PAEONIA

Volume 12, No. 2 June, 1981

REQUIRED READING:

1. "The Peonies" by John C. Wister, $3.50 from American Peony Society. 250 Interlachen Rd., Hopkins, MN 55343
2. Bulletins of the American Peony Society.
3. History of the Peonies and their Originations.
4. The Best of 75 Years; 3 & 4 ed. by Greta Kessenich, and available from the American Peony Society.

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553 West F Avenue,
Kalamazoo, Michigan, 49007.

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Dear Chris: March 23, 1981

Somehow your letter of December got buried in my reference materials for the goat book I just finished. I hope you'll accept my apologies.

SPECIES - I don't have any seeds such as *P. brownii*. Have gotten several batches previously but none ever germinated. If we could ever get some stock plants perhaps we could gather seed and make it available.

Dot and I would like to suggest a plan. If Paeonia members could furnish stock plants of some of the hard to get species, we would propagate them. Their acquisition to be handled through Paeonia or some specific member appointed. It would be their responsibility to notify us as to who was to get what. Our responsibility; to propagate, grow, dig and ship (and furnish up to date inventories each fall). Cost? We are to be repaid for shipping costs only. The rest of our efforts to be seen as a contribution to the cause of hybridizing. The plants would of course be the property of Paeonia — not us — and we would not offer them commercially.

We would like to be able to offer some (varieties) plants that have a reputation as good breeders — such as '**Mikado**' (think we have located a source). Would like to be able to offer '**Good Cheer**'. Do you know any one that would sell or swap for it? (If it proves to be really rare we could consider it in the same category as some species.)

Obviously there would be a limit as to the number of "rare source" plants we could handle but see no problem up to 25 or 30.

Perhaps those who availed themselves of source plants might be willing to contribute to a fund to be used to procure other clones. We'd appreciate your thinking on this.

Looks like an early spring for us. '**Daystar**' and '**Nova**' have buds the size of 50¢ pieces.

- Al Rogers
15425 SW Pleasant Hill Rd.
Sherwood, Oregon 97140

INCOMPLETE FLOWERS

Roy Pehrson set out on a crash program in the exceedingly difficult area of hybridizing for Ito (Itoh) clones. Since he had invested the last several years of his hybridizing career on this project, you would think a great deal of information would now be available to the people who are interested in this particular cross. Unfortunately, ill health and failure to see its value (the value of the listing of the various crosses and their results) left this void, a serious loss to all of us. But let's see if some of the information can be salvaged.

1. '**Petite Renée**'x '**Golden Bowl**'
2. '**Nippon Gold**' x '**Chinese Dragon**'
3. '**Vista**' x *P. delavayi*
4. '**Christine**' x '**Argosy**'
5. '**Vista**' x *P. lutea*
6. '**Luella Shaylor**' x '**Amber Moon**'
7. '**Vesper**' x '**Amber Moon**'
8. '**Vesper**' x *P. delavayi*
9. '**Kate Berry**' x *P. lutea*
10. '**Moon of Nippon**' x '**Amber Moon**'
11. Lactiflora x tree peony mix (Suffruticosa)
12. '**Minnie Shaylor**' x '**Golden Bowl**'
13. '**Petite Renée**' x *P. lutea*
14. '**Shaylor's Sunburst**' x *P. potaninii*
15. Giant jap x Saunders F_2A
16. '**Nippon Brilliant**'x F_2A
17. '**Nippon Brilliant**'x F_2A
18. Lacti x '**Argosy**'
19. Pink jap x '**Argosy**'
20. '**Gay Paree**' x *P. potaninii*
21. '**Primevere**' x '**Aurora**'
22. White jap x P. suffruticosa
23. '**Vesper**' x T.P. mix (suffruticosa)
24. '**Golden Dawn**' x *P. delavayi*
25. '**Golden Dawn**' x *P. ludlowii*
26. '**Kate Berry**' x *P. lutea*
27. '**Petite Renée**' x '**Golden Bowl**'
28. '**Golden Dawn**' x *P. potaninii*
29. '**Largo**' x '**Aurora**'
30. Lacti x *P. ludlowii*
31. '**Westerner**' x *P. delavayi*
32. '**Vesper**' x *P. ludlowii*
33. '**Shaylor's Sunburst**' x F_2A

This long list is not the complete list of his efforts but surely it will show to what extent he tried to develop new information. This list is from plants labeled by him and sent to me at my request. <u>All of these plants were from contaminated crosses</u>.

