling up steep hillsides, over rocky ridges, or down through pathless thickets of thorny brush that literally seems to be



Typical home in the lower brush country

trying to obstruct your passage as though you were a transgressor in their virginal domain.

In the low arid country the merciless sun tries to fry you in your own juice, especially when there is very little available shade and the precious supply of water in your canteen is nearly exhausted, not to say anything about being unpalatably luke warm and also heavy with the unsavory taste of all those dead leaves which were in that last water hole. With the next spring some miles away, and knowing that when it is finally reached your riding and pack animals will have first call on the scant supply, you naturally hoard those few remaining drops just in case there will not be much of it left for you. You may not believe it but you are even grateful for a little of that muddy water that your stock has previously slobbered in. Why so considerate of the dumb jackasses? Well, did you ever have your riding animals

give out on you when you were many weary miles from your base camp? Having once had the sad experience of being put afoot, we had no hankering to hoof it back on our own two feet, so we rated the stock as top priority, and came back on their four feet instead of our two.

In crossing the higher ranges of the mountains, one often encounters the opposite extremes in climate. As the cold night wind whistles through the pines it nearly chills you to the bone as you lay huddled in your none too wind-resistant blankets, even though you did crawl in with all of your clothes on. The howl of the timber wolves at the edge of the clearing certainly has no warming effect on your spine either, because you know that most likely you will have to crawl out and try to quiet your terrified horses and burros.

Water up here is often a reverse problem from the low country as we experienced in crossing some of the



Supply train crossing El Rio Fuerte

deep canyons with their rushing streams. It was sometimes up to the bellies of the pack burros, and a stumble on a hidden rock or a slip into a sink hole of some semiquicksand would mean a drenched pack, and that is no laughing matter when it happens to be your limited supply of food.

These sour parts of the expedition are soon forgotten however, when you experience the thrill of finding several new plants as well as some previously known one, but in a different habitat and with some new variations. Our first major discovery was the three-foot wide clusters of the beautiful yellow-spined *Mammillaria Lindsayi* Craig¹ which was named in honor of my congenial companion of the trail, Mr. George Lindsay of Lakeside, California.

A most unusual variation of another plant was exhibited in what we believed

to be either *Echinocereus Scheeri* (Salm-Dyck) Rümpler or *E. Salm-dyckianus* Scheer. Various types of this species had been observed for several days as we were crossing the many ranges, tablelands and intervening canyons, but this particular plant, which we found near the village of Metate, Chihuahua, was nearly the superlative of the unusual for it was found growing from the roof of a shallow cave. It hung down about three feet as compared to the normal upright growth in that locality of three to five inches. Evidently, the seed has been carried into the cave by the wind, and had lodged in some moss and humus on the roof, and had grown there upside down into the very elongated form.

The goal of the expedition was the Barranca de Cobre del Rio Urique in central western Chihuahua. This canyon resembles somewhat the Grand Canyon in Arizona but it is not quite

¹Cact. Succ. Journ., XII, 182, 1940.



Barranca de Cobre del Rio Urique

as deep and the slopes are largely covered with trees and shrubs. Like the canyon of the north, you are not aware of the big chasm until it bursts out in full view just as you approach the edge of it. The rim is formed by a sheer canyon wall which drops off for fifteen hundred feet or more, and this presents a very definite dividing line in the type of flora to be found there. The colder pine forest, through which we had been traveling, comes nearly up to the very brink, but at the edge of and over into the canyon it is typical oak and semitropical growth. This can be explained to some extent by the draft of warm air that can be felt quite decidedly coming up from the canyon, so that when a handful of dust and leaves was tossed over the edge of the cliff, it was carried right back up and well into the air above the brink. Here at this botanical border line we were most pleasantly surprised when our head guide asked us if we would like to have

a plant that he had found down on the cliff. We immediately wanted to explore its habitat, but he said that he could not let us go down as it was too dangerous for us to attempt it, but that he would make another trip down again to see if there was any more like it; but he had no luck in finding any more than just the one plant. This plant has been the subject of much detailed investigation by several well known authorities on succulent plants for several years, but Dr. Robert T. Clausen of the Department of Botany at Cornell University, Ithaca, New York, has concluded that it is an entirely new species, and has given it the name of *Sedum Craigii* Clausen.²

