PAEONIA

Volume 9, No. 2 June, 1978

REQUIRED READING –

1. "The Peonies" by John C. Wister, $3.50 from American Peony Society.
2. The Bulletins of the American Peony Society.

The PAEONIA is authorized by Miss Silvia Saunders.

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HOME NURSERY

(Read Don Hollingsworth's article on Pages 12 and 13 of the March issue of the American Peony Society Bulletin)

Seed distribution is an interesting project but sending planting instructions is time consuming — more time required than I can spare. So here is the information for one and all.

1. Seeds should be planted one inch deep with one inch space between seeds each way, with the row about a foot wide and as long as is necessary. (12 x 12 = 144 — so for each one foot length of row 144 seeds can be used. Farther spacing is O.K. but not necessary.

2. Protection of planted seeds is important. Dogs, cats, nice, birds (with their dust baths), cut worms, slugs and even your big feet take a heavy toll on unprotected seedlings. I recommend a "cold frame" made up of 2" x 8" boards as long as needed. This enclosure makes weeding easier, a light shading benefiting the infant plants, and periodic feeding, tasks that mean a great deal to the little things; also the watering chore is expedited.

Let's do it by the numbers:

1. l. Make a cold frame — place it in an area out of the way, in full sun where soil is suitable.
2. Plant seeds in June, July or August, even later if necessary.
3. Labels should be used to identify the different groups of seeds.
4. Tree peony seeds (suffruticosa) need protection from freezing the first two years.
5. Shade - window screens or laths (thin strips of wood) spaced far enough apart to provide half shade.

(continued on Page 10)

THE HERBACEOUS HYBRIDS OF A.P. SAUNDERS

Silvia Saunders

As my part in your Save the Clones project, I have compiled a complete listing of the Saunders Herbaceous Hybrids, alphabetized by species name, which I hope may help growers and hybridists to evaluate their hybrid peony possessions.

If we are supposed to have views about what clones to save, I'd give you the following list:

1. '**Halcyon**' (species long gone; a beautiful thing; little of it exists)
2. '**Fireflame**' (unique shade of pink-red? small plant, at least as I grew it.)
3. '**Silver Dawn**' and '**Angelica**' (the species, whether you call it *willmottiae* or *obovata* must be excessively hard to find. Beautiful sheer white; not much in existence. Or have you, by now?)
4. 16350 F_2 (very pretty peach ice-cream color. Doubling, which I like to encourage; a fertile triple hybrid.)
5. '**Picotee**' (a darling pink-edged flower; not large plant; early; pure *coriacea*.)
6. Windflowers (should be more used by breeders. Several flowers per stem? nodding habit is pretty as the blooms are held high. They throw a wide range of progeny: tall, dwarf, ivory, even red. *Emodi* itself must be somewhat hard to find, or is it?)
7. Others, if only to save the species itself: '**Lavender**' (Coriacea); '**Camellia**' and '**Diantha**', both charming things came from *decora alba*.

I have turned over to the Hamilton College Library, Clinton, New York, all my father's peony notebooks, records, and written articles. The so-called "Big Notebooks", Numbers I and III, I caused to be copied, and have sent one pair to the Peony Society at 250 Interlachen Road, Hopkins, Minnesota, and also a pair to Chris Laning, the editor of PAEONIA, 553 West F Avenue, Kalamazoo, Michigan. Notebook II was merely a rearrangement of the material in No I, which I do not think worth recopying.

This article includes all the herbaceous hybrids that were named and offered, out of the many hundreds listed in Notebook I, all those hybrids of whom albiflora is one parent, and contains also a good many in Notebook III (hybrids not involving albiflora in their parentage). (Not included are six introductions not hybrids at all, being pure albiflora: '**Emmy Swan**', '**Grace Loomis**', '**Louise**', '**Matilda Lewis**', '**Silvia Saunders**' and '**Solo Flight**'. Also not included are all hybrids that were later withdrawn, or became lost, or whose names were changed.)

