40. *Syringa spp.* Edward J. Gardner

a) The finest new American lilac is the double, pure pink Edward J. Gardner. Mr. Gardner, before his illness and death, was doing excellent work with lilacs at his Wisconsin nursery.

41. *Syringa spp.* Sensation

a) The recently released Dutch lilac, Sensation is notable in having the first bicolor effect. The purple of the parent Hugo De Vries is edged with white. It appeared as a mutation in 1938. Propagation can be by cuttings or root grafting.

42. *Wisteria venusta.* Silky Wistaria

a) The Silky wistaria has white flowers and is characterized by a silky hairiness, covering the leaves. It should be grafted on *W. sinensis* using the whip and tongue graft.

MODERATOR COGGESHALL: Thank you, Mr. Fenicchia. Now Mr. K. D. Holmes, Mt Arbor Nurseries, Shenandoah, Iowa will speak on the "Propagation of Some of the Stone Fruit Trees."

MR. K. D. HOLMES (Mount Arbor Nurseries, Shenandoah, Iowa): After listening to the sessions since arriving Thursday noon, I am convinced that either our methods are completely outmoded, or that the cycle is coming around to the point where our methods are about to become popular again. Be that as it may, my subject is quite different from those discussed so far in these meetings.

Mr. Holmes presented his paper entitled "Propagation of Some of the Stone Fruit Trees." (Applause)

PROPAGATION OF SOME OF THE STONE FRUIT TREES

K. D. HOLMES
Mount Arbor Nurseries
Shenandoah, Iowa

It has been suggested that I speak on the subject of "Propagation of Some of the Stone Fruits." I will attempt to tell you, rather briefly, of the methods used at Mount Arbor Nurseries. I might start by telling you of the type of record form we keep on all budding operations. We use a large columnar ruled pad, 17″x 11″. This record is prepared in our main office and each page carries a main heading showing the type or species and the location, such as the farm number, the block number and section. A sub-heading carries the row number, the variety, budder, date budded, and the amount budded. There is also a space for brief comments and a column for the per cent of bud take that the budding foreman fills in as we re-bud. There is also space for the name of the re-budder, man hours and rate of pay. This column, if filled in as the budding season ends, will give very valuable cost information.

As concerns our actual methods of production I will start with comments on dwarf flowering and dwarf fruiting peach trees. We line out *Prunus besseyi* or *Prunus tomentosa* seedlings which are about $\frac{3}{16}$″ in caliper. We prefer to get these understocks planted in the fall and bud them the following August. Both *P. besseyi* and *P. tomentosa* are used as understocks for dwarf peach budding However, we find that *Prunus tomentosa* is the most desirable since we get a better per cent of live buds and the dwarf tree produced gives indications of being more compatible. It was August 14th this year before we started the dwarf peach budding. We have no special date to start but try to start early enough to catch the understock as it opens easily and late enough so that the bud stick is ripe, rather than watery We make a "T" shaped incision in the understock. Using the point of the budding knife we attempts to slide the inserted bud-eye to the lower-most extremity of the opening, or as far as it will move downward freely without jamming. We try to see that a great amount of tension is maintained on the budding rubber and that it covers the incision completely, with the exception of the bud-eye If the operation is carried out properly we never have any trouble with moisture entering the understock at the incision.

We believe that extremely hot weather has a very definite effect upon our bud stand and therefore, have a rule that we shall stop budding when the temperature reaches 95 degrees. Some seasons we have experienced temperatures from 95 to 105 degrees for days. During extended "hot" periods, we have found it necessary to change our working hours for the budding gang. They start about 5.00 A M and bud until the temperature reaches 95 degrees, which was usually around 11.00 A.M. Our bud take varies, as it does with most nurseries. It is dependent upon many factors such as the individual budder, the winder, sometimes upon the specific variety and upon weather conditions Our bud take on dwarf peach this year ran from 78% to 91%. I consider this to be an excellent percentage for peach buds on *Prunus tomentosa* or dwarfing understocks

