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Jack Campbell photo

DONCKELARI (ENGLISH STRAIN)

Jack Campbell phot

VILLE DE NANTES

The infinitely variable Ville de Nantes has now produced the amazing peoniform sport shown below.

THE EFFECT OF CONTINUOUS LIGHT HIGH NUTRIENT LEVEL AND TEMPERATURE ON FLOWERING OF CAMELLIA HYBRIDS

By Walter E. Lammerts

Camellia seedlings grown under even ideal garden conditions rarely begin flowering in less than four years from germination of seed and usually from five to eight years elapse before all seedlings may be indexed as to color, petal number, and form of flower. Because of the previously demonstrated great stimulative effect of continuous light on peach seedlings both as regards vegetative growth and rapidity of flowering,[1] I believed it would be very worthwhile to test the effect of continuous light on growth and flowering of camellia seedlings. For this purpose the normal day length was supplemented by light at night from 100-watt Mazda lamps placed in standard reflectors about 5 feet apart and hung 3 feet above the young seedlings in the greenhouse. The seedlings germinated in the spring of 1946 were not placed under this continuous light until about 9 months after germination. The hybrids germinated in October 1946 were, however, placed under continuous light about 6 weeks after germination. Both groups of seedlings were given weekly feedings with a nutrient solution patterned after that developed by the John Inner Horticultural Institution of Merton, England. This solution is made from a salt mixture consisting of 25% nitrogen, 19% of which is organic, i.e., derived from urea, 7% phosphorous, and 7% potash.[2] In addition 1% of sulphur, 1% of calcium, ½% of iron and smaller percentages of manganese, magnesium and other minor elements are present to satisfy any minor element deficiencies which may arise during continued pot culture. A dilution rate of 420 ppm. of nitrogen, 120 ppm. phosphorus, and 120 ppm. of potash was used. This rate is obtained by using 2 level teaspoonfuls of the above salt mixture to 1 gallon of water. For small pots, i.e., sizes up to 5-inch, enough of the nutrient solution was added each week to fill the pots. The plants were *always* thoroughly watered at least once between feedings in order to avoid any possibility of burning by accumulation of salts to a toxic level. A high moisture level was always maintained. For plants in gallon cans ½ pint of nutrient solution per week is adequate and more might be harmful. It may be of interest to note that throughout the progress of this experiment the camellia seedlings and hybrids were kept in 4-inch pots. Some of the plants now are 4 feet tall, bushy and clothed with an abundance of large dark green foliage, even though growing in 4-inch pots.

Of equal importance with the above light, moisture, and nutrition conditions are the heat factors in this experiment. These plants were grown at temperatures of 65° F. minimum and fluctuated often to rather high temperatures of 95° F. in the summer. Evidence recently obtained by Dr. James Bonner of the California Institute of Technology indicates that higher minimum temperatures may be even more effective in inducing both rapid vegetative growth and early flowering. Thus in one series of experiments he

[1] W. E. Lammerts, "Effect of Photoperiod and Temperature on Growth of Embryo-cultured Peach Seedlings, "*American Journal of Botany,* 30:707-711.

[2] Sold under the name of Rancho del Descanso·Plant Food. Other liquid plant foods of lower nitrogen content may be used if this product is not available, by adjusting the dosage rate to match the high nutrient level used in these experiments. It is believed however that most of the nitrogen fed to plants should be given in organic form, i.e., be derived from urea so as to provide microorganisms as well as food.

was able to bring seedlings only 4 inches high and 4 months old into bud 10 months after being placed under continuous light at 80° F. minimum temperature. More experimentation on the exact optimum minimum temperature is needed as well as data on the effect of intermittant light, i.e., hourly light flashes and weaker light intensity.

In any event, under the conditions outlined above growth was very rapid and almost continuous, that is, the time interval between growth cycles was so greatly reduced that wood of the previous growth cycle did not really harden up before a new cycle of growth began. In spite of this rapid vegetative growth, however, buds were observed in December 1947 on some of the seedlings germinated in the spring of 1946. Even more rapid was the response of some of the seedlings germinated in October 1946. Several of these showed flower buds in January 1948, one year and four months after germination. In Table I the results as of November 1, 1948, and April 1, 1949, are presented in terms of progeny numbers. It may be readily observed that certain progenies come into flower more slowly than others. Also an observation not shown in the table is worth mentioning. In each population, seedlings occur which are extremely vigorous vegetatively speaking. Some of these are now over 6 feet high. These extremely fast growing seedlings tend to be slow in flowering, only a few of them so far showing buds. Also the weaker growing seedlings are slow in flowering. However, even with the handicap of 9 months under normal day length prior to continuous light treatment, the seedlings germinated in February 1946 were all in flower by April 1949. In other words it is quite clear that by use of this technique it is possible to shorten the breeding cycle of the camellia from a period of four to eight years to 1 year four months to 3 years. Furthermore from the point of view of varietal introduction, the very weak growers and overly vigorous hybrids would probably not be worthwhile anyway. As the hybrids come into flower they are indexed for color, petal number, and size. Already some very interesting hybrids have flowered, which because of their petal number, form and color have been considered worthy of grafting in order to test them thoroughly under garden conditions.

TABLE I

CLASSIFICATION OF CAMELLIA SEEDLINGS AS TO FLOWER BUD FORMATION AS OF APRIL 15, 1949

	Number flowered or in bud by Nov. 1, 1948	*Number without flower buds Nov. 1, 1948*	*Number flowered or in bud by Apr. 15, 1949*	*Number without buds by Apr. 15, 1949*
Seedlings germinated February 1946	10	6	16	0
Seedlings germinated October 1946:				
Single red ♀ x Daikagura Red ♂	2	3	3	2
Amabilis ♀ x Daikagura Var. ♂	2	11	2	11
Amabilis ♀ x Fragrant Single Red ♂	4	7	6	5
Amabilis ♀ x Herme ♂	3	2	5	0
Large Single Var. ♀ x Daikagura ♂	3	7	6	4
#103 ♀ x Daikagura ♂	0	3	0	3
Amabilis selfed	0	1	1	0
Daikagura selfed	0	1	0	1
Single white #1 ♀ x Daikagura ♂	9	15	10	14
Single white #2 ♀ x Daikagura ♂	1	0	1	0
#100 ♀ x Daikagura ♂	1	0	1	0
Peppermint Var. ♀ x Albatross ♂	1	1	2	0
Single white type 3 ♀ x Daikagura ♂	0	1	1	0
Berenice Boddy ♀ x Apple Blossom ♂	1	0	1	0
Total of October 1946 seedlings	27	52	39	40

(Continued on page 24)

TEST GARDEN AND REGISTRATION COMMITTEE REPORT

Your Test Garden and Registration Committee, appointed by Pres. J. Walter Reeves, was organized about May 1, 1949 for the administration now closing, and has been busily active since.