Albiflora x anomala F_2:	'**Echo**'
albi x coriacoa:	The '**Lavender**s' (a strain). One was slightly doubling; #8078. It was named '**Alida**'.
albi x decora:	'**Reward**'
albi x decora alba:	'**Camellia**', '**Silver Swan**'
albi x Emodi:	'**White Innocence**'

albi x lobata

This is my father's most important cross among the herbaceous hybrids. It comprises a very large group of plants introduced — probably too many. This cross I should say is unlikely to be lost; it is in many gardens and nurseries.

Of the 44 lobata hybrids named and introduced, 36 had resulted from pollen of a lobata (called Perry because it had come from the nursery of Amos Perry in England) onto various albifloras; 3 from pollen of other lobatas; 1 known F-2, and 1 supposed F-2; and 3 were the reverse cross, i.e. a lobata crossed by an albiflora. Total, 44.

36 albiflora x lobata Perry

'Alert'	**'Ellen Cowley'**	**'Nathalie'**
'Alexander Woollcott'	**'Fortune'**	**'Olivia Saunders'**
'Alison'	**'Gillian'**	**'Paladin'**
'Bravura'	**'Grace Root'**	**'Queen Rose'**
'Cardinal's Robe'	**'Great Lady'**	**'Red Cockade'**
'Carina'	**'Joan Cowley'**	**'Red Red Rose'**
'Cecilia'	**'Julia Grant'**	**'Rose Diamond'**
'Claudia'	**'Laura Magnuson'**	**'Rose Royal'**
'Constance Spry'	**'Lovely Rose'**	**'Rose Tulip'**
'Coralie'	**'Ludovica'**	**'Rosy Cheek'**
'Cytherea'	**'Lustrous'**	**'Skylark'**
'Elizabeth Foster'	**'Nadia'**	**'Sophie'**

3 albiflora x other lobatas

'**Janice**', '**Montezuma**', '**Your Majesty**' (the latter two are from seedling lobata #5267)

F_2 's: '**Moonrise**', a known F_2. '**Red Lacquer**', a supposed F_2.

3 of the reverse cross: lobata x albiflora: **'Heritage'**, **'King's Ransom'**, **'Rose Garland'**.

A note about the albiflora parents:

'Adolphe Rousseau' gave 'Lustrous' and 'Red Red Rose'
'James Kelway' gave 'Nathalie'
'Kelway's Glorious' gave 'Carina', 'Ellen Cowley',
'Laura Magnuson' and 'Sophie'.
'Marie Jacquin' gave 'Alexander Woollcott', 'Constance Spry' and 'Nadia'
'Primevere' gave 'Fortune', 'Lovely Rose', and 'Rose Diamond'.
'Venus' gave 'Rose Tulip'

and unnamed seedling albi's gave rise to the remaining 30 hybrids.

albi x macrophylla: '**Audrey**', '**Chalice**', '**Fantasia**', '**Seraphim**' (1612 and 1676), and '**Shell Pink**'.
F_2 's: from '**Chalice**': '**Anthem**', '**Elysium**', '**Winterthur**'.
from 1612: '**Archangel**'
misc.: '**Carnation**', Fantasia II, '**May Lilac**', '**Rose Crystal**', '**Serenade**', and #4992.
F_3: '**Easter Morn**'

Back-cross (albi x albi-macro) '**Garden Peace**', '**Requiem**'
Back-cross (albi x albi-macro F_2): '**Evensong**'

Reverse cross: macrophylla x albi: '**Ariel**', '**Celia**'.
albi x officinalis "single crimson": '**Buccaneer**', '**Challenger**', '**Defender**', '**Erebus**', '**Liberator**', '**Mariner**', '**Tantrums**'.
No F_2 's, but ...
F_3: '**Sanctus**'.

albi x officinalis, miscellaneous: '**Bordeaux**', '**Cavatina**', '**Edward Steichen**', '**Legion of Honor**', '**Jacqueminot**', '**Marta**', '**Postilion**', '**Rosy Wreath**'.
Reverse cross: '**Emblem**' and '**Madrigal**'.

