

## Citrus Orchard Cost Study And Analysis Made In Orange County Over 21-Year Period Is Reported

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about \$30.00 per acre. If manures were applied to supply some of this nitrogen the cost went up to almost \$50.00 per acre.

From data the growers supplied it appears that the grower who spent more than \$50.00 to \$60.00 per acre on his fertilizer budget last year could not justify the extra cost.

Nitrogen and organic matter, with an application of zinc spray for zinc deficiency, have been recommended by the Agricultural Extension Service as an efficient fertilizer program. Organic matter may be added in the form of cover crops or manures. If the orchard is under the non-tillage system of soil management, additional organic matter may not be so necessary because the soil is not stirred and the organic matter is not consumed or oxidized so rapidly.

### Conservative Irrigation

In the first years of this study, the average use of water was 21 acre inches per acre. In recent years the average use has been 17 to 18 acre inches per acre.

Many orchards in Orange County have declined in vigor and production because of excessive use of water.

In sandy soils too much water has leached down the soluble plant food elements to below the root zone. In heavier soils, too frequent or too early irrigation created a soggy environment around the roots and gradually reduced their vigor by the exclusion of essential soil air.

### Use of Irrigation Water Per Acre

Prepared from water-use reports for the period 1942-1946

	Conservative	Heavy	Light
Range of use	14-20 acre inches	21-48 acre inches	7-13 acre inches
Average use	17.1 acre inches	29.0 acre inches	11.4 acre inches
Yield per acre	295 packed boxes	239 packed boxes	182 packed boxes
Value of fruit	\$867.30 gross p.ac.	\$692.66 gross p.ac.	\$535.08 gross p.ac.
Cost of Water—5 yrs.	\$60.50 per acre	\$103.24 per acre	\$40.58 per acre

Here is tangible evidence that conservative irrigation pays good dividends.

Several orchards in the light group reduced the water used because of weak trees. The production from such trees naturally would be lighter than from normal trees.

### Guides for an Irrigation Program

Here are some general rules for an irrigation program.

1. Apply water only to dry soil actually occupied by tree roots.

2. Do not apply water to soil that remains wet. Roots in soil continually wet will deteriorate and cause chlorotic—yellow—leaves, and finally defoliation.

3. Apply only enough water to penetrate as deep as the roots grow. Water which percolates below the root zone is wasted and leaches nitrates below the root-feeding area.

4. Adapt the irrigation program to soil and climatic requirements. Chart your orchard to determine variations in soil types.

5. Use a soil tube or auger to determine the actual condition of soil moisture during the irrigation season.

### Cultivation

Every year, during the 21 year period, orchards in the higher profit group and reporting low cultivation costs were found next to orchards reporting high cultivation costs.

Last year, the top orchards reported an average of \$27.23 per acre for cultivation. The highest cost was \$61.45 per acre and the lowest in that group was \$9.32. These figures are typical for every year in the study.

Records of orchards operated on the non-tillage system indicate that the first year's cost, for setting up permanent furrows and frequent spraying for weed control, is about \$60.00 per acre. The second year's spraying costs about \$35.00 per acre and the third year's spraying, about \$18.00 per acre. In the succeeding years the cost tapers down to very low figures.

### Labor Costs

Farm records of 20 years ago, just after World War I, show general farm labor received 40c an hour and tractor drivers, 60c an hour. Today,

the reports show 75c to \$1.00 an hour for general work and \$1.00 to \$1.25 an hour for tractor men.

The average cost per acre for pruning labor in the five year period, 1926-30, was \$10.47 per acre for Valencias. In 1945, for the same operation, the average cost was \$31.14 per acre.

In the late 20's the average harvesting cost was 16c per packed box. Last year it was 37c per packed box.

In 1930—a small crop year—yields averaged 142 packed boxes per acre. The grower received \$4.99 a packed box. Sixteen years later—1946—in another small crop year, the average yield was 166 packed boxes per acre. The grower received \$3.40 a packed box in 1946.

