HYBRIDIZERS BREAKFAST

MEMPHIS, TENNESSEE APRIL 5, 1986

Dr. William Bender called the meeting to order. Items on the Agenda are:

1. Choosing parents.

2. Loose ends from King of Prussia.

3. Questions from the floor.

Actually lets reverse that, anyone here who has questions? We certainly have an excellent panel of experts and visitors from abroad are here, so lets pick there brains. Anyone want to ask some questions about hybridizing or any questions that are on you minds?

Mrs. Krahmer: In picking parents, how far back should you go in their parents?

Dr. Bender: Any one want to talk to that? How far back in the pedigree should you go back? If you have Dr. Throckmortons' Stud Book, you can go back a number of generations fairly easily. I'm sure if you wrote to him he could go back to Adam and Eve.

Mrs. Krahmer: How far do you think the traits, you know, that someting might re-appear.

Dr. Bender: I think it depends on what your interested in. If your interested in disease resistance or something like that, you may have to go back to the species. Sometimes I question how wise it is to go back very far.

Dr. Throckmorton: I never went back beyond the Grandparents. Some traits will skip one generation. I have found very little usefulness going back beyond that.

Eve Robertson: If you have a flower that has stamina and grows well and good form, I don't see any reason for not using it.

Dr. Bender: If you go back very far and find something you don't like, is that going to influence you not using it, if you like the flower that you have.

Helen Grier: If you find a flower that you like real well and you check its parantage and there is a weakness somewhere back in its grandparents, great grandparents, check it out like you would when you are breeding dogs, cats or horses or something, and you breed to something else that is stronger that will overcome that defiency that you have in the one that you like real well and go out and pick out something that is very similiar of a similar line but without the one showing the weakness and then breed to that one and then see what you get.

Dr. Bender: I think that is very pertinet. I'm an Holstein breeder and we have a genetic mating service and mate our animals by computer, and if the cow has poor legs, the computer will pull out a sire that will improve that. But in Holsteins, you never go back very far. We are told that the best genetics are the young stock in your own herd, so that actually that nice flower that you have may be the best genetics you have and if has something in the background you don't want to cross, breed it out. That would be the way to do it I think.

Dr. Bender: Mr. Cross, Have you any ideas?

Harold Cross: I think with Daffodils as with all animals, line breeding is the answer, but you must not go back to far, otherwise you fighting World War I all over again, with World War III in the offing. You are wasting all the material that is available from other sources as well as your own in a search to go back for something which has probably been transmitted with stock which is infinitely better, thats a waste of time.

Dr. Reed: I don't have the experience to say that, but I would suspect the most important thing is what you have to breed with, if you don't have any more desirable newer offspring but you have a desirable parent with the traits that match what you may question that you want, then it would be worth your effort. I think availability might be a major factor and price.

Dr. Bender: Yes, it is.

Harold Cross: Don't you have neighbors here?

Dr. Bender: To trade off?

Dr. Throckmorton: I think there is something to be lost by really intense line breeding. I've tried this with the computer but what you come up with is a group of really weaker flowers in the long run. They don't have the stamina, they don't last. I think outbreeding occasionally is necessary.

Dr. Bender: Yes, certainly. Out crossing is important and the computer will do that for you.

Dr. Throckmorton: If you outbreed you can find one that won't put the [bad] trait that your looking for, then you are in business. When I tried to get toned daffodils, they all came from three sources way back. Those can be found and used but intense line breeding, I don't think is good.

Dr. Bender: It may be the only way you can have a very special goal. It may be the only way you have to get that, then you should outcross and bring ihn some health. Don't you think?

Dan Ballinger: I would like to comment briefly. I was talking to Mr. Jerrell over there. I think their are some variable parents whose genetic potential hasn't been fully explored yet. One that

was used by Dr. Throckmoton was Green Island. Mr. Jerrell was telling me about a Green Island X Glenwherry cross. We are talking about very old parents that are yielding some unexpected things, simply hasn't been fully tapped. That would we another reason for using something very old.

Dr. Throckmorton: There are over one hundred named Daffodils out of Green Island. You have a large field to chose from.

Dr. Bender: Green Island has 74 offspring as a seed parent and 39 offspring as a pollen parent. That is from your [Dr. Throckmorton's Stud Book] print out. I just listed a few of the grand old brood mares.

From the audience to Dr. Bender: What else is on your list.

Dr. Bender: Daydream has 18 as a seed parent registered, this is from the old Stud Book, and 42 as a pollen parent, so that apparently Daydream is a better as a pollen parent than it is as a seed parent 18 to 42.

Dr. Throckmorton: Take a look at Chinese White if you want to see a bunch of them.

