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California AGRICULTURE

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Agricultural Outlook As of December, 1946

Condensed from an address by H. R. Wellman, Director, Giannini Foundation of Agricultural Economics, University of California, to the Annual Membership Meeting, California State Chamber of Commerce in San Francisco, December 4, 1946.

Within four years after the outbreak of each war (1918 in World War I, and 1943 in World War II) the index of farm prices almost doubled. During the remainder of World War II price ceilings prevented further substantial increases. But with relaxation of price controls followed by decontrols, the index of farm prices shot upward.

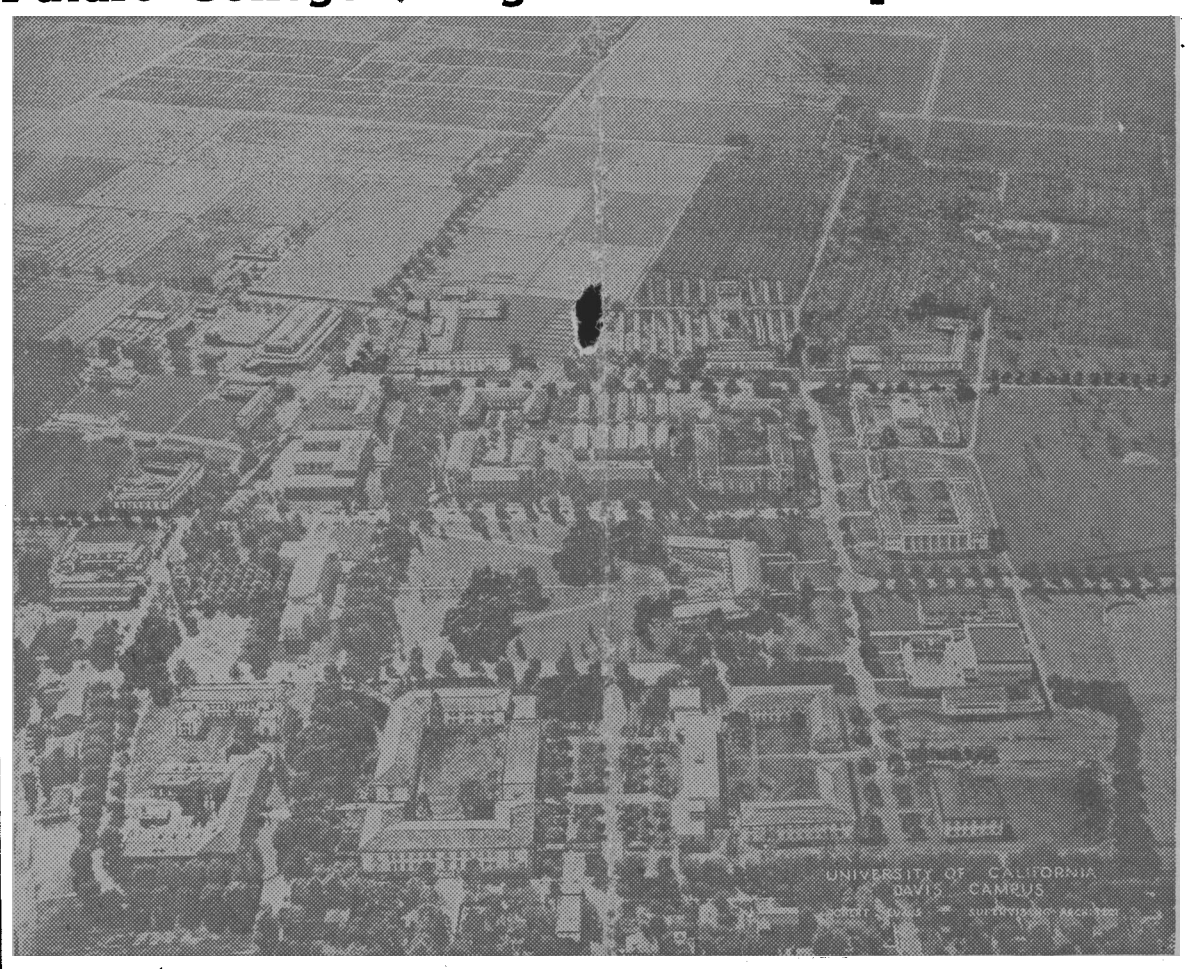
During the two weeks preceding the termination of price controls on November 10, the index of non-agricultural prices (1914=100) rose 3.6 points. Official data are not yet available on the changes since the termination of price controls. Unofficial evidence indicates that the index has continued upward.