### Economic Factors

Important economic factors influenced those prices and returns.

In 1930, the total shipments of Valencias amounted to 10,300,000 boxes from 96,200 acres of orchard. The rate of consumption was 12.5 oranges per capita.

In 1946, total shipments were reported at 27,100,000 boxes from 148,700 acres of orchard. The per capita consumption was 36.1 Valencias, or three times the 1930 figure.

The total amount of oranges, of all varieties and sources, consumed fresh was 46.2 oranges per capita in 1930 and 98.8 oranges per capita in 1946.

Last year, 37.4 oranges per capita were diverted to juices and by-products.

The total production in 1946—a small crop year—was 136.2 oranges per capita.

### Efficiency Hints

Here are suggestions for orchard efficiency.

Keep simple tree records for a four-year period to determine the poor, the average, and the good producing trees. One and a half hours per acre spent each year on the average sized orchard are sufficient to keep production records. Too few citrus growers keep individual tree production records or replace low-producers with good trees or improve environmental conditions so that yields will be increased.

Chart your orchard to determine variations in soil texture, depth of soil, the number of trees missing, and the number and location of diseased, gophered, or low-producing trees.

Determine if low-producing trees are the result of spots of infertile soil or due to variations in soil moisture conditions. Increased applications of fertilizer to poor spots have usually caused marked improvement in yields.

Adapt irrigation practices to variations, in soil, don't irrigate soil that is moist.

Replace all missing trees with certified scaly-bark-free nursery stock. Irrigate replants more frequently than the old established trees.

Treat all beginning stages of scaly-bark, root rot, and brown rot gummosis.

Keep a close check on gophers. Inarch gophered trees as soon as possible after injury. Water inarches as you would a young replant.

Replace all trees that have been low-producers for a four year period unless low-production is caused by soil conditions or other factors that would prevent inherently good replants from becoming good producers.

Apply between two and three pounds of nitrogen per tree per year and small applications of organic matter by cover crops or manure if the orchard is cultivated. If the orchard is under a non-cultivation system, the addition of organic matter may not be necessary. Place fertilizer so that it will get

## Infiltration Of Water Into Soils During Irrigation

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the soil surface there was the question as to whether or not the shade might be a factor in an improved rate of water entry.

Furrows under the skirts of citrus trees, where there is shade, have long been known to absorb water more readily than furrows exposed to the sun.

There is also the factor that rain-drops puddle the surface of a soil, slowing infiltration. Organic mulches and the skirts of citrus trees break the impact of raindrops.

In these experiments, some plots were provided with louvre type shades which provided ventilation and admitted rain, but broke the impact of the raindrops. Principally, the shade intercepted the direct rays of the sun. The plots were kept bare of vegetation and were compared with similar bare plots without shade. Shade, and the breaking of the impact of raindrops, did not increase the rate of water entry. In fact, those rates were significantly lowered.

It is known that infiltration rates increase with the drying out of the soil prior to irrigation. Shading did decrease the rate of drying, and this fact is presumed to account for the lower rates of entry.

### Disposal of Crop Residue

Many of the basins were periodically cropped with corn, pole beans, or peas.

The crop residue was disposed of in three ways: (1) Chopped up and left on the soil surface—or cultivated into the soil. (2) Cut off and removed. (3) Chopped up and burned on the soil surface.

The effect of leaving the residue was to increase the water penetration rate in relation to those basins where it was removed. Where the residue was burned, infiltration rates were lowered to about equal to those plots where the residue was removed.

### Tillage

Some basins were periodically tilled and others were not cultivated at any time.

Planting was done merely by poking a hole into the soil with a stick, inserting seed, and covering with imported soil.

Tillage was done infrequently with shovel, hoe, and rake so there was no tendency to form a cultivation pan of "plow sole" and no appreciable tendency to break down the structure of the surface soil. Under these conditions, tillage did not have any significant permanent effect upon infiltration rates.

