The Camellia Bulletin

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C. reticulata 'BUTTERFLY WINGS'

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A NEW CAMELLIA YEAR

One of the virtues of Old China was the age-old custom of regarding the end of the year as the time for a general clean-up of all unfinished business, thus to have a fresh start with the New Year. There is much to be said for any practice which operates on the "clean sweep" principle, whether it be washing the dishes or forgiving our enemies. It is something akin to unloading one's burden and starting out afresh. Consciously or not, many of us follow this principle — by making resolutions, "turning over a new leaf" and otherwise shutting the door on shortcomings and unpleasantness concurrently with the dawn of a New Year. It is fortunate that we have this break with the past — this annual personal accounting — for life is too short and the road too rough and rugged for each year to pile on its burden. The ideal situation would be for us to add on our happinesses and subtract our sorrows!

This brings us to an appreciation of the camellia hobby — your hobby and mine — certainly an important factor in our pursuit of happiness. I have often wondered how anyone, who is free to choose and reasonably healthy, can stand to live in an environment which divorces him or her from intimate, personal contact with Mother Earth. In this estimate, I am reminded of the mythological character whose great strength ebbed when his feet lost contact with the Earth and thus was defeated by simply being held aloft. Could it be that the ancients knew better than we the importance of living close to the soil and endeavored to pass along to us in this allegorical fashion a bit of real wisdom? Certainly there is nothing more natural and fundamental than to work with the soil and I venture to say there is little that is more rewarding, in the broadest sense. Perhaps after spading up that plot of ground you may not think so, but there is a certain virtue in getting physically tired. It induces rest and thus relaxation of body and mind, besides developing a keen appreciation of what one has accomplished.

One fault we Americans have is our tendency to be too busy to find time to meditate occasionally — a practice designed to develop one's soul. Where better than in the garden and when better than with our hands in the soil, contemplating what wonders of beauty we, with God's help, have wrought? In this respect, the art of gardening has much in common with the art of angling — it isn't only the fish one catches, it is the contest with rugged terrain and swift water, the refreshing drink from the ice-cold stream, the scent and sight of pine and wildflower, the *complete understanding* that one feels from being close to Nature.

So, as we start another year, let us vow to get the most out of it in the true sense, for, to some of us, they are becoming a bit precious. Let us try to pause now and then for reflection, thus to get the full spiritual benefit from our pursuit of the beautiful; let us not forget to look back toward those who have taken Another Road and whose presence we shall miss; let us also contemplate and be mindful of our own good fortune and, as we hope for happiness in the future, let us be thankful for the good things of the past. As we turn the page on another year, that is what we should like to write on the first leaf of your 1959.

COVER FLOWER

'Butterfly Wings' must be regarded as one of the most sensational of the reticulatas, both from the standpoint of size — stupendous under optimum conditions — and form, which with its long, fluted, undulating petals and airy structure suggest its name. The growth habit is, however, among the most leggy, and the plant will probably require many years to become sufficiently bushy to be presentable. Nevertheless, this is one of the better reticulatas and well worthwhile where it can be grown. Perhaps if it were under-potted, or the roots otherwise confined, it might induce more compactness and branching.

GROWING EXHIBITION BLOOMS

John C. Robinson, La Canada, California

Strictly speaking, I suppose none of us actually "grows" exhibition blooms in the sense that we merely supply the camellia with its proper essentials and it then grows and develops the flowers while we stand by hopefully with paternal care and interest. So, whether the verb is used in its transitive or intransitive form is unimportant — our role in the production of exhibition blooms is that of an assistant to the plant and we should ever be on the alert to see where we can be of the greatest help. While this may not be so important if we are satisfied with ordinary blooms for the garden, it is an absolute "must" in the matter of the quest for a blue ribbon or best flower in the show. Actually, this relationship with our plants is very much like that of a father and his children. We are in the role of a provider — of good living conditions, food and care — and they will do their utmost to produce outstanding blooms such as will give us pride and enjoyment if we do our part well.

First, let us see what "living conditions" our camellias need so that they will be the happiest and can do their best. A location in the open where there is adequate movement of air, but out of strong winds, and under natural or artificial shade giving about 50% light in the summer, is ideal. For the best bud set and bloom production, it is essential that the plant receive all the light possible without the direct rays of the sun falling on any section of the foliage for a prolonged period of time during the hot summer months. Plants in too dense shade will produce beautiful, heavy, dark green foliage but as a rule the blooms will suffer in quantity, size and texture.

Now that we have picked the correct location, we must choose a soil or potting mix of the proper consistency to supply both physical support for the plant and to act as a storage reservoir for food and water. A good, sandy loam with adequate amounts of humus is the most desirable soil in which to grow camellias. Our soil must be of such consistency that excess water drains away quickly but which retains enough moisture so that the plant always has available sufficient water to make up for its daily losses. A plant cannot do its best if it alternately experiences very wet soil conditions and then is allowed to become dry. It is for this reason that an adequate amount of humus must be maintained in the soil at all times, since the humus acts a great deal as a regulator in maintaining the correct amount of available moisture. If plants are grown in containers, another requirement is that there be sufficient room for the plant to grow. By this I do not mean that a small plant should be placed in an over-sized container, for this encourages excess moisture in soil and tends to cause "swamping" of the plant.

The next requirement for helping our plants produce exhibition blooms is to supply them with a diet consisting of the correct nutrients and in the proper proportions. The three major food elements are nitrogen, phosphorus and potash. Nitrogen is essential to promote healthy growth of the plant as well as to produce large flowers. Phosphorus and potash are necessary to produce a sturdy well-branched plant and to give good substance and texture to the blooms, as well as to induce root development. An excess of nitrogen frequently causes the plant to become very leggy, with long growth cycles, to set very few buds and, if excessive to the toxic level, it will show up as a brown edging of the leaves, which is commonly known as "fertilizer burn."

The trace minerals are very essential to the camellia. Some varieties seem to be a great deal more susceptible to minor nutrient deficiencies than others. For instance, a 'Debutante' will show an iron deficiency long before a 'Gigantea' growing right next to it develops any symptoms. Most of our western soils have a sufficiency of iron, magnesium and zinc, provided the pH of the soil is such that the salts of these minerals are available to the plant. Normally, the maximum availability of these trace elements is in a pH of around 5.0 to 5.5 but the solubility of the major nutrients, particularly

phosphorus and potash, drops off materially at a pH lower than 5.5 or 6. I believe it desirable to maintain the soil acidity at about 6.0 and supply the iron, magnesium, zinc and other minor minerals in the chelate form since these salts do not become insoluble at this pH.

