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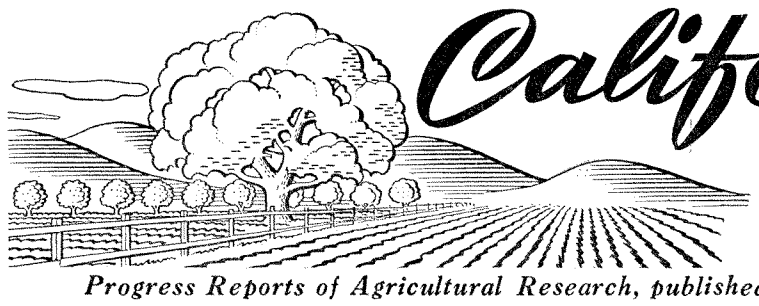

California AGRICULTURE

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New Program of Research On Olive Cultural Problems

H. T. Hartmann

One problem which has plagued olive growers since antiquity is the irregular bearing nature of olive trees.

Well cared for trees in apparently perfect condition often have a heavy bloom in the spring, but most or all the flowers drop soon after opening. This has been determined to be due to abortion of the pistil—female part of the flower—which occurs before the flowers open. To overcome this, various fertilizer treatments are being tried.

Spray applications of some of the new synthetic "hormones" are also being tested for their value in preventing this pistil abortion.

Flower-bud Formation

A study of the time of flower-bud formation in the olive has already revealed that it occurs about the middle of March. There seems to be little difference between varieties or between the various olive sections as to the time of flower-bud formation.

The time of occurrence of this phenomenon in the olive is in marked contrast to deciduous fruits in which it generally takes place during the summer or fall preceding the blooming period.

Rootstock Investigations

An investigation dealing with the response of olive varieties when grown on various rootstocks is being undertaken.

Five acres of land at the Wolfskill Experimental Orchard at Winters will be used for this study. Trees will be grown on a number of **Olea** species gathered from their native habitat all over the world.

Vigorous varieties used as rootstocks in some of the Mediterranean countries will also be tried as well as the rootstocks now being used in California.

Collection of Varieties Under Study

A collection of olive varieties is being established at the Wolfskill Experimental Orchard. About fifty varieties are now growing there, most of these being secured from the United States Department of Agriculture Plant Introduction Garden at Chico.

In addition varieties which have never been grown in this country are being imported from the Mediterranean region. Scions of several

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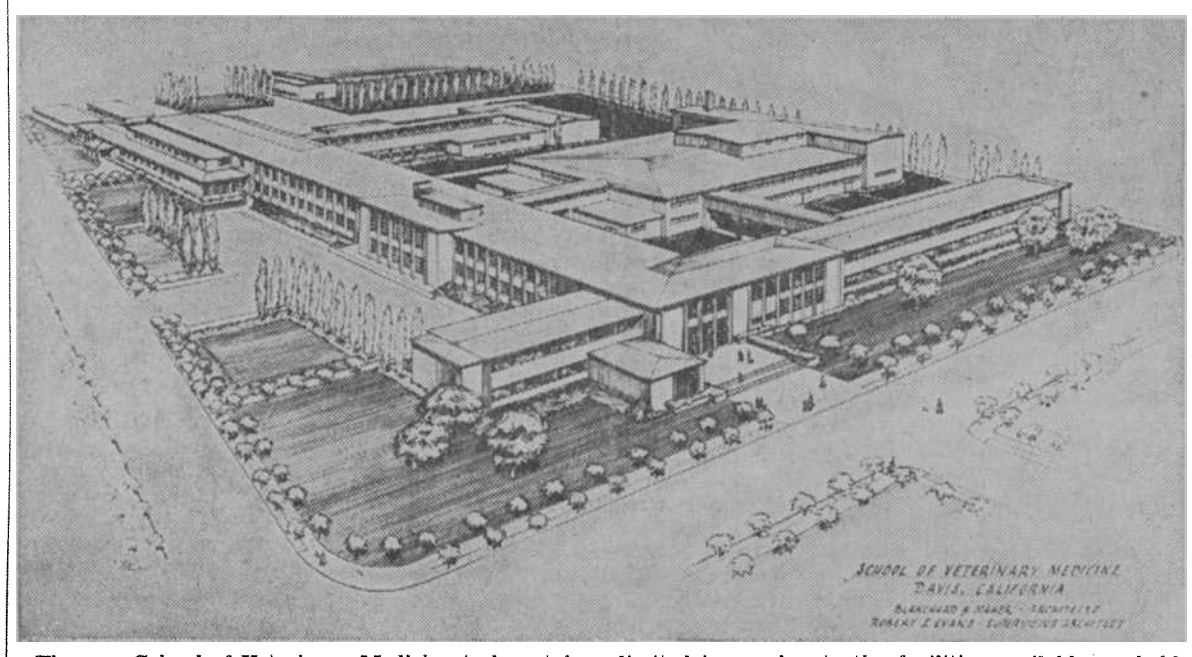
New University of California School of Veterinary Medicine On Davis Campus of College of Agriculture



