

HOLLY SOCIETY OF AMERICA

Proceedings of the Fourteenth Meeting

SWARTHMORE COLLEGE

Swarthmore, Pennsylvania

April 9, 1954

The 14th meeting of the Holly Society, convened in the Martin Building, Swarthmore College, Swarthmore, Pennsylvania at 10 A. M., on April 9, 1954. Members and visitors were welcomed to the College by President Courtney Smith who placed the facilities of the College at their disposal.

The secretary reported on the actions taken by the Board of Trustees meeting on April 8, 1954. The first action by the Board of Trustees was the approval of a budget for 1954 for the amount of \$1,600.00. The Board of Trustees approved plans to meet in Millville, New Jersey, November 11 and 12, 1954. They accepted an invitation from the National Shade Tree Conference to cooperate in staging an educational exhibit at Haddan Halls Hotel in Atlantic City, August 31 through September 4, 1954. They elected Stewart McLean of Towson, Maryland to the Board of Trustees.

The members were advised that a membership roster as of February 28, 1954 would be distributed by April 15th.

The Treasury Report for the period December 2, 1953 to March 29, 1954 was as follows:

Receipts from all sources.....	\$2,217.02
Disbursements:	
Stationery	\$299.56
Clerical assistance	80.00
Printing Bulletin No. 6.....	888.57
Book Account	54.70
Postage	197.33
Fall Meeting Expenses, Citations, Exhibit	
Baltimore Christmas Greens Show.	141.15
	\$1,661.31
Balance in Check Account Union Trust	
Company, Baltimore 3-21-54.....	\$555.71

Mr. Daniel Fenton reported that the State of New Jersey is putting in a new toll highway about one hundred and fifty miles in length from New York straight on through to Cape May, New Jersey. It will be a dual lane highway and will be landscaped primarily with holly. The Holly Society has been working with the landscape engineers and also with the Commissioner of New Jersey Highways and to date have recommended that planted of one thousand hollies in one stretch of highway in Cape May County. Four hundred hollies have been placed in a four mile stretch in Tom's River area and about 300 holly trees will go into another 6 mile stretch near Atlantic City. In the middle of this highway at Mamoria, New Jersey there is a large holly tree measuring six feet, five inches in circumference. The right of way will be widened as it approaches the holly tree and will be 120 feet between the two lanes compared to a normal 60 feet in order that the holly tree will be spared. A fence will be erected and this fine tree will be a landmark for that part of New Jersey.

Mrs. Charles A. Young reported on the Educational Holly Exhibit at the Christmas Greens Show held by the Federated Garden Clubs of Maryland, at the Museum of Art, Baltimore, Maryland, on December 19th and 20th.

The Holly Society received a Gold Medal Award for the identified display of 24 American and English holly specimens. Seven thousand three hundred and forty persons viewed the exhibit during the 2-day show.

Miss June Vail representing the Variety Selection Committee read the following report:

"The committee reports progress, as usual.

It must be realized that of necessity results will be slow in fruition. To make valid comparisons, varieties must be grown relatively near each other and at a comparable plane of nutrition. Most of the plants we receive are not much more than established rooted cuttings, which means a year or two in pots and 2 or 3 years in the nursery before they can be transferred to permanent positions in the arboretum. Then several years must elapse before the plant assumes a true form.

It did seem last summer that it would be possible to designate certain varieties that we have as inferior to others. Then the condition struck that was observable at the time of the fall meeting in 1953. The foliage of all, regardless of variety or of nutrition level (in the fertilizer experiments) took on a rusty appearance. The condition is quite general throughout this region. The probable cause of this, as we reason about it, was the extreme heat combined with drought. We tried a foliar spray of nitrogen, but it was non-effective.

There are many varieties, especially of *Ilex opaca*, that are not included in the arboretum at Rutgers University. I should like to urge all introducers to send plans to us if they wish their varieties to be included in the comparisons."

CHARLES H. CONNORS,
Chairman

Mr. H. Gleason Mattoon, the representative of the Holly Society to the American Horticultural Council, presented his report of the Meeting of the Board of Directors.