Early in this discussion we likened the growing of camellia plants to the raising of a family. We said that the father must supply good living conditions and a healthy diet for his children to develop correctly and these same conditions are true with camellias. In the case of children, it is taken for granted that they can usually get a drink of water by themselves, but camellias need to be supplied constantly with water and this cannot be over-stressed. The average camellia plant's requirement of water in terms of gallons is relatively small; however, they must have an adequate supply of moisture available at all times. A plant that gets on the dry side once or twice for short periods of time during the summer may still produce exhibition blooms, but one that experiences very many dry periods will certainly yield flowers that are below-average.

Many of our western waters contain an unusually high concentration of sodium and calcium salts which, in excess quantities, are harmful to our camellias. When using such water, it is very desirable that the plants be given a very heavy soaking so that harmful salts may be leached from the soil. Of course, after several heavy waterings such as this, increased amounts of nutrients must be supplied since they are leached out at a fairly rapid rate. If plants are grown in a well-drained soil, it is far better to over-water than to allow them ever to become dry.

In the majority of our varieties it is desirable to produce the largest possible blooms for exhibition purposes and to achieve this, it is usually necessary to partially disbud the plant. Some varieties seem to set just about the number of buds that they can successfully develop into satisfactory flowers, whereas other varieties tend to over-bud. With the latter, it is essential to disbud if outstanding blooms are desired. If in disbudding some large and some small buds are left on the plant, it will materially prolong the blooming period of that variety. If, on the other hand, only a few of the larger buds are retained, it will tend to make these few flowers unusually large in size but the blooming season will be short. Disbudding can be quite a chore, for to get the maximum results it should be started in the late summer, just as soon as the flower buds can be distinguished from the growth buds. Some varieties when disbudded tend to try to grow replacement buds and with these it is often necessary to go over the plants a number of times, removing the unwanted buds. (If you get tired of having to disbud a great number of plants, you might consider raising the miniature varieties where disbudding is seldom necessary or desirable.)

When exhibition blooms are the object, all plants should have certain buds removed. By looking the camellia over carefully, you will notice some buds that are in such a position that the flower could not open properly because of interfering leaves or limbs. These buds should always be removed. However, the more promising buds may be left even though leaves might interfere with the opening of the bloom because at blooming time it is possible to pin these leaves back out of the way through the use of clothespins.

Now that we have been helping the plant for a year to produce that certain outstanding bloom, we certainly do not want to damage it when removing the flower from the plant and transporting it to the show or meeting. When picking blooms, the petals should never be touched and the bloom should always be handled from underneath or by a leaf or stem. A very practical way of cutting blooms from the plant is to take hold of the first leaf below the calyx and then cut the stem below the leaf. In this way, after the bloom is cut from the plant, it can be carried by the leaf. I believe the best way to transport blooms is in either florist boxes or large flat boxes of suitable size. I personally prefer the heavy corrugated cartons in which paper is supplied to printers since these boxes have sufficient depth so that even the high-centered blooms will not touch the lid. A one or

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ARRANGING CAMELLIAS

Mrs. Herbert J. (Irene) Teachout, Orinda, California

Camellia arrangements for our homes and gardens should be given special attentiontion because of the individuality of the flower. Anyone wishing to beautify the home with this exquisite flower (which is ideal for the purpose) can easily do so with either a simple flat floral arrangement or a more complicated vertical design. The easiest way to arrange the camellia is in a shallow container. If the blossome are placed on a flat dish the important thing is to have the correct container, which should be black or silver in color or even clear glass. Containers of other colors can also be used as mentioned later on in this article.

The camellias are the important thing to be seen and not the container, certain types of which, especially the ornate and colorful, tend to distract from the simplicity of the design and the beauty of the flower. It is smart to use camellias on the dining table as a centerpiece, for people enjoy viewing them at close range. A tiered dish or compote gets the arrangement up off the table. For interest, add a few camellia leaves or any of the wonderful plant materials that combine well.

Those arrangements which employ the use of foliage in containers are especially lovely in modern rooms. For example, white camellias can be used very effectively in a black container. This type of an arrangement is very bold and its beauty can be enhanced by the use of a suitable figurine. It could serve as suitable decor in almost any modern room if the walls are of a neutral color.

Another modern piece I have enjoyed assembling is the arrangement of two small branches of *juniper procumbens* flat, forming an "S" curve line, on a shallow, oblong container preferably black — then placing two large variegated camellias in the center.

A large, beautiful single bloom such as one of the new reticulatas could rest in a circle of leaves, which arrangement is suited to any flat dish. A broken circle of leaves is far more effective than an entire round of radiating lines. A few folded leaves at one side will bring the desired curved line, so as to return to its source.

I enjoy working with many different varieties of camellia but think it best to list here only those we grow in our own garden, with which I have had the greatest experience. In fact, we grow several plants of the same variety so as to have an ample supply of any one favorite. The camellias I prefer to work with are classified below by color.

Pink

Debutante
C. M. Wilson
Marjorie Magnificent
Hana Fuki (Mrs. Howard Asper)
Berenice Boddy
Daitairin

White

Finlandia
Lotus
Alba Plena
Masterpiece
Joshua Youtz

Red

Flame
Beau Harp
French Imperator
Fred Sander
Te Deum
Blood of China

Variegated

Nagasaki (Mikenjaku-Candida Elegantissima)
Donckelarii

Since camellias are seldom picked with long stems, one often must find ways of pinning the flowers to the foliage where needed. The blooms can be wired through the base of the blossom (calyx area) with No. 22 florist's wire. To prevent wilting, insert a small piece of wet cotton over the base of the flower, which can then be wired to any foliage or wood in the arrangement. Of course, one must always be careful that these artificial contrivances do not show. This is also true of the pinfrog, so some foliage will usually be needed to cover it as the frog is quite essential to the arrangement. For the best results in a medium arrangement, a pinfrog about 5 inches in diameter is required. Usually, when using one of this size and weight, it is not necessary to anchor it. However, if the arrangement is to be transported any distance, it is

well to use florist's clay as a precautionary measure.

When a half-opened bud is needed for a line arrangement and cannot be cut from a small or favored camellia plant, it is often the case that a suitable substitute can be taken with a stem from a camellia that needs trimming or is to be used for grafting stock. Of course, one must have the same color in this bud as that of the open camellias used in the arrangement.

In Figs. 1-a and 1-b, an arrangement for a den or family room, a piece of brown "driftwood" (an artistic piece from the mountains that has some height) is used. Place this in a brass, copper or wood container and then add bright red camellias at the base, following the lines of the wood with graduated smaller camellias and buds. White camellias having yellow stamens can be used instead in such an arrangement.

