BULLETIN OF PEONY NEWS

No. 6

Edited by the Secretary of the Society

A. P. SAUNDERS, CLINTON, N. Y.

PUBLISHED BY THE
AMERICAN PEONY SOCIETY
MAY, 1918

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REPORT OF DIRECTORS' MEETING

The Annual Meeting of the Directors of the Society took place at the Hotel Astor, New York City, at 10:30 a. m., on March 16. Those present were Messrs. Boyd, Farr, Brown, Humphreys, Bonnewitz, Saunders.

The most important question before the meeting was that of the prize schedule for the Cleveland Show, which proved so engrossing and time-consuming that the evening had already come before it was completed.

Messrs. S. Prentiss Baldwin, M. A. Vinson, and H. P. Knoble, all of Cleveland, had very kindly come to the meeting to discuss the local arrangements for the show, and in addition the Directors had the benefit of the counsel of Mr. George Asmus, well known to the trade; to all of whom our thanks are extended.

The prize schedule will be in the hands of our members as soon as this issue, or very soon after. It is therefore needless to make much comment on it here. Some new features will be found in it, which we hope will please exhibitors and draw out a good competition.

All local arrangements for the show were kindly taken over by the Local Committee, consisting of the three Cleveland gentlemen named above.

The Directors chose for the Judges' Committee Messrs. A. H. Fewkes, W. H. Thurlow, and A. M. Brand, all of whom have ere now expressed their willingness to serve and their intention to do so if it is possible for them to be present.

The suggestion of providing identification buttons to the members of the Society was at the last annual meeting referred to the Directors for action. The Treasurer was authorized to have numbered buttons prepared, corresponding to a printed list of our membership in the order of seniority.

Following the precedent established last year, it was decided to offer silver medals to be competed for at the following local peony exhibitions: those of the Massachusetts Horticultural Society at Boston, the Pennsylvania Horticultural Society at Philadelphia, the Northwestern Peony and Iris Society, and the exhibition at Omaha, Nebraska.

It was decided to accept the offer of an exchange of membership with the Northwestern Peony and Iris Society, the Secretary of each organization to be enrolled as a member of the other.

After much discussion of ways and means, a committee of three, Messrs. Boyd, Humphreys, and Farr, was appointed to take such steps as may seem best to them—within a moderate financial limit—to make the Peony Society better known, and to stimulate the growth of its membership.

For Hotel Headquarters at Cleveland the New Amsterdam was chosen. An informal dinner will be held there at 6 o'clock on the first evening of the show, and the annual meeting will take place immediately after the dinner. The date of the show was necessarily left open until a later time, but it was understood that it would be somewhere between the 8th and the 13th of June, according to the season.

THE PRESERVATION OF POLLEN FOR HYBRIDIZING

By A. P. Saunders

The hybridist does not as a rule make as much use as he might of the fact that pollen may be successfully kept for some time, and under favorable conditions maintains its fertilizing power to quite an amazing degree. For the benefit of those who are working on the cross-breeding of peonies or other flowers it has seemed worth while to gather together some of the results that have been obtained by experiment; all the more since the information has not found its way to any extent into general botanical literature. We may thus benefit by what has already been learned and perhaps be encouraged to devise still better means for carrying over the pollen beyond the blooming time of the plant from which it is taken.

Certain facts are fairly well known which show the great vitality of the pollen of a few species of plants. For instance, it is a common practice to gather pollen from tomato plants grown out of doors during the late summer and fall months, and hold it over for use on plants grown under glass in winter. Grape pollen also is said to retain its vitality for fully two months; and that of the date palm for a year or more. Carnation pollen may be kept in closely stoppered bottles for several weeks, and may thus be

shipped from one part of the country to another. In preparing such pollen for preservation it is first to be thoroughly dried, and then sealed up tightly enough so that little or no moisture can get to it. For plants native to moist countries, the drying should be done in the shade, while for those native to arid regions it may be more quickly done in direct sunlight.

It is said that in the West Indies the pollen of certain plants is commonly preserved and distributed by laying it between sheets of dry blotting paper and enclosing these in cardboard boxes.

An important paper by M. Pfundt on the general subject of the influence of humidity on the vitality of pollen, appeared in Pringsheim's *Jahrbücher der wissenschaftlichen Botanik,* Vol. 47, 1910. From this paper most of the following material is taken.

It is of historical interest that in 1712, Kämpfer noted the practice of the Orientals, who cut off the male blossoms of the date palm and hang them up in a dry place, by which means the pollen is preserved until the following year. Kölreuter in 1766 records his having successfully preserved the pollen of Chieranthus cheiri for 14 days; and Gärtner in 1844 describes quite an elaborate set of experiments in which the pollen of various plants was studied with relation to the preservation of its vitality. In all of these experiments the test of vitality was the actual fertilization of blooms and the production of seed.

This method was tedious and involved a great amount of labor where anything like an elaborate series of experiments was to be carried out. Consider a moment the method of fertilization on the plant. The pollen grain having been deposited on the stigma, where it is held by the viscid fluid, sooner or later sends out a process called the pollen tube, which penetrates down to the ovum, and through the means of which a part of the contents of the pollen grain are ultimately conveyed to the ovum, effecting fertilization. Hence it is reasonable to suppose that the ability of pollen grains to send out a pollen tube is as good a test of their vitality as the actual fertilization and production of seed on the plant.

