SOUTHERN CALIFORNIA CAMELLIA SOCIETY

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Some Observations on the Flowering of CAMELLIA JAPONICA[1]

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The production of flower buds and flowers by plants is subject to control by a multitude of external and internal factors. The internal factors such as the genetic constitution of the plants may be studied by the long-range methods of genetics and breeding. The external factors, temperature, light, nutrition, etc. are, however, directly approachable by simple experiments. It would be of obvious interest to know the effects and relative importance of the several environmental factors in controlling flower bud production and flower opening in Camellia japonica. This paper describes two experiments which were undertaken to survey in a preliminary way the effects of temperature and day length on flowering of Camellia. The flowering process may be divided into at least three major parts,

a. production of the flower bud,

b. opening of the bud with production of the flower,

c. development of the fruit.

In Camellia japonica part (a) takes place during the summer months. Certain of the vegetative buds are altered into flower buds and these then enlarge. The fully developed buds open during the following winter or spring depending on variety and environment circumstances. The two experiments to be described below show clearly that quite different conditions are needed for bud production and for flower opening. Process (c) above, development of the fruit, will not be dealt with in this report.

Experiment 1. This experiment was set up to determine the effect of temperature and of day length on the production of flower buds by three varieties of Camellia japonica[2]. Twenty-four plants of each of the varieties, Eureka, Pink Perfection, and Dai Kagura, all three-year-old plants in gallon cans, were randomly divided into six lots so that each lot contained four plants of each variety. These plants possessed no visible flower buds and showed no indication of producing buds on June 27 when the experiment was started. Four of the six lots were placed in different temperature conditions in the air-conditioned greenhouse (Went 1943) as shown in table 1. The two remaining lots were placed in an ordinary greenhouse, one set being subjected to days artificially shortened to eight hours of light per day and one lot to days artificially lengthened to twenty hours of light per day. These two treatments were included since day length is known to be an important factor

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[1] Report of research carried out with the cooperation of the Horticultural Research Committee, Southern California Camellia Society.
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All of the Camellia plants used in these experiments were supplied for the purpose by Mr. Howard Asper and Dr. Walter Lammerts of the Rancho Del Descanso, without whose whole-hearted cooperation this work would not have been possible.

in control of plant flowering in other cases. The plants were allowed to rem under the six conditions for approximately three months. At the end of this ti the total number of flower buds per plant were counted in each case and the resu are tabulated in table 1. Only plants kept in very warm conditions such as 85° d and 70° night or 80° day and night formed buds in Eureka and Pink Perfection. Dai Kagura very few buds were formed and these only on plants in continuous hi temperatures. This striking result shows unambiguously that high temperatures essential to flower bud formation of these three varieties under the conditions us Length of day on the contrary would appear to be of little importance since eq numbers of buds were formed on plants in long and in short day.

Experiment 2. At the expiration of experiment 1, a new experiment was star with forty fresh Pink Perfection plants. These plants (three years old and in gal cans) had spent the summer in the open and had formed an average of five to flower buds per plant. They were divided into eight lots of five plants each a distributed among eight different conditions as shown in table 2. Observations w made on the date of opening of each flower, the total number of flowers produ per plant, and on the size and keeping quality of the flowers produced. Tabl summarizes the data on the time of flower opening. The time from initiation of experiment on September 25 to opening of the first flower is given for each tre ment. In addition the time from September 25 up to the time of production of o half of the total flowers is given as a measure of the time which elapsed betwe initiation of the experiment and the period of full bloom of the plant. Lastly, total number of flowers produced over the entire season is given for each treatme Day length exerted an effect in hastening flowering in that plants under short eig hour days flowered approximately three weeks earlier than plants under twen hour days. In addition more buds opened under short than under long days. the temperature treatments, an 80° day combined with a 60° night gave most ra flowering, both higher and lower temperatures resulting in delayed opening. Un conditions of 80° day and night, much bud drop took place, and the few flow which did open were small, white rather than pink, and possessed greenish cent as is shown in table 3, which summarizes the effects of the various temperatures bud drop and flower quality. An 80° day combined with a 60° night, although gave early and abundant flowering, with every flower bud opening, produced sm flowers which turned brown within two to three days. An 80° day combined w a night of 50° also gave abundant flowering and the flowers were of good size, co and keeping quality. Lower day temperatures also resulted in flowers of good s and quality although flowering was long delayed. At the low temperatures incre of bud size continued slowly and the buds became very large before opening curred. Considerable bud drop took place at the lowest temperatures as at highest temperature.