In September, Curator Ronald Townsend delivered to the committee 9,000 *Camellia japonica* seed, following a custom established by William Hertrich shortly after the initiation of the Test Garden program. The seed were offered for sale at 2½c each to members and 5c each to nonmembers. Later, Mr. Townsend provided 3,600 more seed bringing the total to 12,600; all were sold and the Treasurer was obliged to return the checks of several disappointed applicants.

Receipts from the sale of seed totaled $234.08. To this was added $4.00 from two varietal registration applications. These receipts have more than taken care of the committee's expenditures to date.

Typing	$ 33.48	
Petty Cash	50.00	($46.00 still on hand)
Postage	74.71	
	$158.19	

The item postage covered two airmail shipments of scions, 55 in one lot and 50 in another, sent to Mr. Hazlewood in appreciation of material he so kindly sent for the Test Garden during the previous year.

The plants donated by Mr. Hazlewood, of New South Wales, were turned over to William Wylam to be grown along with the understanding that the first available scions would be placed in the Test Garden. During the current season more than one third of the varieties have been grafted on understock in the Test Garden. A list of these varieties is appended hereto.

In January 1949 Curator Townsend handed to the committee a list of desiderata consisting of 66 varieties not in the Garden. Many of these are collectors items; 44 of them have been provided in the form of scions; some others have been promised for next year. The remainder we plan to purchase in the form of small plants, using a part of the $1,000.00 allocated and earmarked for the use of this activity. Since the Test Garden would desire only scions from these plants, it is our thought to offer them as additions to the monthly prizes; undoubtedly the increased sale of prize tickets would amortize the expenditure.

During the period covered by this report, 17 scions and 1 plant have been contributed to the Garden by persons not members of our society; 27 scions and 2 plants have been contributed voluntarily by members. The remaining 98 scions and 3 plants have been collected by the committee.

The contributors are: (*denotes nonmembers)

Carter, E. H., 15 scions, 2 plants
*Crandall, Mrs. Shannon, 6 scions
Eakin, O. L., 13 scions
*Eversole, Dr. H. O., 11 scions
Hazlewood, Walter G., 38 scions
Maitland, Frank, 4 scions
Marshall, I. Leslie, 4 scions, 1 plant
Miller, Don, 4 scions, 1 plant
Nuccio, Julius, 22 scions
*Olrich, Jerry, 1 plant

Rancho del Descanso, 3 scions
Scott, Paul L., 12 scions
Shepp, Paul E., 4 scions, 1 plant
Tourje, E. C., 16 scions
Wylam, William, 7 scions

The material donated by the above consisted of the following:

SCIONS:

Adolphe Audusson Var.
Anemonaeflora Alba
Anemonaeflora Rosea
Arthur Middleton
Aspacia Rosea
Beacon
Beauty of Holland
Cho-no-Hanagata
Chandleri
C. M. Hovey
C. N. Hastie
Comte de Nesselrode
Comtesse du Hainaut
Constance
Countess of Orkney
Daitarin
Dainty
Delectissima
Duchess de Berry
Duchess of York
Edith Linton
Edith Nichols
Edwin H. Folk
Eleanor McCrady
Eugenia di Massena
F.G. 203
Fred Sander
Galilee
Gibson Girl
Gigantea
Glenn Allan
Gov. Earl Warren
Grace Burkhard (C. M. Wilson?)
Great Eastern
Hakuo
Haku-Tsuru
Hassaku-Tsubaki
Hishi-Karaito
Isabella
Jacksoni
James Allan
Jean Lyne
Jenny Jones
Joan of Arc
Kenny
Lady Astor
Lady Clare Var.
Lady Parker Peony
La Reine Var.
Lawrence Walker
Louise McClay Var.
Margaret Walker
Mariana (Dr. Shepherd)
Marina
Marquis d'Exeter
Marquis de Montcalm
Miyako-no-Nishiki
Mme. Marguerite Calusant
Mrs. Baldwin Wood
Mrs. Bell
Mrs. Luerman (2)
Mrs. Tinley (2)
Mrs. Walter Allan
Pink Glory Var.
Pink Hibiscus
Pink Sara-Sa
Pride of Greenville
Prince Frederick William
Princess Irene
Princess Mary of Cambridge
Red Hibiscus
Rio Rita
Roma Risorta Rosea
Rosea Mundi
Rosea Superba
Rubra Plena
Rubra Virginalis
Ruth Kemp
C. Sasanqua, Hana-Jiman
C. Sasanqua, Hichifukujin
C. Sasanqua, Hiryo
C. Sasanqua, Monozono-nishiki
C. Sasanqua, Omi-goronio
C. Sasanqua, Shishigashira
C. Sasanqua, Showa-no-homare
C. Sasanqua, Showa-no-sakae
Saturnia
Sierra Spring
Spencer's Pink
Storeyi
Tea Garden #113
Thompsoni
Tinky Lee
Venus de Medicis
Virginia Franco Rosea
Virgin's Blush (2)
White Daikagura
White Elegans
White Hibiscus
White King
White Warratah
William Bull
Winter Cheer

PLANTS:

Arlene Lee Shepp
His Majesty
C. Hongkongensis (?)
Mrs. Tinley
Pink Paeoniaeflora
Strawberry Blonde

(Continued on page 23)

HIROSHIGE'S CAMELLIAS

Camellia shrubs on the old Tokaido road between Tokyo and Kyoto greet the weary travelers in a print of Hiroshige reproduced on the next page. Ando Hiroshige, the great Japanese landscape painter, noted for his use of color and treatment of perspective, influenced Whistler and many another artist. E. F. Strange (*Hiroshige,* 1925), writes as follows in the *Britannica* (11th ed., 13:523-24).

"Hiroshige (1797-1858) was one of the principal members of that branch of the Ukiyo-ye or Popular School of Painting in Japan, a school which chiefly made colour-prints. His family name was Ando Tokitaro; that under which he is known having been, in accordance with Japanese practice, adopted by him in recognition of the fact that he was a pupil of Toyohiro. The earliest reference to him is in the account given by an inhabitant of the Lu-chu Islands of a visit to Japan; where a sketch of a procession drawn with great skill by Hiroshige at the age of ten years only is mentioned as one of the remarkable sights seen. At the age of fifteen he applied unsuccessfully to be admitted to the studio of the elder Toyokuni; but was eventually received by Toyohiro. On the death of the latter in 1828, he began to practice on his own account, but finding small encouragement at Yedo (Tokyo) he removed to Kyoto, where he published a set of landscapes. He soon returned to Yedo, where his work soon became popular, and was imitated by other artists. He died in that city on the 6th day of the 9th month of the year, Ansei 5th, at the age of sixty-two, and was buried at Asakusa. One of his pupils, Hironobu, received from him the name of Hiroshige II; and another, Ando Tokubei, that of Hiroshige III. All three were closely associated with the work signed with the name of the master. Hiroshige II some time after the year 1863 fell into disgrace and was compelled to leave Yedo for Nagasaki, where he died; Hiroshige III then called himself Hiroshige II. He died in 1896. The earlier prints by these artists, whose work can hardly be separated, are of extraordinary merit. They applied the process of colour block printing to the purpose of depicting landscape, with a breadth, skill and suitability of convention that has been equalled by Hokusai in Japan, and by no European. Most of their subjects were derived from the neighborhood of Yedo, or were scenes on the old high road—the Tokaido—that ran from that city to Kyoto. The two elder of the name were competent painters, and pictures and drawings by them are occasionally to be met with."