Now it has been found that by putting pollen grains into a sugar solution of appropriate strength, the formation of the pollen tube can be brought about on a glass slide which can be examined under the microscope. This is the method which has been used in the later researches on the subject. It is not at all difficult to

observe the formation of the pollen tube in this way, the tube itself being a gut-like process extending to a surprising length in the liquid. If a solution of cane sugar in water is prepared of about 15 to 20 per cent. concentration—say one-half ounce (two level teaspoonfuls) of cane sugar in half a glass of water—the pollen of a good many species of garden plants will readily germinate in such a solution. Iris pollen tested during the preparation of these notes, showed very good pollen tube formation within three or four hours. A drop of the solution on a microscope slide answers very well if kept from evaporation; the drop may be covered with a thin cover glass, though there is danger of crushing the pollen grains unless this is very carefully done. The best arrangement, if it is available, is one of those slides with a little well in the centre; a drop of sugar solution is then placed on a cover glass with the pollen, and the cover glass inverted over the well. This forms a hanging drop which is protected from evaporation. By such observations, the vitality of pollen may be determined, but experiment has shown that pollen tube formation gets very much slower after the pollen has been preserved for some time; samples of pollen that had been kept several months took as much as three or four days before pollen tube formation began, and it may well be doubted whether such pollen would be of much use under field conditions.

In investigating the vitality of various pollens, Pfundt took samples of them and placed them either in the air of the room or in a desiccator (a glass vessel tightly closed from the air) containing a solution which would maintain a fixed degree of humidity within the vessel.

Ordinarily the air on a dry day contains about 40 per cent. of the maximum humidity. Immediately after rain this may rise to 90 or even 100 per cent. Sixty per cent. is said to be about right for our comfort. In the experiments Pfundt carried out, he records that the humidity of the air of the room in which the samples were kept ran from 30 to 50 per cent. in winter, and from 40 to 80 per cent. in summer. Hence the samples exposed to the air of the room were under a degree of humidity which varied between wide limits with the changes of the weather. In a desiccating vessel one may adjust the humidity to any desired degree by using mixtures of sulphuric acid and water of various concentrations.

Pure concentrated sulphuric acid gives a humidity very near zero, for it is a strong absorbent of water. A mixture of 54 per cent. sulphuric acid and 46 per cent. of water gives a humidity equal to about 30 per cent. of the maximum. That would be roughly dry weather conditions. Acid and water in the proportion 37 per cent. of acid to 63 per cent. of water gives 60 per cent. humidity; moist weather conditions. Whereas 15 per cent. acid and 85 per cent. water gives 90 per cent. humidity; muggy rainy weather conditions.

The experiments show that rainy weather conditions are very bad for the preservation of pollen, and that the best results in longevity are usually attained under dry weather conditions, and even complete dryness is very much more favorable to the life of the pollen grain than is too much moisture. The samples under observation were kept in a dark cupboard, and the temperature of the room was ordinarily about 65 Fahrenheit.

The following table gives the longevity of various pollens in days under the different conditions as specified, the figures 90, 60, 30 per cent. referring to the percentage humidity maintained by mixtures of sulphuric acid and water, as explained above.

Order	Species	In air	90 p.c.	60 p.c.	30 p.c.	Over strong acid, i e. zero humidity
Liliaceae						
	Colchicum autumnale	92	16	32	229	121
	Hemerocallis fulva	11	2	6	20	26
	Tulipa Gesneriana	37	23	43	108	92
	Galanthus nivalis	42	27	42	76	56
	Iris graminea	20	3	16	48	57
Ranunculaceae						
	Peonia albiflora	56	14	39	157	157
	Trollius europaeus	29	9	29	102	124
Glumiflorae						
	Zea mays	1	1	1	1	1
	Poa compressa	1	1	1	1	1
Rosales						
	Prunus avium	28	12	25	102	126
	Lupinus perennis	129	12	43	260	164
Viola odorata		35	19	28	217	235
Primula elatior		56	18	56	155	179

Several facts stand out strikingly from this table. One is the great variations in the different genera. The grasses are conspicuous for their short-livedness, whereas many of the others, especially some of the early spring and late autumn blooming plants,—Colchicum, Viola, Primula,—show an even more surprising longevity.

Wetting is very injurious to pollen, and diminishes its vitality a great deal. Pollen of Tropaeolum majus wetted for two minutes and then placed in artificially dried air, maintained its vitality for only two days, whereas the same pollen unwetted remained vital under similar conditions for 88 days. And the longer the wetting continues, the more disastrous the effect. The flowers—those that can do so—try their best to prevent the wetting of the pollen and stigma by furling up tightly when rain comes, and at night, when dew is falling.

The longevity of many of the pollens included in the above table, was certainly not to be expected, and one can hardly imagine what end in the economy of nature is met by endowing the pollen with a vitality of which it can hardly ever take advantage under natural conditions. Fertilization on the plant is generally completed within a few hours after the pollen is applied to the stigma, though there are a few exceptional cases on record, as for example Betula alba, which is reported as requiring about four weeks.

Most pollens will not form pollen tubes at low temperatures—anything approaching the freezing point—but in the case of a few of the spring flowers—Crocus, Snowdrop, Christmas Rose—it was found possible to get pollen tube formation at a temperature of only about 40 degrees Fahrenheit.

Pollen is particularly susceptible to the attack of mould, which is indeed an even worse enemy than moisture. Hence in exact experiments it is necessary to use precautions in making up solutions for use. After adding the required amount of cane sugar to make whatever concentration is desired, the solution should be sterilized, most easily by heating. Such a solution should be pretty free from mould spores; yet in the tests on very old samples of pollen, where pollen tube formation was slow, Pfundt states that it was impossible to keep the tests going for more than three or four days without mould appearing.