The new School of Veterinary Medicine to be established by the University of California will be housed in a specially designed group of buildings on the Davis campus of the College of Agriculture, as shown in the above architect's drawing.

Professional training will be offered in the form of a four-year curriculum—in addition to the two-year pre-professional course—and the degree of Doctor of Veterinary Medicine will be conferred. Classes will be limited in number to the facilities available, probably in the neighborhood of 40 students per class.

The buildings will have facilities for research and for teaching. The main structure will provide 153,700 square feet of floor space, the infected animals building 68,500, the kennels 5,000, and the hospital barn, 10,000.

The earliest possible date when the facilities for the professional school might be ready would be September 1948, with a later date, a possibility.

Over 1100 Recognized Soil Types Represented in Twelve Regions Of State's 100,000,000 Acres

R. Earl Storie

To date in California 380 different soil series have been established, with over 1100 recognized soil types. In order to condense and make more understandable soils of the state, twelve soil regions have been set up.

Within each one of these general regions a certain zonal soil condition exists, modified to a considerable extent by local variations in parent material, topography, and drainage.

The important agricultural lands of California are composed of the azonal or alluvial soils. Of the total 100,000,000 acres in the state about 11,000,000 acres are classed as cropland with about 5,000,000 acres being irrigated.

I—Northwestern Coast Ranges

This part of California comprises about 10.4 per cent of the state.

The dominant upland or zonal soil is illustrated by Hugo loam, with its gray-brown podzolic characteristics.

The alluvial soils of the valleys, azonal in character, are well illustrated by Soquel loam which is very productive. Chemically, these soils are of acid reaction and usually low in available phosphorus.

II—Central and Northern Coast

This region, about two per cent of the state, takes in an area immediately bordering the coast composed of coastal terrace lands bordered on the east by uplands.

The upland soils have prairie-like characteristics of dark color and slightly acid reaction, as illustrated by Cayucos clay. Extensive areas of intrazonal soils of planosol character such as exhibited in the Watsonville loam occur on the coastal plain.

III—Sierra Nevada, Trinity, Cascade and Sierras of Southern California

The Sierras of California, 21.4 per cent of the state, consist of rugged mountainous topography occurring at elevations of 1,000 to 14,000 feet above sea level.

This region is of predominately igneous parent material. The soils are residual in character, of acid reaction, with the underlying bedrock generally occurring at a depth of two to five feet from the surface.

The two dominant soil types are Aiken clay loam and Holland sandy loam. Both are of podzolic character with Aiken clay loam being derived from lateritic material (basic igneous rocks). Holland sandy loam is derived from granitic rocks.

Chemically these soils are of acid reaction and low in available phosphorus.

IV—Sacramento Valley

The Sacramento Valley comprises about four per cent of the state.

Many of the soils on the east side are derived from igneous alluvium; those in the trough from alluvim of mixed origin, and those on the west side from sedimentary rock alluvium.