"An interesting and helpful meeting of the Board of Directors of the American Horticultural Council was held at the Hotel Madison, New York City on March 10th.

Many subjects were discussed and several committee reports were presented. It seems unnecessary to report at length, but there are some items of interest to the Holly Society.

In my letter to President Wolf in February concerning the proposed meeting, I mentioned that following the publication of the Holly Check List, the next logical step would seem to be the selection of a registrar. Dr. W. H. Camp, Chairman of the Committee on Nomenclature and Registration reviewed the position of A. H. C. in assisting member organizations in registration problems, pointing out that such actions must be on an international level or of a character not in conflict with international interest.

While those present realize the need for keeping the International Code of Nomenclature for Cultivated Plants in mind, the immediate need of many plant societies, of which the Holly Society is one, is for a general method of procedure in registration. We of this society now have a Holly Check List, the value of which is in direct proportion to the number who adopt its system of nomenclature. Logically the Society should next create the position of registrar and choose

a person to act in that capacity. We are now burdened with hundreds of holly names, with the number growing more rapidly as more persons make selections with little or no descriptions. There is need for conformity in the method of naming and testing, and there is equal need for adequate records.

Though Dr. Camp, as you know, formerly of the Academy of Natural Sciences, Philadelphia and now of the Botany Department, U. of Connecticut, Storrs, Connecticut, feels that the rules of nomenclature cannot be simplified, it seems to me that a registration syllabus could be prepared which would be helpful to the Holly Society. If that is the feeling of the society, such information should be sent Dr. Camp.

The next scheduled meeting of the American Horticultural Congress is to be in Boston, November 4-7, 1954 with headquarters at the Hotel Somerset and meetings at Horticultural Hall. The Board urged member societies to consider holding meetings at the time and place of the Congress. If a stated meeting cannot be held, possibly a regional group from the Society might meet. There will be much to see of interest, the Arnold Arboretum, Gardner Museum, the Fall Flower Show, etc.

The A. H. C. can serve a useful purpose in horticulture. Whether it does or not will depend largely on the zeal with which member societies support the Council. I feel that Holly Society should continue its support by membership and that it could be helpful in securing individual memberships through our publications.

I have mentioned only those points which seemed of special interest to our Society. Mr. Wolf and Mr. Young have both received reports of the Board Meeting and may have additional comments to make."

The Membership Committee reported that there are at present 413 personal members and 124 sustaining members, a total of 537. It is our hope and expectation that the Society will continue to show a healthy increase in membership in 1954, the seventh year of our corporate existence. Our Secretary has mailed applications to all members and he will be glad to have prompt response. If you have not yet signed up, there are applications available for you and for any of your friends who are interested in the work we are doing.

We were particularly impressed with the excellent write up of our November meeting at New Brunswick which appeared in the December 15th issue of *American Nurseryman* magazine. The account of the meeting brought a number of inquiries from interested nurserymen, asking about our activities. All of these letters were answered by the Membership Committee, and new sustaining memberships were the result. Letters came to us from the Midwest, South, Coastal states, and even one from Canada. This was good publicity and we hope it can be repeated.

The Chairman of the Committee on Insects, Dr. Clyde C. Hamilton, stated that DDT was his recommendation for the control of Holly Leaf miner. Spraying gives the most effective control when applied at the time of emergence. A period of 10 days may elapse for an entire brood to emerge, however, DDT will remain effective for that period and longer. If the spider mite population shows an increase following the use of DDT, a miticide should be added to the DDT spray. The miticide may be applied separately in the event of heavy spider mite infestation. He has observed both the European and American holly leaf miners emerge in the fall and recommended DDT as effective control. Ladybird beetles gave better control of scale on holly than did any spray and Dr. Hamilton suggested that Ladybird beetles be encouraged in holly plantations as a control measure.

REPORT OF COMMITTEE ON ABORETUMS

Springtime is a season that brings gladness into the hearts of horticulturists. It also means rush. Many details are left undone. One of them is, for me, failing to circularize my committee on the necessity for a report. Accordingly my remarks shall be brief.