Dr. Bender: Chinese White has 35 as a seed parent and 65 as a pollen parent.

From the audience: What about Aircastle

Dr. Bender: 19 as a seed parent and 15 as a pollen parent, so that it pretty close. I don't think that is significant.

Dr. Throckmorton: It depends which way you cross them. Kilworth X Arbar and Arbar X Kilworth are two different deals.

Dr. Bender: I have that one. Kilworth as a seed parent 72 as a pollen parent 1. There are good brood mares and some that arn't so good. If you have a specific goal, I would back to maybe one of the old ones otherwise your modern flowers havethe best genetic potential.

Dr. Bender: Any other questions from the floor.

Dan Ballenger: There is one flower that as kind of opened my eyes. I have not seen the flower in my garden, That is called Turncoat by [raised] by Mr. Duncan. Richill X Foundling a very un orthodoxed cross. Looking at it I ordered the bulb but I did not think I would show the flower or anything like that or probably even have breeding potential but what it does according to the catalogue despription, it starts out yellow/red and ends up white/pink. What I suspect is that the pink is probably Foundling's pink, and the yellow/red is probably Richill's and these do not I believe bloom at exactly the same time. Mr. Duncan I have not seen the flower but I was wondering if anyone can comment on what kind of genetics we are talking about there,

because it would appear if this description is right that this particular plant is baring the genes from both sets of colors, which tells me it may not be either/or for breeding for color but again if your getting both and both are not coming on at the same time and your dealing with tetraploid plants, you may not be just dealing with a single stack. Can anyone comment on that. Mr. Duncan could you comment? Its your flower.

Brian Duncan: There was a very large lot of those seedlings from which it dod come from but it is the only one of that lot that did seem to have this combination of the yelow/red and pink/white petals and all the others were white on white petals. It does seem to have the possibility of having both sets of genes but it definitely starts off yellow/red and eventually ends up a coppery white pink. There were others that did not have the coppery colored cup with white petals. [Could not get the rest of Brian Duncans remarks.]

Barbara Tate: Dr. Bender do you know anyone who is producing mutations through the exposure to X-Rays.

Dr. Throckmorton: [His answer was garbled but did pick up:] I tried it once but never got any genetic mutations on Daffodils.

Barbara Tate: How can I determine chromosome counts?

Dr. Throckmorton: You will have to talk to someone who has done a lot more chromosome counts than I have done, which is none.

Dr. Bender: Some years ago I had some daffodil seeds irradiated by X-Ray that was Cobalt muted. If you produce enough X-Rays you can kill some of them and I got nothing that was worthwhile.

Dr. Throckmorton: It has to be used on a growing thing and a bulb is pretty quiescent. When the bulb begins to sprout then you would be in business.

Wim Lemmers: I have some experience involved about using X-Rays in Tulips, but in Tulips it depends on the variety. Some varieties in nature sport very easily. With X-Rays you can get mutations quickly. Some varieties don't mutate in nature. You can hardly get mutations with X-Rays, but in daffodils you don't see a lot of mutations in the garden and we tried to do mutations in Holland by X-Ray but nothing. I think it depends on the variety and species. They have almost stopped the experiment with X-Rays in Holland with bulbs. Crossing is a better way.

Dr. Bender: The general consensus of the group is to forget about X-Rays unless you are real expert.

Dr. Bender: Loose ends at King of Prussia. We had comment by Mrs. Link in which she suggested using Boric Acid in pollination and would [to Mrs. Link] you like to tell us a little bit about what you do there. That was interesting to me and we did not talk about it.

Helen Link: When I was working and doing some pollen studies I ran across an Article and I cannot tell you the book that it came from. It was a foreign book and I had to order the book but anyway this article talked about Boric Acid stimulating the growth of your pollen tubes. So I took some pollen and some petri dishes and to see just exactly what would happen, I used a control and put in the Boric Acid solution and so forth and I found that it does stimulate the growth of the pollen tubes but it is very minimal amount, if I had known you were going to ask that question I would have had your answer for you. It is a very minimal amount of Boric Acid which you use a saturated solution and it is so many parts per million which you see it is really a small amount, but I do think it stimulates the growth. This person that did study did not work on daffodils, but worked on some other plant and thats what they predicted through their work and I found it to be true, so I have been using surgar syrup, just plain granulated surgar. I make up a syrup and I don't think it very strong. I just dump some water and some surgar and then take my little brush and I put in a drop of Boric Acid saturated solution and then I put it on the pistil and put my pollen on and I haven't really any statistics on it. I have hoped it would help and I had pretty good results from using it but I don't have enough statistics really to say that it is an absolute thing.

Dr. Bender: Do you get good seed set?