Over 80 different soil series have been mapped in the Sacramento Valley. Three have been picked as representing certain conditions or

(Continued on page 2)

Improved Forage Grasses To Be Put To Field Trials

G. L. Stebbins, Jr.

More than fifty new strains of forage grasses have been produced during the past five years by hybridizing valuable existing species. At least twenty of the new strains are potential new species.

The creation of these fifty odd new strains resulted from studies indicated by a survey made of the principal perennial grass species of California with reference to their cell structure, functions, multiplication, and life history.

Survey Findings

There is a predominance of winter growing annual plants in the forage areas of the state, and a scarcity of palatable perennial grasses or other plants which are active during the summer months.

There is a limited number of perennial grass species native to California and all of them have certain drawbacks. Various perennial forage plants have been introduced from other countries but they have not succeeded on a large scale.

The results of the cytological survey—the study of the plant cells—showed that the species most resistant to heat and drouth have high chromosome numbers as compared with other members of the same plant family. The evidence suggested that these species had originated in past geological ages through hybridization between previously existing species, followed by doubling of the chromosome number.

Hybridization Experiments

The suggestion that natural hybridization had originated the currently known species was strengthened by the results of hybridization experiments with certain species of brome grass.

The hybrids produced by these experiments were vigorous. Later work has shown that they can be made partly, or fully, fertile by doubling their chromosome number with the aid of colchicine, a chemical which affects the cell division in the growing plants.

Observations in the field have shown that vigorous hybrids often are formed by natural cross-pollination between different species. Such hybrids are completely sterile, but some of them may be rendered fer-

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Further Improvements Needed Before Mechanization of Cotton Growing Reaches Full Efficiency

J. P. Fairbank

The mechanical cotton picker is the center piece of cotton mechanization, the hoped for answer to the current labor cost of 100 hours per acre for hand picking.

The cotton picker is not a new machine. One was patented way back in 1850. The Division of Agricultural Engineering made studies of cotton pickers in 1928-30. The present machines are larger, better built, pick more cotton and cost more, but the differences are not revolutionary.

Two Types

Cotton pickers are of either the stripper or the picker types.

The stripper is a simple machine which strips off the entire boll together with some of the plant. The lint is extracted at the gin.

The picker plucks the locks of seed cotton directly from the burrs which remain on the plant, as is done by hand. A multitude of revolving spindles traverse the cotton plants and when one of them touches an open boll, the fiber wraps around the spindle.

As the spindle retracts into a housing, the cotton is doffed into an air stream, thence into a hopper or a trailer.

The path followed by the spindles is such that the cotton plants are not raked or combed, thus injury to unopened bolls is avoided and the field can be picked again after the late bolls mature.

Operation

One manufacturer's picker runs at three miles an hour, closely. Another picker operates at two miles an hour in low gear, which, in 40-inch rows figures eight-tenths-acre per hour.

The time lost in turning, dumping and servicing, reduces the av-

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Spring Management of Honeybee Colonies Determined By Colony Needs Rather Than By Calendar

J. E. Eckert

The condition of a honeybee colony during Springtime points to its probable usefulness in the next six or eight weeks.

The term "spring management" denotes the attention given to colonies during the period of their early activity following a quiescent period of winter. It is not a definite period in the calendar year.

Spring Requirements

The amount of spring manipulations can be reduced to a minimum if each colony is provided with certain essentials the preceding fall.

A colony that has a young queen, seven or more frames of bees, and sufficient stores of honey and pollen to supply the bees until they can secure surplus stores in the spring, will need little attention until they require additional room for the expansion of their brood nest and storage area.

The queen is the most important determining factor. A young queen can be provided in the fall and if sufficient natural honey is not available, additional food can be added in the form of a heavy sugar syrup. Besides honey, bees require pollen to enable the colony to develop normally in the spring and this must be in the combs in the fall to provide for early brood rearing.

Colonies Wintered in 1 or 2-Story Hives

Some beekeepers winter their colonies in one-story hives, but a majority leave two hive bodies with the bees. If the one-story method is used, the combs must be filled with at least 30 pounds of honey plus sufficient pollen to fill two combs in order to insure sufficient food for the colony from November through February in most parts of California.