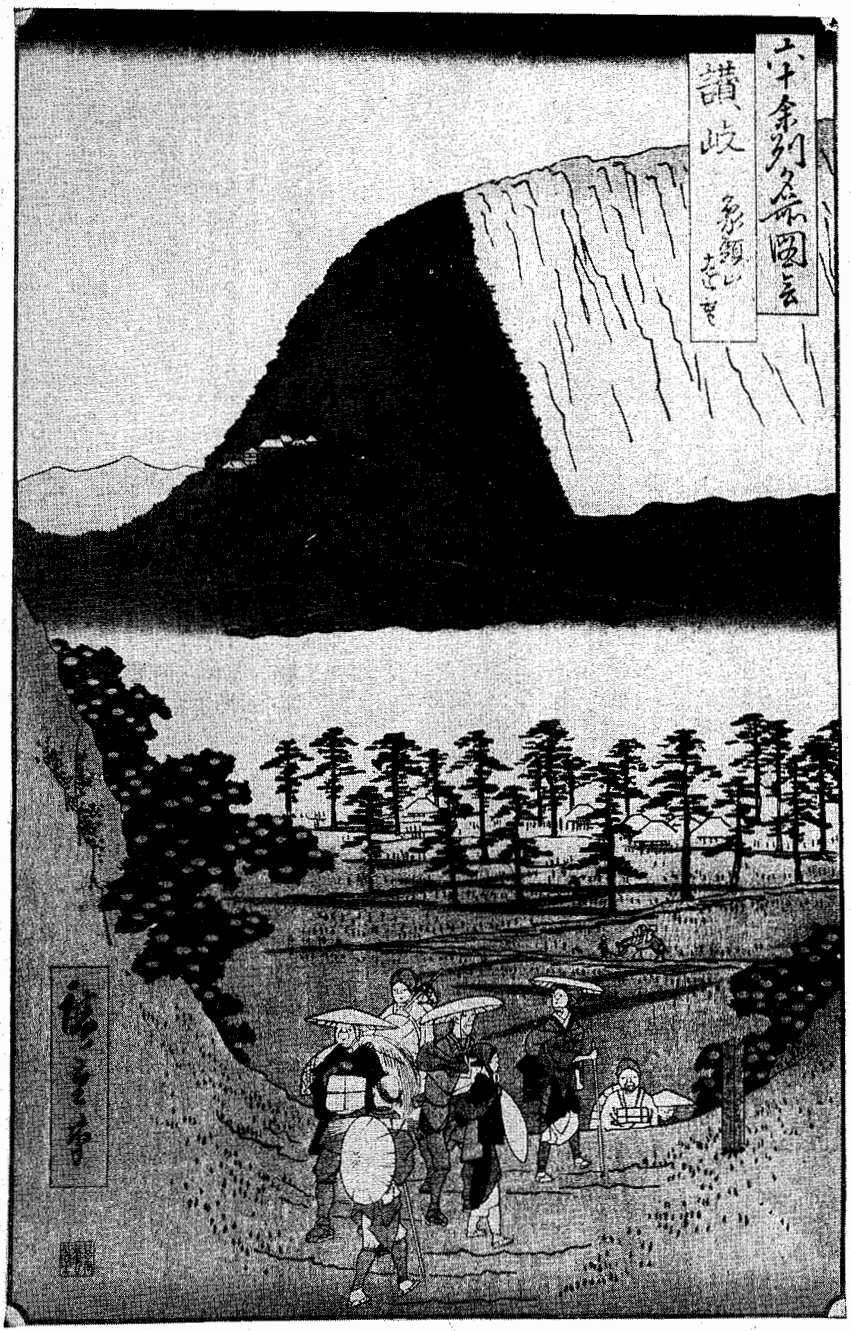
The print reproduced on the following page is from the collection of our staff photographer, Jack Campbell.

NEWS NOTES

OUR NEW NOMENCLATURE COMMITTEE consists of the following members: William Woodroof, *Chairman;* T. H. Seavey, *Business Manager;* Mark Anthony J. Howard Asper, Frank Barley, David Cook, Vern McCaskill, Leslie Marshall, Julius Nuccio, Paul Shepp.

The Committee is already making plans to prepare a revised edition of the Society's book, *The Camellia, Its Culture and Nomenclature.* It is hoped that the new illustrated version will be ready for distribution at the November meeting.

EIGHT ISSUES OF THIS BULLETIN are printed each year. They are published monthly from November to April, and in June and September. This statement is made to inform new subscribers who may be unacquainted with our schedule.


六十余州名所図会
讃岐

THE CAMELLIA*

BY G. B. TIROCCO

Translated from the Italian by
CLAUDE CHIDAMIAN

PRINCIPAL VARIETIES

ALBA PLENA—Medium flower, pure white, regular, very full. This variety is much cultivated for its precocious flowering and for its cut flowers which are much used during the winter. It may flower regularly from December through May.

ALBINO BOTTI—Very large flower, superb, of a beautiful transparent light rose; petals with margins streaked with carmine.

ALESSANDRO VOLTA—Flower of medium size, of a brilliant red color dotted with white; magnificent.

AMELIA BROZZONI—Flower of splendid rose color rayed with white, perfectly imbricated.

AMERIGO VESPUCCI—Very large flower in spiral form, of vivid red color.

ANTONIETTA COLNAGHI—Large flower imbricated in a spiral, of vivid rose color with darker veinings, center light ash-gray.

CATERINA MAGNANI—Ivory-white with yellowish streaks on the central petals and some spots of rose-color.

CONTE G. F. CICOGNA—White flower spotted with vivid red. Very beautiful.

CONTESSA CASTELVECCHIO—Imbricated, rose-color, petals streaked with carmine with white margin.

CRISTOFORO COLOMBO—Flower of bright rose-color, paler at the center, imbricated.

CROCIATA NUOVA—Full imbricated flower, cherry-colored with white lines.

DANTE—Pure white, at times with some petals lightly streaked with rose. Superb variety.

DAVID BOSCHI—Very large flower of a beautiful very delicate light rose; outer petals often streaked with white.

