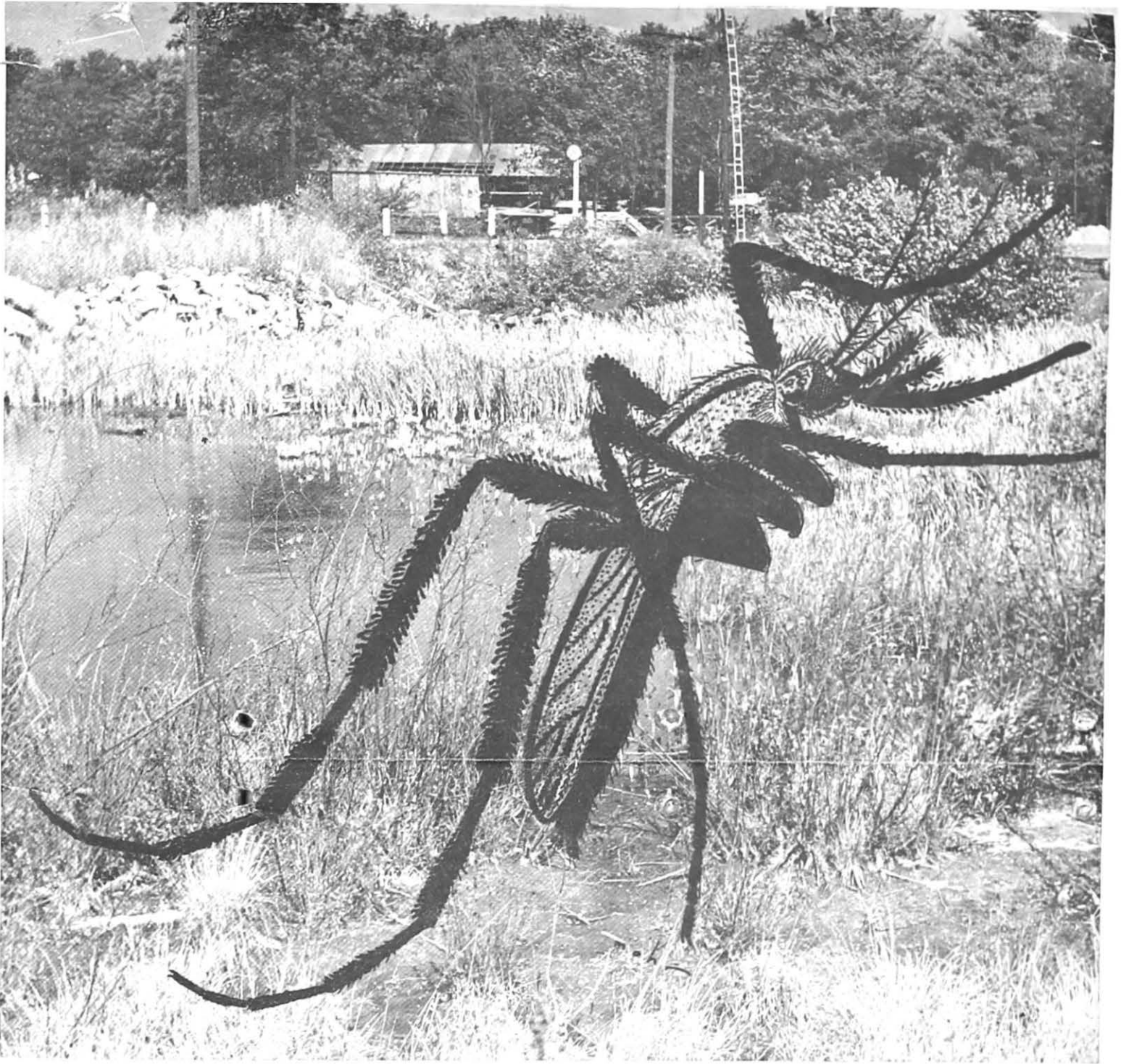


SCIENCE FOR THE FARMER



Mosquitoes of 26 Kinds Pester Pennsylvanians (See Page 1)

January 1950

SCIENCE FOR THE FARMER

SUPPLEMENT NO. 1 TO BULLETIN 515, THE 62ND ANNUAL REPORT, THE PENNSYLVANIA STATE COLLEGE
SCHOOL OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATION, STATE COLLEGE, PENNSYLVANIA



Mansonia perturbans, a vicious mosquito, breeds in swamps such as this. It is difficult to poison because the larvae live in the roots of cattails.

MOSQUITOES OF 26 KINDS PESTER PENNSYLVANIANS

STUART W. FROST

AN UNINVITED OVERNIGHT guest which leaves its lair about dusk to inflict vicious bites upon Pennsylvania's human targets, the mosquito has been the subject of a counter-invasion.

Unlike this insect, which is not too troublesome in the daytime, the entomologist never leaves his subject a moment of relaxation. By day the insect must attempt to evade being swept off his perch with a net and avoid coming in contact with poison bait. At night the bright glare of light may prove too big a temptation and another man-made trap takes its toll.

Twenty-six species have come under the watchful eyes of Station entomologists since 1947, with six of these being reported as abundant and troublesome. The interception of the malaria mosquito *Anopheles quadrimaculatus* in seven localities of the Commonwealth has presented new facts on this pest.

Culex pipiens, the house mosquito, one of the widest distributed species in the State, breeds in tin cans, old automobile tires, rain barrels, and other chance water containers. At right is light trap used in collecting insects.

Malaria mosquitoes have been taken very close to naval hospitals in Pennsylvania. It is suspected that the disease picked up by returning service men from malaria areas may have been transmitted by this mosquito in some instances.

Another difficult problem has been presented by the marsh mosquito *Mansonia perturbans*, a vicious biter which has caused much concern in the recreational area at Presque Isle, Erie, and the residential section of Philipsburg. This pestiferous insect also is recognized as the carrier of sleeping sickness of horses.

Entomologists are encouraging the removal of junk piles and the application of general sanitation measures for the reduction of the species, *Culex pipiens*. Generally referred to as the house mosquito, it occurs from early spring until late fall and is one of the most common and widest distributed species in the State. It breeds in water collected in tins cans, old automobile tires, cisterns, rain barrels, and other containers.

Aedes vexans also breeds around dumps and in small pools. Although this species is not so well known, it is common in Pennsylvania.



ACCUMULATION OF INSECT POPULATION DATA FIRST STEP IN PLANNING CONTROL PROGRAMS

STUART W. FROST

ASSEMBLAGE OF INFORMATION about the abundance and distribution of common insects was begun by the writer in May of 1947. The study has proceeded slowly but much worthwhile data have been received.

Methods of collection varied with the many different responses shown by the insects. Light traps, in the case of the European corn borer, proved successful. The Japanese beetle, however, is a good example of a pest not attracted to light which must be intercepted with bait. Large muslin sheets placed under trees, shrubs, and other growth caught large numbers of insects with the application of beating. Sweepings netted another huge count. With this method flowers and leaves were collected with insect samples, giving an indication of host plants. Dusting with nicotine and calcium eliminated whole populations of insects from trees affected and proved a very valuable method of collecting.

Soil samplings are being instituted as another method of collection. Because many insects evade all known types of interception, new devices are constantly coming into use, including use of DDT bombs. The cooperation of farmers, state police, park managers, school teachers, and many other lay people

has been gratifying, as many as 5 to 10 thousand insects being sent to the Station in one collection. And this is where the work really begins for Station workers. Sorting and counting has been a laborious task.