Usually by the first of March, a normal colony has brood in several frames and is occupying the greater portion of a two-story hive. Col-

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Yield Trials of Lima Beans For Freezing Qualities and Growing Area Extension Possibilities

John H. MacGillivray and L. J. Clemente

Roy D. McCallum

The rapid increase in lima bean acreage, the introduction of new varieties, as well as the rapid growth of freezing plants suggested the need for some lima bean trials in 1946.

These trials were for the purpose of determining the production possibilities in certain areas in order to learn whether yields were high enough to permit the growing of the crop.

Varieties Tested

The following varieties were tested, although not at each location: Fordhook (Regular, Asgrew, Concentrated); Burpee's Improved Bush; Early Market; U.S. 242, 243, 343, a second strain of 343, 403, and a second strain of 403; Green Seeded Henderson; Henderson; and Westan.

The varieties were not all harvested when at the ideal stage of maturity. In trials of this type, it is almost impossible to harvest a field of different varieties more than two or three times, particularly when "viners" are used. This means some varieties were harvested a day or two too early or too late. The lowest yields were obtained at Santa Clara and also the best quality.

Location of Plots

Ryer Island (Solano County) is located near Rio Vista in the delta of the Sacramento and San Joaquin Rivers. The field was planted June 14th and harvested on September 20th, 1946. There were three plots per variety and the least significant difference at the 5 per cent (19-to-1 odds) level was 538 pounds. The beans were all hand shelled, with the flat pods, small beans and white beans discarded.

Santa Clara (Santa Clara County). The beans were grown north of the city of Santa Clara. The large seeded types were planted July 1st and harvested October 8th. The small seeded varieties (U.S. 343A and U.S. 403A) were planted July 15th and harvested October 24th. Areas per variety were about one-tenth of an acre and the plants were run through a viner to obtain the beans for freezing. Quality of these beans were probably the best and this is partially the reason for low yields.

The Hollister (San Benito County) beans were planted north of the city on June 11th in single rows 100 to 200 feet long. Henderson and Early Market were run through the viner on September 17th and the other varieties on September 24th. With the exception of Early Market, the beans were starchy and of poor quality. The smaller seeded types perhaps produced low yields because the screens of the viner were not changed from those used for Fordhooks.

Greenfield (Monterey County) normally produces dry lima beans. Some of the strains planted at Hollister were also grown at Greenfield. The varieties were planted May 15th and grown in single rows, 100 feet long. Individual plants were harvested and the beans were obtained by hand shelling. One week's delay in harvesting increased plant yield 26 per cent. The Greenfield data need further tests before any final conclusions are obtained.

Conclusions

Yields obtained in these tests were encouraging when it is considered the United States average yield for 1934-43 was 1,154 pounds of shelled beans per acre. California yields have been higher and were 1,780 pounds in 1944 and 1,930 pounds per acre in 1945.

This crop is not too well adapted for obtaining yields from small plots because the farm operations are performed as large-scale operations.

Final judgment as to the merits of any variety should be withheld until there has been an adequate field and viner trial. Single row or small plots are essential in selecting varieties for commercial tests.

Roy D. McCallum

The demand for green lima beans for freezing has increased greatly in recent years. In 1947 it is probable that there will be approximately 20,000 acres planted in California if seed is available—twice as many as in 1946 and five times as many as in 1945.

For over 10 years plant breeders have been working to produce better types of lima beans for canning and freezing. They have endeavored to obtain a concentration of maturity, uniform size, high yields, and good quality.

Yield Trials Near Hollister

Thirteen strains of lima beans were planted June 11, 1946, in plots of Yolo Silt loam, six miles north of Hollister.

The rows were spaced 26½ inches apart and the stand later was thinned to eight-inch spacing.

The land was irrigated prior to planting and at approximately three-week intervals during the growing period. Temperatures during the growing season were mild due to proximity to Monterey Bay. The day temperatures seldom exceeded 80 degrees; the nights were cool and frequently overcast with fog. Humidity was relatively low during the days. There were no rains during the growing period.