Tillage does bulk and permit the drying out of the soil, and, where an irrigation followed the tillage, there was a temporary increase in the rate of water entry. Usually this increase appeared to persist for possibly 15 minutes to one-half hour.

Where a two inch deep irrigation was applied just before an irrigation for measurement of infiltration rate, this temporary increase was never

into the soil actually occupied by roots.

Zinc sprays may be necessary to correct mottle leaf, a symptom of zinc deficiency.

Plan your pest control program with your agricultural inspector. Don't experiment with unproved methods or materials.

Cultivate only when necessary to control weeds, to prepare the soil for irrigation, pest control, picking and other necessary operations. Cultivate as shallow as practical to avoid cutting feeder roots.

Normal healthy orange and grapefruit need very little pruning. Lemons need moderate pruning to size up the fruit. More fruit is lost by "opening up" the tree to encourage inside fruit than is gained.

Provide for adequate heating equipment in good operating condition—45 heaters per acre—and sufficient storage capacity to meet any emergency. Know when and how to heat. Lighting too early wastes oil; lighting too late may cost the crop.

Learn to recognize and to control scaly-bark or psorosis, brown rot gummosis and root rot and decline.

Harold E. Wahlberg is Farm Advisor, Orange County, University of California Agricultural Extension Service.

## Spraying Liquid Insecticides, Fungicides And Herbicides By Plane Lessens Drift Problem

O. C. French

Spraying insecticides such as DDT in liquid form by airplane may greatly reduce the drifting problem encountered when spreading poisonous dust by plane.

Finely atomized spray will drift under certain conditions but spray droplets generally are larger and many times heavier than dust particles.

### Spraying by Plane

There are several factors affecting the efficiency of liquid spraying by plane, some of which are beyond human control. These are wind velocity and direction, and air stability. Anything other than stable air is adverse to the deposition of small droplets.

A predominance of large droplets

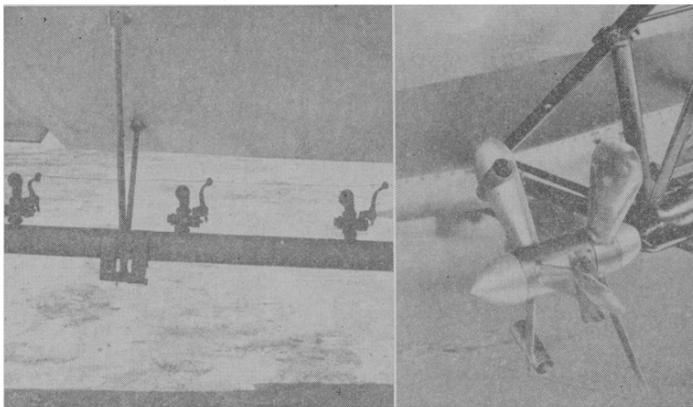
latively close to the ground and there are only short periods during the day when stable air conditions exist in this portion of the atmosphere.

The width of the spray-swath is less than a dust-swath but the actual acreage treated during a given weather period may be more. Spraying can take place while air current velocities are higher than are permissible for dusting.

The spray-swath width is influenced by the height of the plane above the ground, by the design and power of the plane; and by the location of the dispersing device with relation to the slip stream of the plane.

### Spraying Devices

The planes being used for liquid application are, in general, of the



(Left) Close-up view of the nozzle arrangement of boom. Nozzles are attached to top side of boom and discharge to the rear. This location of nozzles is used to apply 2,4-D spray where large size spray droplets are desired.

(Right) A rotating type liquid dispersing device. Liquid is forced out from hub through prop blade to the three blades. A screen is built into each venturi through which liquid passes and is atomized.

which have sufficient mass to overcome eddy air currents tends to reduce the efficiency of the spray solution.

It is apparent that a compromise is necessary as to the degree of atomization of the droplets.

Aerial spraying is carried out re-observed in the latter irrigation.

### Fertilizers

Some commercial inorganic fertilizers are known, under certain conditions, to affect infiltration rates.