A table in the hall often lends itself to a floral display of gray foliage with light pink camellias. The foliage is used for the "line" and the camellias for the center of interest. The container can either be gray or black in color (Figs. 2-a and 2-b).

(Continued on page 20)

Fig. 1-a

Fig. 1-b

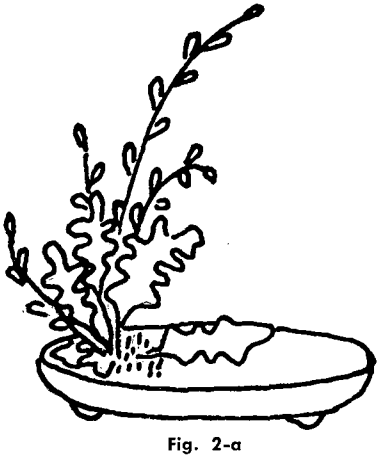

Fig. 2-a

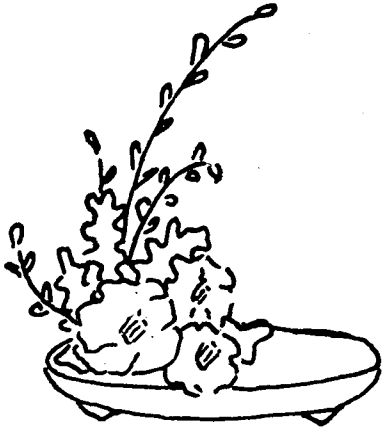

Fig. 2-b

GRAFTING PRACTICES — A SURVEY

Harold L. Paige,* Lafayette, California

During a recent discussion of the difficulties encountered in raising Reticulata grafts, the nature of the grafting stock being used was considered at some length and a question was raised as to whether enough attention has been given by camellia growers to the whole subject of the stock. It was pointed out by Dr. Walker M. Wells that little study has been made of this aspect of camellia growing although there has been a great deal of research on it in other agricultural fields. There was a general feeling that most commercial growers use whatever seedlings they happen to have available, not keeping the grafted plants long enough to learn by observation exactly what influence the stock will eventually have. The whole subject was considered of enough interest to warrant an inquiry directed to various parts of the country to see if the Committee's impression on current practice is correct. Mr. Jack Osegueda, a member of the Committee, was appointed to prepare and circulate a questionnaire to a selected number of commercial and amateur growers. Replies were received from the following 41 growers:

Deep South

ALABAMA: Bellingrath Gardens, Cottage Hill Nursery, Hoyt Lee, Overlook Nurseries.

FLORIDA: H. B. Curry Camellia Nursery, Herrin's Camellia Nursery.

GEORGIA: Central Georgia Nurseries, C. W. Farmer, Roberts Nursery, D. C. Strother, Tick Tock Nursery.

LOUISIANA: Holly-Hill Nursery.

MISSISSIPPI: J. H. Peebles, Clarke B. Wilson Nursery.

NO. CAROLINA: John F. Redding, Western Nursery.

SO. CAROLINA: Hite's Florist & Nursery, Magnolia Gardens, Shady Acres Nursery, and two unsigned replies.

VIRGINIA: Wayside Nurseries.

Pacific Coast

OREGON: Henry Millard, Portland Camellia Nursery.

NO. CALIF.: Berkeley Horticultural Nursery, Domoto's Nursery, John Edwards, Dr. John Lawson, Luce Camellia Gardens, Smyth Nursery.

SO. CALIF.: Abel's Nursery, L. Burr Belden, Ronnie Carr, Councilman Camellia Acres, Kramer Bros. Nurseries, Marshall's Camellia Nursery, McCaskill Gardens, Nuccio's Nursery, John Sobeck, Surina's Camellia Gardens, and one unsigned reply.

Stock Preferred for Use in Grafting

Table 1 showing stock preferred for use in grafting confirmed the general opinion that seedlings, both Japonica and Sasanqua, together with any other stock readily available, make up the "first choice." When choosing varieties to be propagated for use as grafting stock, each grower quite naturally tends to favor that which has proven most successful for him over the years.

From Southern California, where Mr. Burr Belden comments that he uses 'Oleifera' "if cold climate is in prospect" because it is "exceptionally hardy and induces rapid growth of scion," comes the only suggestion of trying species other than Japonica and Sasanqua. With species material gradually becoming more readily available, it is hoped that some sound experimental projects can be promoted which will cast more scientific light on this whole subject — and perhaps provide an answer to the needs of Reticulata grafts in particular.

Months Preferred for Grafting

While the primary purpose of the questionnaire was to learn more about the use of grafting stock, it was decided to ask a few more questions on other aspects of grafting. The definite conclusions to be drawn are that the months of January and February are preferred and that, surprisingly, there is not a great deal of difference in this regard between the Deep South and the Pacific Coast.

Types of Graft Used and Size of Stock

Table 2 gives an interesting slant on the preference of growers in the South for larger stock than is used by some

*Chairman, Cultural Experimentation Committee, Northern California Camellia Society.

Pacific Coast growers, due presumably to the great numbers of well developed seedlings available there from camellias that have grown into the trees nature intended them to be. Table 2 serves only to emphasize the fact that no explanation why outdoor grafting is so prevalent in the Deep South will ever be needed by anyone who has seen camellias growing in the ground there by the thousands. It is well to remind ourselves occasionally that the practice of growing camellias in containers is essentially a development peculiar to the Pacific Coast areas.

TABLE 1

Preference in Grafting Stock

(Determined by allocating 3 points for first choice, 2 for second, 1 for third)

Japonica (19 separate varieties named)			
1. Prof. C. S. Sargent	20	points	
2. Sarah Frost	10	"	
3. Debutante	7	"	
Remaining 16 varieties	38	"	Total: 75 points — 39%
Sasanqua (6 separate varieties named)			
1. Cleopatra	13	points	
2. Day Dreams	7	"	
3. Maiden's Blush	5	"	
Remaining 3 varieties	9	"	Total: 34 points — 18%
Seedlings			
1. Japonica	18	points	
2. Sasanqua	13	"	
Species not designated+	36	"	Total: 67 points — 35%
+presumably deemed immaterial			
Oleifera		"	3 " — 2%
Any Understock Available		"	12 " — 6%
Total Votes: (41 first choice, 28 second, 12 third)			191 " —100%