Our standard peach tree budding is carried on exactly as I have described for our dwarf budding operation, with the exception of the understocks, which for standard peaches are partly red leaf peach seedlings, partly Southern natural and California Lovells. We like to plant some of all three kinds as we sometimes have a germination failure with one of the types Generally speaking, our budwood is taken from our own stock block trees. Our *Prunus mahaleb* is, of course, the main understock used for the production of the sour cherry. Much work has been done on the *Prunus mahaleb* seedlings, particularly during the past six or seven years, in an effort to produce certified virus-free material for cherry understocks Dr W. F. Buchholtz, Head of the Plant Pathology section at Iowa State College started valuable work on this problem long before most of us realized that a great many of the trees being produced were carrying a virus disease that could seriously effect the production of sour cherries. Thousands of *Prunus mahaleb* were repeatedly indexed Many were found to be virus-free and were transplanted for use in the production of *Prunus mahaleb* seed We have one of the *Prunus mahaleb* seed producing plantings that already is providing us with just about enough seed, from indexed virus-free trees, for our seedling production. There are now several other seed producing plantings in the country This same virus indexing work was extended to the Sour cherry variety trees, to the end that a number of nurseries are now growing only virus-free indexed understocks and budwood

I wanted to mention this, primarily, to call your attention to some of the work that must be carried on indefinitely if we are to make a determined effort to furnish our customers and the general public with the best quality tree that can be produced. I would advise lining out *Prunus mahaleb* seedlings as early in the spring season as the weather conditions will permit. We often get them planted during February. Practically all of our understocks and other materials, for that matter, are planted with a two row John Deere planting machine, rather than by hand In our area we have to keep *Prunus mahaleb* seedlings and our stock block trees well sprayed to hold the foliage. We do not like to cut bud sticks that have lost any of their foliage, as we feel that the bud-eyes would be damaged. We usually do not start to bud cherry until after September 15th as cooler weather arrives, and as the understocks show indications of retarded growth

The only Dwarf Sour cherry we propagate is the Dwarfrich variety To me it is more of a novelty than a fruiting tree, but so far we have not produced enough any year to supply the demand. This variety, by the way, is budded on *Prunus mahaleb* the same as any other sour cherry variety

We grow only the American and Minnesota hybrid plums at Shenandoah They are budded on native plum seedlings that are fall planted Incidentally, plum is another of the stone fruits that is subject to a virus condition and a great deal of work has been completed making virus-free budwood available In our State, Dr. Buchholtz is now coming up with quite a few seedlings from virus indexed trees The seedlings will, in turn, be indexed and those that remian virus-free will be planted for seed producing blocks. We usually bud plum during August. There is quite a little controversy in the Mid-West regarding plum budding. Some nurseries like to bud earlier than we do and de-wood the buds. They claim that they cannot get a good stand unless they do use rather green bud sticks and remove the wood from the bud-eye. This practice does not seem to work in our immediate locality. We have gone back to budding plum using riper wood and slicing the bud-eye leaving the wood in. Our stand of buds on plum was better than average this year, as weather conditions were more favorable at budding time. Our bud take on the purple leaf plums (*P. cistena* and Thundercloud) averaged 85% and our entire plum budding averaged 80%. Most of our European varieties of plum are grown at our Yakima Valley, Washington, branch and are budded on Myrobolan plum seedlings.

Our budding operation at Shenandoah is small compared to some of the rose budding operations that I have observed in California, although we try to run a gang of 12 to 15 good budders. It usually takes two winders for each of the budders and two men to rake out the seedlings ahead of the budders, making a crew of 35 to 40 workers altogether

MODERATOR COGGESHALL: Thank you, Mr Holmes At this time the meeting is open to questions.

MR FLEMER I would like to ask what average budding costs amount to.

MR. HOLMES That can vary, but on an average, peach and apple, which bud much more rapidly than the stone fruits, would run around 15 cents by the time we are through, including sprouting.

MODERATOR COGGESHALL: Any further questions? If not, I turn the meeting back to President Louie Vanderbrook Thank you.

PRESIDENT VANDERBROOK: At this time I will turn the microphone over to Dr. John Mahlstede for the report of the Field Trials Committee

MODERATOR MAHLSTEDE: While the final reports are being distributed I would like to call attention and give due credit to those members who helped organize and carry out this year's project. The Field Trials Committee as listed in the 1956 Proceedings consisted of the following members Vincent K Bailey, Jean P Nitsch, Harvey M. Templeton, Jr, John Vermeulen and myself, as Chairman.