Communities have been greatly aided in their mosquito spray programs by this study. In many areas information was disseminated which helped directly in airplane spraying of breeding places. In other communities airplane spraying was discouraged and fogging was advised to trap the marsh mosquito, *Mansonia perturbans*, whose larvae live in the roots of cattails and do not come up to the surface to breathe like other species. Catching this species of adult mosquito in flight is the only practical means of control.

The black fly, a pest as disturbing as the mosquito and a carrier of certain poultry diseases, has been the subject of the most complete survey ever made anywhere.

This "invasion" of insect breeding places by entomologists is helping to rid Pennsylvania of disease and crop losses; at the same time affected communities are being saved thousands of dollars with advice on control programs.

New Bulletins

Bul. 509.—THE EFFECTS OF EXCESS SOLUTES, TEMPERATURE AND MOISTURE UPON DAMPING-OFF. W. S. Beach. Excess solutes were found to be a soil factor which makes the development of damping-off more probable. Data upon the ratio of growth rates, host to pathogen, at five different levels of temperature showed that this relationship determines to a large extent the amount of pathogenic damping-off which occurs during the period of seed germination and emergence of seedlings, other environmental factors being optimum. Much serious loss by disease can be escaped if seeds are sown at a temperature which enables the host to outgrow the pathogen.

Bul. 510.—SULFONAMIDES FOR CECAL COCCIDIOSIS IN CHICKENS. Stephen Gordeuk, Jr. and W. T. S. Thorp. Experiments with sodium sulfamerazine, sodium sulfamethazine, sulfaguanidine, sulfamerazine and sulfamethazine at different rates, given in drinking water and in mash showed that for best results in cases of cecal coccidiosis early treatment is essential. Recommended strengths of dosage for treating this disease are given, but coccidiosis prevention was found better than any cure.

Bul. 511.—AN ECONOMIC ANALYSIS OF 32 POULTRY ACCOUNTS, PENNSYLVANIA, 1946-47. J. G. Hawthorne and L. F. Miller. Success in poultry farming was found to depend on giving adequate attention to more than one factor affecting returns. Those flocks which were below the average of the group in both size of flock and annual egg production per hen had an average net return per layer of minus \$.03 as compared to an average return per layer of \$1.59 for those flocks above average in these two factors.

Bul. 512.—CLOSED RURAL PENNSYLVANIA CHURCHES. Theodore C. Scheifele and William G. Mather. A study of 62 closed rural Protestant churches in 53 townships and boroughs of 31 counties of Pennsylvania was conducted to determine why they closed. Population decline, changes in type of population or to another religious faith, too many churches, congregational disputes, and unsatisfactory professional leadership were principal causes.

Bul. 514.—CREDIT SOURCES, PRACTICES, AND OPINIONS OF PENNSYLVANIA FARMERS. L. F. Miller and F. A. Hughes. In a credit survey in which 399 farmers in 14 counties were interviewed, real estate debt, in general, was found to be small. Personal factors, such as knowing the lender, seemed to be more important in deciding where to borrow

money than the interest rate or loan terms. Banks were thought to be more convenient places to obtain short term loans, but Production Credit Associations were thought to have more convenient repayment plans and lower interest rates.

SCIENCE FOR THE FARMER

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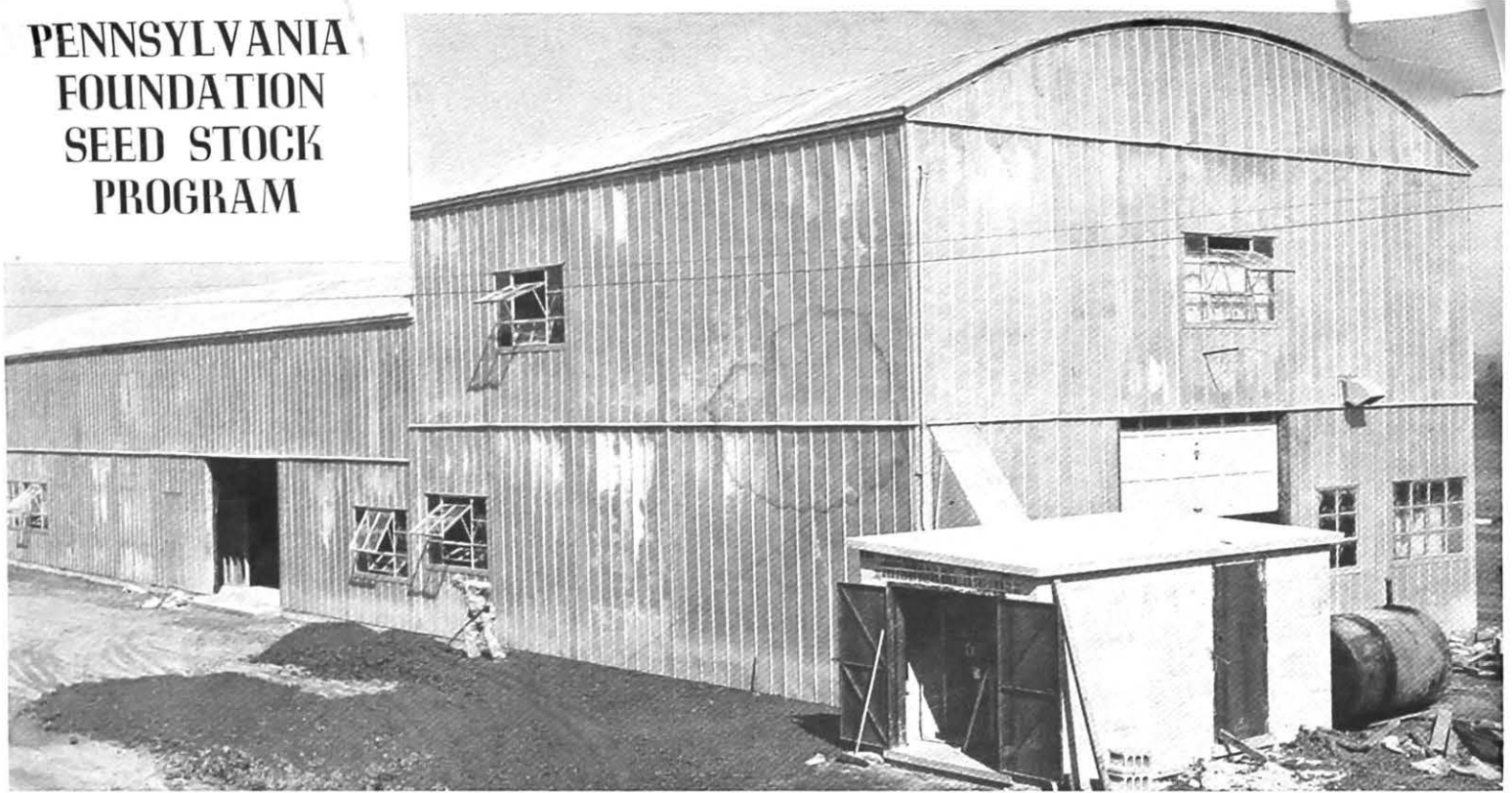
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PENNSYLVANIA FOUNDATION SEED STOCK PROGRAM



This building, 40 by 120 feet, houses drying, shelling, grading, treating, processing, and storing facilities.

B. L. SEEM

TO CLOSE THE GAP between plant breeders and farmers wanting improved, adapted plant varieties and hybrids, the Pennsylvania Foundation Seed Stock Program has been established. This new service, which makes available to growers seed of new varieties and hybrids as they are developed by scientists, has been developing rapidly in the past 8 months.