Expansion of Agricultural Production

During World War I crop acreage was increased 32 million acres; during World War II it increased 16 million acres. The overall expansion in agricultural production last time was about 10 per cent; this time it was nearly 30 per cent.

A substantial part of this 30 per cent increase in total output is likely to be permanent. It rests largely upon increased mechanization, improved

Future College of Agriculture Campus at Davis



THIS perspective view was designed by Supervising Architect R. J. Evans of the University of California campus at Davis, to show the development that will take place under the present building program. Existing buildings and those contemplated are shown in the sketch.

Effect of organic matter on water infiltration rates in a sandy loam soil in a potato field in Kern County. The dark colored basin in the center of the picture received a heavy surface application of organic matter. One week later the basin was flooded to a depth of four inches. It took only 35 minutes for the water to enter the soil. Prior to the application of the organic matter, three to four hours' time was required.

layer of soil immediately below the stirred area. This compacted zone generally is referred to as "plow pan" or "cultivation pan."

Trial plots were established a decade ago at the Citrus Experiment Station, Riverside, to study the effect of excessive cultivation done at a time when the soil moisture content was unfavorable. Although the plots have not been cultivated since, much of the ill effects of the cultivation are still present.

Field and laboratory studies on soils of different types showed that "cultivation pans" of highest density are found on those soils which have a gradation in particle sizes from gravel to clay, such as the gravelly loam soils.

Vibration or compaction by the cultivating equipment causes the smaller soil particles to move into the voids between the coarse particles. In some orchards studied, the pore space of the compacted layer was less than half what it was prior to the time the land was put under cultivation.

Improving Infiltration Rates

To overcome this condition various culture methods have been followed, such as no cultivation, restricted cultivation in combination with the growing of cover crops. It is on this type of soil that the practice of nontillage is finding its widest application.

The quickest method of improving infiltration rates on a soil with such a dense cultivation pan is to shallow subsoil with a tool that will pass just under the compacted layer and fracture it by lifting.

Organic Matter Content

The presence of a high organic matter content has long been associated with good soil structure, which in turn generally means a soil highly permeable to water. Desirable as it may be to have a soil high in organic matter content, it is usually expensive to develop and maintain in semi-arid and desert regions.

of the soil when drainage conditions are favorable.

Poor soil structure can also be caused by using irrigation water that has an unfavorable sodium content.

If the ratio of sodium is high in comparison to calcium and magnesium, even though the total saline content of the water be low, unfavorable soil conditions can result. In time the soil will lose its favorable structure and the rate at which water will enter the soil will be slower.

Gypsum is spread on the soil, or added directly to the water, in order to counteract the ill effects of the sodium.

Certain Fertilizers Have Adverse Effect

Certain fertilizers may at times produce a soil structure which will reduce the rates at which water will enter a soil. When using an irrigation water with a high sodium percentage, it is not advisable to use a fertilizer which contains appreciable amounts of sodium.

When irrigation water has a high calcium ratio, such fertilizers do not adversely affect water penetration.

The adverse effect of ammonium sulphate on infiltration rates under certain conditions was first observed in the Irrigation Orchard at Riverside. Ammonium sulphate at the rate of 50 pounds per tree was applied during one season around a number of orange trees irrigated by the basin method.

The influence of the fertilizer on water infiltration was so marked that the cause of the trouble was sought. It was found that the fertilizer had caused the soil to become so acid that the ammonium was not being nitrified. Under these conditions, the effect of the ammonium is similar to that produced by sodium.

Effects from long continued use of sodium and ammonium base fertilizer have occurred in the fertilizer trial plots at the Citrus Experiment Station, Riverside, and where heavy applications of ammonium sulphate were made on sandy loam soils in Kern County.

Water Spreading

The practice of water spreading to replenish ground water basins is rather general in California. It is desirable to maintain high infiltration rates in these basins if the area devoted to water spreading is to keep within reasonable bounds. Studies by University staff members and State and Federal representatives have been made to determine the cause of decreasing rates of water penetration. One cause of the change in infiltration rates is trapped air in the pore space of the soil.

M. R. Huberty, E[illegible]eer, is Professor of Irrigation a[illegible]rrigation Engineer in the Experi[illegible]Station, Los Angeles.