It can be seen that both day length and temperature exert great influence time of flower opening and on flower quality in the variety Pink Perfection. L twenty-hour days delayed flowering and increased bud drop in contrast to sh eight-hour days which hastened flowering and decreased bud drop. Whether

ot artificial shortening of the day length can be used to force early flowering of amellias is problematical since Camellia normally flowers during the seasons of turally shorter day lengths.

The effects of temperature on flowering can be classified into three groups:

a. with higher temperatures flower opening is hastened and with lower temperures delayed.

b. at high temperatures bud drop is accentuated.

c. at higher temperatures flowers are small, less intensely colored, and of poor eping quality, while the converse is true at lower temperatures.

The larger flower size at the lower temperatures is undoubtedly related to the ntinued growth of the buds before opening under these conditions.

It will be of obvious interest to determine whether the beneficial effects of low mperature treatment can be combined with early flowering by treatment of ants at a low temperature for a period of weeks followed by transfer to a higher mperature. Such experiments are envisaged in the continuation of this work.

Translation of these findings into recommendations for Camellia growers must wait confirmation and extension of the results by further work, and at the present me this work may be used only as a guide to a tentative interpretation of some of the oblems of flower formation. High temperatures during the summer appear to be sential to flower bud formation, and we might therefore expect unusually cool mmers or locations to be attended by low sets of flower buds. Excessively high mperatures during the fall and winter on the other hand are conducive to bud op and to the early production of flowers of low quality, while excessively low nter temperatures would be expected to cause delayed opening of buds.

TABLE 1

Effect of varied temperature and day length on production of buds by **Camellia ponica.** Experiment of June 27-Sept. 25, 1945.

Temperature condition Day	Night	Hours of light/day	Number of flower buds formed per plant Eureka	Pink Perfection	Dai Kagura
85°[1]	70°[1]	20	4	5	0
85°[1]	70°[1]	8	4	5	0
80°	80°	natural day	4	5	1
65°	60°	" "	0	0	0
65°	50°	" "	0	0	0

pproximate mean temperature in ordinary greenhouse. All other conditions in controlled temperature greenhouse.

TABLE 2

Effect of varying temperatures and day lengths on time of opening of flower ds of Camellia japonica var. Pink Perfection. Experiment of September 25-April , 1945-46.

Temperature condition Day	Night	Hours of light/day	Days from Sept. 25 to: 1st flower	50 per cent of total flowers	Total flowers per plt. during season
75[1]	65[1]	20	90	110	2.2
75[1]	65[1]	8	65	90	4.8
80	80	natural day	80	155	1.6
80	60	" "	50	90	5.8
80	50	" "	95	155	5.8
65	60	" "	100	145	2.4[2]
65	50	" "	95	170	2.8[2]
tdoors	outdoors	" "	185	190	3.0[2]

pproximate mean temperatures in ordinary greenhouse. All other conditions in controlled temperature greenhouse.

ome buds not open by April 23.

TABLE 3

Effect of varying temperatures and day lengths on bud drop and flower quality Camellia japonica variety Pink Perfection. Experiment of Sept. 25-Apr. 23, 1946.

Temperature ay	Night	Hours of light/day	Bud drop	Flower color	Flower size	Flower keeping quality
5	65	20	much	pink	normal	fair
5	65	8	none	pink	normal	fair
0	80	natural day	very much	white with green center	small	very poor
0	60	" "	none	light pink	small	poor
0	50	" "	slight	pink	normal	fair
5	60	" "	slight	dark pink	normal to large	good
5	50	" "	slight	dark pink	normal to large	good

eference: Went, F. W., Plant Growth Under Controlled Conditions.
1. The air-conditioned greenhouses at the California Institute of Technology. mer. Jour. Bot. 30: 157-163, 1943.