Hybrid corn, oats, barley, wheat, tomato, and clover seed stocks already are being increased for distribution to growers of certified seed, who in turn will make these materials available to farmers throughout the State. Previously, it was disheartening when plant breeders developed more productive or disease-resistant stocks only to learn that no agency was at hand to increase the small amounts of pure seed so that farmers in general could utilize the new product.

Program is comprehensive.—While primarily aimed at increasing seed stocks developed by plant breeders at the Pennsylvania Agricultural Experiment Station, the program is not confined to this State. Improved varieties and strains developed at other stations will be increased if the crop in question meets the climatic and growing conditions of Pennsylvania. In addition, the Pennsylvania Seed Stock Program is cooperating with the United States Department of Agriculture in cereal crop investigations as well as with the recently formed North East Conference on Corn Hybrids. Thus any corn hybrid developed here that shows adaptation to northeastern states will be released and sold under the label of "Eastland" with a regional code number.

To illustrate how the new program fits into existing patterns, let us take a hypothetical case: First, after years of

experimentation, cross-breeding, testing, and study, a plant breeder decides that a particular variety, strain or hybrid that



Plant breeders develop inbreds for new Pennsylvania corn hybrids. Hand-pollinated plants have purity protected by individual bags.

he has developed has possibilities. These possibilities may be in the form of increased yields over existing kinds, inherent resistance to prevailing diseases or insects or greater feed value, such as increasing protein content.

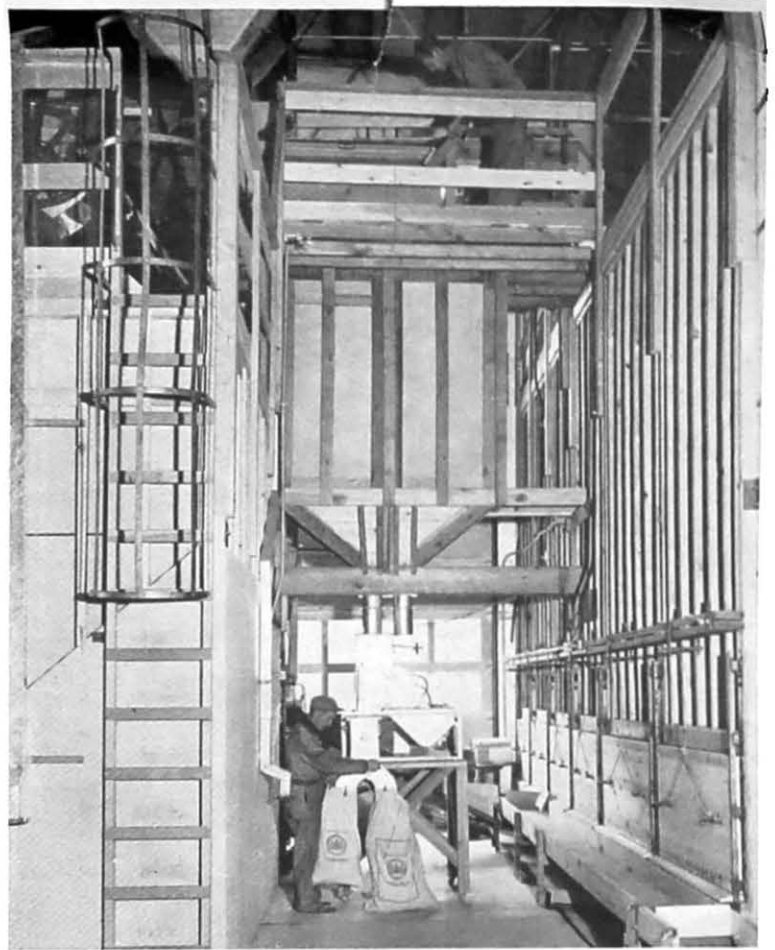
The new seed stock will then be tested at various locations in Pennsylvania to determine its response, compared to existing varieties or strains. Then, with anywhere from 15 to 45 pounds of foundation seed stock available, the new material will be released, given a name, and accepted for certification. At this point the plant breeder's responsibilities end. He can go back to developing other new better materials.

Stock must be kept pure.—This small quantity of pure seed stock, all that exists anywhere, must be carefully handled to keep it pure. But at the same time, small plantings made to increase the supply must be rogued and guarded against possible impurities until perhaps three or four times the original amount is on hand.

A second, and sometimes a third increase will be made, until finally sufficient pure stock material is available for distribution to certified seed producers. These, too, must meet the standards and qualifications established by the certification laws. Seed from these sources goes directly into the farmers' fields.

In the case of corn hybrids, it is necessary to continue pure lines of original inbreds, year after year. An assured supply of pure single crosses must be maintained as well. Finally, a steady source of seed stock is needed for the final hybrid itself, in quantities sufficient to meet demands.

Leaders of the Pennsylvania Crop Improvement Association sparked the movement and on April 1, 1948, the Foundation Seed Stock program was officially launched in Pennsylvania when the board of trustees of the Pennsylvania State College appropriated a budget to begin operations. Since then, a new metal, vermin-proof building has been constructed. This \$60,000 structure, in addition to the usual drying, grading, processing, and storing facilities, has storage bins maintained at a constant 40 degree Fahrenheit temperature. From the start, plans were made to handle and store all types and forms of seed stocks.



Drying bins, graders, and seed treating equipment are among facilities installed in new seed plant. This view also shows some of the conveyors and elevators that carry seed through the various operations.

In 1949, 12 cooperators grew between 400 and 500 bushels of corn inbreds and single crosses, ready for double-cross seed production. Three corn hybrids, first ever developed in Pennsylvania for Pennsylvania growers, have already been released. These are Pa. 661, 612, and 5602. Besides added supplies of these hybrids, two more, Pa. 7501, and 7509, both in the earlier maturing class of M-15, will be available for

(Continued on page 10)



In seeking improved crops, this new variety of oats, as yet unnamed, was tested in cooperation with cereal investigations of the USDA and is now being increased.



Seed from this field of Moore barley, a Wisconsin introduction, provides a new spring barley that is high yielding, stiff strawed, with smooth awns.

STATION HERBARIUM SUPPLIES THOUSANDS OF PLANTS IN STUDY OF FLORA OF STATE

H. A. WAHL

WHAT IS AN HERBARIUM? That question has been asked many times by persons acquainted only with plants as they grow in nature. An herbarium actually is a record of the kinds of plants to be found in nature and, supplemented with field study, it furnishes a means of recognizing and tabulating the plants of any region. It also can be seen that the herbarium tells the story of how plants grew a century or more ago, the specimens at the Station dating back before 1850.

A study of Pennsylvania ferns and flowering plants was started by J. M. Fogg, Jr., at the University of Pennsylvania in 1934, and during the past three years the writer has been associated with this survey.

More than 30,000 specimens of plants in the Station herbarium proved an invaluable source of material for the county-by-county work which has intensively covered the central, north-central, and east-central counties. The north and north-western regions of the State are in great need of survey work. Exchanges with other institutions covering these areas to a limited extent have been secured, as well as regions in other parts of the United States and southern Canada. Most of the collections of the future, however, will result from this study.

Maps for each species.—The manuscript pertaining to a list of the flora of the Commonwealth, will show separate maps for each species with its distribution. Survey workers are interested not only in the kinds of species and varieties of plants to be found, but also their particular habitats, types of soils, climates, and many other factors relating to their presence. They know that plant pathologists are interested in locations and total infestations of host plants and entomologists are seeking more information on plants upon which insects feed.