ELISA CASARETTO—Regular, medium-sized flower of very beautiful form; close-set flesh-colored petals, almost all streaked with rose or carmine-red. A high-class variety.

ELVIRA BIANCHINI—Large flowers well imbricated, of cream-white color and elegantly spotted and streaked with rose. Magnificent variety, of great effectiveness.

EMILIA GAVAZZI—Of delicate form and color, imbricated, rosy white spotted and streaked with carmine; center yellowish.

EMILIA MARZICHI—Light-rose flower with red spots and dots.

EUGENIA PARLATORE—Rose-color with white dots, veiled with vivid red. According to the Mercatellis, this is one of the most profusely flowering varieties.

FERDINANDO MARZIGHI—White striped with deep red.

FIMBRIATA ALBA—Color similar to that of Alba plena, but differs in the margins of the petals which instead of being entire are finely fringed.

GENERALE CIALDINI—Vivid rose-color, here and there streaked with red. Very beautiful.

GENERALE MENABREA—Flower of a very beautiful vivid red; petals streaked with pure white.

GENERALE PESCETTO—Rose-white flower with red spots here and there.

GIARDINO FRANCHETTI—Very large flower of vivid rose veined with brighter rose. Magnificent. It is one of the most profusely flowering, according especially to the above-mentioned horticulturists: the Mercatelli.

GIARDINO SANTARELLI—Very large; white at the periphery often spotted with red. A variety of extraordinary beauty: the most distinguished among camellias with streaked flowers.

GIUSEPPINA MERCATELLI—Large regular flower perfectly imbricated in spiral form, marble-white. Superb.

GLORIA DI FELSINA—Very large pure white flower.

GOFFREDO ODERO—A superb variety, surprising in having on the same plant flowers of unequal shape and of very different colors; sometimes they are white striped with red, rosy-white, or light rose and darker at the center.

IDA ROSAZZA—Buttercup-shaped, white flowers sometimes crossed by a single rose-colored thread. Very beautiful.

IL FOLLETTO—Flower of white color with red spots. Magnificent.

IMBRICATA RUBRA—Large flower of a fine cherry-red; central petals streaked or spotted with white. Splendid.

INCARNATO—Flower flesh-colored, of variable size. A variety much cultivated for the trade in cut flowers. Magnificent. Among others, the head gardener of Villa Pallavicini at Pegli, the above-mentioned Carlo Moroni, affirms that it is one of the best for producing flowers for exportation.

IRIDE NUOVA—Flower perfectly imbricated, carmine red, lighter at the center. Superb. It is one of the most profusely flowering varieties.

ISOLINA BERTI—Very beautiful imbricated flower, brilliant red spotted with white.

LA PACE—Petals with pink ground, lighter at the margin, with many carmine-red streaks and dottings. Magnificent.

LA PIACENTE—Flower of bright color with lighter center, imbricated in spiral form.

LAURA FRANCHETTI—Flower of rose color.

LAVINIA MAGGI—Flower about thirty centimeters in circumference; ground pure white, streaked with cherry-rose. Very beautiful form.

LUISA FRANCHETTI—Violet streaked with red.

MACULA PERFECTA—Imbricated flower, now light rose with white streaks, now white with red streaks, sometimes striped and marbled.

MARCHESE COCCAPANI—Color wine-red with rose veining.

MARCHESE BICHI-RUSPOLI—White with rose veinings.

MARGHERITA BELLUOMINI—Uniform rose of great effect.

MARIANNA GAETA—Very large flower of rose color veined with red, lighter at the center. A variety of the first rank and of great effect.

ORTENSIA LUZZATTI—Flower of red color at the circumference, rose at the center, imbricated and cup-shaped.

PIA MARCHI—Large flower of perfect and regular form; color vivid red; some spotted with white.

REGINA MARGHERITA—Large flower of rose color with red spots. Very beautiful.

REINE DES BEAUTES—Light, very delicate rose.

ROSA CROCE—Large cup-shaped flower; petals ivory-white with very narrow rose striations. Very beautiful.

STEFANIA DI BUTERA—Very large flower of vivid rose color.

STELLA POLARE—Flower of medium size, of carmine-rose color.

SOFIA ONESTI—Large flower; central petals light rose veined with brilliant red.

TERESA TARGIONI—Large, of ivory-white color, petals bent backwards, with lines, splashes or large spots of carmine.

TEBALDO MARZICHI—Large regular flower, transparent rose shaded with lighter rose.

TONI ODERO—Large flower with outer petals white, spotted with red, those of the center light rose.

VARIEGATA—Large semi-double flower, of red color broadly and irregularly striated with white. Magnificent. One of the varieties, according to the above-mentioned Moroni, for early flowering, or a variety for producing flowers for exportation. There is also the Imbricata Tricolor and the Sacco Vera.

VIRGINIA MARINI or TERESA GAMBINI—Very large flower, perfectly imbricated. Petals vivid rose veined and striated with darker rose or with carmine red. Sub-variety of the Mad. A. Verschaffelt.

VITTORIO EMANUELE II—Large peony-shaped flower of light rose color striated and spotted with red. Magnificent.

SACCO VERA—Medium flower, quite regular, imbricated, pale rose, self-colored, sometimes spotted with white, sometimes with dark red. A very free-blooming variety.

TRICOLOR—Flower medium or large, semi-double, regular, white and flesh-colored, speckled with rose and carmine.

IMBRICATA TRICOLOR—Flower imbricated, well-formed, rose-red spotted with white.

SOIL

To achieve a healthy, luxuriant and productive growth, the camellia must be cultivated in suitable soil adapted to its needs. To avoid any mistake in choosing the soil, one need only bear in mind that it is a woodland plant; therefore it requires a soil neither too compact nor too light, but of medium, substantial texture, derived from decomposed vegetable matter. It is also a marsh plant, of those species which thrive in marshy vegetable-mold. If this sort of mold is unavailable, that of brier, heather, chestnut or peat moss may be used. The camellia will grow in firm soils in open ground, but less advantageously.

In some regions it may be cultivated in a mold of decomposed leaves and branches. In others, it is grown in a soil of brier, heather or broom. This soil also contains humus, to which is usually added a fifth or sixth part of very fine sand, preferably river or creek sand. Sea sand is also good, although some think it is less suitable because of the salt contained therein.

In Italy, particularly on the lake shores, along the Ligurian Riviera, around Nice, in Tuscany, they prefer to raise them in the so-called "chestnut mold," a soil of dark chestnut color taken from inside old trees, where it is formed by the slow action of time, humidity and the oxygen of the air. Lacking this, notably in northern countries, willow mold, as well as oak mold, is used.

These should be aged for two or three years. Their acidity when fresh would injure the plants; instead of nourishing them, it would blight them with a slow and cumulative poison.