INCORPORATION

The first meeting of the Board of Directors, following the formation of the corporation, was held on July 17, 1946, at the home of Dr. Lloyd J. Taylor.

Present were the following directors: Mrs. Carlo E. Galli, Dr. Lloyd J. Taylor, J. Howard Asper, Dr. J. Walter Reeves, Wm. F. Huff, Dr. Weston W. Shay, Mrs. W. M. Viney. Present also were Dr. David W. McLean and Thor Petersen, incorporators. Others present were: Robert A. Ward, Treasurer of the unincorporated society; James C. Wright, Treasurer-elect, and C. Elmer Peak, Secretary-elect of the newly incorporated society; Roy M. Bauer, Business Manager of the Bulletin. Guests were Carl E. Tourje, Mrs. D. W. McLean, Mrs. J. H. Asper, Mrs. R. A. Ward, Mrs. C. E. Peak and the hostess, Mrs. L. J. Taylor. Unavoidably absent were directors Robert Casamajor and Mrs. J. W. Miller.

Dr. D. W. McLean presided; Thor Petersen acted as Secretary of the meeting. The Chair announced that he had been advised that the Articles of Incorporation of this society had been accepted by the Secretary of State, State of California, and filed in his office on July 8, 1946, (Sec. 596.3); and a copy of said Articles certified by the Secretary of State and bearing the endorsement of the date of filing in his office had been filed in the office of the County Clerk of Los Angeles County on the 15th day of July, 1946 (Sec. 596.5); and that the formation of the corporation had been completed. Also, that preliminary to the filing of the Articles of Incorporation, claim for exemption from the California Franchise Tax had been filed with the Franchise Tax Commissioner, and that the State Franchise Tax had been waived.

The Chair further announced that upon completion of the formation of the corporation, he, as President of Southern California Camellia Society (not incorporated) had caused the Treasurer of said Society to procure a cashier's check for the sum of $803.56, representing the entire funds of said Society, and that he as President, together with the Secretary of said Society, had prepared and executed on behalf of said Society a document of transfer to this Corporation of all the properties, assets and effects of said Society; that he held said document and said cashier's check pending the acceptance thereof by this Corporation and the creation of memberships in favor of the members of said Society in good standing (a list of whom had been prepared by the Secretary of said Society and which the President thereon presented) with dues fully paid until December 31, 1946; that he as President of said Society had caused the Treasurer of said Society to prepare a certificate, under oath to the effect that so far as is known to said Treasurer all debts and obligations of said Southern California Camellia Society (not incorporated) have been fully paid and discharged, except only certain items incidental to the creation of this corporation. Chair then presented said certificate to the meeing.

Thereupon, on motion duly made, seconded and carried, the following resolution was adopted:

Resolved, That this Corporation accept payment from Southern California Camellia Society (not incorporated) of the sum of $803.56, and the transfer to this Corporation of all the properties, assets and effects of said Society; That this Corporation accept as members of this Corporation all members of said Society in good standing, as certified by the Secretary of said Society, with dues fully paid to and including December 31, 1946.

On motion duly made, seconded and carried, the following resolution was adopted:

Resolved, That the By-laws embodied in the draft thereof presented to this meeting be and the same hereby are adopted for the By-laws of this Corporation.

Further Resolved, That the original draft of said By-laws, and a copy thereof as amended or otherwise altered from time to time, certified by the Secretary of the Corporation, shall be kept in the principal office for the transaction of the business of the Corporation, and shall be open to inspection by the members at all reasonable times during office hours.

On motion duly made, seconded and carried, the following resolution was adopted:

Resolved, That 175 North Los Robles Avenue, Pasadena 4, Los Angeles County, California, be and is declared to be the principal office for the transaction of business of this Corporation.

On motion duly made, seconded and carried, the following resolutions were adopted:

Resolved, That there be, and hereby is, created the office of Editor of the Bulletin. It shall be the duty of such editor to manage and direct, subject to the approval

the board of directors, the editorial and publishing policy of the periodical bulletin blished by the Corporation. The editor shall be a member ex-officio of all com-ttees appointed by the board of directors.