TABLE 2

Other Grafting Preferences

	SOUTH		PACIFIC COAST		TOTAL	
	Choices	%	Choices	%	Choices	%
MONTH PREFERRED						
Late December	1	4%	4	11%	5	8%
January	13	48	9	26	22	36
February	12	44	15	43	27	43
Early March	1	4	7	20	8	13
Total	27		35		62	
TYPE OF GRAFT						
Cleft	17	77%	19	76%	36	76%
Bark (Summer)	2	9	3	12	5	11
All Other	3	14	3	12	6	13
Total	22		25		47	
SIZE OF GRAFTING STOCK						
¼" - ½"	1	5%	5	28%	6	15%
½" - ¾"	10	45	6	33	16	40
¾" - 1"	6	27	2	11	8	20
All Other	5	23	5	28	10	25
Total	22		18		40	
LOCATION PREFERRED						
Indoor	3	14%	10	53%	13	32%
Outdoor	17	77	5	26	22	54
Both	2	9	4	21	6	14
Total	22		19		41	

Remarks on Grafting

The members of our Committee appreciate very much the trouble that growers took to offer suggestions for success in grafting, based on their individual experience. Many of these suggestions have already become common practice on the Pacific Coast as well as in the Deep South. Some of the more unfamiliar suggestions proved very interesting to the Committee members and are reproduced here for the information of readers of *The Camellia Bulletin,* as follows:

DEEP SOUTH

Alabama

1. "We collect our scions in plastic bags, placing a little damp sphagnum moss in each bag immediately after scions are cut and closing bags tightly with rubber band. Then we keep in 42 degree cool storage (up to 4 weeks if necessary). We leave the entire leaf on scion, place it in position and adjust pressure with wedges so that scion is held firmly but not crushed. We then bank soil (packing tight) just high enough to cover top of under stock (using no wax or binding) and then place a 20 or 24 oz. paper cup over each stump or branch and then bank soil firmly around the cup up to one-third of its height. When scion has put on 1" or more new growth we cut a small hole in cup. When growth reaches top of cup we cut top out of cup leaving the cup to protect against rabbits, removing entire cup after wood has hardened."

2. "Use 1 gal. Coca-Cola syrup jars after cutting bottoms out. Handle is used to attach the identification card. The cap can be removed at any time to make examination. The jars are coated with white calcimine paint leaving window 3 x 3 inches open. I do not tape the scions, neither cover the stump."

Georgia

1. "For past two years I have used one blade of hacksaw to saw down in edge of stump instead of splitting. I find it leaves stump in much better condition."

2. "I graft with a keyhole saw and do not use the cleave graft any more. If a cleave graft is used, it is on understock too small for the saw graft."

3. "No tricks — just a clean cut with a sharp knife. We do use wax (a wound deserves a dressing). We use unpainted quart jars over them and cover the entire plant bed with lightweight tobacco cloth on frame 1½ ft. above grafts."

South Carolina

1. "Turn container on sides two weeks before grafting so roots will be well drained of water."

2. "I lean the scion in until the upper rim of cambium layer of the scion is slightly inside the cambium of the understock and the heel of the scion out at the bottom the width of the scion cambium."

Virginia

1. "Completely cover cans with plastic bags. They never dry out and have to be watered. Cut off tops and set in greenhouse to bleed for two weeks before grafting."

PACIFIC COAST

Oregon

1. "I usually cut back understock about half way summer before. Plant is less shocked when cut back for final graft. Only cut through one side of trunk. If back side is split, healing is slower, stub cracks open and will rot."

2. "Cover with polyethylene bags."

Southern California

1. "I use healthy plants 3 years old which have grown one season in container and not fertilized. Do not over-water grafted plants."

2. "I start to remove the jars as soon as possible. The growth will do better when the jar is removed and it (scion) is exposed to the air and summer sun. Grafts will grow faster and obtain greater heights if exposed to the sun as early as possible."

3. "Cover with plastic bags after using fungicide."

4. "Split trunk carefully, saw if necessary to prevent large split. Callus will be better and heal faster. Dip scions in hormodin before inserting."

THE IMPORTANCE OF MICRO-NUTRIENTS

A. E. Morrison, Sacramento, California

It is always a pleasure to visit a garden and find plant material well formed, with foliage a healthy green and the plant covered with beautiful, well-colored and good sized flowers. Our immediate reaction is that our host must be a good gardener who has the know-how of taking care of and giving proper plant food to his plants. We become interested in the particular care these specimens receive and like to know whether our own plants might respond to the same treatment.

To answer these questions involves a number of factors. Most important is environment. Here we must consider:

1. Choice of plant for the particular spot in the garden.
   a. Its reaction to heat or cold
   b. Its reaction to humidity, high or low
   c. Its reaction to direct sun, modified, filtered or complete lack thereof.
   d. Rainfall.
2. Type and depth of soil.
   a. Adobe, clay, loam or sand
   b. Whether the soil is alkaline or acid in its reaction
   c. The condition of the sub-soil and its effect on sub-surface drainage.
3. Water for irrigation.
   a. Is it neutral?
   b. Does it contain excessive sodium salts?

After this information has been analyzed and evaluated our next most important consideration is the possible use of soil correctives and fertilizers. You will note that I have placed "correctives" ahead of fertilizers because the soil must be placed in proper workable condition before the plant can receive the full benefit of fertilizers. This must be understood so the proper fertilizer can be selected. Naturally, soil that may be high in acid to the point where it may even be called sour will need conditioning, even for camellias. Soils with high moisture retentive texture is favorable to the growth of algae and moss and here applications of lime may be necessary. This condition has often occurred and you may have observed it in camellia beds, but particularly in container culture.

Soils high in sodium salts must be corrected by the use of acidifying materials. Fertilizers applied under such conditions may not be available to the plant in proper amounts. Micro-organisms necessary to making soil elements available to many plants thrive best in soils on the acid side, although lime appears to encourage activity. Most of the micro-nutrients also are lost in alkaline soils.

It is almost impossible to join a group of camellia fans without the subject of fertilizers being discussed — that and soil mixes. These discussions, however, usually center around the proportions of Nitrogen, Phosphoric Acid and Potash. Many favorite combinations are advocated by those present involving these major fertilizer elements. Soil mixes for container culture are also pet subjects — proportions of sand, loam and peat (or leaf mold). Then you have those who favor commercial or inorganic elements as well as those who refuse to consider using anything that is not of organic source.

A fact often overlooked is that Nitrogen, Phosphate and Potash may be only as important as micro-nutrients and micro-organisms permit them to be. It is true that a plant may not show the vigor nor the number and quality of flowers because of a deficiency of any one of the major elements but it is from the micro-nutrients that plants appear to obtain much of their real health and vigor. A lack of these necessary trace elements is indicated by an anemic appearance, chlorotic or mis-shapen leaves, sparse foliage, burned edges and brown spotting of leaves, leaf drop, die back, unnatural growth, etc. Some of these same symptoms, however, may result from the presence of diseases, particularly virus, which also can cause chlorotic conditions in foliage and blossoms and in some cases it is most difficult to determine whether we are dealing with a virus or nutrition problem. If the condition is corrected by the application of a trace element we can then assume we are dealing with a nutritional matter, or if a scion is taken from the chlorotic plant and grafted on a

healthy specimen which then develops mottled leaves, we know we are dealing with a transmissible virus disease. These comparisons are made to indicate the complexity of the problem of determining the exact cause behind a condition.