Did he have any success with any of these crosses — success means developing Itos? Yes, he did have limited success — meaning he did develop more than 100 true clones of herbaceous x tree peony crosses. But these plants produced incomplete flowers of no great beauty, having strap-like petals and no ability to produce seed. It isn't possible for me to imagine the great disappointment he experienced with these results.

Roy P. gave me some of his successful herbaceous x T.P. etc, crosses, having tree peony foliage —

1. Lacti x T.P. mix.
2. '**Vesper**' x T.P. mix
3. '**Nippon Brilliant**' x T.P. mix
4. '**Nippon Gold**' x T.P. mix
5. '**Faribo Gold**' x T.P. mix

All of these have incomplete flowers. Also, he sent a good Ito which has dark red complete flowers, a dark red one of which he said, "You name it!" Bill Seidl also received a piece of this plant so we will have to come up with a good one. Maybe "Pehrson's Success"? or what shall its name be?

Others that are good must wait for further evaluation.

Please note this! !
Crosses can be made using other than lutea hybrids as pollen parents. But up until now all of them have produced plants with incomplete flowers, very small and strap-like petals. Why?? Would using tetraploids as seed pod parents make any difference? Roy Pehrson led the way and it is for us to carry on.

- Chris

p.s. T.P. '**Alice Harding**' pollen is the only one that seems capable of producing first class Itohs. I have had limited success with '**Age of Gold**', '**Tria**', '**Thunderbolt**', and Saunders F_2A. Not any of these is good enough for introduction. Also, seedlings resulting from P. suffruticosa pollen on lactiflora clones of various types produced for me - incomplete flowers on giant plants some as tall as four feet! Alas - no good!

CORAL CHARM

Last year at the National Peony Show '**Coral Charm**' was the outstanding new color and looked just beautiful in the Court of Honor. It is an early blooming semi-double hybrid. The flower is coral-peach and of good size. Our "The Best of 75 Years" has in Chapter 6 an interesting bit of information regarding this beauty. Mr. Sam Wissing developed it and of it he wrote that it has real vigor and has very viable pollen. Also, he states that in 1963 it set 200 seeds from just 7 blooms! - and germination was excellent. Why don't we use this clone in our hybridizing program! Why indeed! I don't even own a '**Coral Charm**'.

Note: The Chas. Klehm & Son Nursery listed it ('**Coral Charm**') in their last year's catalog for twenty dollars.
- Chris

ROY PEHRSON PLANTS AND THEIR BLOOMS –

'**Junior Miss**' is in bloom right now (June 22) and has been in flower for nearly two weeks. The blooms are very full double bright pink that slowly fades to a clear white. Stems are stout and flowers perch right on top of them, maybe after it is better established the stems may grow longer but right now the stems are so strong that there is no bending even when the flower is filled with water. This will be an excellent introduction.

'**Mary Jo Legare**' is a rather small plant as of now. The two good size blooms were of beautiful red color blooming rather late for a hybrid. And the stems are adequate.

Roy, the flowers on your "Salmon" were just a little more pink that '**Coral Charm**', blooming on tall stems. This will be of great interest at the show since it draws a lot of attention in my garden!

Your "Big White" fertile tet, that has flares and side buds put on a great show. I would say it is of high quality!

'**Mikado**' (five plants) was pollinated with '**Good Cheer**' just as you had directed. Thirty-seven blooms were pollinated and are now forming seed pods and seeds. If this cross gives plants like your '**Mikado**' x '**Good Cheer**' we will have attained our goal of lobata red full doubles on stiff stems. I fear though, that the seeds may take two years to germinate. That is what often happens to other lobata crosses.

"Husky" was divided last year and seemed unhappy because of it. This must be the champion of all stout stem plants.

'**Roy Pehrson's Best Yellow**' was as dependable as usual and beautiful as always. I'm happy with the seed production — at least in quantity. Seedlings from its seeds developed into nice plants with two of them blooming this year — creamy white singles. I think there are 48 or 50 plants and they all look good and healthy.

Your "Red Jap" is growing great guns! There are four plants of it — they stand 4 feet tall and cover themselves with blooms. These blossoms were pollinated with '**Good Cheer**' but were unprotected (not bagged) since there were just too many flowers on them.

This was a good year for pollinating — now we wait for the seed crop with great expectation!

- Chris

CORRESPONDENCE BETWEEN DON HOLLINGSWORTH AND CHRIS LANING:

Dear Don: January 13, 1981

. . . . . Roy Klehm sent me a letter giving added information on the questions 1 had asked you. This information is most interesting! And from what was written, his new introductions will be great. One puzzle, though, is why '**Coral Charm**' is fertile. If it is indeed '**Minnie Shaylor**' x '**Otto Froebel**', it should be a triploid. Maybe it is an F_2 or F_3 of this cross? I will say, however, that the color of '**Coral Charm**' makes this parentage very likely. (See Page 125 in "The Best of 75 Years.")