albi x officinalis '**Otto Froebel**': '**Anniversary**', '**Birthday**', '**Fidelity**', '**Honor**', '**Mercy**', '**Valor**', '**Verity**'.
Rev. cross: '**Otto Froebel**' x albi: '**Amity**', "Better Birthday", '**Faith**', '**Hope**', '**Good Will**', '**Lotus Bloom**', '**Rosalba**', '**Victoria Lincoln**'.
(The above fifteen hybrids were almost all withdrawn when the much finer lobata hybrids came along. Only '**Honor**', '**Mercy**', '**Lotus Bloom**', '**Rosalba**' and '**Victoria Lincoln**' remained in the catalog.)

albi x Ozieri alba: '**Halcyon**' (a strain). Also a '**Halcyon**' F_2. Ozieri alba had come from Vilmorin's nursery in France, who later reported this specics as "lost". We have never seen it offered elsewhere, nor indeed ever heard of it elsewhere.

albi x Wittmanniana: '**Ballerina**' (a double), '**Elizabeth Cahn**', '**Green Ivory**' and '**Magnolia Flower**'.

We now leave Big Notebook I (hybrids with albiflora as one parent) and go to Big Notebook III (those not having albiflora in their parentage). (Notebook II was merely a cross-index of No I.)

anomala seedling: '**Nightwatch**'
Beresowskyi x emodi: '**Late Windflower**'
Corsica x macrophylla: '**Picotee**'

3 emodi crosses: albi x emodi: '**White Innocence**' (already noted).
Beresowskyi x emodi: '**Late Windflower**' (already noted).
Veitchi x emodi: '**Early Windflower**'.

macrophylla x officinalis '**Otto Froebel**': '**Harbinger**' (lost many years ago).

Mlokosewitschi x macro: None of the F_1's exist now.
F_2: '**Nova**' (5398 F_2)
Others are F_2 's and F_3's of 4710, 5397, 5398, 9037 & 9039

Mloko x Peregrina F_2: '**Belinda**'
Mloko x tenuifolia: '**Playmate**' (a strain)
Mloko x tenuifolia F_2: '**May Morning**', and '**Nosegay**'
Reverse cross (tenui x Mloko) F_2: '**Gwenda**'
Reverse cross F_3: '**Daystar**', '**Morningstar**'
Officinalis x coriacea: '**Eclipse**'
Officinalis x cretica: '**Fireflame**'
Officinalis x decora alba: '**Diantha**'

Officinalis x lobata: (the "Little Reds")
Officinalis x lobata Perry: '**Good Cheer**', '**Little Dorrit**'
Officinalis x other lobatas: '**Ladybird**', '**Scarlet Tanager**'

Tenuifolia x woodwardi: '**Earlybird**'
Willmottiae x macro and reverse F_2 's and F_3's: '**Silver Dawn**' itself was lost, but its F_2 's and F_3's exist. Also '**Angelica**', which is of this strain.

Unknown parentages: '**Carolina**', '**Horizon**', '**Mermaid**', '**Patriot**'.

TRIPLE and QUADRUPLE Hybrids (those involving three, or four, species) (including those offered (under number only) in Breeders' Lists, 1963-73.)

Triple Hybrids (those involving three species)

'**Roselette**': a double albi x (tenui x mloko) F_2; '**Roselette's Child**'; Roselette's Child F_2 etc.
'**Rushlight**': a jap albi x (tenui x mloko) F_2 and its F_3
'**Sprite**': same cross as '**Rushlight**'
No. 16350 F_2 and F_3: same cross as '**Rushlight**'
'**Sunglint**' (No. 14400): a single albi x (mloko x macro)
No 14414, and No l4403 F_2 (same cross as '**Sunglint**')
No 12128: (albi x macro) x officinalis '**Otto Froebel**'
No 17042 F_2: '**Otto Froebel**' x (mloko x macro)
Officinalis x No 4992 (albi x macro) F_2: '**Mid May**', '**Pageant**'.
Albi x (officinalis x macro): '**Burgandy**', '**Campagna**', '**Frances**', '**Herald**'.
Triple F_2 (but parents unknown) '**Lilac Time**'.