Helen Link: It depends on what your using [Cultivar] as far as the seed set is concerned and your pollen if you don't have a viable pollen you are just wasting your time and if you have any doubts about the pollen and you have a microscope use it and then you will save yourself a lot of trouble because you can tell by looking through the microscope at your pollen whether it is viable or not and if there is any question about that and let it do some growing and see what you get, if you get any pollen tubes that are elongated.

Dr. Bender: Can you describe the technique of examining pollen under a microscope?

Helen Link: If you want to know this go back to the article I wrote on pollen in the Daffodil Journal in December 1970 pages 67-84. There are pictures in the article and it describes the whole thing. I don't carry all this in my head.

Dr. Bender: Any quick way to recognize a good viable pollen?

Helen Link: A good viable pollen will be round and you will need a stain. You will have to use methylene blue to stain your pollen and if it is good and fat it is usually viable and if it is crummy, white and glistening, it will never germinate because it does not have anything in it to grow, but it is most fascinating if you have a microscope and try it and see all the millions of the tubes that you will get as it starts to grow and it is good, but you can't do that with every dab of pollen you have, but if there is something you really want to know whether you should use

it or not, instead of wasting a lot of your time by putting it on a hundred blooms, take a look at it. You can tell immediately whether it is going to germinate or not, but after it germanates it may not go down the tubes, so what we have to get is pollen tubes growing.

Dr. Throckmorton: The use of surgar is an old trick. It was always thought that it worked only because it caused more pollen grains to adhere to the pistil.

Helen Link: A lady was asking about the viability of the pollen.

Barbara Tate: If you freeze it, how long can it be kept?

Helen Link: I did some work on that and I had some pollen that I have stored in the dresser drawer in a gelatin capsule for 360 days and I took it out to see whether or not it would germinate and I think I got about 5% germination not very much while that which was frozen in a refrigerator did not even germinate that much after a year. So I don't know about the freezing of the [pollen], however I have frozen pollen and used it and it has been good but never kept it that long.

Barbara Tate: Was it the same pollen?

Helen Link: Yes it was.

Dr. Bender: Any questions about pollen or pollen storage?

Dr. Snazelle: Unfortunately, Harold Koopowitz is not here, but Harold has quite a bit of experience of storing pollen. I'm sure if you have any questions, you could write to him. He would be happy to give you some suggestions. [Note: Call Him].

Dr. Bender: Dr. Koopowitz has a gene bank in which he is storing pollen in liquid nitrogen. I talked to him one day about these old Delos Tazetta seedlings I have. He said send me some pollen, so I sent him some pollen he examined it and put it in the storage bank, so I have pollen in the storage bank for the next thousand years.

Helen Link: We do know that pollen can be kept for a long, long time. I think it depends on where it comes from, because in some of the bogs they have unearthed pollen grains that are hundreds of years old and they are still viable. Why they are still viable I would not know, but that is true they have found viable pollen. [Rest of sentence is garbled].

Dr. Bender: Any one want to speak on the effect of water on pollen? If you pollinate a flower and have a shower shortly afterwards.

Elise Havens: For us I don't see that it hurts anything at all. Just simply out of necessity, we have to pollinate when it is very damp and I know it is optimum to wait until the bees are

out, but sometimes the bees are not out and so the two legged bees are out. Another time that I have done a quite a lot of crossing and most people have because it is the time that most people have is the evening and it probably is not the optimum, but I have had a lot of seed set.

John Reed: Only problem about crossing at night is not being able to see unless you have a power source.

Elise Havens: I do that just before it is dark. We have long twilights. [In Oregon]

John Reed: I have had species hybrids set seed in 48 degree weather and in darkness.

Helen Grier: Doesn't a lot of that depend on your variety? Some will accept the pollen and set seed in bad weather and others won't. It is my understanding the Tazettas won't set seed and the pollen won't germinate if the temperatures are down in the low sixties. It has to be warm like in the seventies or eighties for the pollen to be active and grow.

Dr. Bender: On the other hand, in the standard ones, twos, threes if it is ninty degree weather, I never got much seed set.

Helen Grier: Thats right, because those divisions can't take that temperature.

Dr. Bender: That still gets back to the subject we mentioned in King of Prussia. If you do not have a hot dry day, has anyone tried to amputate the dry stigma and pollinate the style further down.

Polly Anderson: Yes.

Dr. Bender: Wim Limmers says they do it in Tulips to shorten the distance that the pollen tube has to travel. It depends on your flower of course. Have you tried it, Polly?

Polly Anderson: I have tried but I have not had any positive results.

Dr. Bender: I've tried it but I've never got anywhere either.