Moderator Mahlstede presented the Committees report, entitled "Photoperiod Studies and Gibberellic Acid Screening" (Applause)

PHOTOPERIOD STUDIES

After considerable discussion by the committee and your officers it was decided to continue and complete, if possible, the photoperiod studies initiated in 1955-56. A program similar to the one solicited in 1956 was distributed in March of this spring through the courtesy of Dr Snyder Later this fall a request was made in the NEWSLETTER for anyone cooperating in this venture to contact the Committee. Two such notices were received.

Much has been said about the influence of light on the growth of ornamental plants, and plants in general As a science and a field, the effects of radiation on the growth of plants is in its infancy. Scientists know that, for growth, light must be given in sufficient quantity. The term photoperiodism has been given to the length of the day or light period and the night as it affects physiological responses in plants. It is known also that temperature plays an important part in the photoperiodic reaction Plants in turn may be classified by their reaction to the length of the light and dark period, as for example: (1) short day plants (Chrysanthemum), (2) long day plants (China-aster), and (3) those indifferent (*Buddleia*). Plants listed as short day and long day plants must be given certain light and dark conditioning periods before they can be brought to flowering For example, the chrysanthemum, a typical short day plant must have long uninterrupted night periods (50°F. and above) of 12-16 hours duration, depending on the variety, before they can be brought into flower. Flowering can be retarded at will by subjecting the plants to extended light periods or interrupting the night period before flower buds have been formed.

Why plants respond to variations in the light and dark period is not quite clear One explanation might be that in certain plants the reactions necessary for the transformation of buds into flower buds require slow chemical reactions which take place during the dark period. These reactions start with products produced as the result of photosynthesis during the day and finish up during the extended night period.

OBJECTIVES

It was the objective of the project, to determine what ornamentals could be maintained in a continuous state of growth by interrupting the normal dark period by two hours of light. Also by positioning plants in rows radiating away from the primary light source, it was hoped that information could be gained on the effect of light intensity on the growth of these plants which might be affected by an interrupted night period.

RESULTS

Crapemyrtle and *Caryopteris* in 1956, and *Caryopteris* again in 1957 were noticeably affected by interrupting the dark period with 2 hours of light Although the blossom buds on *Caryopteris* were formed, during the period of night lighting, the flowers did not open for at least 2 weeks after the lights had been turned off

General responses of various plant materials in the light experiment are summarized in Table 1. It must be pointed out that although some of the plants responded in a similar manner both years, others responded differently. In part, this may be accounted for by normal growth habit after the plants have become established. However, there is also the influence of environmental conditions as they effect the growth of plants For example, it is known that *Caragana arborescens* is an extremely hardy plant, which has the ability to take hot, dry growing conditions. For this reason it has been used in the Plains States for shelterbelt plantings. During the first growing season, transplants in 1956 performed very well at high interrupted light intensities, poorer at intermediate and again better at lower light intensities. The year was hot and dry in the Midwest, conditions under which the plant ordinarily does well. In 1957 the same general response was obtained at the various light intensities but the percent growth increase was much lower. This can be explained in part by noting that the year was relatively wet and cool. The non-lighted control plants were similarly affected by season, i e., there was a 79% growth increase in 1956 as contrasted to only 26% in 1957.

It was also interesting to observe the rate of growth of various plant materials located in a position directly under the light source (Table 2). With the exception of Red pyracantha, all plant materials had put on most of their growth by July 23rd. In other words, after that date very little growth was made by these plants for the remainder of the season. How this compares to the normal growth cycle of non-lighted materials or plants growing in the field was not determined.

In summary, we believe that further screening of plant materials for their possible response to interrupted light would not be practical. The variation in the age of the plant placed under lights and its normal flowering habits in regard to when it comes into "bearing" greatly influences results One of the primary objectives of this study, was to determine if it would be possible to maintain a plant in the vegetative state by interrupting the night period. Of the plants tested, few economically important plants were responsive, as far as the study went. In order to determine if the majority of these plants could be influenced it would be necessary to carefully observe flowering characteristics over a relatively long period of time, and then grow only those plants which could be held in an active vegetative stage under this system.