I am using the term 'micro-nutrients' although 'trace elements' and 'minor elements' are common designations. I personally prefer 'micro-nutrients' as "minor" could infer lack of importance, which is far from the fact. They serve the same purpose in many ways in plants as do minerals and vitamins in humans and warm-blooded animals. As a matter of fact, some of the same principles are involved and why shouldn't they be? Plants are just as much a living thing as you and I. Their food requirements are just as important.

We can expect rickets if our food lacks calcium, phosphorus and Vitamin D; nutritional anemia from a lack of iron; beriberi from lack of thiamin; scurvy from lack of ascorbic acid and so on through a long list. It has been proved that with a lack of iodine the incidence of goiters increases while the presence of fluorine decreases the cavities in teeth and yet both of these elements are poisonous when the intake is even slightly increased! We have almost identical comparisons in the plant kingdom when poisonous materials are a requirement in limited amounts.

Plants also resemble humans in the wide range of food (elements) they are capable of feeding upon (assimilating). Almost every element available is or can be made use of. Like humans, plants are at times greedy and take in more of a given food than is good for them; furthermore, plants do not differentiate between non-harmful and harmful materials, if it is in an available form in it goes.

A healthy plant must have:

Water, as it is needed to make the nutrient elements movable through the cells of the plant. The cells are made up of a gel-like substance having a strong attraction for water and may consist of 99% water.

Oxygen, taken from the air which is 20% oxygen. Oxygen serves the purpose of combining with other elements, forming oxides and complex organic compounds. In certain situations some elements as developed in the plant have definite poisonous properties such as nitrites and sulfites. These, when oxidized, become nitrates and sulphates and are thus made harmless.

Carbon, which as Carbon dioxide is also taken from the air which contains 3/100 of 1% of carbon dioxide, a most essential element in plant development. It is a brick in the cell walls of the tissue, a component of sugar; an atom in the flavor of juices, a part of the structure of color and an element in the fragrance of the blossom. It is actually the keystone of all organic substances. Before there could be life carbon had to be organized into many of its thousands of combinations with other elements. It is necessary for a combination of the action of the sun acting upon the chlorophyll in the cells of leaves for the plants to obtain this element from the air. Anything that interferes with this combination or upsets the proper balance is reflected in an unhealthy condition of the plant — excessive dust or dirt, molds which form in exudations from aphis and scales; chlorophyll removed from the leaves by sucking insects and harmful materials collected in the atmosphere such as smog. Keeping the leaves of camellias clean by sprinkling or washing with water naturally gives them a better chance of performing their normal functions.

These three elements are provided directly by nature: Nitrogen, phosphates and potassium. They are consumed in large quantities and are artificially replaced by the use of fertilizers containing these materials.

In smaller amounts we have:

1. **Sulphur,** which is a major plant nutrient and the sulphur content of plants often exceeds that of phosphorus.

2. **Magnesium,** the element which is credited with the beauty of the green world as it is the key element in the molecule chlorophyll. It is the green pigment in plants that picks up the energy from the sun making plant life possible. Magnesium also appears to have a place in combining with phosphates, making it

possible for them to move to their proper places in the plant in the form of magnesium phosphate.

3. **Calcium** is built into the walls of the plant cells, forming a protective sieve for the nutrients to seep through in passing into the cells. It also acts as a cement to bind the walls of cells to hold them together. It also appears to have a neutralizing effect on some of the organic acids formed in the plant.

4. **Iron,** while needed only in small amounts, is a most important element. It appears to be associated with the forming of chlorophyll yet it does not appear to be an integral part of this pigment. Iron is usually present in our soils but its availability depends upon the acidity of the soil. It is generally available in soils showing an acid reaction but may become insoluble in neutral or alkaline soils and the plants have difficulty in absorbing their needs.

Now we come to the micro-nutrients and trace elements, some of which are most essential to all plants but in minute quantities. There are four recognized essential micro-nutrients although 36 other elements or minerals have been known to be present in plants. I will mention only a few of these other elements for the interest they may create.

Gold, as an example, is on the list. It is widely distributed in nature in very minute quantities. Gold has been recovered from the ash of plants growing on sands along the Danube river in South Slovakia. As much as 610 grams of gold was obtained per ton of ash of scouring rush. The gold appears to be concentrated in the seeds of the flowering plants.

Silver salts appear to be toxic to plants; however, mushrooms have been reported to contain as much as 100 parts per million. Little is known about its occurrence in agricultural soils.

Selenium closely resembles sulphur, but unlike this sister element, is very poisonous to animals — even moreso than arsenic. Selenium is toxic to most plants, also, though some species are tolerant of or possibly under some conditions even partially dependent upon it for normal development. In the form of potassium sulphoselenide, selenium is very effective in the control of red-spider, being carried in the plant as a systemic poison.

Thallium is another highly toxic material, being an excellent rodenticide. The use of thallium is restricted by law and if used in large quantities could cause some soil sterilization. It, too, can be picked up from the soil by plants.

These four elements have no real place in our discussion of micro-nutrients but are mentioned to illustrate the point that plants can assimilate, and often use, any element the roots contact.

The four micro-nutrients which are generally considered most important are: *Boron, Copper, Manganese* and *Zinc.*

1. **Boron** is unique among the chemical elements in that a very small quantity is necessary for the normal growth of many, if not all, plants while only slightly higher concentrates cause injury. With a number of plants the range between these two levels is only a few parts per million. It has recently been indicated that a lack of boron caused internal cork of apples, top rot of tobacco, cracked stem of celery, heart and dry rots of sugar beets, just to mention a few examples. Top rot of tobacco may be corrected through the use of one pound of soluble compounds per acre as a side dressing and yet citrus orchards have been damaged by the use of irrigation water containing more than ½ part per million! Walnuts are damaged from 1.5 to 2 ppm.

Micro-nutrients, themselves, do not appear to serve as plant food but rather to act as catalysts in their effect on other nutrients, making them available in a more usable form. This is definitely the position of boron which apparently has an affinity for calcium and plays an important part in keeping the calcium of the plant in an active and usable form. In the absence of boron a lack of available calcium becomes a limiting factor in plant growth.