At the same location we had the pleasure of finding an extension of the distribution of a most attractive little rosette-like succulent with terminal hairs on the ends of the leaves. It has been identified and reclassified by Mr. Jack Whitehead of University of California Botanical Gardens at Berkeley, California as *Graptopetalum filiferum* (Watson) Whitehead.³

Notwithstanding the rumors of an unfriendly attitude of some of the Indians of this region, we experienced no difficulties when we kept our noses out of their private affairs (good advice in any man's country). Where others might have encountered some opposition, we made many friends along the forest trails by taking time out to administer to some of the aches and pains of these mountain people whenever possible, although sometimes it was a little inconvenient for us to do so. One morning an old man came into our camp just as we were ready to hit the trail. He had hiked about three miles over the mountains to see if we could do something for a toothache that he had been experiencing for the

²Cact. Succ. Journ., XV, 105, 1943.

³Cact. Succ. Journ., XV, 19, 1943.

past six moons. (The grapevine of the brush country is certainly a remarkable broadcasting system in spreading the news of our presence in the country). Of course nearly everything had been packed, including the first aid kit, and we knew that there was to be a long day of rough riding ahead of us, so we wanted to get an early start; but seeing that he had come so far, and a glance into the old codger's mouth revealed that he certainly was in need of attention. While the other members of our party unpacked the instruments and got some water from the canteen on to boil in order to sterilize what "civilized people" call the tools of torture, I attempted to "scrub up" in the thin mud at the spring, as there was no other water available at this camp. After administering a local anesthetic, I removed six teeth that were in a very bad condition. The expression on the old fellow's face will certainly always be remembered, as he could not understand how it was possible to relieve him of those aching choppers without hurting him. He went down the trail with his teeth in his hand and kept muttering to himself "teeth out, no hurt." The appreciation and friendship of these simple people for a service rendered to them is well worth the time spent even though it would mean harder traveling to make up the time lost so as to get to the next spring before night fall.

In as much as we were in the Tarahumara Indian country at Easter time we had the very fortunate opportunity of "participating" in the festivities of the season. We were not only permitted to witness, but also obtained moving pictures of the famous Tarahumara ball game which is an almost superhuman display of endurance that makes our modern football game take a back seat. That part of the Easter service at Choro which was held on



Church of Choro, Chihuahua

the night of Good Friday (to which we were not invited, but which we did attend against our better judgment) nearly had a tragic ending. Although the spirit of the season is Christian in nature, there is still considerable of the pagan influence in evidence in their interpretation of it. The presence of intruders in the midst of their religious ceremonies offered them sufficient excuse to revert to some of their pagan tendencies. The continued possession of our scalps was doubtlessly contingent upon our cool heads instead of a hot trigger finger, although it was very tempting to resort to the latter method. The next day we were able to square our account with the tribe by performing an operation upon the daughter of the chief "under rather unfavorable conditions" to say the least. In as much as everything turned out satisfactory and amiable relations were established we did some trading with the Indians for blankets, etc. When the time came for us to depart the chief

came out to see us off and he bid us farewell with a most touching adieu: "When your footsteps brings you this way again, my house is your house."

If only these little plants could talk,

many interesting sidelights of the expedition could be related which we failed to make a memo of in our field notes.

ROBERT T. CRAIG.



A species of Tillandsia often grew in large numbers in the native vegetation. These are growing on "ocotillo"—Robert Flores. (See page 309.)

The Gardener's Pocketbook

Sweet-scented Daphne

Daphne odora has so much to commend it for the rock garden and the garden yet it is not commonly seen. It is usually killed by kindness. It suffers from what is done and not from what is left undone. Neglect, starvation to force bloom, and withdrawal of surplus water by free drainage, are the essentials. Increase of plants vegetatively is difficult except in skilled hands and also being a slow grower, are contributing reason for not seeing it more generally grown.

The growth is compact with ultimate height from two to four feet and a little more in diameter and looks well at all seasons because it is evergreen and

moreover requires little if any pruning. A small branch with its sprig tips in bloom makes an attractive corsage as the foliage alone provides a dainty leafage. It is a modest flower associated with refinement and good taste.

The fragrance is said to be about the most powerful of any plant in the world. This is a broad statement but anyway, it is remarkable how one little twig of bloom will scent a whole room with its delicate mild fragrance. Somewhat such as the violet, it is elusive and not oppressive and yet penetrative, particularly so in the garden where for some distance about its delicate fragrance is in the air.