Quadruple Hybrids (four species)
A mloko-macro hybrid was crossed onto an officinalis, and the resulting triple hybrid was in turn crossed onto an albiflora.

'**Athena**'	'**Northern Lights**'	'**Winged Victory**'
'**Early Daybreak**'	'**Papilio**'	'**Artemis**'
'**Firelight**'	'**Rose Noble**'	'**Astarte**'
'**Lady Gay**'	'**Starlight**'	'**Bright Diadem**'
'**May Music**' (No 16209)	'**Sunlight**'	
'**Northern Crown**'	'**Sweet May**'	

Some under their number: 16209 (now '**May Music**'), l6l97, and l6234.
Some F_2 's and even F_3's were offered too.

In 1971 in the Brooders' list we offered "Quad F_2 x '**Moonrise**' F_2 " as "very fertile seedling". This was an introduction, not of this nursery, but by Roy Pehrson, then of Mankato, Minnesota. Adding lobata to the four species in the Quad, he had obtained a quintuple hybrid, the first to my knowledge.

In addition to all the above, I chose to include in my "Breeders' Lists" in order not to completely lose the species bloods involved, those unnamed hybrids from the nursery: Broteri x mloko; Albi x corallina (**'Louise's Lilac**'); Albi x corsica (several clones); and finally Veitchi x mloko F_2.

POLLEN EVALUATION METHODS USED BY PROFESSOR SAUNDERS

by Don Hollingsworth

Professor A, P. Saunders wrote that after he commenced testing pollens he was able to save a lot of time. Working without evidence of pollen viability, he had often devoted hope, effort and time in making crosses with worthless pollens. Whereas species plants are normally very high in pollen fertility, the first generation hybrids between species will be more or less infertile. Some are highly sterile. Once he had developed evaluation procedures, a certain amount of potentially useless effort could be ruled out simply by being more selective of pollens to be used in the desired crosses. This doesn't mean that weak pollens were never used, just that they were used with some knowledge of their deficiency and plans made in accordance with that knowledge.

In the last issue of PAEONIA (Dec. 1977) was reproduced a selection from the Saunders summary records (BIG NOTEBOOKS) on "Albiflora x Wittmanniana" (albiflora= lactiflora). The entry for Number 4931, '**Elizabeth Cahn**', includes the statement, "Pollen: v few - 0 - v few 5-7%." This statement is in a format that is repeated many times throughout the BIG NOTEBOOKS. Many, many of the Saunders hybrid peonies were evaluated for pollen quality and the results were recorded for future reference.

A general study of the Saunders notebooks and of his published accounts of pollen germination methods reveals the nature of his evaluation procedures. There are evidently two procedures involved. The report of percentage, "5-7%" is one evaluation, the series of "v few - 0 - v few" reflects a second, separate measure. The former is the proportion of full, plump grains observed dry under magnification. Many grains collected from inter-specific F_1 hybrids will be found to be shrunken and small. This procedure assumes that only the plump grains have a potential for germination. If the pollen grains are scattered thinly for the observation, it is possible to get accurate separation and count. The estimate of whether a grain is plump and normal is, of course, judgmental and subjective. Also, one would have to make several counts in order to presume accuracy as is implied by the straightforward, unqualified statement, "5-7%. Chances are that once the observer gains some experience through counting and sorting, the extent of plump grains will simply be estimated.