In Florence, Signore Mercatelli writes me, camellias are generally cultivated in pure chestnut mold. Here they find suitable nourishment and grow vigorously. However, it is my own observation, and that of foreign horticulturists, that these plants when transplanted to a different climate quickly decline. Losing their leaves one by one, they finally deteriorate till all resistance and vitality are gone.

To overcome this obstacle facing the camellia trade, he continues, it was necessary to devise another system of culture. After repeated experiments, they have succeeded in raising young plants in a soil compound in which they not only grow more luxuriantly and show greater hardiness, but are so conditioned as to adapt themselves to any climate, soil and cultivation without deterioration, regardless of the region in which they are destined to reach full development.

I had asked him if camellias grow best in garden soil or that of brier, heather or chestnut. He promptly replied to me: "In a mixture of half chestnut mold and half brier earth. The nitrogen they contain also acts as a fertilizer."

When I put nearly the same question to the gardener of Villa Pallavicini and other well-known camellia growers, they answered unanimously: "For pots—garden soil, or better still, two-fifths chestnut mold and three-fifths heather. For open ground, one-third chestnut mold and two-thirds heather, or else straight heather." I asked the gardener if chestnut or brier mold was preferable for pots. He replied: "Brier mold, and in the bottom of the pot, for drainage, coarse chestnut mold."

The scarcity and rather high cost of chestnut and brier mold caused growers in past years to turn to the manufacture of artificial molds. These are effective substitutes. I could cite many of these compounds and mixtures. Since they are all about the same, I shall indicate only a few of them, which we owe to the long experience of the distinguished camellia cultivator Giacomelli. They differ little from the natural molds or mixtures thereof. They are as follows:

(a) Three parts of heather earth, two parts of chestnut earth and one part of very fine river sand.

(b) Three parts of chestnut mold, two parts of ordinary earth, and a sixth of sand.

(c) Three parts of well decomposed concentrated vegetable mold, one part of rather clayey ordinary earth and a sixth part of sand.

(d) Equal parts of earth and vegetable mold and a fifth of river sand.

In Belgium, where camellia culture has had considerable development, it is grown in decomposed leaf mold, also in heather earth, which, as I observed contains considerable decomposed vegetable matter mixed with very fine sand.

In preparing his molds, the cultivator must take great care to mix all the parts very well so as to obtain a homogeneous mixture which can always be used without sifting, as is usually done for other plants.

I must also note that in brier earths which are too sandy or too concentrated the camellia easily becomes subject to chlorosis. Therefore it is dangerous, or at least undesirable, to use such molds unless they are dusted with iron sulphate.

Regarding molds, distinction must be made between pot culture and that in open earth.

The preferable mold for pot culture is, without doubt, coarse pure chestnut mold. So too is that of brier or heather, provided it is composed of vegetable matter only half decomposed, with a little very fine pure quartz sand.

Until a few years ago, the late Father Agostino Martini of Taggia had in the monastery garden, in pure chestnut mold, a magnificent nursery of camellia trees. They were of all varieties and colors, some of them exceeding three meters in height and nearly five meters in circumference. Having been kept in a shady place, they remained sound and sturdy for over three decades. Some of them, splendid specimens, were valued at over two hundred lire each. The pots in which they lived in their last years, when part of them were presented to benefactors of the monastery, had a diameter of a meter and a half and a depth of over a meter. In part, they were specially constructed tubs.

When I asked him how he had succeeded in getting such splendid camellias, admired by all for their glossy leaves and profuse blooming, he told me that he had given them no other care than that of transplanting, for which in their later years he substituted changing the mold. Also, he cleaned their leaves by washing. They were sprinkled regularly, and after the buds developed, were given sprinklings of liquid fertilizers especially fowl and pigeon manure well decomposed and diluted. In the very last years, he used a solution of one per cent of sodium nitrate and one half of one per cent of potassium sulphate. At the last he was using, at my suggestion, the Wagner Nutritive Salts, consisting of a mixture of 30 parts of ammonium phosphate, 25 parts of sodium nitrate, 25 of potassium nitrate and 20 of ammonium sulphate, in 100 parts: 13 parts of phosphoric anhydride, 13 parts of nitrogen, 11 parts of potassium, with splendid results. Even the old plants had acquired a really extraordinary vigor. Every two or three years he would spread a little—about 200 grams—bone phosphate on the pots or vessels. He attributed the vigor and health of his plants to the logical drainage of the pots. Besides putting the usual pot fragments or pieces of brick or tile at the bottom of the pots and tubs, he inserted large pieces of wood charcoal This, besides absorbing and at the proper time restoring the humidity, disinfected the pots and prevented insects from getting in through the drainage holes. I recommend this practice.

In the case of plants cultivated in open ground it is necessary to prepare a fertile, permeable and fresh subsoil in which their roots may develop with facility.

For such culture, in some regions, one may use with excellent results a mold composed of about four parts of willow or oak leaves and one part of natural earth. This is better if rested and of siliceous nature. It is an excellent idea to add to this compost some splinters of wood and a little charcoal dust in order to facilitate the run-off of rain water and irrigation water and to improve the soil itself.

Although in some regions of Italy one may admire magnificent camellia plants which attain relatively large proportions, even though planted in firm clayey soil, and are sound, vigorous and productive, neverthless it is an excellent practice to use natural or artificial molds similar to those described above. I recommend particularly the advice of the Mercatelli firm of Florence, which has a collection of over twelve hundred varieties, and of Signore

Carlo Moroni who has, in Villa Pallavicini at Pegli, a grove of over a thousand camellia plants.

In the past it was the practice to add cow or horse manure to the above-mentioned molds and to sprinkle them with water impregnated with cesspool refuse and guano. Nowadays it is recommended that bone phosphate and potassium sulphate be added and that the plants be sprinkled before they flower with a one per cent solution of nitrate of sodium or with the Wagner Nutritive Salts described above.

One of the most recommended and important practices is certainly the drainage of the pots and the soil.

Not much need be said about the drainage of pots, as it is a practice well known even to novices and one on which depend the plants' health and vigor. I simply recommend that, to the pot fragments or pieces of tile or pebbles to be placed at the bottom of the pots, there be added pieces of wood charcoal and also some charcoal powder. As we have seen it practiced by Father Martini, this disinfects the soil.

For the drainage of holes in open ground, I add only that this is of great value. Cultivators should therefore take every care to execute this well, according to the advice of the most expert gardeners.

Anyone who wishes to make his own mold for camellias and other flowers, outside of heather, brier or chestnut, has only to dig a hole in the farthest corner of the garden and throw into it leaves, twigs, pruning residue, sweepings from garden or nursery paths or from the house, weeds, a little stable manure, even rabbit manure, and to wet down the whole every now and then with diluted cesspool refuse. Every three or four months it is well to turn over and mix the entire mass so as to reduce it all to a fine soft powder. After a year, or more usually two, the mold is fully formed and ready for the plants. Some gardeners dust the mold so prepared with bone phosphate or mineral phosphate, gypsum, or even a little potassium sulphate. I repeat: anyone who wishes to cultivate only a few plants, and in pots, should choose pure chestnut mold or the mixture recommended by Signore Moroni and the Mercatellis.