The *Daphne* is generally classed with the rhododendron, azalea, and the



George A. Furniss

Sweet-scented Daphne

heather. It is a companion to the extent of location free from harsh winds and hot sun. In fact peat, or acid soil conditions are apt to develop a soil fungus, called *Phytophthora cactorum* causing crown or root rot. The frequent recommendation of acid soil, or acid reacting, probably comes from the practice of large producers, especially in California, Oregon and Washington of growing seedlings and cuttings in sand and peat for the first year. It is a fast growing medium. The plants are then grown on in neutral soil that is loose, rocky and moderately fertile.

It thrives under many variable conditions and tolerates 10 degrees F in

the open. Does well in subdued sun or in shade with strong overhead light such as on the north side of a house. Blooms on two years' wood and the liberal cutting of flower-sprigs is sufficient pruning other than to keep it shapely. Blooming is stopped or restricted by excessive shade, by soil kept constantly wet, and frequent use of fertilizers . . . better without enrichment unless soil shows impoverishment.

Considerable skill is required to propagate from cuttings and a long time from seed so the home gardener had better resort to layering. In the spring a bottom branch is well pegged down

under about four inches of soil. The tip end is elbowed up at a sharp turn and tied to a stake to keep it rigid. This stricture in the sap flow induces rooting which may be helped by cutting a few tongues or niches back of the bend. Severance and transplanting may be done the following spring. For the colder climates north of Washington, D. C., plants may be grown in pots or tubs outdoors during the warm months and thereafter moved indoors in a moderately moist atmosphere. In layering, should the tip be allowed to lie horizontally, the branch may continue its outward growth without rooting.

There are three varieties, introductions from Japan and China, all profuse winter and spring blooming and handsome foliage:

Daphne odora has creamy white flower clusters and shiny green foliage.

Daphne odora variegata (marginata) Leaves edged with gold and pink flowers.

Daphne odora Rose Queen; Pink flowers larger and deeper color than above and plain green leaves . . . a general favorite.

Our gardens like our wearing apparel and our household furnishings, are subject to style changes. In order to keep up with introductions and also keep up with the Joneses, we take out the old to make room for the new.

Thus our gardens too often part with standbys for expectations and subsequent disappointments by not looking before leaping.

GEORGE B. FURNISS,
Oakland, California.

A Few Notes on Herbs

To have the best success with herbs they should not be placed in one class or considered alike in their habits of growth. After all they belong to many

different families and come from the far ends of the earth.

Basil originated in India and is not hardy, it shrivels at the first frost, though oddly enough holy basil, *Ocimum sanctum* sometimes seeds itself in my New York garden, which means the seeds live through very cold winters. However basil for flavor is not planted before it is safe to sow okra or put out the plants of egg plant. Purple basil has proven a bit fussy and is started indoors in a pot or flat and transplanted to the garden after it has made a good start. Purple basil is decorative with its leaves as if burnished with a bronzey finish, sometimes revealing green here and there on the veins or in splashes. It is particularly handsome among grey-leaved artemisias, marrubiums or the grey mints. It tastes much like green basil.

Sweet marjoram, *Origanum majorana* is perennial in the South. It can be carried over the winter, up North, in pots. The seed does not keep its viability long, so it is important to buy it from reliable sources. A small amount of seed can be planted in a pot in February and then transplanted to a flat and finally into the garden, when all danger from frost is over. Three or four plants are sufficient to supply the needs of a family.

Fennel, dill, anise, chervil, summer savory and borage, all, can be planted in the garden as soon as the elms are in flower, for here, they are the first trees to bloom after the willows, or they can be sown simultaneously with spinach and lettuce seed. Tarragon plants are dug up and wintered along with chrysanthemums, that is in a dry and sheltered frame and so is thyme. Sage, once it has started, along with pot marjoram, sorrel, and chives, are divided in the autumn and left in the garden all winter, under a light mulch. Lovage and sweet cicely are very har-

dy, too, but do not need dividing. The mints are mulched with a light covering of humus. Balm is not too hardy in my garden, but tastes so deliciously it is renewed yearly from seed planted indoors, so have it mature early.