The second measure of pollen quality is evidently a report of germination test. After germinating pollen for a couple of years, it has become obvious to me why the calculation of a percentage is not reflected in the Saunders notes. The problem is that the pollen tubes grow quite long compared to the size of the grains from which they originate. A highly fertile sample will be seen as a mass of intertwining tubes, comparable to a forkfull of grass hay. One quickly resorts to comparative terminology for classifying the results. The three-part classification arises from the fact that Professor Saunders used three levels of sugar in the culture media used for each test — 5, 10, and 15%, approximately. (The method has been described previously in PAEONIA, and it appears in Saunders articles in BOYD'S MANUAL and the APS BULLETIN.)

Abbreviations used in the Saunders notebooks appear to translate thusly:

V few = very few	0 = none
V many = very many	1 - one (not a per cent)
Ab = abundant	100 = all or 100%

Other terms are spoiled out in full as many, some, etc.

Pollen testing requires a microscope, but only low power lenses are needed. I am using an instrument such as schools use in student laboratories. The eye piece is 10x and the low power objective is 4x, while the middle power objective lens is 10x. These give a choice between 40x and 100x totals. I find use for both. Three small Pyrex flasks with stoppers are needed to store and heat up the culture media. Some glass microscope slides will be necessary to set up the tests. Other than that, a small stock of agar from a science hobby shop, table sugar, and grocery store distilled water will complete the supply requirements. If the flasks are marked for 100 milliliters, no additional measuring device will be required. Professor Saunders suggested the following approximate measurements, "Place half a teaspoonful of powdered agar jelly (weighing about 1 gram) and a teaspoonful of table sugar (weighing about 4 grams) in 20 teaspoonfuls of water (weighing about 100 grams). Heat to gentle boiling until agar and sugar dissolve. Make up two other solution by the same formula except that in one of them two teaspoonfuls of sugar are used and in the other four....," giving the approximate range of sugar percentages desired.

Pollen evaluation must be at least as beneficial to those of us in present day peony breeding as it was to Professor Saunders. When working with the relatively sterile interspecific hybrids, as many of us do, it is probably more valuable.

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LETTER TO: Don Hollingsworth
FROM: Father Joe Syrovy, Vining, Iowa
DATE: April 25, 1978

Dear Don:

Have been thinking of writing to you and received your welcome letter, so hasten to answer. Perhaps it was well that you didn't include me in the Robin this last time as I have been very busy since Easter and things have let up a little. You can include me in "the Robin" then, the next time around.

I guess you have the same kind of weather we have been having — cold, cold, cold! Besides that, rain, rain, rain! The farmers are frantic because the soil is so wet they can't get out to disc, plow or sow! They had one Saturday two weeks ago to do this, but we've had two weeks of rain, starting every week-end! Today the sun is out and will continue until the week-end again!

The winter was devastating here, as you well know, and the wet weather last fall and the prolonged warmth until December wreaked havoc with most of my Tree Peonies. I had to trim and cut off a lot of branches and some I cut down to the ground. I thought I had lost some of the older ones but they came up from below as they had been planted deep enough. Those plants you sent me all survived, except one, I believe. The Itohs are O.K. Sorry, your grafts that I sent you didn't take.

I had bags of seedlings in my refrigerator and finally set them out. I don't think I'll bother again with seed in the refrigerator, as the seeds I planted out last fall are all coming up and ahead of my refrigerated ones!

My two Itohs ('**Yellow Dream**' and '**Yellow Heaven**') look excellent! I gave them a good saw-dust mulch for the winter. I'm doing that from now on! I wrote to you about my experiments with the branches I saved when I cut them down last fall. I really thought I was going to succeed with rooting