Pollen tube formation may sometimes be observed in pure

water. If a little of the pollen be scattered on a microscope slide, a tiny drop of water added, and the whole gently covered with a cover glass, the pollen grains will be seen to swell, and within a few hours or even in less than one hour, pollen tube formation may begin. Too much must not be expected under these conditions, for at the best only about 20 or 30 per cent. of the pollen grains show vitality even when perfectly fresh.

For ordinary purposes of testing, it is probably best to use a sugar solution as I have described, though it is to be remembered that the same concentration does not suit all pollen equally well. However, if positive results are obtained showing the sample to have retained its vitality, nothing more is needed. If the results are negative, which will be more likely with pollen that has been kept over for some time, then it may be necessary to use sterilized solutions in order to be able to give the test a longer duration.

Later investigations on the germination and fertility of pollen, for instance those of Sandsten at the University of Wisconsin, have extended the conclusions of Pfundt to a larger range of species, and have thrown new light on some other aspects of the problem. For example, it is often supposed that frost is actually fatal to the vitality of pollen. This is not the case, for it is found that pollen subjected for several hours to temperatures two or three degrees below the freezing point, while it does not act as well nor as quickly as fresh unchilled pollen, nevertheless retains a fairly high fertilizing power and germinates much as usual in the warmth. On the other hand, the life of the pistil, at least in the case of tree fruits, is imperilled by frost; indeed the majority of the pistils after exposure to the same conditions as used in the test on the pollen, were found to be dead and quite incapable of being fertilized.

It is sometimes supposed that rain washes off the viscid juice from the stigma, and so makes fertilization impossible. The fact appears to be that the female part of the flower is not seriously affected by rain; but the pollen is so; and since the period of receptivity of the stigma is not very prolonged—a few days at the utmost—if rain is persistent it may prevent the dispersion of the pollen until the stigmas have passed the time when they could be fertilized.

Conclusions

The practical conclusions from all this for our purpose as peony hybridizers, are these:

1. Peony pollen under favorable conditions is very long lived and there should be no difficulty in carrying it through the entire season from the earliest blooming species to the falling of the last blooms of Chinese peonies, thus making it possible to cross P. Wittmanniana or other early species on those forms that come on later.

2. The safest conditions for preservation are where the fresh pollen is put into a desiccator provided with a mixture of sulphuric acid and water in the proportion by weight 54 of acid to 46 of water, which will be by volume 30 of acid to 46 of water, since concentrated sulphuric acid has a specific gravity of 1.8 where water is unity. But if the pollen is simply dried in the sun, folded in paper and kept in a dry room, it will probably retain its vitality for a couple of months, hence there should be no difficulty in hybridizers exchanging samples of pollen during the season.

3. Pollen that is to be kept must be carefully preserved from wetting; and as a corollary, it is probably hopeless to use in the field any pollen that has been wet and dried again.

4. Pollination should be carried out on days that are at least fairly warm in order to have the chances of its "taking" as good as possible.

Perhaps a few words may not be out of place here for the benefit of the beginner in cross-fertilization, who will probably have found this paper rather dry reading.

The fundamental necessities are, first, to take the bloom before it has been fertilized either by its own or by other pollen; second, to effect pollination with the desired pollen, and third, to prevent subsequent pollination.

To meet these aims we take for example a peony bloom that is just expanding, and before it is sufficiently opened to permit pollination either by wind or by bees. If it is a double, without stamens, there is no danger of self-fertilization; but if stamens are present they should be examined to determine whether or not they have already burst; if so, the flower is probably already fer-

tilized; if not, they and all the petals should be stripped off with a pair of forceps. If the stigma is dry and not covered with viscid juice, the flower should be enclosed in a little paper bag and left until the stigma is in a receptive condition; when this time arrives an anther may be brought over from the bloom that is to be the male parent, and gently rubbed on the sticky surface of the stigma. It is very easy to see the yellow pollen adhering to the surface when this is done. The fertilized flower should then be enclosed in a little paper bag or in a bit of cloth tied over it; this may be left on for the rest of the summer, or it may be removed after a few days, when all danger of outside pollination has passed. A string tag should be attached to the stem, recording the two parents, and for precaution an entry should also be made in a note book, as the records on the plant may be washed off during the summer rains.

BEST TIME TO TRANSPLANT PEONIES

The following article on transplanting peonies appeared in the pages of that excellent and too short-lived magazine, Garden and Forest, which was published in the eighties and nineties under the able guidance of Prof. C. S. Sargent. Why so valuable a paper was allowed to die, we need not here inquire; probably it was too good to be popular—like that superb venture of Mr. William Robinson's in England, Flora and Sylva, which also perished in its youth.

This article appeared in the number for July, 1897, and while the suggestions it contains may not be new to some growers, it is very doubtful whether the general American practice conforms to them; and it would be extremely interesting to hear from some of our experts as to what their own practice and beliefs are; particularly whether they would agree with Prof. Sargent that in America August is the month in which peonies are best moved.