Several plantings can be made of borage, if it is to be used as a cooked green.

HELEN M. FOX.

Adonis vernalis (Spring Adonis) in North Dakota

The beautiful picture of *Adonis vernalis* that adorns one of the Society's invitations to membership, and which the Editor informs me, was taken by him in the rock gardens at Kew, England, prompts me to say that this dainty little plant is as hardy as a rock on our Dakota prairies. Here its two-inch-wide blossoms of brilliant yellow, appearing above its finely cut foliage with almost the first breath of spring, have an almost startling effect against the bareness of the season.

I started years ago with six plants, but upon my return home after an absence of seven years I found that only one had survived a number of successive seasons of drought and grasshoppers. I was afraid to divide this one lest I lose it, and its seeds were refractory and refused to come up. After searching catalogues from all over the United States unsuccessfully I finally located some plants in Vermont and these have thriven wonderfully for about ten years. Besides, young plants are appearing from self-sown seeds.

A. L. TRUAX,
Crosby, N. Dak.

Chimonanthus fragrans

Every year, the first day or so in January, I walk down the path that leads to The Moon Garden. This I

do just to pass near a tall shrub from which I know I am going to get my first whiff of Spring. When on one of these daily walks I catch a breath of sweetness, I detour off the path to stand by a rather insignificant looking shrub; if a stranger happens to be with me when I reach this particular spot, they want to know what it is that they smell. When I point to the shrub they want to know what it is and they usually go on to say they have never seen it before. This is *Meratia praecox* often called Wintersweet, more properly called *Chimonanthus fragrans*.

I purchased mine about four years ago from Fruitland Nurseries, Augusta, Georgia. At that time it was about two feet high. I planted it in the fall back of an azalea bed at the top of a knoll. Here it is under tall pines and often gets very dry in summer.

The first spring it pushed from the base one tall vigorous shoot with light green four inch leaves. This shoot I cut back about halfway. The next spring we were not here at Ta-Lo and it was not until the following year that I passed again by the Wintersweet. I noticed a fragrance new to me and discovered that the *Meratia* was in bloom. It was now a shrub about seven feet tall and with several more shoots from its roots.

The blooms on my bush are tiny cream-colored affairs and are not outstanding except for their fragrance. I have read recently in Elizabeth Lawrence's "A Southern Garden" that there is quite a difference in the bloom of different specimens and that it is wise to pick yours while it is in bloom. Since my own is the only bush I have seen in flower I do not know how the quality of the flowers compares with others. The *Meratia* can be successfully propagated from layers.

Most of the year *Meratia* is not an

outstanding shrub and, even in bloom, it is a shrub that you have to see at close quarters to appreciate. If it were planted against a dark evergreen background it might show up to better advantage.

The tiny fragrant blooms which hang on the bare branches are marked with little red dots. These branches make delightful Oriental arrangements and one small branch will perfume a whole room. I like to use them in a porcelain Chinese boat that I have and to arrange their angular stems in a windswept line.

Meratia praecox is a shrub which I think could be used more often in the Gulf Coast region. It does not seem to be common locally but it is an old shrub in some regions which was once used more widely. It would still be a good thing to use for variation and winter bloom. The blossoms open every year on schedule in spite of our snap freezes and our sieges of winter rains. It also does not seem to be harmed by summer drought. I have kept my bush cut back but I feel sure it could be trained to a standard form if so desired. In winter the leaves turn to a golden yellow before they fall.

So far my Wintersweet has not been bothered by any scale or insect. It has never been sprayed, watered or fertilized except at the time when it was first planted. It has proved so dependable, however, that I think it deserves more attention and maybe it would reward me with a larger wealth of its blooms.

I know, from now on, I will always want a *Meratia* in my yard if for no other reason than to walk down some quiet path in January and be fooled for a moment or two into thinking that Spring is already here.

BABETTE ODOM,
Tulsa, Okla.

The Prickly Poppies (*Argemone*)

(See pages 324, 325)

According to a catalogue classification of seeds to be sown "as early as possible, early, after warm weather begins and after all danger of frost is past," the argemones fall in the first category. Remembering the tap rooted behavior of most plants of the Poppy Tribe, the seeds were sown very thinly in late March, in a sunny spot with light quickly warming soil. Annual pinks and a few other hardy annuals came up promptly, but no argemones. They dallied until the soil was definitely warm, late April.