them, they were doing so well. However, I think I should have kept them longer under refrigeration instead of taking them out and exposing them to a higher temperature. To do those things properly, one would have to have a laboratory with scientific equipment. I'll stick to my layering system! The important thing I learned is that one must make those cuts below the bud in July to stimulate callus growth. I was surprised that even though the outer layer (bark) and even the cambium layer had deteriorated that the area around the bud where the callus cut had been made was living. It seems that the callus area around the bud collects and stores food or energy for the bud somehow. When the bud begins to grow it also begins to collect energy from the light, or the sun, and begins to manufacture its own food. I watched a film on our "Iowa Public Broadcasting System" which has a lot of educational films, and got a complete course of how plants grow, the different kinds of light they choose, red, blue, green out of the spectrum, the effects of temperature, heat, light, root growth, etc. It was wonderful! I wish they would repeat it again. You've got the same ambitions I always have had to go farther into plant study — but I'm too old! Wish I had done this 20 or 30 years ago! (But they didn't know all that we know today!) I, too, have been interested in genetics for a long time, but like you say, you have to have laboratory equipment— a high powered microscope, etc! Did I let you read my book on Genetics by A.M. Winchester published 1958. I also have a book on colchicine by 0.J. Eigst and Pierre Dustin (1957) from Iowa State College Press, Amos, Iowa. This really goes into chromosomes and cellular structure. Will loan it to you... Perhaps you can find these two books in the University Library.

You said you lost a lot of stuff using Capton as a disinfectant. I use a mild solution of copper-sulfate for disinfecting. I also use Root-Tone to rub into the cuts I make into a cut. It is also a disinfectant as well as a root stimulant. Also used it on seeds when I put them in bags of vermiculite to store in the refrigerator.

From my winter experiment (failure in some ways, but I think I learned a lot), I think that the production of callus tissue is very important even in your grafting of T.P.'s. Perhaps one should make a cut below the bud in July from the stock you are to graft on the herbaceous stock. What do you think? I think for future meristem experiments the cuts on stems to induce callus tissue will also be important.

However, if I ever get any Itohs (I Hope! I Hope!), I'm going to stick to my underlayering. One looks for a few branches on the outside, start bending them and even cut a little way below, rub on some Root-Tone and keep on bending and make your cuts below the bud in July, rub in Rootone and finally when leaves are dead or ripe, peel 'em off — and bury, fasten down with heavy wire and put on a good layer of sawdust for the winter.

Well, that does it! Got to get out today as we're going to have sunshine and to get 60° today and tomorrow! If you think any of "my brain-storm" is good enough to pass on, you may do so. I may have repeated some of this stuff before, but I think it is important!

Regards,

Father Joe

HOW TO ROOT TREE CUTTINGS By Dr. Robert C. Hare

THE KEY; Girdle Before Cutting

Rooting of plant cuttings is nothing now to horiculturists. They have been doing it for years to propagate improved genetic strains of food crops and flowers. But trees don't cooperate like flowers and crops. Few tree species will root from cuttings under normal circumstances.

Now, however, a new technique is available for forest geneticists — and home gardeners as well — to propagate trees directly from cuttings. It works with both pines and hardwoods, and the tools needed are available to anyone at small cost.

Key to the process is girdling the shoot a month or two before cutting. This prevents translocation of sugars out of the shoot via the inner bark. Food reserves therefore accumulate above the girdle where they cause callus tissue and root primordia (appearing as small bumps) to form.

No expensive growth chamber is needed with those techniques. Success can be achieved under ordinary greenhouse conditions. And if no greenhouse is available, more simple expedients can be used. It's all outlined in this folder.

This new system is similar to air-layering for plant propagation — up to a point. Both improve rooting but, under this new system, the cutting is removed to an optimal environment once callus is formed. This promotes rapid rooting and eliminates the problem of dried-out cuttings. It also eliminates use of damp moss, used with air-layering, which often leaches out growth substances.

Note: For best results, girdle hardwoods in the spring when leaves have expanded fully. Girdle pines in mid-summer. Girdle many more cuttings than you'll need, so only the ones showing root primordia can be selected for rooting. For rooting stock, select branches well exposed to the sun in the lower part of the tree.

Remove all foliage from a two-inch section of stem, about six to eight inches below the terminal bud. With a pocket knife, remove a one-inch ring of bark down to the wood in the defoliated section.