"Gardeners are well aware that the tops of Lilium candidum die down to the ground soon after the plants flower, when the bulbs take their rest, and in a few weeks begin to throw out roots and radical leaves which remain green all winter. The Oriental Poppy is another plant with large fleshy roots, which behaves in

the same manner, and, of course, the proper time to move these plants is as soon as the tops have died, and before the new roots have started for autumn growth. There are, however, many other herbaceous plants with fleshy roots, the tops of which do not die down after flowering, while they send out a new set of roots in early autumn, which are probably useful in aiding to store up material in the root for the production of early flowers and seeds the ensuing year. Among plants of this class Peonies may be mentioned, which are most successfully moved in this country in August. Owing to climate and exposure the most successful practice in English gardens differs much from that which prevails in this country, but the following advice from a late number of the London *Garden* is well worth considering in America:

" 'An all-important item in the matter of peony culture is planting at the right time, and for this work no better time exists than the early autumn or late summer, by which I mean the end of August or during September. At that season of the year the plants will still be furnished with leaf and stem, and, preserving these intact, it is possible to lift and transplant a very large-sized clump of one of these peonies with the assurance that a good proportion of flowers will be forthcoming the year after. There are many who believe that planting or transplanting may be done at any time while the growth remains comparatively dormant, but let any such transplant a fair-sized specimen in September with all its foliage intact and another in January with no foliage, and note the results. The one planted at the latter time will have many of its flowers blind in the ensuing year as a direct result of late planting. Nor is this all, since the same cause which has contributed to the blind buds will in all probability have produced a debilitated condition generally of the plant, though more particularly of its roots, that will not readily be overcome. A weakened root-action in a peony means a relatively weak growth, and from this an obviously weak bud at its base as the result. It may be thought that I have restricted the planting season to very narrow limits, yet I regard a certain season quite as important for these as I would for certain classes of bulbs to be planted before root-action commenced.

" 'The whole subject of planting peonies turns on a question of roots, or rather the time and the manner these are produced, and the more these facts are generally realized the easier will it be to

insure the planting of these within reasonable as well as seasonable limits. In peonies two sets of roots are produced during the year, the chief being in early autumn, and it is, therefore, to secure these intact that the planting should be done before they push forth. Planting done at a much later date either sacrifices these roots entirely or so mutilates them that they are of little value, and then the cry goes forth that peonies are difficult to establish. In point of fact, few things are more readily established when the work is done at the right time; but this is rarely the case. Lifted and planted when growth has well begun, and the plant has to exist all summer long on its own resources, it is little wonder the plants decline for a year or two or are slow to make a start at all. At Kew, about two years since, some very large clumps were lifted, rearranged, and replanted in full leaf in early autumn. Well planted, thoroughly soaked with water at the root, it was evident what the result would be the year after. Many of these plants, in fact, carried large, handsome blossoms, while today they are perfect examples and loaded with vigorous growths and flower-buds.

"'Next in importance to planting is the soil, which cannot be either too deep or too rich for these gross-feeding and vigorous perennials. Select a spot away from the roots of large trees and dig the soil as deeply as circumstances will permit, two feet, or three feet if possible. Work in quantities of well-rotted manure and bone-meal, old mortar rubbish and the like, also leaf-soil where this is plentiful and the natural soil very stiff or water-holding. So far as the soil is concerned, peonies will thrive in almost any that is deep and well enriched, but there must be no stint of manure, especially where hot sand or gravelly soils abound. In these latter it will be found a good plan to slightly sink the surface of the bed below the ordinary level, so that manure water may given freely at any time when needed'."

DESIDERATA FOR THE WASHINGTON COLLECTION

Our President, Mr. Boyd, furnishes this list of peonies wanted for the Co-operative Peony Garden of the American Peony Society at the U. S. Department of Agriculture, at Washington, D. C.

Alsace-Lorraine (Lemoine 1906).
Belle Mauve (Lemoine 1903).
Coronation (Kelway).
Chestine Gowdy (Brand 1907).
Daybreak (Hollis 1909).
Duchesse de Nemours (Calot 1856).
Elizabeth B. Browning (Brand).
Evangeline (Lemoine 1910).
Frances Shaylor (Shaylor 1916).
Grandiflora Nivea Plena (Lemon 1824).
Ginette (Dessert 1915).
Gismonda (Crousse 1895).
Jessie Shaylor (Shaylor 1916).
Jubilee (Pleas 1912).
Kelway's Glorious (Kelway 1909).
La Fée (Lemoine 1906).
Le Cygne (Lemoine 1907).
Longfellow (Brand 1907).
Lora Dexheimer (Brand 1907).
Martha Bulloch (Brand 1907).
Mary Brand (Brand 1907).
Mary Woodbury Shaylor (Shaylor 1916).
Mignon (Lemoine 1908).
Miss Salway (Kelway).
Mme. Savreau (Savreau).
Opal (Pleas 1908).
Philippe Rivoire (Riviere 1911).
Raoul Dessert (Dessert 1910).
Reine Hortense (Calot 1857).
Solange (Lemoine 1907).
Thérèse (Dessert 1907).
Virginie (Calot 1858).

These varieties are for the most part rare and precious, and it is very much desired that those who could spare them will be generous enough to do so. Correspondence on the subject should be addressed to Mr. F. L. Mulford, Office of Horticulture, Room 306, 220 Fourteenth St., Washington, D. C.

SOME IMPRESSIONS OF MRS. PLEAS' PEONIES

By Lee R. Bonnewitz, Van Wert, Ohio.

After exhibiting Pleas' Jubilee at the Philadelphia Peony Show, I received a very nice letter from Mrs. Pleas in which she gave me the names of thirty varieties she has originated, the majority of which I have never seen.