Further Resolved, That there be, and hereby is, created the office of Business nager of the Bulletin. The business manager shall manage and direct, subject the approval of the board of directors, the business affairs of the periodical lletin published by the corporation, and shall cause all moneys received from e business activities of said Bulletin to be paid into the corporation's general fund the hands of the Treasurer. Separate account shall be kept of such moneys.

On motion duly made, seconded and carried, the following officers were ly elected:

President: Dr. Lloyd J. Taylor.

Vice-President: Dr. J. Walter Reeves.

Secretary: Mr. C. Elmer Peak.

Treasurer: Mr. James C. Wright.

Editor of the Bulletin: Dr. David W. McLean.

Business Manager of the Bulletin: Mr. Roy M. Bauer.

Following the election of officers, the Chair asked Thor Petersen to install the coming officers; the installation culminated in the presentation of the gavel to esident Lloyd J. Taylor, who thereupon assumed the chair and presided through-t the remainder of the meeting.

On motion duly made, seconded and carried, the following resolution was opted:

Resolved, That the Treasurer be, and he hereby is, directed to execute bond favor of this corporation in the penal sum of Two Thousand Dollars ($2000.00) vering the faithful performance of his duties as treasurer, and that he cause the nd to be executed by some nationally known surety company as surety to the plication, and that the cost thereof be defrayed from the general funds of the rporation.

On motion duly made, seconded and carried, the following resolution was opted:

Resolved, That the Treasurer be, and he hereby is, authorized to disburse from e general funds of the corporation any unpaid expenses incidental to the incor-ration.

Owing to the lateness of the hour, the meeting was adjourned, to reconvene at e call of the President.

History had been made!

SPEAKING OF HISTORY . . .

The March and April 1946 Bulletins recorded the first, second and third meetings the Southern California Camellia Society (unincorporated), held in January and bruary, 1940. The remainder of that first season of activity will probably ays remain a blank. The Minutes, By-laws and perhaps other documents were ned over by someone to someone and placed somewhere—where, no man know-s. New By-laws were later evolved; to evolve new minutes was, alas, out of the estion. Requiescat in pace!

The second blooming or active season opened in November of the same year, the Pasadena Public Library; the members learned "how to photograph and r your own camellia pictures." We wonder if that's where Carlo Galli learned s gentle, but exquisite art! In December, according to the announcement, "Final lection of authentic **(varietal)** names **(of camellias)** are to be presented." Alas, at list too has vanished into thin air, and 1946 finds us still unable to write "final" a varietal list or "finale" to the subject . . . At this meeting Long's Camellia rdens donated a plant for the first prize drawing of our history; the winner, s. W. M. Clennin of Pasadena.

In December 1940, new officers were elected: President, J. C. Barber; 1st Vice-esident, Harry Davis; 2nd Vice-President, Frank L. Burke; Secretary, Thor tersen; Treasurer, Robert A. Ward; Publicity, Opal Scarborough. The minutes this meeting carry the first of several recorded Question and Answer periods.

Quite suitably, question number one is the historic number one question:

Question: What causes bud drop? How can it be prevented?

Answer: Usually, too little water during summer before; plant may b too deeply in the ground; also there may be over-production of buds. Best c avoid plants that drop buds! (Interesting that this issue carries also, in Dr. Bon article, the first successful groping toward a really scientific answer to this ag question.)

Question: What makes camellias die suddenly?

Answer: Large hard ball on roots; planted too deep. (This question, too, lives. None other than this very scribe toted into the presence of Mark Ant a plant with leaves suddenly dry and shriveled, asking of the learned one, " come?" "Planted too deep," quoth Mark; "also, probably too wet, with too poor d age." The bark and cambium layer had rotted at the ground level, cuttin circulation and spelling—finis. One of the "never-nevers" is: **Never** plant a can more deeply than it was in the can it arrived in. If your soil demands a large centage of leaf mould, allow for settling as the leaf mould decomposes; **raise plant,** if and when it settles, to its original level. Ed.)

Question: What is the best time to graft Camellias?

Answer: Winter, though experiments show they may be grafted any m of the year. (See Wm. Woodroof in Bulletin April 1946. Ed.)