The long slender seed leaves look poppy-like but the developing true leaves look more like those of thistles, particularly the handsome leaves of *Argemone mexicana*.

In spite of the thin sowing, there were too many plants and the excess were pulled up and thrown away. Whether only the "goats" were left or whether the seed represented a poor strain in each case, I may never know, but nothing flowered here, that showed the beautiful contrast that one sees in the Southwest, between the coarse though handsome foliage and the delicately tissue-thin flowers. These, particularly in the case of *A. mexicana* were definitely poor.

The first of the pair to flower was *A. platyceras* which has a more slender growth and here at least, a somewhat sprawling habit. By the end of May it was topped by a host of pale mauve poppies which had never shaken their petals free of wrinkles before this office worker was on his way, leaving him only the weekends for observation. There was no range of color, which was regretted since the species is reputed to be normally white-flowered. For picking, the stems must be burned with a flame as for true poppies.



Robert Taylor

[See page 323]

Argemone platyceras



Robert Taylor

[See page 323]

Argemone mexicana

Seed pods came in great abundance and by late June the plants had finished their span. August, however, saw a few volunteers in equally indifferent bloom so perhaps we have here an incipient weed, even though this is far from the natural range of the plant.

A. mexicana grew far more lustily and promised well, but the plants from the packet gave only pale straw yellow flowers and no white. No plant had decently ample petals, so that the beautiful effect of the silken corolla holding the full ring of stamens, about the snowy ovary, was lost. Growth was finished in August.

Those who claim to know the plant in the wild seem a little scornful of it as a garden plant here, but this writer would try it again, were he sure of his seed, since remembering his own hot summer climate, which is not always humid respite all stories, and his own diminishing efforts in mid-summer, he is interested in plants that like sun and heat and that can on occasion tolerate a "spell" of either heat or drought or rain!

1946 footnote. No seedling of *A. platyceras* put in an appearance but seedlings of *A. mexicana*, not too many, but enough, have put in their appearance with the chickweeds and the familiar small fry, of the earliest germination. None are being left.

B. Y. M.

From the Midwest Horticultural Society

Rhododendrons and Soil

Some years ago I planted a bed of rhododendrons and related plants in a mixture of sand, peat, and oak leaves. This planting has proved quite successful with only the addition of oak leaves from time to time.

Later in making a planting of rhododendrons at my farm I was confronted

with the prospect of having lots of oak leaves but no peat or sand readily available. In order to take care of the plants I excavated the depth of the balls and then placed the plants in their respective positions and filled in around them with oak leaves that had been gathered the previous fall. This was to be merely a mulch or stopgap until I obtained the other materials.

The plants started to grow and the other materials failed to show up so they remained in the pile of leaves. As the plants took hold the foliage became very dark green and luxurious looking. Summer droughts did not seem to be serious factors to them. By then it was no longer desirable to add sand or peat. Winter came and went and the plants took an even better hold the next spring. Others were planted and this time the oak leaves were the only medium used deliberately. Again the same story. Improved growth, good resistance to drought, and a dark glossy color. Three distinct plantings over four years have been made in pure oak leaves with identical results. Rhododendrons, azaleas, mountain laurel, and blueberries are growing in this medium and any future plantings will be in the same. It is the simplest and the best method that I know of for handling this type of plant without fussing around about special soil mixtures, fertilizers, and soil acidifiers. Just a bed of oak leaves either fresh or partially rotted, and a top dressing of them yearly has given me the best results.

'Mums and Hardiness

In checking through some of the literature on hardy 'mums I was somewhat surprised to see that most of the statements regarding hardiness were mere assertions that the varieties were hardy, sometimes with qualifications such as: not very; extremely; very.

Everything else is left to one's opinion as to what these indefinite terms mean.

All varieties of 'mums are temperature hardy in this region. The important factors that distinguish hardy 'mums from the greenhouse sorts are earliness of bloom, and heaving resistance.

Earliness of bloom is important if flowers are to be obtained before severe frosts kill the tops. This normally occurs around Thanksgiving. Most catalogues give the flowering season so that this point can be easily ascertained.