Although Jubilee has attracted more favorable notice than all the others combined, yet Mrs. Pleas believes she has originated three peonies of greater merit than Jubilee. Her Elwood Pleas she places first, followed by Madam Pleas, and then by Queen of the Pleasance. The last two varieties I have never seen, and so I will not attempt to describe them, but I am sure that a very high place in the peony world must be given to Elwood Pleas. In partial shade and on old plants I have seen blooms of this peony which rival and somewhat resemble the world famous Thérèse: while on plants growing in full sun we have had blooms which equalled and very much resembled the very best Madame Jules Dessert exhibited in any of the big shows.

I hope the Cleveland meeting will be late enough in the season so that someone may show a first-class Elwood Pleas, and I know it would give Mrs. Pleas great pleasure if her favorite peony should prove to be a prize winner.

Not all the Pleas peonies deserve such favorable mention I have been disappointed with Golden Wedding, General Lawton, and Little Gem, and it is quite possible that there are other varieties in Mrs. Pleas' list upon which I might not place a high value if growing in my own garden. But she has produced so many peonies of very great merit that her position as an important peony originator is assured. Her Midsummer Night's Dream may become as famous as Jubilee, which it much resembles, but it has the distinguishing characteristic of a most beautiful corn colored collar, while Jubilee has a white collar. Her Opal is as beautiful as Thérèse, though not so large, but it is peculiar in changing color from season to season. In 1916 Opal was greatly admired for the excellent wax-like quality of its petals and for its dainty pink color. In 1917 the Opals in Van Wert lost both the quality of flower and the beautiful color, and instead of pink, we found a white bloom. However, I found an Opal which I had sent to

St. Paul, Minn., with the same beautiful pink bloom we had seen the previous year.

Mrs. Pleas' Lady Emily is quite an attractive bloom of medium size, with rose, pink, and cream in its loose petals, and of a general quality and color very much like Duchesse de Nemours (Guérin). Walter Morgan is a very double deep cream peony which may get into the prize winning class.

But Jubilee has been my favorite since the very first day I saw it, probably six or seven years ago. The plant grows fully four feet tall if properly supported, and blooms very generously. The buds are pointed and the outer petals are shell pink, but the full blown flower is white with cream tints showing in the depths of the centre. With the exception of Le Cygne, it is the largest white peony I have ever seen; and it is very much like the French variety, Mont Blanc, except that Jubilee is larger and has a deeper, richer centre.

Within the next year or two I hope to see all the Pleas peonies, and I am trying to secure a division of each, in order that I may have a Pleas Peony Garden of my own.

[Our members well know that Van Wert is the centre of enthusiasm for Mrs. Pleas' varieties, and we are all hoping that there will be a goodly number of them staged in true form at the Cleveland show. We cannot all get to Van Wert in peony season, much as we might like to, so when we gather at Cleveland we shall expect our Van Wert friends to bring their gardens with them.—EDITOR.]

NOTES TOWARDS THE HISTORY OF THE PEONY IN AMERICA

Previous instalments under this heading have included articles by Mr. C. S. Harrison, the Messrs. Thurlow, Mr. Rosenfield, and Mrs. Pleas.

V. From Mr. A. M. Brand, Faribault, Minnesota.

Discharged from the Union Army for permanent disability, my father returned home to Wisconsin in 1863. Impaired health

kept him from working for some time. But it was not long after the close of the Civil War before he engaged in the sale of nursery stock, and the nursery business became his life work.

Removing to Minnesota in 1867, after several moves he finally settled down upon those grounds which now for over fifty years we have devoted to the general nursery business.

For the first twenty-seven years as a nurseryman he spent much of his time, at first afoot, but later on with horse and buggy, travelling over the state selling nursery stock. In this way during the many months of June that he was on the road he ran across quite a number of good peonies blossoming in the gardens of the many good farm wives where he stopped.

The Minnesota climate produces wonderful peonies. Cool moist fore parts of June when the peony blooms with us, are the rule. These conditions are ideal for the flower, and with us the peony is surely the flower of flowers.

As my father found a good sort here and there in his travels, he purchased it, and in time in this way acquired quite a collection. Thus Fragrans, Whitleyi, Delicatissima, Festiva maxima, Humei, Delachei, Edulis superba, and other sorts of like quality came to us.

As I grew up, I followed in my father's footsteps and travelled with horse and buggy over the prairies and through the great woods of Minnesota selling nursery stock. And I, too, was ever upon the lookout among the great plants of peonies I so often saw for some variety we did not have at home. I remember very well first beholding a great root of Rubra Officinalis in full bloom during one cold very damp June. I thought I had never seen another such flower. I purchased the root at $5.00 which was about all the money I had at that time. In September I travelled eighty miles to dig and bring home that one peony root.

In 1889, I think it was, my father purchased of Ellwanger and Barry a dozen varieties which he selected from their catalogue, and when these sorts bloomed, from that time on he was under the spell of this wonderful flower. After that time his collection rapidly increased, until by the fall of 1899 as far as number of varieties was concerned he had one of the greatest collections in America.

Father was the pioneer nurseryman of Minnesota. His early years in the nursery business were those years when the horticul-

ture of Minnesota was passing through the experimental stage. All varieties had to be tested out for hardiness, and most varieties were found wanting. He gave much of his time searching for varieties of apples suitable to our climate, and finally came to the conclusion that a satisfactory stock for Minnesota could be produced only by growing quantities of seedlings from the hardiest varieties we had, and selecting from these.