I have letters from responsible individuals of two newly established gardens, expressing the hope of cooperating with us in testing and promoting holly. Dr. R. C. Allen, Kingwood Center, Mansfield, Ohio, wrote to us offering to test holly varieties. He writes in part: "We are interested in promoting hollies for use in Ohio and we need more information about the adaptability of the various clones." Dr. Allen intends to come to New Brunswick and to select material for cuttings as a beginning of their holly collection. In the second letter, Mr. Fred C. Galle, Ida Carson Gardens, Chipley, Georgia, writes: "We are striving . . . to have one of the most complete holly collections in the Southeast and would appreciate any assistance from . . . the Holly Society."

Since our meeting in New Brunswick last fall, three cooperating arborists namely, U. S. National Arboretum at Washington; Missouri Botanical (Shaw's) Garden at St. Louis; and A. H. Scott Horticultural Foundation at Swarthmore, have shared in our surplus plants. This is part of our program of distribution and testing of hollies (in this case American hollies) that our Society is sponsoring.

Activities at Rutgers included the expansion of arboretum planting by approximately 1/3 which now totals 328 plants including 66 named and 82 numbered (148 varieties). Three new hedges (Clark, Helleri and rotundifolia) and 3 *Ilex montana* were planted. Remaining in the nursery is 72 "varieties."

Respectfully submitted,
ROBERT B. CLARK

The Holly Society Award to Distinguished Members was made to Mr. Wilfrid W. Wheeler, former Secretary of Agriculture for Massachusetts, and an ardent holly grower of Falmouth, Massachusetts. In making the presentation for the Society, Dr. John Wister cited Mr. Wheeler's contributions to the cultivation of holly and his untiring efforts to improve the quality of holly in the United States.

A second Award to Distinguished Members was made to Miss Elizabeth C. White of Whitesbog, New Jersey. Mr. Harry W. Dengler cited Miss White's many accomplishments in the field of applied horticulture, her early association with the development of blueberries, a work which won her the title of "Blueberry Queen," and her work with the propagation of holly at Whitesbog, New Jersey.

The awards were stained glass plaques with a holly motif designed by Mr. Forrest C. Crook.

Mr. Edgar H. Diehl, Native-American Holly Farm, Manheim, Pennsylvania, presented the following talk:

FROM A HOBBY TO A BUSINESS

"My basic training was a degree in Industrial Engineering from Penn State University and shortly after my graduation in 1934, I was installed as purchasing agent for a firm employing 400 people. We manufacture a wide variety of complicated machinery and there is a terrific amount of detail involved. All this leads to mental fatigue so that by the end of a working day I was mentally tired and decided that some physical activity would be quite beneficial.

During World War II, I got interested in gardening and shortly thereafter became interested in the propagation of holly. For several years I experimented on the rooting of cuttings and growing of small hollies and in 1950 after surveying the available supply of hollies, I decided that holly growing would be an excellent commercial venture.

From observation, I noted that very few hollies were available in 3 and 4 year old sizes whereas large quantities of rooted cuttings and 6 to 8 inch hollies could be easily obtained. After analysing this, I felt that commercially a nicely branched 18 to 30 inch tree would have a very acceptable market and I made my plans accordingly.

My engineering background and work in industry provided me with the ability to formulate a working plan of which the end result was to produce nicely branched 3 and 4 year old trees at a modest price. I set my goal to produce 5,000 trees annually and not to sell any stock less than 3 years old or less than 18 inches in height. My plan was rather ambitious because it meant that I would have to operate for a 3 year period without any income from the project and the expense of providing the required facilities to grow this many hollies would be rather high. This meant that because of lack of capital that my good wife, Louise, and I would have to do the complete job ourselves.

In order to keep labor to a minimum, I laid down a plan as follows:

1. Provided a 72' x 6' cold frame heated with cable and covered with sash. In this bed I rooted the cuttings and after being rooted I had ample space to reset the potted cuttings back in the bed to give them protection for the first winter.
2. Provided 3—72' x 12' bin type beds that could accommodate 2,500—6" potted plants in each bed. These beds were constructed so that if advisable they could be covered with sash.
3. Provided a 60' x 90' aluminum house for 3rd and 4th year growing.
4. Constructed a 10' x 20' potting shed for storage and potting.
5. Provided a sterilization area where potting soil could be prepared.
6. Provided overhead watering on all areas to eliminate needless time in watering.
7. Put 8" sand in all growing areas to set the pots in. This eliminated practically all weeding problems and proved to be a real water saver because of the ability of tightly packed sand to draw water from the ground below.