Resistance to heaving which is the major factor in carrying a plant over winter is dependent largely on the ability of the plant to produce basal shoots in sufficient quantity so that the main stem is surrounded by young growths and is a clump before winter sets in. The basal shoots on the extremely hardy variety *Amelia* (Pink Cushion) form a mass of compact stems and foliage which serves to shade the soil around the plant and the multitude of small roots thrown out by these shoots gives a solid anchorage so that alternate thawing and freezing does not occur. The beautiful variety *Sunkist* forms but one or two small shoots close to the main stem. When this dies and the roots decay there is nothing to prevent the ice from heaving the old stem and the small shoots out of the ground. Where heaving is not a factor any variety that blooms early enough is hardy, but in the heavy soils of the Chicago region survival, or hardiness to most people, is a matter of clump, forming ability. 'Mum growers and experts would do well to indicate this important factor in connection with the description of the varieties if they are to be satisfactory in most of the midwest.

Some Thoughts on Tulips

Shortly before the war I procured several varieties of Darwin and Cot-

tage tulips from a bulb grower in Michigan. These bulbs were grown by him in the sandy soil of the famous fruit belt, and reached me in an excellent condition. The bulbs were as large as any I have seen and somewhat more solid than the imported ones, due likely to the lack of drying in transit.

The bulbs were planted in groups between peonies and shrubs and allowed to naturalize. This year the usual flowers appeared, as large and colorful as the first year they were planted. The number was somewhat less than the original plantings but cultivating accidents have taken their toll as well as the overgrowing of the shrubs. This loss has been slight compared with the labor and bother of lifting and replanting every year.

With the resumption of imports there will be competition between the domestic and imported bulbs. My experience indicates that there is no difference in the two when all factors are considered. Domestic bulbs will likely be higher in price because of labor costs, but should be of better quality as much exposure and handling is eliminated.

ELDRED E. GREEN.

Roses

My acquaintance of roses has covered a period of forty years. When I was a boy I helped in my father's nursery in Piqua, Ohio. The soil was a fertile clay loam in which it was no trouble at all to grow Hybrid Perpetuals with healthy foliage. I still remember my father and mother out cutting roses which, if I remember correctly, brought 25 cents for a dozen blooms. When cut at 5:30 in the morning "sun time," the dew was on the rose buds, and when quickly plunged in crocks in a cool, dirt-floored basement, they did very nicely.

No sprays for mildew were used.

Hellebore in a small hand bellows and Paris Green as a spray were used for insects that occasionally troubled the roses.

I can still recall the varieties we grew; viz.: Gen. Jacqueminot, Ulrich Brunner, Capt. Hayward, Clio—a white which bloomed sparingly and how exquisitely beautiful it was, Paul Neyron, Mme. Plantier, Prince Camille de Rohan, Mrs. John Laing, Magna Charta, Moss Roses, American Beauty.

In retrospect I think how nice it was that we were spared having an endless number of varieties—few if any we would remember now. At the present we are living in an age of Hybrid Teas, Polyanthas, and Floribundas. New varieties come out each year while only a few ever remain as "standbys."

I am not interested in new varieties of Hybrid Teas for the simple reason that I know from experience how few ever survive the test of public opinion. After a rose has been out five or more years, one can generally regard this rose as being better than average.

As a general rule a rose with 25 petals is not as good as one with 40 or more petals. A full double rose is one with 40 or more petals.

If one wants fool proof roses, he should plant Radiance and Red Radiance which are strong growers with remarkably healthy foliage.

Growing today's Hybrid Teas is no easy job if you live in a city. If you live in the country and can plant roses in a clay loam soil where they will get the sun 10 or more hours a day, you can't help but have plenty of roses.

Here are some rose pointers set up in menu fashion:

1. Make rose bed 5 feet wide (3 rows with outer rows 9 inches from edge of bed).

2. Plant roses early in the spring about April 1. (March 1 is better if the season is early.)

3. Determine bed height, preferably on level of walk or grass, keeping about 2 inches higher to allow for settling.

4. Keep point where rose joins the wild root on a level with surface of bed. Hill up rose after planting and don't remove hills for three weeks, or until leaves show that growth has really started.