CHOICE OF CONTAINERS FOR CAMELLIA CULTURE

The most appropriate pots, and the most suitable, for the culture of camellias are the common ordinary ones of baked clay in the shape of an inverted frustum of a cone, with smooth even walls, unglazed, and with drainage holes in the bottom to carry off excess rain or sprinkling water.

Recently some writers have maintained that glazing was essential, or rather that it did not affect the health or vigor of the plants. They have not hesitated to suggest changes in the shape of the pots, but experience has shown the contrary. The porous ones, with thin walls, and the primitive form as described above, are recommended nowadays.

The porosity is necessary for the regular development of the roots. Likewise the conventional shape is most favorable for this development. It facilitates transplanting or repotting. The best pots are those whose height is equal or nearly so to the upper diameter (called generally the mouth of the pot, or orifice).

Wooden containers, in the form of pots or square, are not subject like the earthen ones to breakage and are lighter. However they have the serious defect of rotting because of the continual humidity. Some makers, to render them more resistant, manufacture them of oak or of seasoned chestnut wood, coat them with tar on the inside and varnish them outside. Square boxes or

other vessels are less advisable for this use, especially with regard to the conformation of the roots. Nor are tarring and varnishing advisable; they become a necessity for the preservation of the containers, but the plants do not breathe well in them.

These containers must not touch the ground; therefore they are furnished with appropriate feet or are set on bricks.

Cleanliness of pots or other containers destined for repotting plants is one of the most recommended practices if one wishes to obtain the desired results. Hence, those gardeners makes a great mistake who neglect it through carelessness, more than through ignorance.

All know now that in certain respects, especially in nutrition, respiration and sicknesses, plants resemble animals. Thus, as Pucci so rightly observes, pots are to plants what houses are to man. We all know that a clean healthful house is one of the first requirements of hygiene. Therefore flower pots too must be clean both internally and externally, to remove all vegetable growths and all germs of the parasites harmful to the plants.

While new pots may be simply washed or, even better, kept immersed in clear water for several hours, old ones—those which have already been used for plants kept in hothouses, those which are damp or covered with greenish vegetable growths—must be washed thoroughly, even in soapy solutions, or, if one has the use of a tank of water, left in it for several days.

To prevent or delay the development of fungus growths on pot walls, Pucci suggests dipping them in a solution of two hundred liters of water, a liter and a half of ammonia at 26 degrees C. and a hundred and fifty grams of copper carbonate. Repeating this operation every year will insure clean wholesome pots without compromising the health of the plants.

The capacity and thickness of the pots, as I shall show, also has a very great importance in the growth and vigor of the plants.

The pots must be adapted to the size of the camellias; thus the young plants grown from seed must be placed, during their first year, in pots five to seven centimeters in diameter at the mouth and of proportionate depth. From these, as they grow, they must be replaced in larger pots.

It is a fact that plants require greater precaution if placed in large containers than in small ones. Therefore repotting must be done with great care and only when need of it is recognized. Camellias are plants which do not thrive on too many repottings, since they are able to live and thrive for several years in pots exceeding fifteen centimeters in diameter. Furthermore, when they are transferred from a smaller pot to a larger one, under no consideration must one change the shape. First to suffer would be the roots and then the plant itself, which might even die.

MOLDS ADAPTED FOR SOWING CAMELLIAS

While the production and ripening of the fruits and hence of the seeds for reproduction is easy in temperate climates suited to this precious plant, it proves quite difficult in cold climates. There the plants are obliged to pass the greater part of the year in greenhouses, in boxes, or covered up as a protection against the cold. Though artificially cultivated camellias can bear splendid, even abundant flowers, they rarely produce seeds. Only the really sturdy and vigorous ones, thanks to the thinning out of the flowers, and thanks to the maximum of air and light, with a steady high temperature, produce any seeds, and they only comparatively few. Open ground, air, light and

warmth are definitely the prerequisites which greatly influence the perfecting of the fruit-bearing and consequently of the seeds.

The production of so many new and splendid varieties of camellias, occurring constantly and regularly in our Italy, is due to a great degree, over and above the intelligence and care of our cultivators, to the adaptation and favorability of the climate to this culture.

It is the wild plants indeed which produce seeds more profusely and regularly than the others. However, plants grown from those seeds are wild and are used chiefly for grafting stock. Wild plants bear seed even in cold climates. Sometimes, through fortuitous fertilization, they bear semi-double as well as single flowers.

The cultivator desirous of obtaining novelties and varieties of merit must fecundate the plants artificially, with patience and care. Despite all this, the really splendid varieties he will get through planting the fertilized seeds will be few.

Certainly these few will reward him generously for his trouble and expense. If he wishes to obtain seeds of the very first quality, he must gather those produced by the first and best flowers.

When the seeds are ripe in autumn, they must be sown immediately after being taken from their capsule. The time of maturing is marked by the plant itself; that is, by the opening of the fruit to let the seed fall.

Seeds may be planted in wooden boxes, pots, or earthenware pans full of good mold. Some use brier earth mixed with rich leaf mold, others garden-earth and sand.

They are covered with two or three centimeters of the same earth and are stored in a warm greenhouse or in a sheltered spot, according to the climate. Since seeds not recently gathered are hard and difficult to germinate, that is facilitated by soaking them for a half day in tepid water.

The germination of the seeds is rather slow. Sometimes it lingers even for three or four months. In general, however, seeds put in the soil in November begin to sprout in January or February, or even in March. When the young plants have reached a certain height, which is at the end of three or four months, in June or July, they must be placed in the little pots indicated above, five to seven centimeters in diameter, one by one, in brier earth mixed with chestnut mold. The same operation of transplanting must be performed on the young plants grown from wild seed and intended as understock, as on those grown from selected seed, from which new and beautiful varieties are hoped for.

THE MULTIPLICATION OF CAMELLIAS

The multiplication of camellias may be brought about, as we have seen, by seed; either for the purpose of obtaining robust grafting stock, or of new varieties. But this method is not adapted to the preservation of the choice plants we already possess, because the seed does not easily reproduce the mother plant from which it comes. Two other means of propagation—artificial, not natural—are: slips and grafts.

As I noted, the botanical type camellias and their cognates are the wilder ones and those which produce seeds not only abundantly but also better fitted for propagation purposes.

From these seeds are obtained the best and hardiest plants destined for understocks and also for giving slips. These too, in turn, will become grafting stock, or "subjects" as they are commonly called.

The second method of artificial propagation is that by slips, which sometimes, rarely however, is also used for the propagation of the select varieties.