Chicken lice are reported to have been controlled by DDT sprays and dusts in various concentrations. These materials have been applied to the birds as well as to the roosts, nests, and floor. Pending the accumulation of additional experimental data, there is still some question as to the advisability of using DDT for this purpose in place of sodium fluoride dust or roost paint treatment with nicotine sulfate.

The lice of cattle, horses, hogs, sheep, and goats are all susceptible to control with DDT dusts, sprays, and dips. When proper formulations are devised and methods of application worked out, it is possible that a single treatment will be sufficient to eliminate lice from these animals.

Mites

Generally speaking DDT does not seem to be effective for the control of mange mites or chicken mites. Repart to difficulties encountered in ports indicate that this is due in making contact between the DDT and the mite. In one case reported, however, successful control of the chicken mite was obtained by spraying the poultry house with two and one half per cent DDT in kerosene.

Ticks

DDT has been found to be useful in the control of certain ticks and

ber or compounds have become available which equal or surpass soap as a washing agent. Most of these are restricted in use to industry.

A large number of these so-called synthetic detergents was collected for trial with DDT on pears. Those which reacted with acid were discarded, but a considerable number still remained.

If a given detergent causes much foaming during operation of the washer, this will interfere with circulation of the wash water and often result in much of it getting out of the tank and onto the floor. On this

rather ineffective against others. The poultry tick or "blue bug" for example, has been completely eradicated from poultry houses with a five per cent DDT solution. On the other hand, the control of dog ticks is very difficult with DDT. The U. S. Department of Agriculture has reported successful control of the winter tick on horses with the use of a wash consisting of DDT in soluble pine oil and water. The spinose ear tick also appears susceptible to control with five per cent DDT in a non-drying adhesive formulation.

This, then, appears to be the future of DDT so far as the California livestock industry is concerned. Certainly many changes will take place as improved formulations and methods are developed. In some cases DDT will be supplanted by better, safer, and cheaper products. As sorely needed fundamental research progresses the results will be translated into practical recommendations. This is necessarily a slow, everlasting process. There are many phases of an investigation, not readily apparent, that must be explored before a safe and effective procedure can be recommended.

In order to keep in touch with the latest developments depend upon your local farm advisor, he is in the best position to give you sound advice.

James R. Douglas is Assistant Professor of Parasitology and Assistant Entomologist in the Experiment Station at Davis.

Quick Decline of Oranges Believed Virus Disease

Quick decline of oranges still is largely confined to certain parts of Los Angeles County, although some cases have been seen in northern Orange County, in western San Bernardino County, and some suspected cases have been noted elsewhere.

In early studies of the disease a significant characteristic was noted, namely, that it affects only oranges budded on sour orange stock. Oranges on sweet stock are unaffected.

Recent findings emerging from transmission experiments, together with all the other facts and observations which have emerged, indicate beyond much doubt that Quick Decline is a virus disease. It is thought that this virus builds up in the leaves of the sweet orange and that it, or some metabolic substance produced by the virus passing down through the phloem, causes a collapse of the sieve tube of the sour orange stock.

This blocks the passage of sugar and other elaborated products to the roots, lays them open to decay by soil organisms, and thus brings on the ensuing visible manifestation of decline in the top.

First Above-Ground Symptoms

The first tangible above-ground symptom of quick decline is a lusterless appearance of foliage accompanied often by abnormal leaf fall. New growth is sparse. The tree is of suspension not over three times during the spraying season and stated that oil should not be included in the spray mixture.

For experimental purposes, some spraying was done with DDT spray to which oil was added and the fruit was washed in the detergent mixture. Such residues were removed very ineffectively and it was concluded that for this reason as well as on account of danger of harm to the trees, oil should not be added to DDT sprays on pears. Such oil-DDT residues can be removed by use of an emulsified solvent such as benzene in the wash water but such a wash also removes part of the natural wax from the fruit and results in darkening and shriveling after a few days.

Analyses have been made of many samples of pears sprayed with DDT in various manners and it has been found that usually the residue present at harvest even before washing does not exceed the tolerance, provisionally set at seven parts DDT to one million parts pears or apples.

Unless oil has been used with DDT, any excessive residue can be reduced readily by washing with the detergents and hence it appears that no serious difficulty is to be expected from the use of DDT for control of the codling moth.

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