Sodium nitrate may cause an exchange of sodium for calcium on the wet, paste-like mass—the colloid—which results in a separation of the soil particles and a sealing of the soil pores, causing a decrease in water penetration.

Ammonium fertilizers may have, indirectly, much the same effect—if concentrations are such as to make the soil sufficiently acid.

In these experiments, fertilization was at a rate of 100 pounds of nitrogen per acre per application. Three fertilizers were used: sodium nitrate, ammonium sulfate, and urea. There was one application per year.

Los Angeles city water was used for irrigation throughout. It is moderately low in salts for this region, and has a favorable calcium-sodium ratio.

In these tests, neither sodium nitrate nor ammonium sulfate caused a decrease in infiltration rates when an effort was made to apply it in such a way that concentrations would not be high. When these fertilizers were spread over the soil surface just prior to irrigation, a subsequent lowering of the rate of water entry was noted in each case. The effect was greater and persisted longer with sodium nitrate.

Under these conditions, both fertilizers can be safely used with lighter applications, or with similar applications in the irrigation water, without ill effects.

### Depth of Effects

There has been reason to believe that some of the effects herein described are limited to a surface crust of soil. At one time a surface crust, about 1/8 inch in depth was skimmed off all of the plots. This operation brought no change in the effects described and it is assumed that they were not limited to such surface crust.

Arthur F. Pillsbury is Associate Professor of Irrigation and Associate Irrigation Engineer in the Agricultural Experiment Station, Los Angeles.

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## Spraying Liquid Insecticides From Air Lessens Drift

(Continued from page 3)

The by-passed liquid also serves for agitating the material in the storage tank.

A clutch is provided on the power take-off drive so the plane's full engine power can be utilized in lifting it from the ground.

### Droplet Size

Some materials such as selective weed sprays seem to be more effective when applied as coarse sprays. This is fortunate because the drift problem is much less critical with the larger droplet sizes in the range of 300 to 500 microns.

Insecticides, in general, give a more uniform and effective deposit when atomized to smaller droplet size, probably in the range of 50 to 300 microns.

The degree of atomization by the boom-with-nozzles type of disperser may be changed greatly by the location of the nozzles on the boom. For example, with nozzles discharging downward and at 90 degrees to the air flow, the liquid is broken up much finer than when the nozzles are directed to discharge backward with the air flow.

### Seeding and Weeding by Plane

The airplane has been used successfully for seeding thousands of acres of rice, barley and legumes.

Herbicides have been applied successfully by plane on grain field, rice fields, alfalfa, and on irrigation and drainage ditches.

Even the broadcasting of fertilizer by plane has been done extensively and successfully.

These diverse agricultural applications for the airplane make it possible for the commercial operators to use their equipment over a greater portion of the year and as a result, lead to better equipment and less cost to the grower.

O. C. French, assistant Professor of Agricultural Engineering and Assistant Agricultural Engineer in the Experiment Station, Davis, resigned Sept. 1, 1947.

## Control Measures In Trichomoniasis Abortion By Cows

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the bull when breeding a cow. The organism — trichomonad — causing the disease lives deep in the sheath of the bull and does not affect the semen.

The cow may conceive normally from the service, but if trichomonads are also introduced into the uterus with the semen, ideal conditions are created for their multiplication with the result that the developing fetus is eventually killed by the trichomonads. This can occur any time after conception and may result in an abortion too small to be observed.

### Spread of the Disease

A cow may come in heat in two or three days after an early abortion, and be rebred, perhaps to a different bull, with the result that the second bull may become infected. The vagina of the cow is likely to harbor numerous trichomonads for several days following abortion.

The first symptom in the herd is the return to heat of a number of cows, assumed to be with calf, because of having shown no heat following breeding two or three months previously.

Being an infectious and venereal disease a considerable number of cows are likely to be involved, and the majority of them traced to service by a particular bull. Vaginal discharge, whitish in color, from cows supposedly with calf is also observed.