Working along these lines as he did, it was natural that when he once became really interested in the peony, he should try to improve that, as he had the apple.

In the spring of 1899 he had a collection of about three hundred good sorts, the best he could acquire. These were planted in four different beds, most of the varieties running about three large plants to the variety. In this collection were about twenty choice singles. No hand pollenizing was done. The bees and the winds attended to that.

That fall seed was saved from the entire lot, and late in the fall, planted. This seed being allowed to dry did not germinate until the spring of 1901. In June, 1902, two plants blossomed, and wonderful to relate one of these was that fine early bright red which we named Richard Carvel, the M. Jules Elie of the reds, in bloom with Edulis superba.

The next season, that of 1903, the seedlings came strong and robust and almost all of them bloomed. This was truly a wonderful sight. The world's most beautiful flower bed is a bed of good peonies in full bloom. And the most beautiful peony bed is a bed of well cared for seedlings in full bloom. Each plant is crowned with wondrous large flowers, and the blooms of each plant are different from those of all its neighbors. Were the bed to contain a hundred thousand roots no two of these roots would produce blooms exactly alike. All would be different from one another.

This season of 1903 to us was truly a feast of flowers. We checked and re-checked that bed of seedlings continuously it seemed from the time the first kind opened until the last faded petals fell. We were in it with the coming of the sun, during the heat of noontide, and until almost dark.

From the thousands of seedlings in this bed we selected about forty as worthy of trial. These were divided in September and planted out for further trial. All the balance of the doubles of

this seed bed were lifted that same September, divided, planted out, and staked, that we might not by accident have classed as poor some variety that afterwards we would wish to keep. From this lot of seedlings at first classed as second grade, I have since selected four very fine varieties.

From the forty selected as good in the first place, after years of testing we finally find that we have about ten very choice sorts.

Judgment can hardly be passed upon a new seedling inside of ten years after the planting of the seed. A new peony to be of value must in the first place possess great beauty; its habit in growth must be good; it must be a profuse bloomer; it must do well on many soils and in many different locations; and all of these things must come true year after year. It takes fully ten years to test these things out. This is the test we give all our seedlings.

This first seed bed has given us such sorts as Archie Brand, Charles McKellip, Chestine Gowdy, E. B. Browning, Frances Willard, Henry Avery, Judge Berry, Longfellow, Lora Dexheimer, Mary Brand, Martha Bulloch, Phoebe Cary, Richard Carvel, and William Penn.

The results have been so gratifying to us that we have been compelled to keep on planting seed. And so now each year we plant from a quart to a peck of carefully selected seed; in the fall of 1917 making our largest planting of some sixteen quarts. And by so doing each year, we expect to have new candidates for peony honors coming on continuously in our gardens.

A. M. Brand.

[The statement in the above article that of the seedlings which germinated in 1901 two bloomed in 1902 and almost all bloomed in 1903, will seem scarcely credible to those accustomed to growing peonies from seed. However, the dates were referred back to Mr. Brand for alteration, and he avers that they are correct as they stand.—Editor.]

A METHOD OF HASTENING GERMINATION OF HARD-COATED SEEDS

In the February number of the Garden Magazine there appeared a paragraph by M. G. Kains on the above theme. The

earlier part of the communication reads as follows:

"Many seeds such as Canna, Kentucky Coffee Tree, hardy Locust, and to a less extent Sweet Pea, are very slow to germinate because of the bony coverings around their kernels. Many a Moonflower, Wild Cucumber, and Abyssinian Banana seed have I filed, cut, or soaked in boiling water, to hasten germination. While the holes admit water, the process is too slow; and while the hot water is a quick and easy way of treating a lot of seed at a time, it does not prove as effective as could be desired. A year or so ago, a friend who had heard of the use of sulphuric acid for the treatment of cotton, alfalfa, and clover seeds, tried some experiments with the boniest seeds he could get at the time—those of the Kentucky Coffee Tree. These seeds had lain beneath the parent tree from the previous fall, more or less covered and thus kept moist by leaves and leaf mold. Not one had shown the slightest inclination to swell, much less to sprout. They were placed in a convenient sized beaker glass and covered with concentrated sulphuric acid (specific gravity 1.84, the strongest obtainable). They were left in contact with the acid for one hour, when the acid was drained off and the seed washed free from acid with water. Next they were planted (July 15) in flower pots filled with ordinary good soil and the pots plunged rim deep in a shady moist place. Untreated seeds were similarly planted, but up to the time that the photograph of the successful ones was taken, forty-one days later (August 25) not one had sprouted. Considering the extreme slowness of this plant, the growth of about six inches of stem and a spread of nearly a foot is surely remarkable."

The photograph referred to shows a healthy looking young plant with four well-developed compound leaves.

The application of this method to peony seed suggested itself at once, and on April 14 I started the following experiments: (1) 20 seeds of tree peony (Japanese seed, rather old) were soaked in sulphuric acid for one hour, then planted; after one month this lot showed 7 rotted, the rest still sound but showing no signs of germinating. (2) 20 tree peony seed, fresh, *i. e.* last autumn's, also in acid one hour; after one month 1 rotted, the rest sound and showing no signs of germinating, but the shells are quite soft, and can be rubbed off. (3) 20 herbaceous peony seed of last autumn, one hour in acid; after one month, one was

rotted, two splitting open and sprouting, the rest sound and unchanged. (4) 20 herbaceous peony seed of last autumn, another variety, one hour in acid, after one month two splitting open and sprouting, the rest sound and unchanged. (5) 20 herbaceous peony seed of last autumn, two hours in acid; after one month, one sprouted, the sprout already half an inch long, four others splitting and sprouting, two rotted, the rest sound and still unchanged.