With the above facilities provided, the next job was to follow the plan and attempt to grow commercially acceptable hollies. As to whether or not we were successful we will let you be the judge by examining the 1, 2, and 3 year old specimens on the table.

We are very quality conscious in all details, whether it be our holly stock, stationery, advertising, or any other detail that has to do with the growing or selling of our product. We make every effort to do a good housekeeping job at our nursery and this feature alone we believe helps to clinch many sales. We provide detailed planting instructions with all trees sold and give all customers a nicely prepared 15 page booklet which tells a nice story about the romance, types, methods of propagation, and uses of hollies as a landscape tree.

We believe that our policy of selling only well established 3 year old trees is paying off although quite frequently we have offers to buy smaller stock. From a retail point of view, we believe we are gaining satisfied customers through our policy because many folks tell us that in the past they have obtained smaller potted hollies but they were unable to keep them alive.

My suggestion to the industry would be to grow larger stock, the same as we are doing. Keep the price in line with the larger stock offered and you will not only gain better satisfied customers, but many repeat sales will result from this policy."

During the afternoon session of the meeting a demonstration on soil nutrients and the effect on plants was conducted by Mr. Wallace A. Mitcheltree, Extension Specialist in Soils, Rutgers University, New Brunswick, New Jersey. The following paper contains a summary of Mr. Mitcheltree's remarks:

HOW NUTRIENTS ACT IN THE SOIL

Nutrient action in the soil is based on simple chemistry. Fundamentally this chemistry is a play on plus and minus electrical charges. The principle can be demonstrated with horseshoe magnets. One side of a magnet is a north pole, the other a south pole. When the north pole of one magnet is moved close to the north pole of the other they repel or push each other away. But when the north pole of one is brought near the south pole of the other they attract each other. Electrical charges act in the same manner. Two plus or two minus charges will push each other away, but a plus and a minus will attract and neutralize each other. In other words, like charges repel and unlike charges attract.

Zone of Influence. This attraction exists when the magnets are touching as well as when they are in close proximity to each other. The electrical waves actually reach out from their source and this area of attraction is called the zone of influence.

Water Key to Soil Chemistry. A key to nutrient chemistry comes from a study of water. The popular chemical formula of water is H_2O but structurally it should be written as HOH , since it is made up of two chemical ions—Hydrogen (H^+) and hydroxide (OH^-). Hydrogen (H_2) is an explosive gas and hydroxide is a very elusive compound existing only in combination with other materials. These two materials when brought together are attracted by their unlike charges and form a very stable, safe, common and indispensable compound called water.

Acid or Alkaline. Water contains the basic materials of the acid-alkaline chemistry so important in soils. Acid exists only when Hydrogen (H^+) is present and an alkali is impossible without hydroxide (OH^-). When chlorine (Cl^-) is combined with Hydrogen (H^+) a very strong acid is formed (HCl). This is hydrochloric acid. Potassium (K^+) when combined with hydroxide (OH^-) forms a very strong alkali (KOH) which is potassium hydroxide, or commonly called lye. Acid and alkalies are chemically direct opposites yet when Hydrogen (H^+) and hydroxide (OH^-) are combined they form a neutral material called water.

Solution. Fertilizer materials which are chemically classed as electrolytes must dissolve before they can be used by the plant. This can be described more vividly in terms of common table salt which is sodium chloride ($NaCl$). Sodium (Na^+), a highly explosive soft metal is combined with chlorine (Cl^-) a very poisonous gas to form a stable, safe and highly necessary chemical for human life. Table salt when sprinkled into a glass of water dissolves or goes into solution. What happens is that the two elements separate or become disassociated and since they have split up they no longer form a solid material. If they had not disassociated, the salt would have settled out on the bottom of the glass as unchanged recognizable crystals.

Fertilizing Materials.