'**Sable**' (Glasscock, 1943). Almost black - early - hybrid. Albiflora x '**Otto Froebel**', second generation. Bulletin #91. This is a plant ('**Sable**') that has almost black single flowers, the height of the plant is well over four feet - and the stems are lax (need to be staked). I do not understand the genetic mechanics involved in the producing of such a plant. Surely it is different from either parent and quite likely not a mixture of the two. It is fertile in pollen and pod, seeds germinate very slowly, and the plant increases in size rather slowly. What do you think about this?

* * * * *

Dear Chris:

You raise the question of whether '**Coral Charm**' is fertile. Is it? I've wondered, but have had no information about this. If you have something positive, I'd like to know, too.

About '**Sable**', I'm not sure I understand what you mean by the "genetic mechanism" that produces this sort of plant. If you mean how is it that the observed attributes of the two ancestral species interact to give a plant that looks the way '**Sable**' does, then the problem seems no different than explaining any other outcome of crossing two individual parents. The only sort of circumstance I know in which the interaction products from two parent genomes can be predicted is when the cross has been previously tested. Such predictability is only reliable when working with highly inbred lines where the individuals are highly homozygous and identical or nearly so among all individuals in the line. Peonies have never been bred for this purpose, insofar as I know. The closest thing to it that has ever existed in peonies is probably the wild peonies as they were in nature. Even there variability was obviously prevalent in the gene pool. Under domestic selection, the tendency has been to maximize retention of the interesting mutations, greatly magnifying the variation (genetic variation) present in the available plants. '**Otto Froebel**' is uncertain, as I understand it, being at its narrowest possible interpretation a variable strain, not coming true from seed. Since it was no doubt grown from open pollination in many, if not most instances in which it was seed grown, there is no assurance that it is even made up entirely of one species. On the other side, the pod parent is lactiflora, which has been selected for domestic use to the point of extreme variability. Further, '**Sable**' is an F_2, and may have been produced from an outcross, rather than being the result of self pollination. Glasscock seems to have been one to make deliberate crosses.

It seems to me that the thing to do with '**Sable**' is to self it and see what segregates out among the seedlings. In this way you learn something of the range of outward expression which different combinations of its genetic complement are capable of yielding. Then if there is some attribute of the parent which you want to preserve, select as closely as you can to it among the progeny while picking against whatever else you want to correct, e.g., tall flopping stems, and interbreed the selected progeny, or backcross to '**Sable**', to see what you can come up with. We can never find out what combinations are involved genetically if we always outcross. Notwithstanding that many interesting breaks may come from outcrosses, it may be that some of our best advances come from open pollination where inbreeding or line breeding occurred. We never know unless the crosses are deliberately made and the identity of the crosses maintained with the resulting seedlings. Back to '**Sable**', the selfing will have to be deliberate if you're going to be able to interpret with any confidence that you know what is in it genetically by looking at the progeny. Open pollination means unknown parentage!

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16 Aberdeen Street
Reservoir, Victoria
Australia 3073

Dear Chris, March 9, 1981

Thank you for the past issues of Paeonia and the seed selection. I planted all the seeds in vermiculite on 30th January, 1981, and when I examined them again last night I found one of the suffruticosa had sent down a radicle. I did not soak the seeds be fore planting; is this necessary?

I am keeping an observation sheet on the seeds and this may come in useful for further plantings.

The second part of this note concerns two publications, one being the Journal of Horticultural Science and the other being a book written by Lela Barton entitled "Twenty Years of Seed Research at the Boyce Thompson Institute for Plant Research". Are the publications worth buying (or subscribing to in the case of the Journal).

Yours faithfully,

Peter Rafferty

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Dear Peter,

It is always a pleasure to receive mail from Australia! Please keep me posted on your activities in hybridizing. Don Hollingsworth soaks his seeds and I do not. I guess you'll have to try both ways.

The publications you mention seem interesting and of value but I don't have either, so use your own judgment.

Chris

DIPLOID CROSSES

Species crosses of diploid x diploid, when thinking of interspecies, can remain at the diploid level for only the F_1 cross — or at the very most, at the F_2 level. If continued to the F_3 generation, the resulting seedlings will be tetraploid.

One diploid species crossed with a different species which is diploid results in diploid F_1 seedlings and only very seldom will their F_2 generation be diploid — but all F_3's surely will be tetraploid.