5. Set roses 18 inches apart.

6. Don't fertilize when you set out a rose; feed on July 15 with a complete fertilizer of high potash content.

7. No mulch is required. Break crust of rose bed soil every week or ten days.

8. After established, roses require but little artificial watering.

9. Keep rose bed as clean as a hospital floor. Keep it free of leaves and petals by religiously picking these up and burning them. It is Black Spot and Mildew which you must keep out of your rose garden by practicing clean maintenance and by applying a fungicide once a week from the time the leaves have unfolded until October 15. The fungicide I use is Dow "Mike" Sulphur which is applied between 5-6 p.m. when foliage is dry by using a duster.

10. Use a spray of Black Leaf 40 and C.P.O. (spreader). When Dreft is available again, you may use Dreft instead of C.P.O.

11. When a rose is about to drop its petals, break it off (don't cut off $\frac{3}{4}$ inch of stem) and save yourself the trouble of picking up petals all over the bed.

12. How long a stem shall I cut? If the bush is large, it won't hurt to cut long stems (15-18 inches) but a small bush can allow only small stems (6-8 inches).

13. Hybrid Teas are quite a lot of trouble if you wish to look at it that way, but they are worth the effort. A beautiful rose bud cut with the dew

on it is the best dividend one can secure from garden work.

14. As to rose varieties, some are at their best in spring and some are better in fall; don't discard a rose before giving it a fair trial.

15. Here in Pittsburgh we like northern grown roses (Oregon, Northern Ohio, Eastern Pennsylvania, New York or New Jersey roses).

16. It is not necessary to prepare a rose bed two to three feet deep unless your soil is most unusual. And don't make the mistake of excavating and sending to the dump clay (unless it is the gluey, sticky variety) and filling in the new rose bed with top soil.

17. The rose can be grown successfully over a large part of this continent. One can see beautiful blooms on New Year's in Miami Beach and Nassau and many of us have seen nice blooms in Canada. There are not many woody plants that thrive over such a large area.

As to which roses I like, that is such a debatable question that I will merely say that I personally like Condesa de Sastago, Duquesa de Peñaranda and Mme. Joseph Perraud because I like warm shades. For those who wish strong growing fool proof roses Radiance and Red Radiance are again recommended.

STANLEY LEONARD,
Pittsburgh 24, Pennsylvania

Edible Horse-Chestnuts

Who has not stood under a spreading horse-chestnut tree dropping its nuts and thought what a waste of food material! If only the bitter, and supposedly poisonous, principle could be bred out of the nut with its paper shell and great carbohydrate content!

Well, the dwarf horse-chestnut, used as an ornamental on lawns, is quite sweet and good, if not excellent. Why

not hybridize the two with the hope of getting a large tree bearing sweet nuts? We know that there are many natural hybrids between the bitter hickory and the sweet shagbark which are edible. The bitter principle is almost completely recessive. Perhaps it would be so with the horse chestnut. By the way, it is said that the "spreading chestnut tree" under which stood the "village smithy," was a horse-chestnut, not a "sweet chestnut." Please don't call a horse-chestnut "chestnut." I once traveled forty miles to see a horse-chestnut tree reported to me by one who should have known better as a large "chestnut" free from blight.

DR. W. C. DEMING,
West Hartford, Conn.

Possible Use for Discarded Iris Seedlings

Orris root has long been used as an ingredient in dentrifices and other perfumed products. The orris of commerce comes from the dried rhizomes of certain species of iris, principally *I. germanica*, *I. florentina*, and *I. pallida*. These have been cultivated for many years in sections of Italy as an agricultural crop. The rhizomes are dug in midsummer, and after the roots and outer skin have been removed, they are carefully dried. The "roots" are powdered for incorporating in commercial preparations. The unground roots are said to be used for teething babies.

In the course of time the orris roots develop a delicate odor of violets. It is reported to take three years for the roots to acquire their maximum strength.

Since the species of iris referred to have entered more or less extensively into the make-up of the modern iris, it occurred to the writer that discarded seedlings might be utilized as a source

of the orris root. Accordingly some miscellaneous material was prepared and dried. At first the product did not look too promising, but now after 18 months the characteristic odor is quite definitely apparent. Whether or not the material will compare favorably with the article of commerce after the full three years' period remains to be seen.

Under normal times there, perhaps, would be little incentive in this country to develop a commercial product, notwithstanding the fact that there is now a decided scarcity in the supply of orris. Never-the-less there might be considerable opportunity for pleasing garden friends by making them the recipient of home grown and home cured "orris root."