Apply a slurry of rooting powder to the upper portion of the girdle (closest to the terminal bud) with a camel's hair brush. See following slurry formula, or use commercial powder containing 0.8 percent IBA such as Hormodin 3.

Formula for Rooting Powder:

Dissolve the following in 40 ml anhydrous acetone:

0.5 gm IBA (indolebutyric acid)

0.5 gn PPZ (l-phenyl-3-methyl-5-pyrazolene)

Source: K & K Laboratories, Plainview, N.Y.

Transfer solution to 24 gm talc (Baker USP) in a bowl. Stir slurry constantly in a hood over gentle heat and under a gentle air stream until completely dry. Add 25 gm talc and sift through a stack of sieves to 45 mesh. Grind the final mixture in a large mortar and sift again.

Wrap wound with plastic film followed by aluminum foil.

Leave intact for six weeks for hardwoods, eight weeks for pine. Then sever cuttings below the girdle and transport to greenhouse in plastic bags.

Immerse cuttings in water to freshen. In case of oak trees, girdles should be examined at four and five weeks. If callus has formed, cuttings should be taken at this time, because oaks tend to overcallus. This inhibits rooting.

Remove the plastic film and foil. This is the time to select the most promising stock. Choose the ones with bumps (root primordia) on the callus, as these will root faster than those without the root beginnings. While holding the cuttings under water, reclip the cutting at the upper end of the girdle.

Moisten the cutting base with water, or preferably 50 percent ethanol, and dip the base into talc containing powdered sucrose and Captan (10 percent each for pines, 20-5 for hardwoods). The ethanol wets the stem better than water does. It also reduces objectionable wetting of the rooting powder.

Insert the cutting base two to three inches deep into a rooting medium composed of equal parts of fresh perlite and vermiculite, using a spacing of 4x4 inches. Medium should be sifted beforehand with 10-mesh screen to remove the fines which inhibit aeration. In cool weather, electric heating cable can be used to maintain 75-78 degrees in the medium.

From this point, the need is to allow cuttings to root under humid conditions. One way is to apply intermittent mist in a greenhouse. This is best controlled by a Geiger Mist-A-Matic system, which operates by evaporation of water from a screen. By properly adjusting the counterweight and the position of the screen at the edge of the bed, mist will be applied only when necessary to maintain a film of moisture on the cuttings.

Overwatering is detrimental because it keeps the medium saturated, preventing free diffusion of oxygen, and it tends to leach nutrients from the cuttings. For the same reason, oil-burner type nozzles are preferable to the Florida-type impact nozzles, which give a coarser spray with more runoff into the medium.

When roots have developed, usually in one to three months, transplant into containers. Then gradually reduce the watering regime and fertilize weekly with diluted 20-20-20 fertilizer until root system is well established.

No greenhouse facilities? Root the cuttings directly in perforated-bottom quart milk cartons filled with the rooting medium. Water thoroughly and cover the entire plant with polyethelene to establish humid conditions. Keep out of direct sunlight but in bright light. After the cutting has rooted, tear off the bottom of the carton and plant the containerized cutting in the ground. The paper carton soon will deteriorate.

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HOME NURSERY Continued from Page 1 :

6. Delayed germination is always a problem. Seedlings should remain in the seed bed for two years if they are of the lobata type hybrids, suffruticosa (T.P.'s) and especially the seeds from the Itoh cross. Space these groups farther apart than the general crosses. Actually, the Quads and '**Moonrise**' and '**Archangel**' crosses grow like weeds and can be transplanted after the first year of growth.

This information is for you -

1. F.P. Healey - Canada
2. Russell Graham - Salem Oregon
3. Richard H. Sceperda - Harlinge, Holland
4. W.J. Simpson - Australia
5. Etc.

Please note: — if these instructions were too late in arriving to be of use in your seed planting, ask for more seeds this year and try again.

Mr. C. Graham Jones of England: If you can send me any seeds of any species peonies, I'd greatly appreciate it. The seeds you sent me two years ago were not handled properly, so results were poor. All my fault!

Chris Laning