Table 1.—Effect of various interrupted light intensities on the growth of woody ornamental plants

High Light* 120-320 fc**	Intermediate* 30-120 fc	Low* 2-30
Artemesia stelleriana (1)	*Abelia grandiflora* (1)	None
Kolkwitzia amabilis (2)	*Ilex cornuta burfordi* (2)	
Prunus laurocerasus (1)		
Rhus glabra (2)		
Symphoricarpos chenaulti (2)		
Viburnum burkwoodi (1)		
Weigela vaniceki (2)		

Increased Growth* At All Intensities	No Effect in Growth	Decreased Growth At All Intensities
Amorpha fruticosa (2)	*Acanthopanax Sieb* (2)	*Magnolia grandiflora* (1)
Caragana arborescens (2)	*Cornus alba sibirica* (2)	*Spiraea billiardi* (2)
Caryopteris Blue Mist (2)	*Gardenia fortunei* (1)	
Cercis canadensis (2)	*Lonicera claveyi nana* (1)	
Forsythia suspensa (2)	*Spiraea froebeli* (2)	
Fraxinus p lanceolata (2)		
Ligustrum lucidum (1)		
Prunus besseyi (2)		

* Growth at least doubled at the specific light intensity in comparison to non-lighted controls.
**—Foot candles
( ) Reference

Table 2.—Growth rate of various ornamentals*

Plant Material	Percent of Total Growth Made by July 23, 1957**
Abelia grandiflora	100%
Gardenia fortunei	84%
Ilex cornuta burfordi	100%
Ligustrum lucidum	97%
Lonicera conjugialis	100%
Magnolia grandiflora	100%
Prunus laurocerasus	89%
Pyracantha coccinea	45%
Viburnum burkwoodi	100%

* Reported by J B. Roller
** 320 fc position

PRELIMINARY SCREENING STUDIES WITH GIBBERELLIC ACID

Late in 1955 it was brought to the attention of many members of the various sciences, meeting in Storrs, Connecticut, that a new growth stimulating chemical was available for testing on a limited scale This chemical was tested by many of the colleges during 1956, principally in the vegetable field.

In the Spring of 1957 several large chemical companies started marketing the chemical under various trade names to any taker The results were generally discouraging. Most plants were responsive to the chemical. In general, increased stem length, earlier flowering, large blooms, increased flower stalk length, longer internodes, and occasionally more lateral branching was noted as the result of the application of the growth regulator.

Because of the interest in this product and the effect it might have on modifying propagation and growing methods, the Field Trials Committee and several selected cooperators were asked to run a preliminary screening test. A chemical containing Gibrel, was purchased from a company in Missouri. Samples of this product were then distributed to the cooperators with suggested concentrations, possible uses, and a warning about burning.

RESULTS

From a summary of the results from members who used this particular product it was clear that the carrier used in the formulation of this product caused considerable damage to almost all plants to which it was applied (in concentrations over 100 ppm). Genera and species were quite variable in their response to concentrations between 10 and 100 ppm (Table 1 — Ref. 3)

Samples of the pure chemical supplied primarily to Experiment Station personnel by Merck and Company and Eli Lilly & Co , have given better results, at least from the burning standpoint. Dr. S H Nelson (4) treated rooted cuttings of several ornamentals on May 8th, 1957 and transplanted them 2½ days later. The results are summarized in Table 2. It is interesting to note that little loss occurred in the transplanting operation and that the height of plants of *Spiraea media* treated with 100 ppm gibberellic acid almost doubled over that of the untreated control plants. Cuttings of *Philadelphus* Dame Blanche also made a "favorable" increase in height over the untreated controls. *Hydrangea, Lonicera,* and *Viburnum,* on the other hand, were unaffected, at best, and often stunted by the higher concentrations

Table I.—The effect of gibberellic acid on the growth (height) of various ornamentals. (R. L. Ticknor-3)