Many personal collections are included in the herbarium, which was founded by J. T. Rothrock in 1868. Besides ferns and flowering plants the herbarium is important for its collection of wood-destroying fungi. There are about 50,000 collections of fungi, built up largely by the late L. O. Overholtz, and approximately 2000 specimens of mosses.

Following the Rothrock collection, William A. Buckhout, who headed the Botany Department for 40 years, donated his specimens in 1868. Other collections were procured from T. C. Porter, L. W. Nuttall, G. W. Caffrie, J. R. Lowrie, and F. N. Pease.

Similar to eastern Asia.—The Appalachian region of the United States is one of the oldest botanical areas on the earth and is referred to as conservative flora because of the small amount of change it has undergone through the ages. Unlike the coastal plain, which represents a geologically younger area, the Appalachian region has profited from being above water for the past 250,000,000 years.

The region compares favorably with eastern Asia in this respect, a great resemblance being noted in Pennsylvania and eastern Asiatic plant species.

Some species of plants found in Pennsylvania remain a big question mark to botanists as to their origin. A particular woodland sedge, *Carex Geyari*, for instance, grows in Big Hollow, just back of the College orchards, and can be found in no other place east of Colorado. It is familiar to the wild Sequoia habitat of California and is thought to have survived the glacial period, before which it may have been widespread throughout North America.

Many people do not realize that orchids grow wild, practically within their reach. There are 28 distinct species of orchids within 25 miles of the Station, one of which reaches its northern limit at Bear Meadows, Centre county. This elevated mountain-bog has been a famous place for botanical explorations during the past 100 years. In 1853, two years before the founding of the College, J. Roberts Lowrie of Warriors Mark, Pa., collected this orchid in that area, and the specimen which he collected still can be found in the Station herbarium.

Some plants in restricted range.—A member of the pea family, *Lathyrus ochroleucus*, exists in only two counties in Pennsylvania. The northern Blazing Star, *Liatris borealis*, can be found in no area of the Commonwealth except the Centre county Barrens and in Lackawanna county. Otherwise it is in abundance in the New England states. A wild honeysuckle reaches its southern limit in the Black Moshannon region of Centre county.

The mustard family has long been the scourge of agriculture. An Asiatic species, *Bunias orientalis*, the only one of its kind in this State, has been found in Armstrong county, and should it find suitable conditions for reproduction one more noxious weed might well be added to the Pennsylvania list. Another weed, climbing buckwheat, *Polygonum perfoliatum*, has recently been found in one place in southern York county, several miles from Maryland. It occurs in an old apple orchard and climbs the trunks of trees with its curved, hooked thorns.

Fall grass is recent invader.—A recent introduction to Pennsylvania is a large species of fall grass, *Setaria fabreii*. It has been observed for the past decade as it invaded southeastern Pennsylvania, being found this year for the first time in Centre county. It may grow as high as corn and stands cultivation well.

Another outstanding botanical area is Presque Isle, near the northwestern tip of the State. Many western species of plants have drifted onto the sandbar, and a biological station of the University of Pittsburgh is located there for study. Collectors also have found ballast soils to yield many interesting European species, introduced to this country in sailing vessels.



Plant collections often are made in strange and interesting locations. "The Rock," located back of the College orchards, is noted for its fern growth in the crevices of the otherwise barren formation of limestone.

X-RAY DIFFRACTION PATTERNS QUICKLY IDENTIFY VARIOUS MINERALS IN SOIL

C. D. JEFFRIES

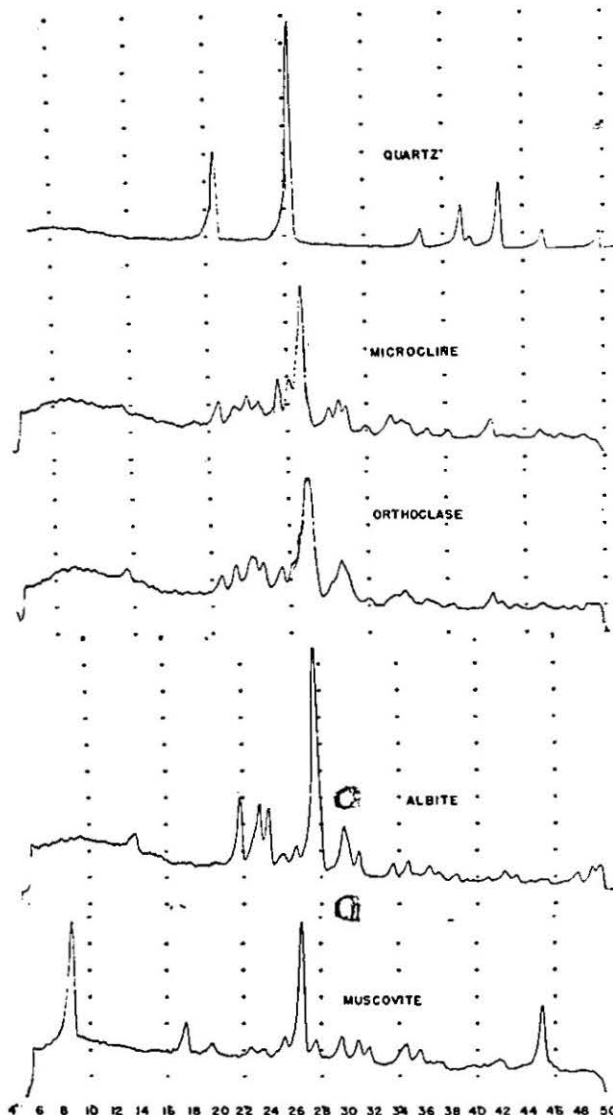
MOST SOILS CONSIST of two general classes of compounds, those organic and those inorganic in nature. The inorganic constituents of soils have been derived by natural processes from rocks and generally are called the mineral portion.

This part of soils is made up of relatively few important mineral groups, but their distribution in soils and their relationship to specific soil properties are not too well understood. The reason probably is the difficulty in separating and identifying these mineral components in sufficient number of soils so as to make possible correlations of their occurrences with other soil characteristics.

Rapid mineral analyses.—The development and use of rapid procedures for the estimation of the principal mineral constituents of soils gives data which sets forth the variations which occur in soils in regard to these mineral compounds. These data show that the inorganic portions of soils in general are made up of the following mineral groups: quartz, feldspar, mica, and clay minerals. The mineral groups are few, but the variations within the groups are considerable and their properties variable.

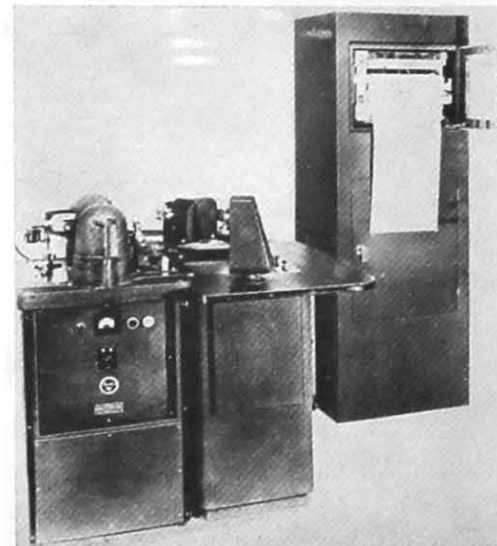
The development of the Geiger counter X-ray spectrometer has resulted in the development of procedures by means of which the occurrence of these various mineral groups can be determined rapidly and the constituent mineral differences between soils determined. Figure 1 presents a general view of the apparatus. The principal upon which this equipment is based is that different crystalline compounds when exposed to an X-ray beam yield reflections at different angles and with different intensities. The angles and intensities are recorded on a strip of paper providing a permanent record. These recordings are designated as X-ray diffraction patterns. When patterns of pure minerals are at hand, these may be compared with patterns of unknown composition and the characteristics of the unknown be determined. With the equipment illustrated above a pattern is prepared in about 40 minutes.