Let us consider two very common nitrogen fertilizer materials—sodium nitrate ($NaNO_3$) and ammonium sulfate ($NH_4)_2SO_4$. Nitrogen (N) is an inert gas. It comprises about four-fifths of the atmosphere but as such is unusable by plants or animals. By means of extremely violent reactions such as a high voltage electric arc it can be combined with oxygen (O) to form a usable but very unstable material called Nitrate (NO_3^-) or with Hydrogen (H) to form ammonium (NH_4^+), a high pressure gas. In order to make these materials stable enough to haul around in a truck or fertilizer spreader they must again be combined with some other material. The Nitrate (NO_3^-) can be combined with sodium (Na^+) to form Sodium Nitrate ($NaNO_3$) which is a white, granular, stable powder. The ammonium (NH_4^+) can be combined with sulfate (SO_4^{--}) to form ammonium sulfate ($NH_4^+SO_4^{--}$). Since the sulfate has two minus charges and $\{NH_4^+SO_4^{--}\}$ the ammonium has only one plus charge, it requires two ammoniums to satisfy the one sulfate.

Nitrogen in a Nitrogen Carrier. In sodium nitrate the nitrogen was first diluted down with oxygen to make it usable and of course oxygen has weight. Since this material was unstable it then had to be further diluted with sodium to make it stable and sodium also has weight. When a hundred

pounds of the sodium nitrate fertilizer is manufactured it is found that only 16 pounds of it is nitrogen and 84 pounds is oxygen and sodium. The ammonium sulfate combination is such that 21 pounds of nitrogen can be worked into the material. Ammonium can be combined with nitrate, one for one to form a fertilizer material called ammonium nitrate $\text{NH}_4 + \text{NO}_3$. Since less material is used for dilution here and since nitrogen (N) is carried on both sides (plus and minus) of the compound, this material will contain 32 pounds of nitrogen per hundred.

Plus and Minus Forms of Nitrogen. It should be noted here that there is one big difference between nitrogen materials. The sodium nitrate carries its nitrogen on the minus side of the compound and the ammonium sulfate carries its nitrogen on the plus side. Ammonium nitrate carries nitrogen on both sides.

Soil. The clay and organic matter in the soil are chemically active—that is, they have unsatisfied electrical charges. These are all minus charges. When sodium nitrate ($\text{Na} + \text{NO}_3$) is added to the soil it disassociates or dissolves. The nitrate (NO_3), the part of the fertilizer which carries the nitrogen, has a minus charge and is therefore forced away from the soil particles and remains out in the soil solution. If a heavy rain immediately follows an application of sodium nitrate (NaNO_3) the nitrate (NO_3) is washed down and out of the soil since it is in no way attached or held. On the other

hand, when ammonium sulfate $\left\{ \begin{array}{l} \text{NH}_4 + \text{SO}_4 \\ \text{NH}_4 + \text{SO}_4 \end{array} \right\}$ is applied to the soil and dissolves or disassociates the ammonium (NH_4) is attracted to the free minus electrical charges of the soil. If a heavy rain should follow an application of this material the nitrogen is not leached out of the soil, since it is electrically attached and will resist the water movement past it.

Usable Forms of Nitrogen. An important thing to remember about nitrogen is that the ammonium (NH_4) and Nitrate (NO_3) forms are the only two forms of fertilizer nitrogen a plant can use. Cyanamid must break down chemically to urea and then to ammonium (NH_4) before it is usable. The ammonium is the first usable form. Therefore, cyanamid is not immediately available to the plant when first applied to the soil. It does have the advantage, however, of delayed action, becoming available later in the growing season. Organic nitrogen carriers such as cottonseed meal and dried blood have this same property. They are not immediately available when first applied but must first go through a biological breakdown to form simple N compounds and ammonium before becoming usable to the plant.