Charles Vander Weh: When you cut off the style, you place the stigma and put the stigma on the place you get the style cut off, because there is something in the stigma that makes the pollen grow. I'm not sure about it but that the way they do it with Lilies.

Dr. Bender: What about the droplet of fluid that bleeds from the wound? Do you blot that with a sterile tissue?

Charles Vander Weh: I do not know.

Helen Grier: I've read somewhere that when the pollen strikes the stigma there is a hormone in each of those parts that is stimulated so that together it forces the germanation.

Polly Anderson: I've used another pistil on to a dry pistil to get the fluid on the the dry pistil and then the pollen will stick and it seems to work.

Dr. Bender: Does it have to be the same flower?

Polly Anderson: No.

Dr. Bender: You don't cross type your flowers?

Polly Anderson: No.

John Reed: Do you use the mating surface or the cut in surface.

Polly Anderson: The top of the pistil. The juicy one.

Dr. Bender: Anything else to add?

Helen Link: I have one statement to make and you all may throw me out the window when I get through. I would like to say that we try so hard to get this bloom and that one together and get seeds and get a beautiful flower. When you stop to think about it, at mitosis, we do not know which genes are going to connect or which chromosomes are going to connect with the other one. We cannot predict it because nature just connects them and we are trying to do something that nature is going to do regardless of how we want it to do it, so I really think we need to think about that when we are trying to force this plant into this one and get this beautiful flower and three fourths of the time we get a dud, just simple because nature does it her way.

Dr. Bender: Will we are just trying to improve on it.

Helen Link: We sure are, and we should not quit.

Dr. Bender: Nature does provide for jumping genes, you know, and maybe we will get something.

Bill Roese: I see a lot of new hybridizers faces in here every year. One thing I like to impress on everyone, is that before you start hybridizing, you ought to establish your goals. What are you going to do. Dr. Throckmorton is a good example of a man who used the Data Bank to establish his goals and got what he wanted in his flowers. You can do the same thing, if you make adequate use of the Data Bank that is at your disposal. It would be silly not to use it. I think we should take a long hard look at what we want to do befor we start, not just run willy nilly and spreading pollen like a bee, you are just wasting a lot of time.

Dr. Bender: Do you have any suggestions Dr. Throckmorton?

Dr. Throckmorton: The only suggestion I've got, is that in medicine, we know that doing something with a big set of variables, you have to do it about sixty-five times in order to cover most of the possibilities. In other words, if you want to get everything out of a Daffodil cross you are going to get out of it, you have got to it at least 65 times.

Dr. Bender: So get crackin!

Dr. Snazelle: One fascinating idea to hybridizing, if you have acres and acres to plant seed in, and if you have perhaps four different cultivars which you woul like to breed, you can set them up in a grid pattern 4 X 4 and create 16 different crosses, and if you have all kinds of time and work to keep up with what you are doing and where you get all possible combinations of genes coming together you will end up with fifty thousand dogs and one good seedling out of that, but it is an intriguing idea to take all possible combinations of genotypes and mix them all up in grid type pattern, in cross in a 4 X 4 block with sixteen combinations. You probably will end up with nothing but it is a fascinating idea.

Dr. Bender: You will need about three slaves for that.

Brent Heath: Is there a possibility that more Stud Books could be made available to us? Is there just one that Dr. Bender has?

Dr. Bender: Mine is the old one.

Dr. Throckmorton: I suppose it could be done. Up until now, we have kept the information for the ADS because the RHS would love to have it. It is the one thing have that nobody else has. I don't think we should stand in the way of progress. If you want to buy one, you had better get your wallet out, it is a long computer run and I suppose you can get one for $75.00.

From the audience: How do we get one?

Dr. Throckmorton: If you write Miss Leslie Anderson and put your order in, we will see what we can do. It is about 1200+ computer pages long, but it does give the parantage of the flower. Lets say you are talking about Arbar. It would give the parantage of Arbar, then all of Arbar's children and it will give the parent on the other side of the cross so you have four grandparents with all there characteristics, color, height, season. It is a lot of fun to use and a lot of fun to have, but it is not much fun if you don't know how to use it. I think we can do that for the group. Up until now we have kept this as one thing that we have that no one else has.

Dr. Bender: I think that it would be nice. Mine is the one Bill Ticknor sent to me when I became chairman of the Breeding and Selection Committee.

Dr. Throckmorton: That is used copy. I swore him to secrecy.

Dr. Bender: I have exhibited it in educatonal exhibits for one hour, one time and took it home.

Dr. Throckmorton: I've got a copy of it here, if anyone would like to look at it.

Dr. Bender: Shall we auction it off!

Meeting Adjourned at 8:20 A.M.

Respectifully Submitted,

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Marilynn Howe, Secretary