	Percentage Growth Increase			
		Concentration (ppm)		
Plant Material	CK	10	50	100
Malus spp **	548	533	506	358
Rhododendron Schlip *	21	19	14	23
*Pieris japonica**	78	83	61	63
*Cornus Kousa***	229	129	214	165
*Chamaecyparis obtusa***	265		160	0
*Rhododendron o arnold***	32	27	30	38
Syringa vulgaris "Congo"*	41	60	4	9
*Rhododendron poukhanense**	30	14	26	3
*Euonymus vegetus***	11	30	32	17
*Daphne creorum***	61	63	56	59

Chemical applied July 12, Evaluated October 14, 1957

* Bedded June, 1956

** Bedded, June, 1957

Table 2—Height (in cms) of ornamental shrubs after one growing season following gibberellic acid sprays prior to transplanting

Material	Treatment			
	Check	10 ppm	50 ppm	100 ppm
Spiraea media	26 45	26 95	26 60	40 30
Philadelphus Dame Blanche	26 70	28 70	27 90	33 10
Hydrangea arborescens	22 06	15 25	21 17	16 50
Lonicera Carelton	33 15	29 63	30 33	19 75
Viburnum lantana	12 94	13 58	9 63	11 88

Similar results were obtained by J. B Roller (1) using seedlings and cuttings transplanted into 2½ inch pots two weeks prior to treatment. Gibberellic acid at 100ppm was applied on June 6, 1957 and again on June 13. *Photinia,* and *Taxus* were the only plants which showed any height effects from treatment (Table 3).

Table 3.—Effect of gibberellic acid on the growth of transplants

Plant Material	Per cent Growth Increase of Non-treated Plants	Per cent Growth Increase of Treated Plants	Type of Plant
Taxus cuspidata	35%	48%	Cutting
Ilex perneyi	Dead	123%	Cutting
Ilex cornuta rotunda	63%	50%	Cutting
Ilex bullata	94%	63%	Cutting
Ilex vomitoria (df)	69%	38%	Cutting
Ilex cornuta burfordi	50%	25%	Cutting
Acer atropurpurea	289%	200%	Seedling
Scheffelera	300%	300%	Seedling
Photinia	100%	300%	Seedling

Vincent Bailey, (5) using the supplied formulation on *Syringa, Euonymus, Philadelphus, Ribes, Abies, Pinus, Juniperus* and a number of other plant materials, reported uniform, negative growth results which were accompanied by various degrees of leaf burning

In summary then, it appears that the use of gibberellic acid by nurserymen should be restricted to small scale testing When more is known about its physiological action in plants it may well be that it will have a definite place in speeding up growth of slow growing dwarf plants, in establishing rooted cuttings and liners, and in seed propagation. In this latter regard, the use of this chemical on the so-called two year seed has particular merit which deserves further testing.

The situation has been very accurately evaluated in the July-August Agricultural Leaders' Digest by the statement "Right now the gibberellic product is like the atom bomb — it's got a lot of power of some kind, but nobody knows how much."

PARTIAL LIST OF CONTRIBUTORS

Reference No.	Name	Firm and Address
1	J. B Roller	Verhalen Nursery Co Scottsville, Texas
2	J P. Mahlstede	Iowa State College Ames, Iowa
3	R L. Ticknor	Waltham Field Station University of Massachusetts
4	S. H. Nelson	Dept of Agriculture Ottawa, Canada
5	Vincent Bailey	J V. Bailey Nurseries Saint Paul, Minnesota

MODERATOR MAHLSTEDE: I would like to ask Dr. Nitsch to come forward and give us a few details of the work he is doing on photoperiodism Dr Nitsch.

DR JEAN P. NITSCH (Department of Ornamental Horticulture, Cornell University, Ithaca, New York): It was suggested that we make a few remarks about our work at Cornell. First of all. I am sorry to say most of our experience has been in the greenhouse, although we did have a very limited test outdoors this summer. We came to the following conclusions:

1 For the most part, in the greenhouse, where the temperature is high, I think the commercial use of light would be feasible only in the South where the night temperature doesn't go below 55 degrees I think light has no effect at all below this temperature.

2 Light effects the facility with which some cuttings root The intensity of rooting of poplar cuttings changes greatly with changes in day length.