When an abortion is seen it is usually during the first half of gestation and the fetus shows evidence of having been dead in the uterus for some time. In some cases there is little but skin and bone accompanied by considerable brownish colored fluid.

### Diagnosis Difficult

Diagnosis is difficult and can best be made from the breeding records of the herd. A positive diagnosis consists of finding the organisms in fresh discharge following abortion. This is not always possible since trichomonads die rapidly on leaving the pregnant uterus.

## Treating Row Crop Seeds With Fungicides As Control Measure Against Decay Or Damping-off

L. D. Leach

Treating seeds of several vegetable or field crops with the proper fungicides may improve stands by reducing the amount of seed decay or damping-off. In addition, several seed-borne diseases can be controlled by seed treatment.

To be satisfactory the chemical must be non-injurious to the germinating seed but toxic to the organisms that cause seedling infection. For this reason the treatments used upon various crops differ considerably.

### Lima Beans

Lima beans are quite susceptible to seed decay when planted in cool, moist soil but prior to 1940 practically no seeds were treated because the fungicides then available caused severe injury to germinating seeds. About that time new fungicides, safe upon lima beans, were introduced and by 1945 over 75,000 acres of large lima beans, or 75% of the total acre-



Control of damping off of sugar beets by seed treatment. The sixteen rows to the right of the center were planted with nontreated seed, while the rows to the left and the extreme right were planted with treated seed.

age in California was planted with treated seed in the five southern coastal counties of Santa Barbara,

The possibility of this infection getting into the herd is one of the reasons for maintaining good breeding records including a record of the performance of each bull in the herd. A bull infected with trichomonads will show a very poor record; over a period of one hundred services he may show as few as six normal calvings.

A tentative diagnosis may be made from breeding records, and control measures adopted immediately because these measures are such that they constitute, today, good dairy management.

### Condemned Practice

The infection is usually introduced into the herd through the purchase of a herd sire that has been used elsewhere. Since diagnosis is difficult in the male there is danger that the infection may become widespread throughout the herd unless curbed. Unfortunately, it has been customary to breed a cow to a different bull if she fails to conceive from the first. This practice should be abandoned, it leads to spread of infection to other bulls.

### Slaughter of Bull

When infection is suspected or found in a herd, the infected bull should be slaughtered. There is no reliable cure. The infected bull can be determined from breeding records. Infected cows will recover following abortion; that is, the organism will disappear from the genital tract within a few weeks.

### Recommendations

A bull should be assigned to a group of cows. If a cow fails to conceive she should be bred back to the same bull unless, in the meantime, the bull has been proved of no value as a breeder, in which case, two heat periods should be missed and the cow bred to another bull on the third. This will allow time for the elimination of any infection acquired from the service by the first bull.

Adherence to this practice at all times is good herd management and if infection of this type gets into the herd, it will be confined to one group only.

H. S. Cameron is Professor of Veterinary Science and Veterinarian in the Experiment Station, Davis.

Ventura, Los Angeles, Orange and San Diego.

### Other Row Crops

Some crops such as radish, carrot, celery, onion and lettuce are not particularly susceptible to damping off and usually are planted without protective seed treatments. Other crops including spinach, sugar beets, melons, cantaloupe, and peas are frequently subject to seedling diseases and often show considerable benefit from proper seed treatment.

High temperature crops such as beans, melons and cotton are most apt to suffer from seed decay when they are planted in cold moist soils because under these conditions the soil fungi that rot the seeds grow relatively faster than the seedlings. At high temperatures, on the other hand, these same crops may entirely escape seedling infection.

Low temperature crops like spinach and peas are more subject to seed

decay or damping off at moderate than at low temperatures providing soil moisture conditions are similar.

### Sugar Beets

Sugar beets present a special problem because in addition to being quite susceptible to seedling infection by several soil-borne fungi, some seed lots carry spores of a fungus that causes damping off in cool moist soils. It has been found that dusting the seed with organic mercury compounds gave effective control of these diseases but storage of such treated seed for prolonged periods resulted in seed injury.