Reasoning: The F_1 x F_1 (self pollinated) of an intercrossed species can set fertile seed only when unreduced gametes are involved. This means in both the ovum and pollen unreduced gametes are of necessity involved.

Intra-species crosses are O.K. Interspecies crosses put such a strain on the pairing of the chromosomes that many unexpected and unexplained changes result. Along with this, the poly-gene effect in this and succeeding generations produces a bewildering succession of changes which in many cases is not unwelcome but confuses the goal.

Let me try to get down to the beginner's level. The *P. mlokosewitschii* x *P. tenuifolia* cross will be the example we will use. *P. tenuifolia* has ten chromosomes — its pollen has 5 chromosomes. *P. mlokosewitschii* has 10 and its egg has 5 chromosomes. P. mloko ovum - 5 chromosomes. P. tenui pollen - 5 chromosomes. Mating the two produces a diploid (10 chromosome) seedling. But — these seedlings are sterile and only when something goes wrong (which happens' occasionally) will this F_1 seedling produce a fertile seed. If and when the pollen grain has a double count, and the ovum also has double count, of chromosomes (unreduced gametes) a seed, can be formed. I'll bet you guessed the results — a seedling is produced and this one is now a tetraploid and is fertile.

Example I: *P. mloko* x *P. tenui* = '**Playmate**' which is a diploid
'**Playmate**' x self = '**Nosegay**' which is a tetraploid.

'**Nosegay**' produces seeds, the seedlings of which are all naturally tetraploid but all the characteristics of *tenuifolia* have dropped out and they look like (phenotype) *P. mlokosewitschii*.

So, what did we gain with all this crossing? I'll tell you! — we have a tetraploid mloko, which is fertile in pod and pollen though not often as good a color as the species mloko. It is a good tool for the hybridizer.

Example II: *P. tenuifolia* x *P. mlokosewitschii* -
the F_1 is unknown - diploid
The F_2 is '**Gwenda**' - tet
The F_3 is '**Daystar**' - tet
And descendents of '**Daystar**' tend to be cream or yellow.

Example III: Descendents from triploids also wind up as tetraploids.
Seems that hybridizing at the diploid level when using species crosses is only an intermediate stage.

But -

Why when crossing a tetraploid species with another tetraploid species the resulting seedlings are also tetraploid — why not octoploid? Or hexaploid? Can't we have unreduced gametes in them also?

Corsica x *macrophylla* -

F_1 - Picotee - a tetraploid.

F_2 - Picotee's seedlings - also tetraploid - too bad!

Professor Saunders made a great many tet x tet crosses and always got tetraploids! !

Gamete - the male or female germ cell of a sexually reproduced organism.

Chromosome - the dark-staining body in the cell nucleus that bears the genes in linear order. (Think of a chromosome as a string of genes.)

Allele - one of the two or more states of a gene that occupy the same locus (position) on the chromosome.

Gene - a unit of heredity which is capable of controlling one or more characters.

Diploid - in peonies the number of chromosomes within each cell. This number is 10.

Tetraploid is 20 chromosomes in each cell.

Triploid is 15 chromosomes in each cell.

Polyploid is any number of chromosomes above the diploid level.

- Chris

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Letters from Betty Bock, 511 Conneaut, Bowling Green, Ohio, 43402

Dear Lanings:

Miss Silvia Saunders sent me some peony seeds a few years ago. One plant which has bloomed in 1979 and 1980 has flowers on it which look like small dark red rose buds. There are no leaves on the stalk. She said the seeds were Mr. Auten's and they are from '**Telstar**' and probably were pollinated with tree pollen. It is nice. I tried to draw a picture of it.

June 1981:

I took a colored picture of the flower I told you about but it looked like a black flower and you couldn't tell what it looked like, so I won't send it. The flower is different this year. There were 3 flowers on one stalk and they were much larger than before. The largest flower at the top was very pretty but I can't describe it to you. It didn't look like a peony flower. It bloomed for more than 2 weeks and on June 6 it opened a little and by the 7th it was a double and looked like a peony. It lasted until June 11. I liked it

(Continued pg. 10)

'**CYTHEREA**' AS A BREEDER PEONY

Don Hollingsworth

One of the most highly regarded of the hybrid peonies, '**Cytherea**', is widely appreciated for its fine flowers. For this same reason and because I have found the pollen to have useable fertility, I also regard '**Cytherea**' highly for its breeding possibilities. It has excellent pedigree credentials and evidence of this is already showing up in its progeny.