The Early Market and the Henderson were harvested on September 17th, 98 days after planting. The rest of the beans were harvested on September 24th, 105 days after planting.

Report on Freezing Quality

Immediately after threshing, the beans were taken to the laboratory, where they were processed. The frozen beans were examined for quality. Most of the varieties were overmature and the quality of the frozen products was not good.

Because of variations in the maturing dates of the varieties grown, it was not possible to harvest each variety at the ideal stage. There is need for a simple method of determining the proper degree of maturity in harvesting lima beans for freezers.

In commercial practice, beans are harvested when the range of "white beans" is between 5 and 15 per cent. In these trials, however, there was little correlation between quality and the number of whites in the various lots.

Observations

The data collected in these trials indicate that there are several varieties which will produce over 2,000 pounds of shelled beans per acre.

From these and other tests, there is reason to believe the higher yielding varieties will produce an acceptable product for the consumer.

Using small harvest samples, it was difficult to obtain strictly comparable samples for taste tests.

Some observations were made during the past season of field plantings in other localities within the county. In some of these fields satisfactory yields were secured. In others they were disappointing.

Among the causes of low yields were improper soil moisture at planting time, improper seed bed preparation, late planting and heavy seeding. Fields to be used for lima beans should be pre-irrigated. It is not possible to irrigate the plants up and secure satisfactory stands.

Several late planted fields were injured by frost. Beans should be planted in this locality before June 20th if advantage is to be taken of optimum growing conditions.

Seeding rates in excess of 80 to 90 pounds per acre of the Fordhook types may result in poor sets of beans.

Other factors such as frequency of irrigation, fertilization, and winds may influence yields, but information on their importance is not now available.

Further studies of lima varieties are obviously necessary before any conclusions can be made in regard to the freezing quality of the beans.

John H. MacGillivray is Associate Professor of Truck Crops and Olerculturist in the Experiment Station, Davis. L. J. Clemente is Senior Laboratory Technician.

Roy D. McCallum is Farm Advisor, San Benito County.

New Program of Research on Olive Cultural Problems

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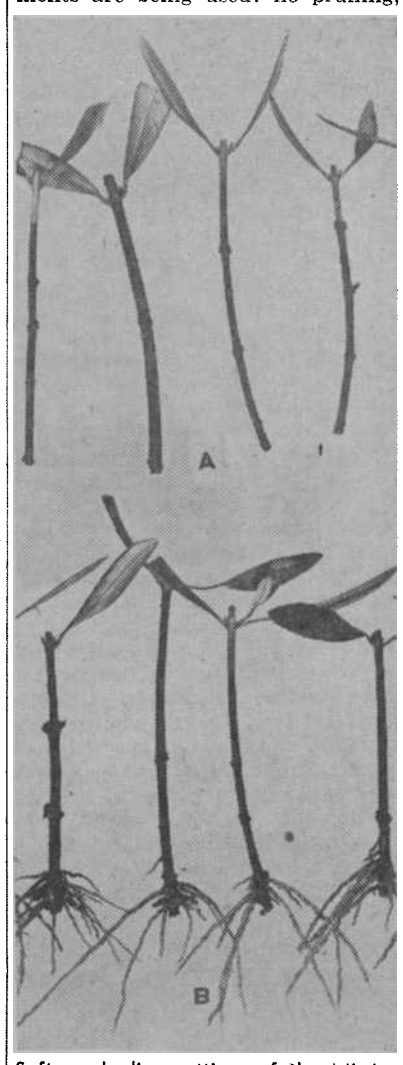
large-fruited varieties from Greece and from the Island of Cyprus have recently been received.

Pruning Experiments

The proper method of pruning bearing olive trees is still a much debated question among growers.

In order to obtain information on this subject, pruning experiments have been established in the Corning and Oroville districts. Three treatments are being used: no pruning, moderate pruning, severe pruning.