Of course these first sprouts are roots, not leaves. The sequence of events with ordinary dry peony seed, as those well know who have worked with it, is this: if sown, let us say, in the autumn of 1917, growth begins about August, 1918, and consists in the sending down of a root to a depth of two or three inches; and then nothing more that year. In the spring of 1919 leaf growth begins. It will therefore be interesting to watch these seeds, which are beginning their root growth three months earlier than normal, and to observe whether they will decide to start leaf growth this summer, or to wait over until next spring. Meanwhile it is evident that the treatment with sulphuric acid is effective in bringing about speedy germination, though there seems to be some danger to the kernel, to judge from the rapid rotting of some of the tested seeds.

Perhaps some of our members will be interested to try experiments of their own. If so, it may be worth adding that the seed should be carefully washed after treatment with the strong acid. In the tests I have made, it was soaked for a few minutes after washing, in water containing a little ammonia to free it from the last traces of acid.

The blackish outer coating of the seed can be rubbed off after the acid treatment, leaving the seed of a uniform brown color. In the case of seed treated for two hours, the shell was so much reduced in thickness that it could be easily broken between the fingers.

It is of no use to follow the matter to its logical conclusion, and crack the shells open and plant the unprotected kernels in the soil. I have done this, and they all immediately decayed and filled the soil with mould.

A. P. SAUNDERS.

COMMENT ON THE ACCOMPANYING LIST OF PEONIES FOR RATING

Along with this issue of the Bulletin, there goes out to our members a rather comprehensive list of peonies for rating. The list itself carries sufficient explanatory matter.

This is a continuation of the earlier symposium which appeared in Bulletin No. 3, and it is very much hoped that all growers will co-operate in making it a success.

I have thought that we might make twenty votes the basis for definite recognition. Thus if a variety received twenty votes averaging 9 or over, it should go into the group of best peonies; on the other hand, if the average fell below 5, it should go into the discard. Even an average of 6 would indicate a peony so poor in quality that it might well be dropped.

To draw definite conclusions it is necessary to have a fairly large number of votes recorded, since there is always the chance that some returns may be based on specimens not true to name.

Readers are urged to note the request accompanying the list, for additional names of varieties not included in this list; from such names a supplemental list will later be made up.

Prospective raisers of seedlings, who have visions of putting a large group of their products on the market, might do well to ponder the fact that there are already in this list 435 varieties of American origin, each one of which was no doubt considered a gem by its originator. Yet of this number probably not a tenth will prove of permanent value. We should not underestimate the importance of the fine sorts that have been and are being raised by growers in this country. At the same time, when we blame foreign growers for overloading the market with inferior kinds, it might be as well that we should also recognize our own sins in this respect.

CULTIVATION OF PEONIES IN CALIFORNIA

The letter given below comes from a peony enthusiast in Central California, and should bring cheer to the hearts of those who have despaired of the possibility of growing peonies successfully in that climate, where summer heat and drought are severe.

The adaptability of the peony to northern latitudes makes it the most precious of garden perennials for the north and northwest; and this year particularly those of us who live in the north may feel grateful to our peonies for the undisturbed calm they have preserved in the fact of so ferocious a winter as the past, when many of the ordinarily hardy shrubs have been killed to the ground. We often think of the peony as difficult to manage in those parts of the country which have very hot summers, yet we have now on our membership list the names of several growers in California as well as in the Southern States, who do not find it impossible to raise blooms of the highest quality, and it begins to look as though the peony, naturally a northern and cold climate plant, could be taught to endure the rigors—at the other end of the thermometer—of the southern summer also. The letter follows:

"I have grown peonies here since1897. Have had fine blooms every May. I have never had a plant to die.

"I have been careful to get good roots from a reliable grower. Holes were dug thirty or more inches deep, filled with our soil (which is a loamy gravel)—mixed with plenty of two-year-old cow manure to about twelve inches from the surface, then soil without manure to the level. Holes must then be thoroughly settled with water. I later filled up with soil so roots can be set with the crowns two and one half inches deep, and not settle after planting. This work is to be done in July for September planting.

"Another important point is to keep the roots cool after blooming. Heat is the one enemy of the peony here. I mulch them with forest leaves (oak leaves) and when the thermometer goes above 95 degrees, the plants are well sprinkled after sundown. Nights are invariably cool. This revives the foliage, and keeps it fresh until autumn, when it dies naturally.

"I believe that deep digginf, not too deep plantinf of the roots, plenty of water in May, ordinary moisture through the summer, and care of the foliage after blooming, are the rules of success.

MRS. F. H. MCCULLAGH,
Los Gatos, Santa Clara Co., Central California."

FROM THE SECRETARY'S OFFICE

1. Peony Collection of the late James McKissock.

The members of the Society, as well as all other peony growers, will be interested and glad to hear that the peony collection of the late Mr. McKissock is to be maintained in being.

Mrs. McKissock writes: "I am going to continue the cultivation of the peony, and would like very much to continue the membership in my name, and receive the literature. I am issuing only a type-written list of varieties for this year."