Foundation of agriculture.—The accompanying illustrations of the variability of the mineral characteristics of soils are typical of studies being conducted at this Experiment Station to ascertain these important characteristics of soil in order to assist in the interpretation of soil survey, fertility, and related soil information. Since differences in behavior of various soils are not definitely understood, it has seemed wise to determine the fundamental mineral composition of soils. Upon these different mineral distributions various climatic and local factors contribute to form soils. Such important characteristics as drainage, organic matter content, available plant nutrients, etc. to name a few, are developed differently on different soil forming materials. Briefly, what is being undertaken is an effort to determine by modern methods what the foundations of soils are, as soils are the foundation of agriculture.

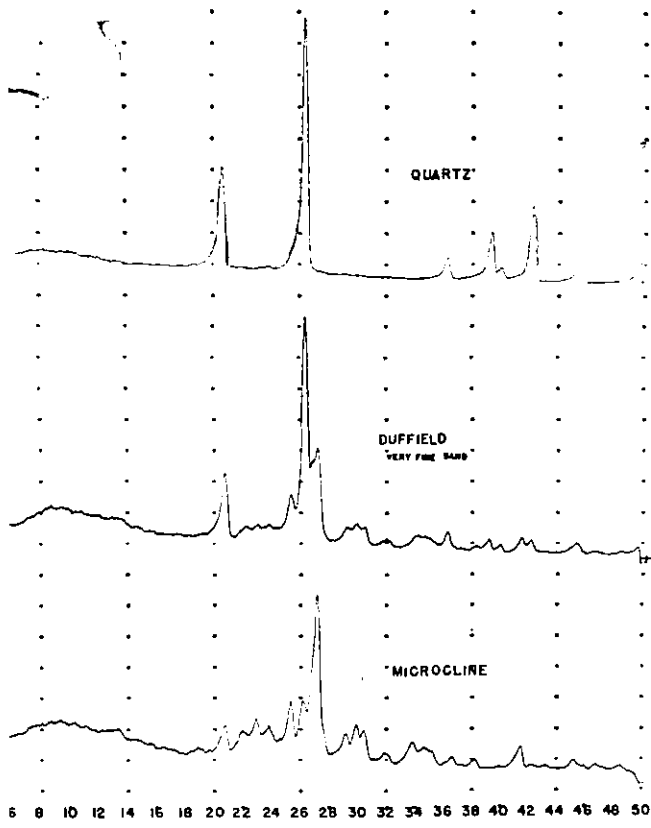


The above X-ray pattern of soil minerals illustrates certain standards which are particularly useful in soil studies.

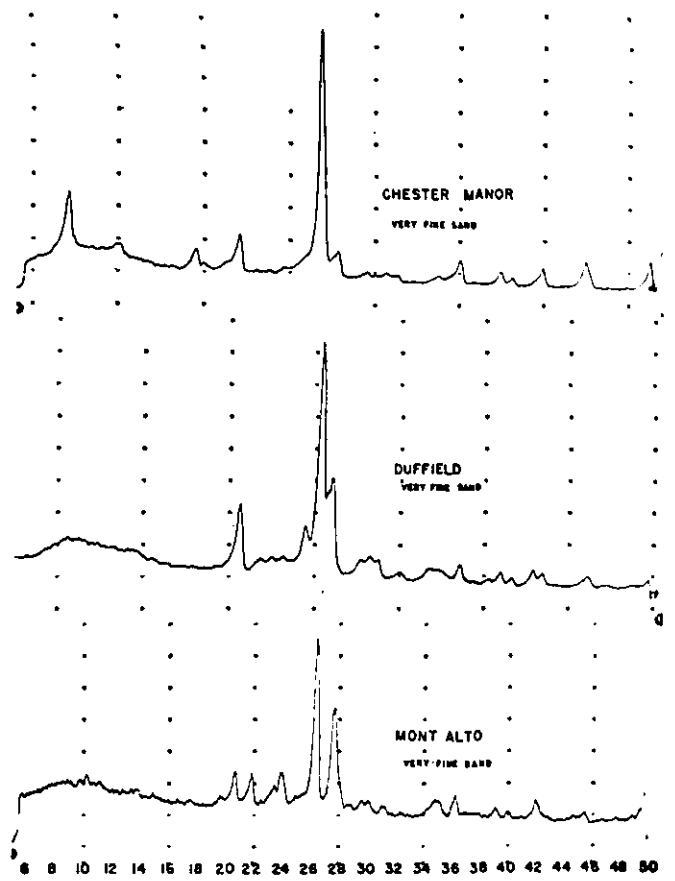
Figure 1.
X-ray apparatus used in soil mineral determinations.
Photo courtesy North American Philips Co., New York.