Conversion of Ammonium to Nitrate. To take ammonium (NH_4) into the laboratory and change it over to nitrate (NO_3) is a difficult job. It can be done but only with special equipment and procedure. However, the nitrifying bacteria in the soil can do this simply and rapidly if the proper conditions are present. Moisture, pH and temperature are the factors which alter this bacterial conversion. Temperature is the prime one of the group. If soil temperature is below 45° F. these nitrifying bacteria will not function and the ammonium will not be converted. As the temperature rises above 45° F. the conversion starts and increases in rapidity proportion to the rise in temperature until a temperature of 90° F. is attained, after which further rises in temperature reduce the rate of conversion. Conversion stops at 100° F. because of the sterilizing effect of the heat. This temperature-conversion relationship means that if ammonium is added when the soil temperature is below 45° F. it will remain as ammonium until the temperature is raised above 45° F. On the other hand, if ammonium is added when the soil temperature is 75° F. it will remain as ammonium only a few days, being converted very rapidly into nitrate.

Potassium. The next nutrient to consider will be potassium. Potassium is generally bought as muriate of potash which is Potassium Chloride (K Cl). It is a combination of potassium (K+) a plus material and Chloride (Cl-) a minus material (K+Cl-). As potassium chloride enters the soil it disassociates and the potassium adheres to the soil particle (K+ Humate-). It will also cling to the clay, forming a K+ Clay- as did the ammonium.

Potassium Leaching. It is a known fact that potassium leaches out of the soil. Why then if it has a plus charge is it not securely fastened to the soil particle in a non-leachable state. Potassium does leach from the soil but not as rapidly as often given credit for. The reason it does leach is because it does not remain perfectly still in the soil as one might think but it is constantly bumping back and forth

within its electrical zone of influence. It bounces back and forth very rapidly off the soil particle. Frequently as it bounces out to the outer edge of the zone of influence some other plus type chemical ion will slip up in between the soil particle and the potassium ion satisfying the same minus electrical charge. When this happens the potassium is no longer attracted to the soil particle and flies off into space until it finds another unsatisfied minus soil charge. During this change of allegiance the potassium generally works itself deeper and deeper into the soil until it finds the water-table and is then carried out to sea. The ammonium ion does not leach as rapidly as the potassium because its bouncing activity is less, its length of bounce is shorter and it is more difficult for some other ion to wedge in between the ammonium and the soil particle.

Exchange Capacity. The plants have a very unique way of obtaining its nutrients from the soil. Consider the case of potassium. Potassium Chloride (K Cl) has been added to the soil. It disassociates and formed a potassium Humate and Clay. The plant root can form and exude from its cells

$\left\{ \begin{array}{l} \text{H} + \text{CO}_2 \\ \text{H} + \end{array} \right\}$. When the root needs K+ it simply trades the soil one H+ from its acid for one K+. This forms an H+ Humate-. This function in reality is a trade or exchange and in soil terminology is called the plus ion or cation exchange capacity of the soil. Since the clay and organic matter are chemically active their relative amounts therefore regulate the exchange capacity of the soil. Fertilizer practices must be altered to fit the exchange capacity. A soil with a high exchange capacity, that is a large amount of clay and organic matter, which means a large number of unsatisfied minus electrical charges can receive all of its fertilizer at plowing time and hold it until harvest time. Soils with a low exchange capacity does not have enough unsatisfied charges to hold any great amount of nutrients. Therefore, these type soils must be fertilized frequently to keep an ample supply of available nutrients on hand for growth and maturity. Generally speaking, light sandy soils have much lower exchange capacities than loam or clay-type soils.

Root Preferences. The roots themselves seem to have certain preferences for the various materials. Alfalfa, for instance, has a preference for bi-valent elements. Magnesium (Mg++) and calcium (Ca++) are both double plus and are preferred by alfalfa over potassium (K+) a one plus element yet potassium is highly essential for alfalfa growth. This must be considered in the fertilization of alfalfa. A sufficiently large enough amount of potassium must be added to the soil so that the mono-valent potassium ion supply will overcome the preference for the bi-valent magnesium (Mg++) ions. In this way the root does not have as much of a choice and consequently must take in a higher percentage of potassium, giving better yields and longer lasting stands.

Phosphorus. Phosphorus is the only other major element and its discussion has been held over until last because of its uncertain behavior. Since a discussion of phosphorus can become quite complicated only what is believed to be its most common type of behavior will be discussed here. Phosphorus is generally believed to occur in the soil as a phosphate (H_2PO_4), (H PO_4), (PO_4). Since it has a variety of minus charges one would expect it to be forced away from the soil particle, out into the soil solution and thereby leach rapidly from the soil. Yet it is a well known fact that phosphorus for all intents and purposes does not leach out the soil. Why?