Question: What makes buds of Ecstasy blight when ready to open?

Answer: Only poor varieties of Ecstasy show blight. (This would be a subject for a program next winter. Ed.)

Question: Is it possible to set more buds by special treatment?

Answer: Yes, with a chemical named Napthalene Acetic, suggested by Frank Burke. Spray in September as buds are beginning to set.

Question: What type of food should be given to camellias planted in h adobe soil?

Answer: Same as for other soils, but see that hole is properly prepare drainage.

Question: Describe method of transplanting rooted cuttings when taking from the sand and soil mixture?

Answer: Transfer to thoroughly clean 2½-nch pots, in a mixture of 1⅓ 1/3 leaf mould and 1/3 soil.

Question: Should roots of pot-bound plants be pulled apart when replan

Answer: Difference of opinion. On heavily rooted camellias, yes; on f rooted camellias, no. When camellias are removed from cans and a hard lay soil and rust is found, this should be taken off.

Question: Can walnut leaf mould be used in soil mixture for camellias?

Answer: Yes, when thoroughly decayed. Member using same has he growth with very dark green leaves, although he has been using it only as a m two or three inches deep.

EDITORIAL

An editorial, gentle reader, is an article written by the editor. In all art by whomever written, the writer more or less sticks his chin out. An editor, he writes an editorial, is supposed to stick his out especially far, "high, wide handsome."'

This is the first editorial to appear in this Pinnacle of Profundity; if the re cussions are great enough, it may also be the last, lest the editor lose his hi remunerative job. At any rate, it should make history and should be an outstan job of chin-strutting. Let us, then, discuss the planting of camellias, a highly troversial subject, to be discussed only by experts. An editor writing on subject is like a man biting a dog; it is news—even if the dog doesn't bite back.

Southern California is blessed not only with an almost unimaginable r of climatic conditions, but with an equally wide range of soil composition structure. Our soils range from pure sand, through sandy loam, silt, decomp granite, to adobe so full of clay that when puddled and dried in the sun it m bricks of which the earliest settlers built homes, many of which are still stan today.

Obviously, one who buys a new home and then a flock of camellias which he sires to plant, must first ascertain the structure of his soil. If it is sandy loam, ith perhaps slight emphasis on the sand, his concern will be to introduce peat oss and leaf mould or other humus, to retain moisture. Camellias are shallow- oted. Sometimes the soil auger will show moisture three feet below the surface the sandy loam soil several months after rain gave it its last water; the top foot, wever, may be dry as dust. It is the top foot or two which count. In this soil, wever, the hole need not be as deep or wide as in the heavier soils. Perhaps or eight inches beyond the ball in all directions. One successful grower adds e-third peat to the soil which goes back into the hole, surrounding the ball. As treatment of the ball, more later.

In the heavier soils, the hole must be larger, deeper. There is an old saying pecially appllicable to camellias, and doubly so in heavy, poorly drained soil: letter a one-dollar plant in a ten-dollar hole than a ten-dollar plant in a one-dollar le." In adobe soils, two or more feet in diameter and three or more deep, makes good hole. In addition, one to three drainage holes made with a hydraulic borer ill help, especially if there is hardpan beneath to block the drainage.

The hydraulic borer consists of an eight-inch piece of ½-inch pipe at the siness end; to this is added a "¾ to ½-inch reducing collar;" to this is added a piece ¾-inch pipe about five feet long; then add a ¾-inch "street L" and to that, a se connection. When the hole is dug, attach the hose, turn on the water and ply the tip of the borer to the bottom of the hole; point it away from you or the d will spatter you as the water starts boring the hole; after the hole is started, raighten the borer and rock it gently from side to side as it works its way down to the ground. If you strike a layer of hardpan, dense gravel, be patient; in a w minutes the borer will work its way through. Discovery of hardpan calls for ree drainage holes leading down from the excavation, sinking the borer to its hilt. hen you have finished boring, the hole will be full of water; how quickly it npties will answer the question whether or not you have established enough rainage for this particular spot, how much coarse gravel should be placed in the ttom of the hole, to be covered with sand, before the mixture goes in.