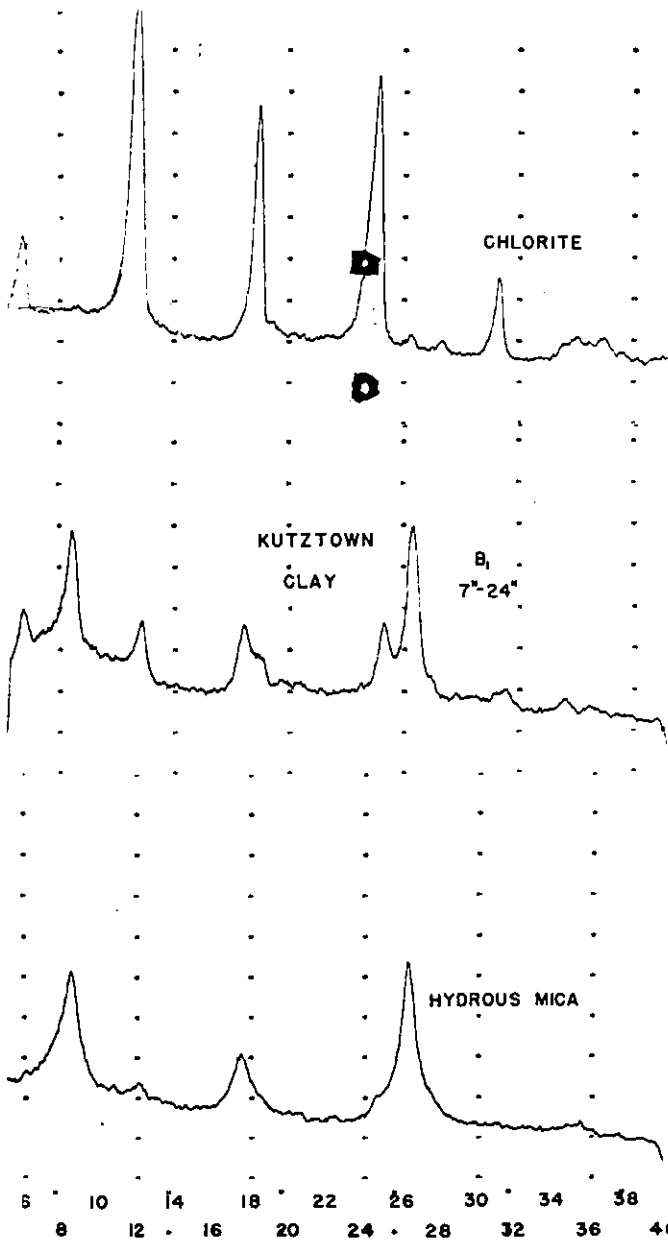
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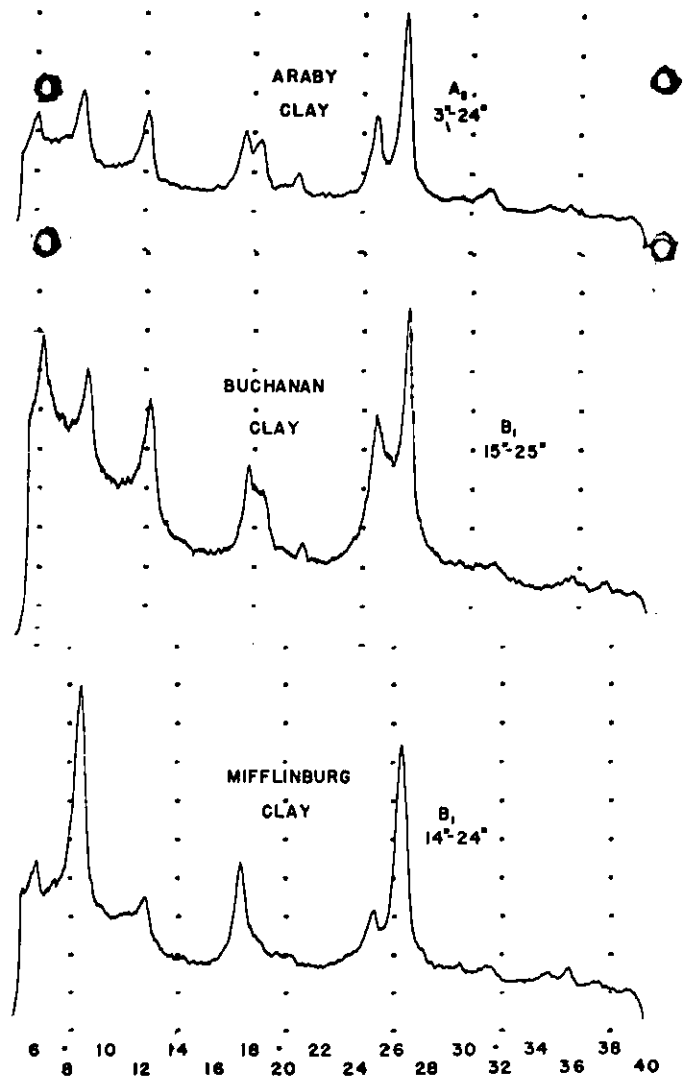
Typical analysis of a sand fraction of a soil (left). Compare the middle pattern with standards above and below it.



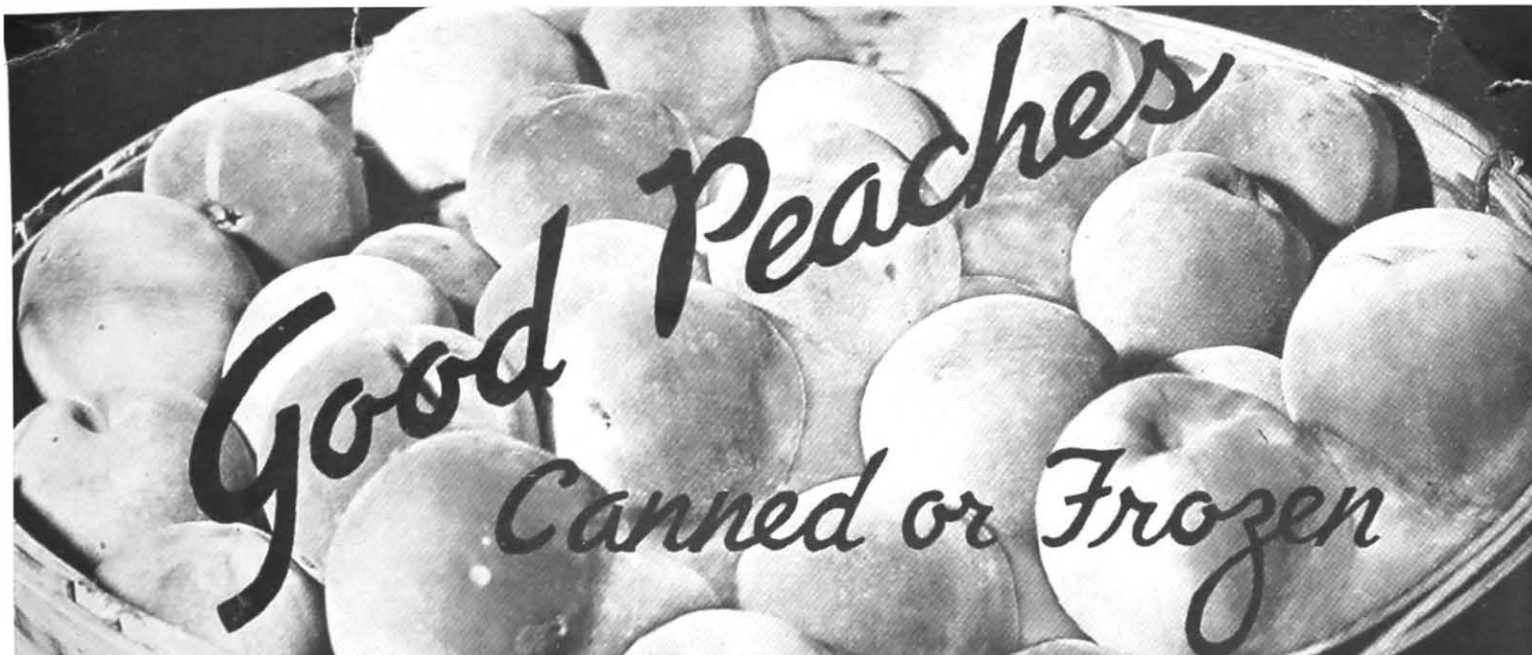
Fundamental variations in the mineral content of three sand fractions of soils are shown in these patterns (right).



Typical analysis of a clay fraction of a soil (left). Compare with associated standards.



Fundamental variations in the mineral content of three clay fractions of soils are shown in these patterns (right).



FRANK N. HEWETSON

South Mountain Fruit Research Laboratory

RESULTS OF RATHER COMPREHENSIVE tests show the improved quality of many of the newer varieties of peaches over the older ones both for canning and for freezing. Triagem, Sunhigh, and July Elberta ranked at or near the top, while Golden Jubilee and commercial packs were at the bottom in four comparisons conducted during two recent marketing seasons.

As every fruit grower knows, the season has considerable influence on fruit quality, so that certain varieties of peaches may be better one year than another. This probably accounts for some of the differences in variety standing in the different years.

The Pomology division of the South Mountain Fruit Research Laboratory at Arendtsville has as one of its projects the continuous evaluation of new varieties. This project is designed to help the fruit grower decide which varieties will make him the most money, and therefore which ones to plant. In addition to fruit quality, he must consider also such factors as tree vigor, productiveness, hardiness, and insect and disease resistance. This report is confined entirely to quality of the processed fruit.

New and old kinds processed.— In order to obtain information on the quality of different varieties of peaches as they come from cans or frozen storage, as many of the newer varieties as were obtainable were processed along with older ones for comparison. The results of these studies show differences which should be of interest to housewives and fruit growers.