The type-written list of varieties offered includes a large selection of standard sorts—about two hundred; then a separate group of about fifty rarer sorts, mostly of European origin and including several not commonly met with in catalogues; then a group of Brand seedlings, a dozen of Hollis, and eight or ten of the best Richardsons. And Mrs. McKissock adds, "I have a number of very rare varieties which do not appear in my list but of which I shall add a few each year."

Altogether the collection is such a one as could only have been brought together by an enthusiast of fine discrimination.

2. New Seedling to be offered by the Messrs. Thurlow.

Mr. Winthrop H. Thurlow, in a letter responding to the invitation from the Directors to act as one of the judges at the Cleveland show, has this to say, which will interest the peony growing public:

"We wish to list a new seedling this year which we shall name President Wilson, if there has been no other named for him. It is a variety having very large flowers of shell pink with flesh tints in the centre; the petals are wide and delicately formed, and the flowers are very pretty. We have had this seedling under our observation for a number of years and have decided to offer a few plants this year."

With regard to the judging, Mr. Thurlow gives, unfortunately, only a very provisional acceptance, adding, "I expect before that time that the draft will enclose me, and I may be anywhere but in Cleveland. If by any chance I can make it so as to go to the Society's meeting, I will do so."

We shall all hope to find Mr. Thurlow in Cleveland when we

meet there, but if we do not find him there, I am sure all our members will wish him God-speed, wherever he is.

3. *First Staging of Peonia Lutea.*

The following note on the staging of what must have been the first blooms of P. lutea to be exhibited to the western world, is taken from the issue of Garden and Forest, for July 6, 1892:

"At a recent meeting of the Société Nationale d'Horticulture de France, Monsieur Cornu exhibited the yellow flowered Peony, raised from seed collected in Yunnan by Delavay, to which Monsieur Franchet has given the name Peonia lutea. It is a small flowered species of no ornamental value, but interesting from the unique color of the flowers and the possible influence it may exert in the creation of a new race of yellow-flowered garden peonies."

This forecast has now been fulfilled, and is particularly interesting to us just now in connection with the purchase reported below of the stock of La Lorraine and Souvenir de Maxime Cornu, both of which varieties will in future find their home in America.

4. *Purchase for America of Lemoine's Hybrid Tree Peonies.*

Mr. T. A. Havemeyer and Mr. Farr have jointly purchased from M. Lemoine of Nancy, France, the entire stock of the two yellow double flowered hybrids of Japanese tree peonies on P. lutea. Several individual blooms of one of these hybrids, La Lorraine, were staged last spring, one at Philadelphia by Mr. Farr, as visitors to that show will remember. The other hybrid variety, Souvenir de Maxime Cornu, which was raised by M. Louis Henry of the Paris Museum of Natural History, was taken over by Lemoine and Sons for propagation, and they intended to put it on the market as soon as conditions became normal again.

The stock of these plants, about fifty of each, came over last autumn, arriving in good condition, and is now reported as showing fine growth.

5. *A Letter from Sergeant J. C. Wister.*

A letter from our member Sgt. J. C. Wister of Germantown, who is in France with the Y. M. C. A. service will interest the

readers of this bulletin. Mr. Wister begins by bringing a word of praise for the Bulletin, and its editor lays modesty aside long enough to quote the flattery which is doubly pleasant as coming from one of the premier horticultural papers of the world:

"The other day I was reading the French paper 'Revue Horticole' and found quite a complimentary notice about the Peony Bulletin containing the article on the perfume of different varieties." The letter then goes on, "I moved all my peonies in August, just before I was called into active service. * * * I hope I shall come back to find them thriving, as I have asked Mr. Scott to take care of them for me. * * * I wish I could visit Lemoine's place, but there is no chance. I want to see Dessert also, but cannot get there at peony time this year, though I may be able to get my seven days leave which is due in April, at Iris time. I received my prize money for my exhibits, and while I was glad to get it, I want to suggest that a ribbon or certificate would be greatly appreciated; also I think an offer of peony roots of the better kinds would be a much greater incentive than money prizes in some classes. As our gardens grow, I am sure many of us would be glad to contribute roots for this purpose and the time might come when choice new varieties might be distributed in this way.

"If I do get to see Dessert I will write you about it for the Bulletin. There seem to be only mediocre varieties offered by the other French nurseries, which surprises me greatly. Perhaps they have sold all the good ones to Americans! * * * I find my work interesting though monotonous. Just this minute I am in the hospital with jaundice; otherwise I would never have found time to write this letter, for they certainly keep us busy."

When this note comes under Mr. Wister's eye he may know that his friends in the Society wish him good health and good luck. We shall hope to hear from him again, whether he gets to see M. Dessert or not.

The suggestion of roots of fine varieties as prizes is a good one, and would be particularly likely to have a warm welcome in the Novice Amateur classes. Directors please take notice when the time comes for making up the next schedule.

6. *Major John Connon.*

Major John Connon of Hamilton, Ont., a member of the Peony Society since 1912, was with one of the Canadian contingents that went to the front. He received very serious injuries, and was invalided home more than a year ago. His fellow members will be glad to learn that his condition is at last reported as showing improvement, and all will unite in hoping that he may speedily be restored to health.

7. *Arrangements for the Cleveland Show.*

The following items of information can be found in the report of the Directors' meeting printed above, but for anyone who has not happened to notice them there, they are reproduced here:

Hotel Headquarters, The New Amsterdam.

Dinner, informal, at that hotel on the first night of the show, at six o'clock.

Meeting, immediately following the dinner.

All other necessary information will no doubt be found on the prize schedules.