3. Norway spruce grown under short days, results in shorter stock If they were kept under continuous light, they continued to grow, and at this time, they are still growing. This is just to show you that this type of plant does respond to daylength You can get a Christmas tree in three of four years if you keep it under continuous light I am afraid this is not practicable commercially, because we have to do it in the greenhouse

Departing from the subject of photoperiodism I might add a comment on the subject of gibberellic acid. Certain plants do respond very dramatically to gibberellic acid Gibberellic acid was applied to maple with very noticeable results. We observed a very large increase in height, but the stem was very thin. You get a tall spindley plant which generally is not desirable.

MODERATOR MAHLSTEDE: Thank you, Dr. Nitsch. Mr. Wells has a few words he would like to say in regard to the use of gibberellic acid on ornamentals Mr. Wells.

MR. JAMES WELLS: Some of you have received some material from me this summer and I think, without exception, all of you had notice of it. We applied this material to about 80 different kinds of plants in all stages of growth. We had some results which appeared quite quickly but which were later submerged in the normal growth of the plant I should perhaps say that we made three treatments, (June 5, July 1, and August 5) and we applied three strengths, i e., 25, 50, and 100 parts per million An untreated check was also used for comparison.

I would just briefly mention one or two of the plants which responded to treatment. We estimated response in percentage of increase in growth against the check. *Viburnum tomentosum,* treated with 25 parts per million gibberellic acid solution increased its size 75 per cent over the check. The percentage increase with 50 parts per million was down to 50 per cent *Philadelphus virginalis* and *Spiraea vanhouttei* was essentially the same.

There was only one plant, *Biota orientalis,* that gave a response which I thought was good. The plants, which were one year old from seed, were set out in the spring and had rerooted and re-established themselves at the time of treatment. The 25 ppm treatment produced plants which were 120 per cent larger than the check, and the plants were normal, without elongated internodes.

There was one other feature which we noticed on a number of plants, and that was that quite a few of the treated plants appear to be more healthy than the untreated plants Under our exceptional summer this year they retained their leaves when in some instances the check was completely defoliated. The treated plants looked healthier. The leaves were darker green and in better condition.

Right at this time I don't think we have any information which would suggest that it should be used by anybody except on an experimental basis.

MR JOHN B. ROLLER. I tested a number of commercial preparations of gibberellic acid and obtained poor results. However, I procured 100 milligrams of the pure acid from Eli Lilly & Co This I dissolved in 1,000 cubic centimeters of distilled water The solution was applied to young seedlings, some of which gave some terrific responses. One outstanding example was *Magnolia grandiflora.* These plants were in pots two weeks before treatment and approximately an inch and a half in height I treated these with three treatments at four-day intervals. It became apparent I was over-treating, so I skipped a week, gave them another treatment, and then I skipped two or three months These plants were growing so fast that they were unable to stand up and consequently had to be supported. After a growing period of two months the treated plants were about eight to ten inches in height compared to an inch and a half to two inches for those which were not treated. These plants were then put out when it was warm enough out in the shade and periodic fertilization continued The treated plants absolutely stopped growing until today the untreated plants are as tall, with better foliage and generally much better plants in appearance.

I am against use of this chemical after seeing what happened to some of these plants one year later Thank you.

MODERATOR MAHLSTEDE: With that gentlemen, I now turn the meeting back to our illustrious President.

PRESIDENT VANDERBROOK: Thank you very much, gentlemen, for the presentations. This is more or less a labor of love The membership doesn't realize the work that is being done by you scientific men. Neither does it realize the amount of cooperation it takes to make a project of this type "go"

We will now proceed to our Annual Business Meeting. (See page 11).

SEVENTH ANNUAL BANQUET

The Past President, Mr. Louis Vanderbrook and the newly elected president, Mr. Hugh Steavenson, presided at the annual banquet.

Dr. William Snyder was justly recognized for his faithful service to the Society. Through his services and foresight the Society has grown to be recognized as one of the outstanding organizations of its kind in the world.

Following a period of entertainment, Past President Edward H. Scanlon discussed a number of select slides he took while "Sleuthing for Specimens from Moscow to the Mediterranean"

The Seventh Annual Meeting of the Plant Propagators Society adjourned *sine die* at 10:00 p.m.