The varieties selected for this study were canned and frozen under home conditions. The different varieties were obtained from a number of commercial orchards and were harvested at or as near tree ripe condition as practical, then stored in a cool basement overnight and processed the next day. The individual fruits were selected for size and maturity in order to obtain as uniform a pack as possible.

The method used for canning was as follows:

- (1) Fruit dipped in a boiling water bath for about 30 seconds and then transferred immediately to a cold water bath in order to stop the cooking action of the hot water treatment.
- (2) Fruit cut in halves, the pit removed and the skin slipped off.
- (3) The peeled and pitted halves then packed in cans and covered with a 50 per cent hot syrup.
- (4) The cans sealed and processed for 20 minutes in boiling water, then transferred to a cold water bath immediately in order to prevent overcooking.

Preparation of fruit for freezing.— For freezing, the fruit was dipped in boiling water and then transferred to cold water as for canning. From here on, however, the procedure was changed. The fruit was peeled whole and dipped into a 1 per cent citric acid bath for a few seconds to prevent browning while the fruit was exposed to the air. The peeled peaches were next sliced into the No. 2 cans containing one half cup of a specially prepared 50 per cent syrup. This 50 per cent syrup was made by using equal volumes of sugar and water and then adding ascorbic acid at the rate of one half teaspoon per quart of syrup. The cans were packed full, sealed and frozen at zero degrees Fahrenheit.

Evaluating a large number of canned and frozen peach varieties is a difficult task. Quite consistent results were obtained, however, by asking different groups to evaluate the samples by means of a uniform score sheet. A numerical system was used to evaluate general appearance of the product as a whole; color, texture, and flavor of the fruit; and color and sweetness of the juice. The points scored for these various characteristics were totalled, and this figure was used to rank

the different varieties. The samples were tested at different times by the technical staff of two of the larger canning companies in Adams county, two groups of fruit growers and their wives, and by the Horticulture Department of the Pennsylvania State College at State College.

The results of the several tests were averaged and are shown in Table 1.

Elberta and commercial packs of clingstone peaches were the basis of comparison in all the tests. In the canned lots, the outstandingly good varieties were Triogem, South Haven, Sunhigh, July Elberta, and Halehaven. These peaches all had an excellent flavor and an attractive appearance when served. The Sunhigh and South Haven varieties were clear yellow while Triogem, July Elberta, and Halehaven had a strong peach color tinged with red around the pit. On the other hand, Golden Jubilee did not hold its shape, was ragged and rather tasteless and flat. The commercial pack was attractive, but the fruit tended to be somewhat leathery and lacked the delicate peach flavor of the experimental packs. Golden East, which was not packed the first year, showed up very well in the second year lot of peaches.

The frozen lots were thawed out in the can, then opened and judged immediately. After being judged, they were left standing for a day in order to find out how well they kept the original color, or to put it in another way, whether or not they turned brown. As in the canned lots, July Elberta, Triogem, and Sunhigh made very good products, both as to appearance and quality. Golden Jubilee was again at the bottom of the list due to its poor appearance, stringy texture, and general lack of fruit flavor. Golden Jubilee, Sunhigh, July Elberta, and Midway showed no browning 18 hours after being thawed out, while Triogem, South Haven, and Pacemaker showed only a slight amount of browning after the same period. The other varieties in the test were entirely brown and impossible to use.

In comparing the same variety frozen and canned, the frozen samples did have a slightly better appearance and quality than those canned. The cooking involved in the canned lots produced a slightly ragged appearance of the flesh while the frozen samples had a much smoother finish. The freezing procedure also retained more of the natural flavor of the peach. These differences, however, were only slight, both methods of preservation being highly satisfactory.

Table 1.—Some processed peach varieties ranked in order of preference

CANNED		FROZEN	
1st Year	2nd Year	1st Year	2nd Year
1. South Haven	Triogem	July Elberta	Triogem
2. Sunhigh	Sunhigh	J. H. Hale	Sunhigh
3. July Elberta	Golden East	Pacemaker	July Elberta
4. Halehaven	J. H. Hale	Valiant	Golden East
5. Triogem	July Elberta	Midway	J. H. Hale
6. J. H. Hale	Elberta	Halehaven	Red Haven
7. Pacemaker	Halehaven	S. Haven	Halehaven
8. Midway	Rio Oso Gem	Triogem	Elberta
9. Eclipse	Red Haven	Sunhigh	Rio Oso Gem
10. Commercial	Golden Jubilee	Elberta	Golden Jubilee
11. Valiant	Vedette	Eclipse	
12. Summercrest	Commercial	Summercrest	
13. Elberta		Golden Jubilee	
14. Afterglow		Commercial	
15. Golden Jubilee			

Foundation Seed Stock

(Continued from page 4)

1950; while three others, Pa. 7840 and 7850, both in the U. S. 13 maturity range; and Pa. 7526, in the M-15, or K24 class, will be available in 1951.

About a dozen oats varieties, some of unreleased lines, are being increased and tested. One new spring barley variety, Moore from Wisconsin and the new Tennessee winter introduction are being increased. About 400 bushels of Moore barley is available for 1950 plantings, while the unnamed Tennessee variety will not be released this year.

A promising introduction of a new Ohio wheat was increased last year on 6 acres permitting about 100 acres to be seeded this fall by 12 certified seed growers. This new wheat will be named early in 1950, and ample supplies should be on hand to meet initial plantings by interested farmers. In addition, two new Pennsylvania wheat varieties are being increased, looking forward to their release within a year.

A new tomato hybrid, Keystate, developed at this Station, and very much in demand for commercial production, was increased on one acre. Seed will be distributed in 1950.

Demand for adapted clover seed, always strong in Pennsylvania, will be partially met by two strains increased the past year, and work has begun on increasing a new bluegrass that shows promise for special purpose turf and pasture. Approximately 500 pounds of the Scott strain of medium red clover were grown for increase in the past year. The Scott strain, coming from Lancaster county where it was used successfully for 50 to 75 years, has been developed into a pure strain at the Station during the past several years. In addition, 600 to 800 pounds of the Craig strain of mammoth red clover, originating in Franklin county, are in storage. Craig clover grows more than waist high and has been producing as much green material in one cutting as two of ordinary clover.

Inbred lines have been increased to establish foundation seed for two new sweet corn varieties developed at this Station. These will be released as soon as stocks are increased sufficiently. Several new potato varieties show promise and may be added to the foundation stock program.

While initial emphasis has been placed on increase of improved and adapted lines, work of the Foundation Seed Stock program will be correlated with educational efforts to inform farmers on proper handling of new varieties or strains. To the growers of certified seed, this may mean isolation of certain plots, special fertilizer applications, particular cultural practices at specified seasons or similar details. In general, this educational program is being carried by the extension service and by teachers of vocational agriculture so that full benefits of any new, improved variety or strain can result.

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H. W. HIGBEE

SOIL SURVEY MAPS OF Mifflin county now are available.

Probably this is of no importance to you unless you have agricultural interests in Mifflin county or intend to develop some. If you happen to be a Mifflin county farmer with land to buy, sell, or operate and pay taxes on, this announcement may be important.

A soil survey or inventory of resources presents geographically the areas of various soil types of which a piece of land is composed. Any intelligent farmer can determine from a good soil map whether a given land area contains excellent, good, medium, poor, or very poor soils. If he has any doubts about his decisions, he may counsel with soil technologists at his state agricultural experiment station.