Camellias can be multiplied by slip either naturally, that is, "cold"—in gardeners' terms—or by forcing them with heat. This method is used only with single camellias for the purpose of creating good "subjects" adapted for grafting later on. Nevertheless it is better to obtain the plants from seed and to graft them. The above-mentioned Father Martini used to prepare his young double camellia plants sometimes by slips, but with a friar's patience.

In January or February the slips are selected from among the short branches with very green leaves and are detached with a heel; they are allowed to root "cold." In July or August they are transplanted into pots in broom mold and are grafted in two or three years.

The method is as follows. The camellia plants with single or slightly double flowers which are destined to furnish the branches for the slips are usually kept in open earth and in open air where the climate permits, and are sheltered suitably during the winter cold. Branches must be from the preceding year, well-formed and robust. In length they must be twelve to fourteen centimeters, and carry two or three growth buds, according to their vigor.

They are placed in earthen pans or wooden trays filled with broom mold or brier earth mixed with very fine sand, so that two buds remain covered with the soil. The mold must be pressed very tightly around them. As soon as they are planted they are sprinkled, and then the pans or trays are covered with appropriate bells or panes of glass to protect them especially from the air and excessive evaporation. The pans and trays are placed upon a warm bed in a box or hothouse protected from the sun.

Protected, kept moist but not too wet, in thirty days or more they put out roots. As they grow larger they are transplanted into little pots of a diameter like that indicated for young plants. They are left there until the moment of grafting.

It had been recognized since antiquity that to germinate orchard and garden seeds and to raise tender ornamental plants during the cold season it was necessary to put them in surroundings approximating their customary ones during the warm season.

In conformance with these observations, the first attempts made consisted of spreading over their manure heaps a layer of earth. Over it were sown salad greens, radishes, etc., or else such hotbeds were used to sow certain plants to be transplanted later in open ground.

In the course of time it became evident that these manure heaps exposed to the air on all sides dissipated a great deal of heat. They hit upon the idea of digging ditches and there compressing the mass in layers. This concentrated the heat produced by fermentation to the profit of the plants cultivated thereon. These were protected during the night by coverings of dry leaves, mats, etc.

This system has gradually improved. Nowadays it is usually accomplished by digging a ditch 1.60 meters wide by 50-60 centimeters deep, of indeterminate length. This varies according to the amount of cultivation.

The earth removed to make the ditch is piled around it to keep water from running in. Next, fresh horse manure is mixed thoroughly with a third of dry leaves. Then this mixture is put in the ditch in even layers. These are strongly stamped down by foot, taking care not to make uneven depressions.

This proportion of manure and leaves is by no means absolute. Rather, it must be modified according to whether a more or less intense or more or less quick heat is needed. Thus, when an immediate and strong heat is necessary, the amount of leaves must be much less, almost nil. If instead a moderate

warmth is needed, the amount of dry leaves will be increased up to equal parts with the manure. If this proportion should be exceeded, the manure, having little capacity for fermentation, would give as a result a warmth insufficient for a hotbed in winter. It would constitute, rather, a warm-bed which would be very useful in the spring, for early seedlings to be transplanted later to open air.

In case forced cultivation is practiced on a large scale, it is more practical to have the ditches for the hotbeds permanent; that is, to have them of masonry. Market gardeners, however, often construct and use large movable boxes made of four boards about three centimeters thick, joined with square corners in parallelogram form 1.30 meters wide by 3 meters long, so that the box has three windows each a meter square. The chest corners are equipped by the growers with feet which are stood on stones or the like, so the box will not sag. The frames that hold the windows covering them, being of more difficult manufacture, must be prepared by skilled workers out of well-seasoned oak or fir. They must be so constructed that they can be raised to give the plants air and be moved without danger of loosening them or breaking the panes of glass with which they are provided.

To end this digression, I shall say that the good or bad result of forced cultivation depends largely on how the hotbeds are made and the boxes and windows constructed. I will also add that I have added the method of preparing the beds themselves in this monograph because I shall have to refer to them also in the others, and because novices do not know how to prepare them, even though they are described in all the pamphlets on horticulture and floriculture.

Before coming to the most important method of artificial propagation of camellias, that is, grafting, I shall speak briefly of "layering."

Layering can be practiced in broom mold, according to Sig. Vannuccini, under glass or in the open.

Multiplication by layering (*margotta,* or *margotto,* as it is called by Prof. Vannuccini) is closely analogous to multiplication by slips. In fact, layers tend to produce roots at a place on the plant where they would not normally be produced. The sole difference is this: the production of roots occurs in the case of slips on parts of a plant after the latter have been detached from the mother plant, while in the case of layers the production of roots occurs when the part that is to produce them is still attached to the mother plant. Thus the layer receives constantly from the mother plant itself its nutrition during rooting.

The factors in the forced production of roots are principally: lack of light; humidity of soil, which softens the tissues; and finally, bending and incisions.

These elements oblige the sap to stop and accumulate at the point of the bend and of the incision. As a consequence, the increased amount of sap provokes the development of the roots.

This method is little used by professional gardeners, as it takes a comparatively long time for the development of roots. Besides, one seldom has a large number of mother plants which can furnish the necessary branches without undergoing deformation. Layering is more practiced by amateurs than by professionals, the latter relying mainly on seeding and grafting. It has, however, the advantage of being simple, easy, within the reach of all, and of requiring, as we shall see, little subsequent attention.

The most favorable time for layering depends on the condition of the plants, It generally comprises the end of winter and the beginning of spring, from February to April.

The proper earth for the layers will be that used for the cultivation of the mother plants, only it will be lightened somewhat when the mother plant is being cultivated in heavy, compact earth, as is the practice of some in Southern Italy.

Leaving aside all the usual systems for layers, I shall speak only of the aerial method. It is the only one that can be applied to camellias, whose branches are distant from the ground and are not so flexible as to permit their being bent into the soil surrounding the mother plant. Thus, not being able to bring the branches to the ground, we are forced to bring the ground to the branches. Francis Bacon teaches us that when we cannot make things adapt themselves to us, we must adapt ourselves to them.

For aerial layering there have been and still are manufactured special pots of earthenware with a longitudinal slot for the introduction of the branch. These are always too heavy, especially when they are wet. Therefore it is better to make them for oneself with a piece of sheet lead or pieces of tin plate or zinc.

These are cut so they can be bent into the shape of a cornucopia or funnel, thus forming a sort of small vessel held closed by a pin thrust through, or by a wire tied to the mother plant or to a small isolated support.

It must be noted that the earth put in the vessel for the layer must be kept well loosened and continually moist. For this purpose some regularly install, slightly above the layering vessel, a flask full of water. In it they put a thick moistened cotton string, Issuing from the mouth of the flask, it dips its end in the vessel below. The string soaks up water. This passes by capillary action into the container below, like a wine siphon. Thus the earth is kept always moist and it is only necessary to fill the flask occasionally.