The bored drainage holes will fill with mud; bore them free of it; when the all amount of water thus reintroduced has drained away, fill the holes with avel; then the bottom of the hole with four to eight inches of it; then a like ount of sand over the gravel and you are ready for the soil mixture and the plant.

In these situations, in such soil, the consensus seems to incline toward a mix- re of peat, leaf mould and soil in equal parts. If the soil is especially heavy, dition of a small proportion of sand may be desirable. Some growers add a all amount of redwood bark; some do not like peat; others dislike leaf mould hich breaks down and tends to allow the plant to settle. One grower who had st spent days and days raising all of his large plants five to seven inches, swore would never use leaf mould in a camellia mix again. A plant set—or settled— o deep, is on the highroad to destruction.

As you fill the hole, tamp the mix well; when the ball goes in, tamp the mix ound it. Place the ball high enough to allow for settling; the plant should not ttle deeper in the ground than it was in the can it came to you in.

As to treatment of the plant, the ball, when it comes out of the can. One friend ho grows them most successfully and inclines to the scientific side, bare-roots ery plant he buys, gives the roots a hormone wash before planting. One of our ost successful, and scientific, growers bought a large nursery; dug hundreds of rge plants out of the field, carted them home bare-rooted in trucks, planted them ithout loss.

Don't assume that the plant comes to you in perfect soil or perfect condition. me of the soil in cans we have opened was like concrete; some almost like pure nd; some had excellent drainage, some none. In some cases, the tap root of the aby plant grew against the bottom of the small pot, curled up like a corkscrew nd, ever after, the root system just went 'round and 'round. A friend recently ept on my shoulder because several choice grafts suddenly stopped growing, ecame sick, began to turn up their toes. Bare-rooting showed the understock have almost no roots at all. A hormone bath, long and strong, and repotting; nxious waiting; finally the sick plants began to move.

All this does not necessarily discredit the nursery from which the plant was btained. The plant may have stood long in the can, the soil deteriorating. In ite of utmost care, one can may contain a high percentage of one ingredient of mix made by a good formula; this can may not be so good.

It would be ill-advised to suggest that all plants should be bare-rooted, espe-

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cially by the inexperienced, the novice. Certainly, however, the soil in the ca should be evaluated; if too bad, there might be less risk in gently hosing off th soil, giving the roots a 15-minute bath in vitamin B, unravelling them as well a possible, and as gently, then planting it, than in planting it as it came in the ca

The hard outside layer, caked and infiltrated with rust from the can, should b removed when present. If the roots are matted tightly around the ball, this scrib likes to pick them loose so they can grow somewhere other than 'round and 'roun the ball.

Finally, a rim of raised soil should be formed outside the edge of the filled hol when planting is complete, and the basin thus made be filled with water. Aft it has drained away, a thin layer of loose soil should be raked over the area to pr vent further evaporation and caking of the top soil.

One of the things to love about camellias, in addition to their beautiful folia and gay flowers, is their hardiness. Given good environment, reasonable judgme and care, they do well. They ask so little and give so much!

HERE AND THERE

The Horticultural Research Committee met recently to discuss several interes ing projects which promise interesting information to come in due time.

Dr. Walter E. Lammerts has promised an article which will run serially The Bulletin, commencing in the fall.

Mention of Henry Prucha's invention for protection of C. Lotus blossoms fro sun and rain, has brought much speculation and question. Perhaps we can ove come Henry's modesty and obtain his permission to disclose the secret.

Dr. H. Harold Hume's book, CAMELLIAS IN AMERICA, is on the press, abo ready for distribution. It contains 466 pages, 181 illustrations of which 49 are fu color inserts, 78 are half-tones and 54 are line cuts. The book divides into fo parts: Historical, Botanical, Cultural and Varietal. The pre-publication price f a small limited edition, is $25.50. Check to J. Horace McFarland Co., Publishe Harrisburg, Penna.

Dr. Hume is one of our two Honorary Members. His long study of th Camellia, from various aspects, his many outstanding contributions to its unde standing, appreciation, culture and varietal nomenclature, have won him an envia position in the world of horticulture—and guarantee anything he writes as w worth reading, studying—and owning.