Inventories aid farmers.—If a farmer finds himself located on an inferior piece of land, he may logically ask himself, "Why should I continue to struggle to make a living on this place? In times of lower prices, I am sure to be faced with a declining standard of living." Similarly, if a farmer or a veteran is about to purchase a place, he may logically say, "Is this farm which I am about to buy potentially capable of providing my family with a good living? Will I be able to pay off the mortgage within a reasonable length of time?" Good soil resource maps help answer questions like these.

For specific purposes, soil resource inventories may be made in great detail from field to field on individual farms. Present costs for work of this kind range from \$20 to \$40 per farm or from \$50,000 to \$100,000 per county. Obviously this type of survey involves expenditures far beyond any appropriation of funds that ever has been granted the Pennsylvania Agricultural Experiment Station for this type of soil research. By careful study, however, Station workers have found that small reductions in mapping detail lower costs markedly. The result has been a new type of survey costing about one tenth that of extremely detailed maps.

New type of publication.—The Mifflin County Soil Map is the first publication to illustrate this new, low-cost type of soil inventory. The resulting material provides most of the basic information needed to appraise land in any part of the county.

Bankers and farm loan agencies find much interest in soil resource maps. Land which can not be made to pay for itself may be considered poor security for a loan. Growers of specialty crops often discover suitable areas by consulting soil maps. Potter county potato growers and Columbia county tomato producers are intensely concerned with information revealed by county soil maps. Canning companies and milk processing plants in Pennsylvania now scrutinize any soil maps which may be available before locating plants.

Tax assessors in some counties are alert to the usefulness of soil survey data in evaluating land. This is particularly true in Crawford, York, and perhaps some other counties. Highway engineers and contractors also recognize the necessity of knowing what kind of soil material must be

moved in making the cuts and fills before an accurate estimate may be made of the cost of building a road. Similarly, telephone, telegraph, and pipeline companies save themselves a lot of expense by studying soil survey maps in advance of digging holes or trenches.

Foresters and farmers need to locate those soil areas which are unsuitable for growing crops but which still may be developed into pastures, wildlife refuges, or forests within a reasonable length of time. Hydraulic engineers often face the problem of starting grass, shrubs, and trees on watersheds to prevent the silting of dams. Such plantings must conform to soil conditions if they are to succeed.

Soil maps aid armies.—Military strategists now are busily engaged in the study of soil maps. Information of this kind drawn from maps made 20 years ago was of vital importance in planning the North African campaign of World War II. Heavy engines of war are easily immobilized in certain kinds of soil in unfavorable weather. Depth of soil, drainage, and soil bearing capacities are vital data to military operations in time of war.

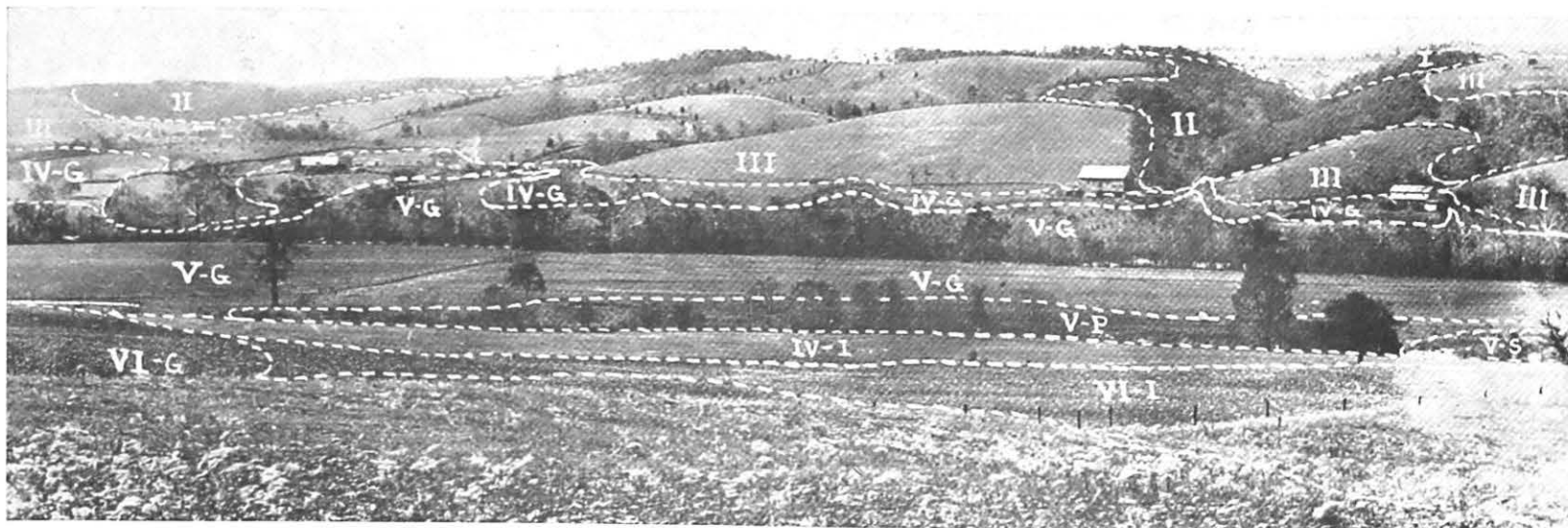
A reconnaissance soil map was made for Pennsylvania between 1908 and 1912. The material was extremely general in nature and the supply of these maps was exhausted long ago. Modern field surveys have been made of about one third of the counties of the State but maps and survey data are in stock for only 11: Armstrong, Indiana, Huntingdon, Franklin, Fulton, Tioga, Lycoming, Union, Wayne, Bucks and Mifflin. The field work has been completed, some of it ten years since, in Crawford, Fayette, Northumberland, and Montour counties. Maps and data are being published for these areas at the convenience of the United States Department of Agriculture.

The field survey work also is practically complete for Clinton, Juniata, Snyder, Columbia, and Lebanon counties. Under present plans, the soil surveys of these counties will be published by this Station as rapidly as personnel for finishing the maps and funds for publishing become available.

New data on up-to-date maps.—Data taken in these later surveys include depth of soil. While depth of soil may indicate severity of erosion, it also serves as a land-use guide. Knowing how much soil has been lost is of interest but of no practical value. Farmers have to decide how to use their land in its present condition. The recent discovery that almost any soil having sufficient depth to hold moisture throughout the summer months can be made to support highly productive meadow has added great significance to soil depth evaluations. Acidity and lack of fertility may be corrected, but grass, like other crops, must have moisture if high yields are to be obtained.

A lime and fertilizer program designed to raise the fertility of a deep limestone soil will not increase the productive capacity of a shallow soil underlain with shale to the same degree. There is no substitute for soil depth. If it is worn-out, a deep soil may be restored; but a shallow soil presents almost insurmountable problems.

A view of Pennsylvania farm land on which the boundaries of various soil types have been sketched.



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| I Calvin shaly silt loam. | V-G Pope loam and sandy loam. | VI-G Laidig gravelly sandy loam. |
| II Ashby shaly silt loam, steep phase. | V-P Atkins silt loam. | VI-I Buchanan gravelly sandy loam. |
| III Ashby shaly silt loam. | V-S Elkins silty clay. | VI-G Soil has good drainage. |
| IV-G Holston silt loam. | V-G Soil has good drainage. | VI-I Soil has imperfect drainage. |
| IV-I Monongahela silty clay loam. | V-P Soil has poor drainage. | |
| IV-G Soil has good drainage. | V-S Soil is permanently wet. | |
| IV-I Soil has imperfect drainage environment. | | |