W. R. BALLARD,
Hyattsville, Md.

Aquilegia longissima

The publicity recently given others of the western species recalls the story of the above and its final introduction into gardens. In Vol. I of Garden and Forest, there is an excellent drawing by Faxon, the master of such subjects who helped Sargent with his work until the publication ceased. At the time, prior to 1890 I was concerned in the introduction and cultivation of hardy herbaceous plants, the illustration noted fired me to "get seeds" but alas, the habitat was rather indefinite, as I remember it is Southwestern United States. It appears that Texas is favored also.

Well, the years went along until a Santa Barbara lady was travelling with her artist husband and came to a gas station where the owner was cultivat-

ing *Aquilegia longissima*. Seeds were obtained and the plant was recognized here at once as the long lost species.

It was cultivated here in the Botanic Garden and seeds were gathered and distributed. After seeding the parent plants died but enough seems to have been used and in the course of hybridizing, vigor was also given the species, as well as other colors. This often happens. The original color was dull yellow. My few plants also died though they were given "desert conditions," but their native shady canyons are very different from my concepts.

A word should be said here of the discoverer. A man could not well be at a gas station cultivating this rare aquilegia without having something else in his makeup. He had. I found that in the winter he was or is, the naturalist in the Mojave Desert where I later met him. His name escapes me. He never told me where the plant grew nor where he found it and he is honored for this. The craze for seeds was insatiable for years by the "improvers," but the task was accomplished and now we have a race of long-spurred *A. longissima* with color varieties.

E. O. ORPET,
Santa Barbara, Calif.

Useful leaflet.

There is a leaflet—AIS-18, "How Much Fertilizer Shall I Use," prepared by Dr. Charles E. Kellogg, of the U. S. Department of Agriculture, which gives what amounts to conversion tables for the home gardener who will never be concerned with "tons per acre" or maybe even pounds per acre. He or she will know about pints and/or cups.

SOCIETIES AFFILIATED WITH
THE AMERICAN HORTICULTURAL SOCIETY

(Continued from page i)

The Trowel Club,
Mrs. J. Douglas Rollow,
4524 Cathedral St., N. W.
Washington, D. C.

Tulsa Garden Club,
Mrs. Allen Henry, Pres.,
1301 South Yale,
Tulsa 4, Okla.

Victoria Horticultural Society,
Mr. D. D. McTavish, Secy.,
Victoria, B. C., Canada

Washington Garden Club,
Mrs. Stacy Noland, Pres.,
3616 N. Albemarle St.,
Arlington, Va.

Woman's Dept. Club, Garden Dept.,
802 Margaret Place,
Shreveport, La.

Woodlawn Garden Club,
Mrs. A. F. Schwichtenberg, Sec'y,
4845 N. 16th St.,
Arlington, Va.

Woodridge Garden Club,
Mr. George Targett, Pres.,
2948 Carlton Ave., N. E.,
Washington, D. C.

Worcester County Horticultural Society,
30 Elm Street,
Worcester, Mass.

The American Horticultural Society

INVITES to membership all persons who are interested in the development of a great national society that shall serve as an ever growing center for the dissemination of the common knowledge of the members. There is no requirement for membership other than this and no reward beyond a share in the development of the organization.

For its members the society publishes **THE NATIONAL HORTICULTURAL MAGAZINE**, at the present time a quarterly of increasing importance among the horticultural publications of the day and destined to fill an even larger role as the society grows. It is published during the months of January, April, July and October and is written by and for members. Under the present organization of the society with special committees appointed for the furthering of special plant projects the members will receive advance material on narcissus, tulips, lilies, rock garden plants, conifers, nuts, and rhododendrons. Membership in the society, therefore, brings one the advantages of membership in many societies. In addition to these special projects, the usual garden subjects are covered and particular attention is paid to new or little known plants that are not commonly described elsewhere.

The American Horticultural Society invites not only personal memberships but affiliations with horticultural societies and clubs. To such it offers some special inducements in memberships. Memberships are by the calendar year.

The Annual Meeting of the Society is held in Washington, D. C., and members are invited to attend the special lectures that are given at that time. These are announced to the membership at the time of balloting.

The annual dues are three dollars the year, payable in advance; life membership is one hundred dollars; inquiry as to affiliation should be addressed to the Secretary, 821 Washington Loan and Trust Building, Washington, D. C.