On the pod side, '**Cytherea**' comes from a Saunders lactiflora seedling which was bred from the cross of an obscure Japanese flowered variety, '**Hogioku**' and '**Lady Alexandra Duff**', the fine Kelway semi-double. (This information is from Silvia Saunders.) On the pollen side of its parentage, '**Cytherea**' comes from the tetraploid "Perry Lobata", the sire of more than 40 hybrid peonies which were introduced by Professor Saunders. A number of these have attained a high level of recognition from specialist growers and exhibitors.

Another hybrid group by the "Perry Lobata", the Little Reds, is known to peony breeders through its members, '**Good Cheer**', '**Little Dorrit**', '**Scarlet Tanager**', and some unnamed clones which were distributed by Miss Saunders. These are tetraploid, are known to be extremely fertile when crossed with lactiflora (Chinese) peonies and produce a limited number of Japanese and bomb type flowering progeny.

Professor Saunders recommended '**Lady Alexandra Duff**' as being more prone to transfer doubleness to hybrid progeny than are most other Chinese peonies. '**James Kelway**' is another which he recommended for the same capability.

1 find that '**Cytherea**' is able to transmit massive flower-in-flower doubleness to of its progeny which have come from Japanese flowered lactiflora pod parents, I conclude the flower-in-flower doubleness of these is descended from '**Lady Alexandra Duff**' through '**Cytherea**' since the Japanese flower type is basically a single stage flower and the two-stage doubleness trait is believed to be inherited as a generally dominant trait. I use the qualifier "generally dominant" because the trait does not show up in the triploids, which get a double dose of singleness from their tetraploid parent while only a single dose of doubleness inheritance from the diploid parent. Yet, as in the case of '**Cytherea**', this doubleness inheritance is apparently present, for it shows up in the progeny.

Among the '**Cytherea**' progeny so far flowered in my garden, the colors range from blush to a medium "lobata-type" pink. The flowers range from pollen bearing singles and the Japanese flower types to semi-doubles and full doubles. So far there are no bomb type flowers and the doubles have yellow tipped staminodes in place of the thin ring of stamens often seen in double flowered lactiflora varieties.

There is a milky pink single from '**Moonrise**'. The milky opaqueness is presumably imparted by '**Moonrise**', for it is characteristic among the '**Moonrise**' - '**Paula Fay**' seedlings and other seedlings of '**Moonrise**'.

Several of the Saunders Lobata of Perry hybrids are prone to produce an occasional seed. One of these is '**Sophie**' and I once mounted a small campaign of crossing its flowers by '**Cytherea**' pollen. One of the resulting seedlings may be big enough and mature enough to flower next year. I have great hopes that some of these F_2 generation SLP will come full doubles with petal colors in the great Perry Lobata tints, of course.

These results are encouraging and lead one easily to a decision to liberally cross '**Cytherea**' not only on fine lactiflora varieties, but on the best forms of the SLP hybrids, as well. Also on the Little Reds. There is a little problem, however, in making the crosses on the hybrids. Most of them are earlier flowering than '**Cytherea**' within a given exposure to solar radiation. This can be considerably offset by having '**Cytherea**' in a warmer site such as a protected southern slope, so that it gets pushed a little in the spring, and the others at a colder site. Or, you might solicit cooperation from your more southern colleagues.

Known seeders among the SLP triploids are '**Sophie**', '**Laura Magnuson**', '**Red Red Rose**', '**Lustrous**', '**Paladin**', '**Ludovica**' (these last two are '**Cytherea**' siblings), '**Cardinal's Robe**' and '**Bravura**'. If you check the SLP pedigrees (in an APS Bulletin of 1976) you will find these eight varieties come from just four lactiflora parents.

'**Cytherea**' can be easily grouped with '**Claire de Lune**', in my mind, as representative of a perhaps sizeable class of hybrid peonies that have been too much overlooked in the efforts of breeders. It takes some extra diligence to use them and the work deserves to be done more carefully since just a little contamination can account for a large share of the results, when seed yields per pod are low. However, some extra good results among a few seedlings are well worth, a little extra diligence. These results can be fully as rewarding as good results among a large population of progeny. There is definitely a place for both and neither approach has much chance of duplicating the possibilities which exist in the other. The genetic lineages are too different from one hybrid group to another.

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Letter from Betty Bock, *continued from Page 8*

better before it changed to a double. It has never had pollen or seed and is a small plant. The plant is 39 inches tall and has dark green leaves.

I wanted to go to Mansfield but my friend is having car trouble and we couldn't come.

1 put a lot of fertilizer on the plant last year and now you can't call it a rosebud peony. I'll see what it looks like next year.

Yours truly,

Miss Betty Bock