Phosphorus Does Not Leach. Phosphorus has a terrific affinity to react with Iron (Fe+++), Aluminum (Al+++), and Calcium (Ca++). For reasons of simplification forget about aluminum (Al+++), and think in terms of Iron (Fe+++), which will produce the same end result. Iron under acid conditions has a high chemical activity. As the acidity reduces, the activity of iron is reduced. In an acid soil the iron reacts with the phosphate forming iron phosphate. This forms an unavailable type of phosphorus and one that does not leach from the soil. In reality this reaction is probably not quite this simple but it does serve to demonstrate the point. Lime Reduces Acidity. Lime contains calcium and when lime is added to the soil the calcium (Ca++) goes about replacing the hydrogen (H+). As the hydrogen is forced out of the soil, the acidity is necessarily reduced because hydrogen (H+) is a necessary part of an acid. As the acid content of the soil is reduced the chemical activity of the iron is reduced and now the phosphate reacts with the calcium, forming a calcium phosphate. The important thing here is that the calcium phosphate will not leach from

the soil but the phosphorus is available to the plant.

It can be seen from this discussion that soil is the medium for some very complex chemical reactions. An overdosage of the improper grade of fertilizer can actually reduce yields. Best yields can be produced where the nutrient content of a soil is inventoried by a soil analysis and that fertilizer added which will come closest to fulfilling the needs of the current crop. Just remember the nutrient status is not the only controlling factor in plant growth. Drainage, organic matter, depth of top-soil are only a few of the other factors concerned with crop production.

Dr. George S. Avery, Jr., Brooklyn Botanic Garden, spoke informally on "bonsai" or the art of dwarfing trees as developed by the Japanese. He mentioned the need for patience and the highly developed technique necessary to train the plant to grow under the restricted conditions of potting. Dr. Avery encouraged members of the Society to experiment with holly in an effort to determine which variety might be adaptable to this art.

Mr. Allen Davis of the Upper Bank Nursery, Media, Pennsylvania spoke on the topic EXOTIC HOLLIES AND THEIR USES. He stated that Upper Bank Nursery had collected and used exotic species of hollies for several years and that he found them useful in shrub borders, hedges, and foundation planting, and successful use had been made of holly as a winter decoration in gardens.

Among the several varieties used, Mr. Davis noted that *Ilex ciliospinosa*, because of its columnar habit, was particularly suitable for a foundation planting. Only male plants have been available in the past he stated, but believed that

female plants were becoming available. Upper Bank Nurseries have found that *Ilex crenata* in several types has thrived in extremely hot sites and noted that in one location a specimen plant was planted between a concrete walk and a brick wall with a southern exposure. This variety may be used either clipped or unclipped.

Mr. Davis cautioned against using *Ilex cornuta*, *burfordii* as a foundation plant. The ultimate size of the plant may be too large for the situation despite the attractive appearance of the large berries. He noted that *Ilex convexa* prefer a shaded or eastern exposure and that the varieties Heller, Kingsville, Dwarf, and Stokes were very useful as foundation plants, and that *Ilex pendunculosa* can be moved when 16 to 18 feet tall and appears to be hardy. This plant will stand shearing.

Mr. Davis mentioned in closing that *Ilex pernyi* would endure a hot site and did not require shearing. He ventured the observation that it might be useable as a Japanese bonsai. *Pernyi* made an excellent hedge in restricted areas in his experience.

The final activity of the meeting was a tour of the arboretum on the Swarthmore College campus. Under the guidance of Mr. John C. Wister, the members visited the areas in which magnolia, flowering cherry, flowering apple, and azaleas were in blossom. A visit to the daffodil fields with permission to cut blossoms of the many selections of daffodils was an unexpected treat for the members. Mrs. John Hoyt Scott was present to identify the many varieties and make everyone at home in the fields of bloom.

At the conclusion of the touring, the members were the guests of Mrs. Courtney Smith at the President's home for tea as a delightful end of a delightful day.