A vigorous young branch is selected. A notch is made in it, placing in it a small wooden wedge so it will not heal. After the surface of the earth in each vessel has been well tamped down, it will be well to cover it with a layer of spaghnum moss, for the purpose of preventing excessive evaporation. For all layerings the earth must be kept constantly moist, but for aerial layerings the sprinkling must be repeated several times a day—unless the above-indicated method with the cotton string, which I recommend, is used.

When the rooting of the layers has occurred, they must be detached, or "weaned" as the gardeners say, from the mother plant. This operation consists of cutting off the layered branch at the point where the buried curve begins or, in aerial layers, immediately below the vessel.

The time for this weaning depends on when the layerings have been performed. Generally the most favorable time is at the beginning of autumn. There are some who recommend that the layer not be detached all at once, but that the branch be cut into, sometimes with a fortnight's interval. This forces the new plant to live very gradually on its own strength and induces it to develop its root system more rapidly.

New plants thus obtained are treated the same as those raised from seed.

I asked Sig. Mercatelli, whom I have mentioned, for information about the usefulness of layerings in the culture of camellias. He kindly replied to me: "Up in Liguria, they habitually use layering for the multiplication of plants, but we do not use it, because while at first it gives prettily-formed plants, afterwards they are not sturdy. That is why we usually use grafting, either by budding or by approach. Both methods give sturdy plants. These types of grafts always give excellent results."

(To be continued)

TEST GARDEN . . .

(Continued from page 6)

During the year seed of the species Reticulata and Pitardii have been obtained from China by E. C. Tourje and presented to the Huntington Botanic Gardens with the request that when plants are available one of each be placed in the Test Garden. It will be recalled that Mr. Tourje was instrumental in obtaining from China last year the seed of species Sinensis, Oleosa, and Cuspidata; plants of these camellias are now in the Test Garden. Mr. Tourje also made the initial contact with Mr. Hazlewood of Epping, N.S.W., Australia, who has contributed so generously to the Test Garden. Mr. Tourje has borne the brunt of the task of collecting the material from Curator Townsend's desiderata list and the chairman wishes to especially commend him for his splendid performance as a committee member, and to suggest that since varieties available in this area are now for the most part in the Garden and since, therefore, search must be made for material from far places, future committee appointments should seek to provide for the committee persons who have, or can build up, foreign contacts.

From the beginning of the current season, all new material has gone into the Test Garden tagged with a number only and will remain so tagged until the plants bloom and the correctness of the varietal name can be verified; meanwhile the names will be kept only in the Curator's files.

There are several varieties now in the Garden which are not listed in the society's nomenclature book; other varieties are seemingly not in accord with the book. Since the initial aim in connection with the Test Garden was to use it as a test of varietal nomenclature, your committee recommends that from this time on, the Test Garden Committee, the Curator of the Garden, and the Nomenclature Committee should work together to utilize to the fullest the benefits that may accrue from the Garden for the clarification of varietal nomenclature.

In the past no material has gone out of the Test Garden. It is customary practice for botanic gardens to exchange material with other botanic gardens, for the benefit of both. From this time on, such exchanges will be made at the discretion of the Curator, upon the following conditions: (a) that the variety shall have been published in a commercial catalogue in this area as available for purchase, or (b) with the consent of the donor. An instance in advance of the establishment of this policy occurred last year when seed of the three species obtained from China were given to Professor R. J. Wilmot during his visit here, for use in the test garden of the American Camellia Society; he in return has provided seed from other sources. A reciprocal policy of this sort between the American and Southern California societies would be beneficial to both.

There are, at the present moment, 504 varieties in the garden, so that it is fulfilling the larger concept of becoming a repository for camellia varieties from all over the world. In accord with the original objective, no list of these varieties will be published until the plants have bloomed and the names have been verified.

The Test Garden has now been extended for some distance beyond the Japanese Tea House and pond which formerly marked its end, and the canyon itself has been cleared of brush and the oak trees have been pruned. Much of the propagating is now done in special grounds nearer the Curator's office.

Due to the difficulty of policing so large a tract in the manner necessary when the Garden is thrown open to the general public, the date of such public opening is still several years off. The Curator has expressed his desire that

members of the society and its affiliate societies should see the Garden from time to time. It is planned that during the next blooming season there will be a conducted tour for members and their collector friends during the early bloom period and others during the middle and late blooming periods. Dates will be announced in due course.

In closing, the chairman wishes to express the committee's deep appreciation to William Hertrich for his early efforts in organizing the Garden and for his continued interest and cooperation, and to Curator Ronald B. Townsend for his active interest and his cordial and complete cooperation. The committee feels that both the Southern California Camellia Society and the Huntington Botanic Gardens are fortunate in having as Curator a man of Mr. Townsend's ability and industry coupled with such a real interest and love for camellias and the camellia Test Garden. To Jerry Olrich, Superintendent of the State Capitol grounds in Sacramento, goes hearty appreciation for his interest and support.

The committee also wishes to express its appreciation of the splendid cooperation of the Secretary-Treasurer, Col. C. M. Gale, both for his capable handling of the seed sales and his assistance in the everyday routine of the committee's activities.

DAVID W. MCLEAN, *Chairman*

CAMELLIA FLOWERING . . .

(Continued from page 4)

It is obvious that the above technique has many other uses besides the induction of early flowering of camellia hybrids. The collector or fancier may greatly speed up the growth of his cuttings or grafted scions by its use and thus bring into flower some recently acquired rare variety years sooner than would otherwise be possible. Furthermore by combining this treatment with an artificial winter effect he may bring camellias into flower at any time or season of the year he may choose. Thus experiments by James Bonner reported in the 1948 Yearbook of the American Camellia Society indicate that camellias which have an abundant bud formation as a result of continuous light treatment will flower normally in 2½ to 3 months following the lowering of minimum temperature to 55° and resumption of normal day length. This change of temperature and day length should be made when flower buds are about ½ to ¾" in diameter and before they show color. The flowers produced in this way are as lovely and even more perfect than those produced under the usual outdoor garden conditions, due to elimination of such adverse factors as rain and wind damage or insect injury. Plants left under continuous light and high temperatures do not open flower buds normally and flowers are small and of poor quality. Considerably less time under continuous light (possibly only 2½ to 3 months) is needed to induce flower bud formation in plants which have already reached flowering age. By the use of the above technique one can readily bring such varieies as Chandleri Elegans and Gigantea or even Mathotiana Alba, which normally flower in January, February and March, into flower before Christmas. Continuous light treatment for such results should begin in May or June.

OKI-NO-NAMI

The glowing orange-red camellia on the opposite page is called Oki-No-Nami in Japanese, meaning "Wave of Embers." It was imported from Japan a number of years ago by E. A. McIlhenny, but is still rare on the West Coast.