Recently two new organic compounds were introduced commercially that gave reasonably good protection and avoided storage injury. In a dust form, however, both proved to be irritating to operators and a modification of the method of application appeared desirable.

### Methods of Mixing

Most seed treatments are applied as dusts by mixing the seed and fungicide in commercial continuous-flow seed treaters or by mixing measured batches in diagonal barrel treaters or in cement mixers.

To eliminate the dustiness of treated seeds and to increase adherence one of the commercial companies recently developed a process for applying the fungicide in a moist, pastelike mixture by the so-called "slurry method." This method proved satisfactory upon corn and is being tested on other types of seed.

Other methods of applying concentrated suspensions by spraying the material over the seed during agitation are also being investigated.

### Fungicides Available

Nearly all fungicides used for seed treatment have been developed and are offered for sale by commercial chemical companies. The chief function of a special series of fungicidal experiments has been to evaluate these materials with regard to the tolerance of different seeds to specific fungicides and to the protective effects of the fungicides against specific pathogenic organisms.

On the basis of safety and efficiency as well as cost, availability and ease of application the producers are enabled to decide which materials are most suitable for their purposes.

L. D. Leach is Professor of Plant Pathology and Plant Pathologist in the Experiment Station, Davis.

## Improved Flavor—Color Produced In Evaporated Milk

N. P. Tarassuk

There is no known effective method of preventing the cooked or caramelized flavor and brown discoloration of milk processed at high temperatures to render it sterile.

Experiments involving a 5% lactose solution containing phosphate buffer revealed the manner in which heating and storage can effect the discoloration. Slight differences in color were intensified when a lactose solution was sealed in a container with different gases in the free space.

### Chemical Changes

The chemical changes in the milk which are brought about are an uptake of oxygen, and the production of carbon dioxide by at least one constituent in the milk which is heat-labile—altered by the application of heat.

The decrease in oxygen would account for only a small part of the increase in the percentage of carbon dioxide. The increase in carbon dioxide, in the free space of the container, can not be the result of heat on the carbon dioxide soluble in the milk.

### Solubilities of Gases

The solubilities of carbon dioxide and oxygen vary as the partial pressures of the gases change in the free space in the can.

After milk has been heated it will contain more dissolved carbon dioxide and less oxygen. The reaction which produces the browning discoloration releases carbon dioxide and uses oxygen, as shown by an analysis of the gas in the free space.

### Ratio of the Gases

Evidenced by the changes of the gases in the free space in the can, the ratio of carbon dioxide produced, to the oxygen used, averaged 0.12 when evaporated milk was sterilized at 244°F for 15 minutes. When the same milk was heated at 168°F for five minutes, the ratio was only 0.09%. Apparently this ratio is much closer to a unity than indicated by the data on the gases in the free space.

When pure moist lactose was discolored by heating in a closed container at 212°F, the ratio of carbon dioxide produced to oxygen used was 0.66.

There is no doubt that lactose is the principal source of the carbon dioxide given off during the discoloration of the milk under a high heat treatment.

### Color and Flavor Improved

Evaporated milk was improved in color and flavor by replacing the oxygen in the free space in the can with nitrogen before the milk was sterilized.

In this experiment the nitrogen containing cans and a control can with the usual oxygen in the free space were sterilized in a commercial plant for 15 minutes at 242°F and at 243°F.

In comparison with the control can of ordinary evaporated milk, those with the nitrogen was found to have only a mild caramelized flavor.

In other experiments, when some of the oxygen dissolved in the milk was removed, and the oxygen in the free space was reduced to 0.69% before sterilization, the resulting evaporated milk had an even greater improvement in color and in flavor.