Boron deficiency generally is indicated by marked changes in the growing point of the plant; the terminal buds become light green in color, paler at the base than at the tip. Succeeding developments are death of terminal bud, causing the

leaves to thicken and increase in area, giving a witch-broom effect. One of the most pronounced symptoms is red coloration, sometimes with a purplish tint affecting first the margins of the leaf or the tip half. The condition becomes prevalent over the entire plant. On camellias the leaves show an orange-red chlorosis and the sheaths of terminal buds die. Damage from boron in the apical margin of the leaf causes yellowing which then extends between the lateral veins toward the midveins. The yellowing increases in area with dead spots appearing, loss of leaves and dieback.

This strange element is made use of as an additive to gasoline and other high-powered fuels and recently has shown promise as an aid in the detecting and treatment of brain tumors.

Borax is the main source of boron.

Manganese seems to act as a reception committee, directing other nutrients to their respective positions in plant cells, which allows them to carry out their functions in the plant. In this respect it is similar to zinc and copper. It, like boron, can be considered a catlyst. A lack of manganese also may cause chlorosis in the foliage. Manganese does not appear to be available in soils showing a strong acid reaction, and like boron, can cause damage to the plant when it occurs in amounts above what is actually needed.

Zinc is another essential micro-nutrient; however, not too much is known about its action in plants. It also appears to be a catalyst serving in conjunction with manganese and copper.

In neutral or alkaline soils zinc phosphate is so very nearly insoluble as to account for observed unavailability of zinc in such soils and even though it is present, in most of our soils a zinc deficiency may be indicated in the plant. Zinc deficiency in fruit trees appears as a rosette condition or little leaf, yellows and leaf mottling. In camellias it is described as producing a slow rate of growth and on foliage, clear necrotic spots with some chlorosis.

Copper appears to be a third member of the catalyst group and is generally available in most soils. Deficiencies have been recognized more often in dark colored soils, including peat and muck types. Symptoms include stunted growth, poor root development, wilted appearance of new shoots with foliage tending to curl; development of a bleached-appearing chlorosis. On camellias, young foliage shows a necrosis condition and white mottling. Copper necessary to correct this effect in nutrient solutions varied from 1/16 to 1/8 part per million, and amounts much in excess of this produced a decided stunting of plants.

A second group of micro-nutrients, which may be referred to as minor, include: sodium, molybdenum, chlorine, fluorine, iodine, silicon, cobalt, strontium, and barium. They do not seem to be universally essential although the soluble compounds of some may increase crop growth or their importance may later be recognized. This is true particularly with molybdenum which shows a possibility of stimulating the nitrogen-fixing powers of soil. It is toxic when present in any considerable concentration.

The amount of the important elements used by a concentrated planting in a garden approximately 50 x 100 feet would be:

Maganese: 0.04 lb. or the amount contained in 2 oz. potassium permanganate.

Boron: 0.006 lb. or the amount contained in 2 drams of borax.

Copper: trace or the amount contained in 3 ft. of No. 9 copper wire.

Zinc: trace or the amount contained in a flashlight battery cell.

Iodine: trace or the amount contained in 1/8 oz. tincture of Iodine 2% strength.

The mere presence of any or all the essential elements in the soil does not mean they are available to the plants. Various combinations may set up chemical reactions which lock up certain elements. The soil may lack active micro-organisms which are necessary to break down some of the elements so they are in a form more readily absorbed by the plants.

Possibly the most important factor in this respect is the pH (Potential Hydrogen Ion Concentration) rating of the

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GARDEN SOILS

H. M. Butterfield, University of California, Berkeley, California

Soil is made up of more or less finely divided mineral particles, formed by the decomposition of rock, plus such organic substances as vegetable and animal residues. These organic and inorganic constituents form a porous material wherein the activity of bacteria and other soil organisms constantly change both its chemical and physical structure. The gardener is interested in soil as the normal medium for plant growth. It is true that plants can be grown successfully in a balanced nutrient solution without the presence of soil, but the preparation and subsequent handling of such a solution presents many problems difficult to overcome in general garden practice. The soil is an extremely complex substance, but if the gardener is willing to study his particular type of soil and cultivate it intelligently, the condition of his plants will be greatly improved. Some important considerations concerning soil structure and fertility are listed below in the hope that they will assist the gardener in devising an adequate soil management program.

Soil Texture — refers to the size of the particles which may vary in diameter from 1 mm. and up as in gravel, to .002 mm. and down as in clay. A loam soil contains 50% silt and clay, but less than 50% silt and less than 20% clay, whereas a sandy loam contains from 20% to 30% silt and clay, but not over 15% clay. A clay or adobe soil has more than 50% silt and clay and usually more than 30% clay. This increase of clay results in a "stubborn" soil or one which is hard to cultivate. Colloids in the clay tend to swell with moisture, and shrink on drying, theby causing a gummy, sticky condition in winter, and a hard, cracked condition in summer.

Soil Structure — refers to the arrangement of the soil particles. Decayed organic matter, micro-organisms and weathering have a pronounced effect upon it. A clay loam readily forms lumps or clods; by adding lime, gypsum, or various organic substances its physical condition is improved because the addition of these materials increases aeration and drainage. Farmers and gardeners know that working a heavy clay soil when wet is very detrimental to its physical condition. However, by alternate wetting and drying, accompanied by tillage, a cloddy soil may be pulverized.

Soil Profile — soil within the root zone should be of desirable texture. It is not sufficient that the top layers of soil be friable and fertile if the underlying subsoil is of the hardpan type which obstructs any deeply penetrating roots and interferes with the movement of soil moisture. Such a soil would require deep cultivation and possibly tile field-drains. After heavy rains or irrigations, a finely tilled soil may form a crust which is detrimental to plant growth, especially seedlings. Organic mulches applied to the surface or worked into the top layers will help to rectify "crusting."

Soil Moisture — much of the difficulty in growing plants can be traced to improper watering. It is advisable to irrigate thoroughly and allow the plant to use up available moisture before giving another watering. Cultivation is necessary for the control of weeds, the preparation of seed beds and planting areas, but contrary to general belief, it is not a direct means of conserving moisture; in fact, excessive cultivation wastes moisture. By applying surface mulches of decayed manure, leaf mold, etc., need for tillage can be greatly reduced and excessive water loss by evaporation in part eliminated. Cultivation is not desirable for surface-rooted plants, such as camellias.

Organic Matter — the addition of bulky organic matter tends to improve the physical condition of the soil, but it is usually a more expensive method of furnishing nitrogen or other plant food than the addition of commercial fertilizers. In potting mixtures, the gardener often uses up to a third of such organic materials as peat or leaf mold. A comparable mixture in garden soil, would require application of some two hundred and fifty tons per acre of such organic materials. From the standpoint of expense and additional available food this would be impractical.