Soft-wood olive cuttings of the Mission variety. A—Untreated. B—Treated with 50 parts per million indole butyric acid for 24 hours.

Yield records and size grades obtained over a period of years will show which method is the most profitable.

Propagation Studies

Experiments on the use of root-promoting growth substances in propagating olives by soft-wood cuttings have revealed a marked benefit from soaking the basal ends of the cuttings for 24 hours in a solution of indole butyric acid at 25 to 50 parts per million. The Sevillano variety, which is very difficult to root from cuttings, responds well to this treatment.

In rooting olives by soft-wood cuttings it is necessary to use a glass-covered propagating frame in order to keep the humidity high; the use of bottom heat is also very desirable for best results.

H. T. Hartmann is Associate in Pomology, Experiment Station, Davis.

Forage Grasses

(Continued from page 1)

tile with the aid of colchicine as in the case of experimental hybrids.

Tests of the Potential New Species

Of the new strains produced by hybridization, some are distinctly more vigorous than their parents, when grown at Berkeley, and stay green better during the summer.

Tests on a small scale on uncultivated, unirrigated pasture plots in Berkeley and in the Carmel Valley, have shown that certain of these strains also survive better than their parents under dry conditions.

At present, all of the desirable types are being selected for vigor and fertility. Large enough progenies are being grown, so that seed can be supplied to the Division of Agronomy, for adequate field tests.

G. L. Stebbins, Jr., is Associate Professor of Genetics and Associate Geneticist in the Experiment Station.

ABSTRACTS OF NEW PUBLICATIONS

Easter Lily Bulbs

The test of a California Easter lily bulb is in the forcing process in an eastern greenhouse. Satisfactory forcing by the eastern buyer will assure the sucess of the industry in California. Therefore, every grower should know that the stock he is planting is reasonably free from inherited weaknesses, nematodes and serious diseases.

These are the factors which govern the successful commercial production of Easter lily bulbs: Climate should offer relatively low, equable temperature, with a minimum annual rainfall of 70 inches. Land—preferably sandy loam—should be porous, friable, and well-drained. There should be three to four times as much land as is needed for planting in any one year. This permits rotation, which aids in the control of pests and diseases. A covercrop should be grown on the land the year before lilies are grown.

The mother-block system should be used to assure healthy bulbs, true to a desirable marketable type, with variety maintained. Mixed and diseased stock must be rogued out.

Machine harvesting is necessary on large acreage. Harvested bulbs must be graded carefully for quality and size. Bulbs must be shipped to eastern buyers in sufficient time to meet the variable dates of Easter. Follow-up information on the results of forcing should be secured from eastern buyers.

These matters are discussed in detail in the following publication now available:

PRODUCTION OF EASTER LILY BULBS, by H. M. Butterfield. Ext. Cir. 132, February, 1947. (34 pages).

2,4-D As A Weed Killer

The use of 2,4-D in controlling weeds was discussed in the February issue of **California Agriculture.** Complete information on this subject may now be obtained from the publication listed below. This is the first of a series of circulars dealing with various phases of weed control which will replace Ext. Cir. 97, "Weed Control." The present circular is a progress report and will be revised when further information is available.

2,4-D AS A WEED KILLER, by W. A. Harvey and W. W. Robbins. Ext. Cir. 133, February, 1947 (8 pages).

Lawn Sprinklers

The simplest kind of sprinkler system is a small portable sprinkler attached to a garden hose connecting with a water source. For small areas, such as most home lawns, an underground system having small sprinkler heads set flush with the surface of the sod is perhaps the most satisfactory; one need only open and close a valve to sprinkle the lawn. For larger areas, rotating sprinklers are usually more economical.

Sprinkler heads are either fixed, whirling, or slow-revolving, and selection depends upon the pipe system, size, and shape of the areas to be sprinkled. Water pressure, spacing, and sprinkler pattern are each important to satisfactory results.

In planning a sprinkler system, the problem is to reduce resistance and maintain pressure. A sketch of the yard, locating the control valves and sprinkler heads, is the first step. The sizes of pipes and number of sprinkler heads on one line may then be determined on the basis of friction loss and resistance of water meters and fittings.