N. P. Tarassuk is Assistant Professor of Dairy Industry and Assistant Dairy Chemist in the Experiment Station, Davis.

## ABSTRACTS OF NEW PUBLICATIONS

### BRUSH REMOVAL

IMPROVING CALIFORNIA BRUSH RANGES, by R. Merton Love and Burle J. Jones. Cir. 371, August, 1947. (31 pages).

Not all of the 10 to 20 million acres of brushland in California can be cleared profitably, but large areas can be made to support additional livestock.

Well-planned programs of brush removal by individual ranchers can change certain adaptable California brushlands into valuable grasslands that produce greater crops of meat and wool.

Any brush clearance project must be well planned if it is to succeed. It involves the choice of areas which will offer support for forage growth after clearance, the proper clearing of the land through fire and machinery, and reburning of cleared lands at intervals to prevent regrowth of brush.

The second phase of range improvement is revegetation. The area should be examined before burning to determine whether or not artificial seeding will be necessary to establish a forage crop. After the crop is established, adjusted grazing is essential to insure permanent stands.

Information on this three-fold plan for improving range lands through removal of brush, revegetation of cleared areas, and control of grazing is to be found in the circular listed above.

### HOME FRUIT GROWING

HOME FRUIT GROWING IN CALIFORNIA, by W. L. Howard, revised by Reid M. Brooks. Ext. Cir. 117, September, 1947. (81 pages).

Deciduous fruit trees for the small home orchard can be grown almost anywhere in California, within the limitations of climate, site, and soil.

The kinds of fruit to plant depend upon the geographical location, the owner's taste, and the amount of land available. With sufficient irrigation water, favorable climatic conditions, and enough space, a good selection might be apples, apricots, peaches, plums, pears, cherries, walnuts, and almonds. If possible, one should try to have a succession of fruits ripening, from the earliest to the latest.

Trees may be selected from many good nurseries in the northern and the southern parts of the state, and should be ordered as early in autumn as possible, for tree digging begins in December.

In most parts of California, the best time to plant deciduous trees is in January, when the trees are dormant; evergreen trees on the other hand, may be planted at any time if the roots are balled or in containers.

Immediately after deciduous trees are planted, the tops should be shaped so that growth will be directed properly. Care should be taken to keep young trees adequately watered. A continuous program of irrigating, pruning, and spraying will prove rewarding.

Climate, soil, selection of trees, planting, and cultural operations for both standard and dwarf fruit trees, and for nut trees, vines, and bushes are discussed in this revised circular for the home fruit grower.

### DONATIONS FOR AGRICULTURE RESEARCH

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

#### BERKELEY

Italian Swiss Colony.....\$500.00  
Division of Plant Nutrition  
Sugar Research Foundation.....\$80.00  
(First installment of total grant of \$3,550.00) Division of Plant Nutrition  
Sugar Research Foundation.....750.00  
(One-half of \$1,500.00 grant) Division of Food Technology

#### DAVIS

California Fertilizer Association.....\$1,500.00  
(One-half of \$3,000 grant) Research with fertilizers

#### MISCELLANEOUS GIFTS

American Cyanamid Co. ....5 lbs. of 15% 3422 wettable powder  
3 drums insect or fungicide Agric NOIBN O/T Liquid  
Chipman Chemical Co., Inc.....5 lbs. of Berako Livestock Spray Powder  
The Dow Chemical Co.....1 bag DN Dust, weight 76 lbs.  
1 drum DOWAX, weight 55 lbs.  
2-1 gal. drums agricultural insecticide OTIQ  
1 Fibre Pak Agricultural insecticide OTIQ  
Mr. Leo Gardner.....100 lbs. 5% DDT dust containing 1% oil  
100 lbs. 5% DDT dust containing 2% oil  
100 lbs. 3% DDT dust containing 2% oil  
O. E. Linek Co.....4 lbs. 1A1 HOU-E-LZ  
Merck and Co., Inc.....5 lbs. Potassa Sulfurated  
Rohm and Haas Co.....100 lbs. Rhothane WP-50  
2 bags—50 lbs. each RHOTHANE WP-50