Soil Fertility — is not a fixed condition. Variations in fertility are constantly occurring as a result of chemical reactions and utilization by the growing plant of available soil nutrients. Various micro-organisms play an important part by breaking down organic matter to furnish available food and, since their activities are dependent upon the same soil conditions as those required by the plant, it is important that a balanced fertilizer program be carried out. This tends to restore any loss of nitrogen in the decomposition process.

The Fertilizer Program — should center about the problem of supplying soil deficiencies. The majority of plants require the same nutritional complex, although they may differ slightly in the properties of the different food elements which are absorbed. If possible, the gardener should determine which elements are lacking and which can be effectively supplemented by adding commercial fertilizers or animal manures. For example, it is useless to add phosphorus or potassium if the soil contains more than the plant can use. In garden practice, deficiencies are supplied by the trial and error method. Up to a certain point, the intelligent gardener can tell by the appearance of the leaves or by other symptoms, which element is most likely to be lacking. Generally speaking, the fertilizer element present in the least adequate amount will determine the growth of the plant as a whole.

Soil Analysis — is not considered practical, because no laboratory analysis will show the availability of plant foods under field or garden conditions. A more correct interpretation of which foods are available might be achieved by an analysis of the leaves and stems, but even then it is doubtful whether or not the final results would have a practical application. There are several "kits" on the market which are used to determine the degree of acidity or alkalinity of a soil. By following the accompanying directions, a proper corrective can be applied so that the pH reading is brought back to a suitable point for the type of plant being grown, that for camellias being from about pH 5.5 to pH 7.

Soil Management — the many factors requisite for the proper growth of plants must be correlated in such a fashion as to produce the desired results. Irrigation affects not only the soil moisture content but also the degree of humidity in the surrounding atmosphere. The amount of organic matter and nitrogen, plus temperature and aeration, have a pronounced effect upon the growth of micro-organisms needed to maintain fertility. Only by adopting proper cultural practices such as mulching, adding soil correctives and organic matter, will the soil be kept in a friable condition.

Summary: There is a great variation in garden soils and it is only by intelligent observation and by correlating the many factors involved that the gardener can hope to achieve the best results from his particular soil type. Both organic substances and commercial fertilizers have a place in the fertilizer program, one primarily to supply a needed humus and the other a source of available food. Then by correct methods of cultivation a friable and fertile soil should result.

(The foregoing is the essence of an excellent talk given on the subject by Prof. Butterfield before the members of the Northern California Camellia Society at their December 1, 1958, meeting and relates to plant life in general. The sound principles advocated here apply equally to camellias, azaleas and the "acid-group" plants having relatively shallow root systems, whose lack of tap-roots merely emphasizes the importance of practices which will bring about maximum moisture-conservation, such as mulching and a soil medium containing a high percentage of humus.—Ed.)

SHOW DATES

Northern California Camellia Society: 2 p.m. - 10 p.m., Saturday, March 14, 10 a.m. - 6 p.m. Sunday, March 15, 1959. Armory Bldg., Walnut Creek recreational center.

Camellia Society of Sacramento: Saturday, March 7th, Sunday, March 8. 1959.

Camellia Society of Santa Clara County: Auditorium, Sunday, March 2, 1959 (a non-competitive show). All of these shows are well worth seeing and each is a little different. The NCCS show will have ample space this year, so bring your blooms and win a few ribbons, or maybe the Best Flower Award!

"Camellias take a lot of leaving alone."

A great deal has been written and said about various methods of camellia culture and I sometimes wonder if the tendency with some of us is not to "go overboard," after listening to or reading so many different recommended treatments.

For example, we are admonished never to let a camellia become dry. Generally, this is good advice. But when is a plant "dry"? Is it when the top of the soil appears to be dry or should you wait until the leaves start to droop? The answer probably lies somewhere in between.

The amount of watering, fertilizing and perhaps other recommended procedures will depend to a great extent upon the requirements of your own particular area and on the season of the year. If the latter, the question then arises whether it has been one of northwind and drought, or, as to winter and spring, whether there has been a normal amount of rainfall. The record-breaking drought experienced throughout most of California in November and December has necessitated much more artificial watering than is usually the case in those months, or else our plants have suffered. In any event, how much you water at each season of the year will be governed greatly by your location, environment and whether your camellias are in the ground or containers.

Generally speaking, I believe we are inclined to overwater as to frequency and under-water as to quantity. Notwithstanding the high temperatures and warm, drying winds in the summer and fall, here in the Sacramento Valley I have found that one good, deep soaking a week and an overhead sprinkling or two in between is quite adequate normally.

Some over-particular camellia enthusiasts water their plants every day or night regardless of whether it is required (speaking of plants in containers) — even in winter. In many instances, in due course of time their plants will have dropped most of the leaves and buds, too, and the over-zealous owner will wonder what hit them. Regardless of how good the drainage may be (and it must be perfect to avoid immediate trouble) too much water will drown a camellia, as they do not like to have "wet feet."

Then there is the case of the camellia enthusiast who does not realize that camellia leaf color often varies according to variety. So he may endeavor to darken the light green foliage of a *Debutante* or *Sierra Spring* so that it will resemble that of a *Gigantea.* In order to bring this about quickly, our over-eager friend may have been too generous with soil sulphur or trace elements and the result is he has accomplished one thing: his camellia has a "tummy ache." However, the leaves remain the same light green, provided they have not been burned from an overdose of chemicals.

It is wonderful to be enthusiastic about one's hobby and this should be encouraged. However, there are differences in camellias as there are in humans and they have their own "blondes," "brunettes" and "redheads" and there is nothing we can or should try to do about it. We should all realize that Mother Nature has her own peculiar way of doing things in a quite satisfactory manner and camellias will do better "on their own" than being overwatered, over-fertilized and over-chemicaled.

IMPORTANCE OF MICRO-NUTRIENTS

(Continued from page 14)

soil. It has been established that the optimum pH range for the availability of:

Nitrogen	is 5.5 to 9 plus
Potassium	is 5.5 to 9 plus
Phosphorus	is 5.9 to 7
Calcium	is 6.1 to 8.5
Magnesium	is 6.1 to 8.5
Sulphur	is 5.5 to 9 plus
Iron	is 4 to 5.2
Boron	is 4.9 to 7.1
Manganese	is 4 to 5.2
Zinc	is 5.1 to 7
Copper	is 5.1 to 7

Micro-organisms are also influenced by the relative acid or alkaline reaction in the soil. Fungi are strongest at 4 but remain at a high level through 9. Bacteria and similar organisms are optimum at 5.5 and taper off slightly through 9.