It is important to allow for the settling of the lawn. The sprinkler heads should be kept clear. Thickened sod, grass, and clogged heads will interfere with proper performance.

Specific methods and practical suggestions on planning a lawn-sprinkler system are given in the following publication, which will be available later this month:

LAWN-SPRINKLER SYSTEMS, by J. E. Christiansen. Ext. Cir. 134, March, 1947 (20 pages).

The Dairy Situation

An extract from a circular discussing the dairy situation in California appeared in the February issue of **California Agriculture.** The circular, now available upon request, is the first of a series of papers, prepared by the Giannini Foundation of Agricultural Economics, which will deal with the situation and outlook of California agriculture and agricultural industries.

THE DAIRY SITUATION IN CALIFORNIA, 1947, by J. M. Tinley. Cir. 366, February, 1947 (24 pages).

Plant Nutrition

Only very small proportions of mineral elements from the soil are present in a plant, but these are indispensable. We have some control over their supply in the soil by use of fertilizers.

These mineral elements are usually called "plant foods." Although the term is often used to cover the three elements potassium, phosphorous, and nitrogen, elements needed in only minute quantities are just as necessary in plant growth.

To correct deficiencies in the amount of available mineral elements in a soil, each case must be considered specifically. The same fertilizer will produce different effects in every different soil. The point of interest, as far as crop growth is concerned, is the resultant condition of the soil after fertilizers are added.

From general experience, the importance of crop rotation is to be emphasized. Animal manure nearly always produces highly favorable effects on the growth of plants. Artificial fertilizers under proper conditions of soil management may often give results comparable with those obtained by manures.

Specific conclusions about the effect of fertilization on the quality of a crop should not be drawn without careful study of the particular soil and crop in question. No simple method of analyzing a California soil is known. Many factors must be considered with the aid of knowledge of local experience, such as has been gathered by the farm advisor.

A discussion of this subject appears in the following publication which will be published late this month:

FERTILIZERS, SOIL ANALYSIS, AND PLANT NUTRITION, by D. R. Hoagland. Cir. 367, March, 1947.

DONATIONS FOR AGRICULTURAL RESEARCH

Gifts to the University of California for research by the College of Agriculture, accepted in February 1947:

BERKELEY

Canners League of California $4,920.00
Investigation of insects attacking spinach and tomatoes.
Cutter Laboratories 115.20
Research in Veterinary Science.
Hercules Powder Co. ..... 10 lbs. toxaphene 50% Dust; 10 lbs. toxaphene 25% wettable powder; 1 gal. toxaphene 50% water miscible.
McLaughlin Gormley King Co. ..... 1 gal. Selocide concentrate.
California Spray Chemical Corp. ..... 750 lbs. Persisto S-50-30 Dust; 150 lbs. Persisto S-30-30 Dust; 1 pint Vapotone.
Dow Chemical Co. ..... 5 gal. drum dowfume; 5 gal. drum dowfume W-40.
American Maize Products Co. ..... 1 lb. Amaizo (corn steep water solids).
L. H. Butcher Co. ..... 2 qts. Isonal DL1; 5 lbs. micronized dusting sulfur.
E. J. DuPont De Nemours Co. ..... 1 drum Zerlate.
General Chemical Co. ..... 6 4 lb. bags Spraycop 29%.
Griffin Chemical Co. ..... 2 lbs. DDT.
B. F. Goodrich Chemical Co. ..... 2 lbs. Goodrite p.e.p.s.
Orchard Supply Distributors ..... 5 gals. D-24 (Visko).
Rohm & Haas Co. ..... 30 gals. Dithane D-14.
Mrs. Clyde C. Barnum ..... Collection of reprints and bulletins.

DAVIS

Essick Mfg. Co. ..... Essick Model 600 "Air Power" sprayer and accessories.

RIVERSIDE

American Cyanamid Co. $2,000.00
Investigations of organic materials for insecticidal and fungicidal value against fruit pests.