Camellias are adapted to the general range where the micro-nutrients are at their peak — 5 to 7. Above 7 and below 5 important nutrients are increasingly unavailable and the plants suffer. This does not mean that good specimens may not be found in soils below 5 nor above 7 but merely indicates this to be the ideal growing range and may be considered slightly to moderately acid in its reaction.

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GROWING EXHIBITION BLOOMS

(Continued from page 5)

two inch layer of loosely shredded parchment or waxed paper should be spread in the bottom of these boxes and the blooms laid flat on the paper. Carrying blooms in this way will give them the maximum protection since they are supported at the calyx as well as throughout the lower petals. When a box of blooms is full and ready for transporting, I always spray the inside of the lid and the top of the blooms and waxed paper with a fine spray of water from a florist's atomizing gun. This gives a spray so fine that it will not waterspot any of the blooms but at the same time provides maximum humidity in the box and thereby maintains the substance of the flowers. It goes almost without saying that the blooms must not touch each other in the box and they should be placed far enough apart so that normal movement while in transit will not cause them to hit against each other and bruise.

I believe that if you will supply the best possible "living conditions" for your plants — feed, water and disbud them as required throughout the year — they will reward you with many fine exhibition blooms.

This part of Southern California has had about ⅜ of an inch of rain since July 1st, notably high temperatures (warmest since 1877), and an almost uniformly low humidity. These conditions have resulted in unusual camellia performance: (1) There has been a total lack of petal blight thus far. This would seem to indicate that a supply of fairly moist air is necessary for the transmission of the spores from the ground up to the flowers. Dry air probably shrivels up both the apothecia and the spores. (2) The flowering season for at least a third of the varieties has been advanced from four to six weeks. (3) The flowers have been more numerous and smaller than usual and many have wilted almost immediately after opening. This has been true on well-watered plants; they simply couldn't absorb enough water to supply their extra-heavy load of blooms. (4) Leaf buds on about half the varieties have begun to elongate to the point where they are unsuitable for grafting. (5) With all the heat and lack of humidity there has been no sun-burning of foliage. Perhaps the long, dry fall has conditioned the leaves to stand more sunshine; the extremely heavy waves of sunburned foliage which we have occasionally seen in the past may have been due to the suddenness of the change from humid to dry air, plus exposure to sunshine. This did not occur this fall because the air has been pretty uniformly low in humidity.

* * *

The camellia is certainly subject to the dictates of fashion. One hundred years ago, in the horticultural world of Europe and America a fashion was inexorable and not to be violated. In camellia blooms the fashion was "perfection," or, as we would call them, "formals." This fashion was very narrow for it dictated that only those camellias which were "perfect" — that is, completely regular without variation, were to be admitted to the canon of respectability. There were, to be sure, similar types of camellia to those we have today, but these must be possessed or talked about only apologetically; if one admitted to a single or semi-double, he kept it as quiet as possible.

Fifteen years ago, when a new wave of interest in camellias swept the country, the ruling fashion was for size, regardless of type or color, and, while not as inexorable or rigid as that which demanded "perfections," this fashion nevertheless held sway among camellia enthusiasts. However, today we are witnessing a still different fashion in camellias. The popularity of size has been very much diminished and, while still a matter of great importance, camellia people now exhibit a much broader taste in camellia flowers. There is now much more freedom of choice; one can openly admire a single, or a small flower today — all types are popular. It would be hard to say just what the fashion is, so catholic have our tastes become.

One of the factors which has broadened our tastes today is the great tide of new varieties — not only new japonicas but new species and hybrids. The six original types — single, semi-double, anemone, peony, rose-form, and formal have not been added to, but the multiplicity of patterns within these forms has become legion. Perhaps this plethora of varieties has tended to emphasize individuality of taste, so that no type is predominant.

BOOK REVIEWS

CAMELLIAS IN THE HUNTINGTON GARDENS, Vol. III: *The Huntington Library, $10.* This, the third and final volume of the excellent set by William Hertrich, concludes the splendid written and pictorial coverage of *C. japonica,* and *C. reticulata* and, in addition, covers in the author's typically thorough fashion the species *C. sasanqua* as well as some of the hybrids. To the person desiring full information on the appearance, behavior and culture of all the camellias he is likely to encounter, it would be difficult to find a more complete, authentic and satisfying work than these three volumes which, as a set, retail for $25.

REVISION OF THE GENUS CAMELLIA: *J. Robert Sealy, Royal Horticultural Society, Sept. 1958.* Unquestionably the finest work to date on the taxonomy of the camellia, this book is invaluable to professional, geneticist, student and amateur breeder and as a reference work for anyone seriously interested in the subject. It deals thoroughly with the history, geographical distribution, description and relationship of the various species (82 classified), which are fully illustrated by line drawings. The composition and typography are superb. The result of a decade of painstaking work concluded in 1951, for which the author is entitled to the greatest credit, it is unfortunate that the long interval before publication (7 years) left a hiatus so that the crossing of reticulata with japonica and other species, for example, has not been recognized.

ARRANGING CAMELLIAS

(Continued from page 7)

To enhance and supplement the camellia arrangements I grow certain plants and trees that flower during the camellia blooming season. These are used only for their supporting value and design in the arrangement. Care should be taken that flowers you combine with camellias do not demand too much attention and thus be competitive. They should preferably be of a soft color, such as *flowering fruit blossoms, viburnum burkwoodii, andromeda, daphne, pussy willow* and *hellebore.*

The beauty and variety of different foliages is a "must" for design and form. I like to use *dusty miller, saxifrage, juniper procumbens, flax, aspidistra, iris, magnolia* and the *calla lily.* Additional material from the garden that will combine well will constantly be found and this search is an endless adventure. Foliage of a rather heavy texture and interesting color serves as a good background against which the camellia flowers can be dramatised. After much practice, one learns how to perfect the severe beauty of simple lines in so doing.

Arrangements are not necessarily confined to floral displays inside our homes. A patio can be very pleasantly decorated with properly placed boxed camellias. I have deliberately potted camellias in larger tubs than necessary, then planted low-growing annuals such as *white violas, forget-me-nots, white primula* or *lobelia,* around the inside edges. Care should be taken that such plants harmonize with the camellias if both will be in bloom at the same time. After the flowering season of these annuals has passed, remove them so that the camellia can get the benefit of the extra soil and space.

Many gardens or patios have all sizes, shapes and even colors of containers for their camellias mingled together in the same area. The result is usually lack of harmony, which destroys much of the beauty of such an otherwise fine grouping. An idea has occurred to me that should overcome this objectionable situation — to screen off the base of such containers by building a wooden framework about 18 inches high and as long as required, much like a raised flower bed. This would greatly improve the overall appearance by transforming the misfits into a harmonious unit that should be far more pleasing.