

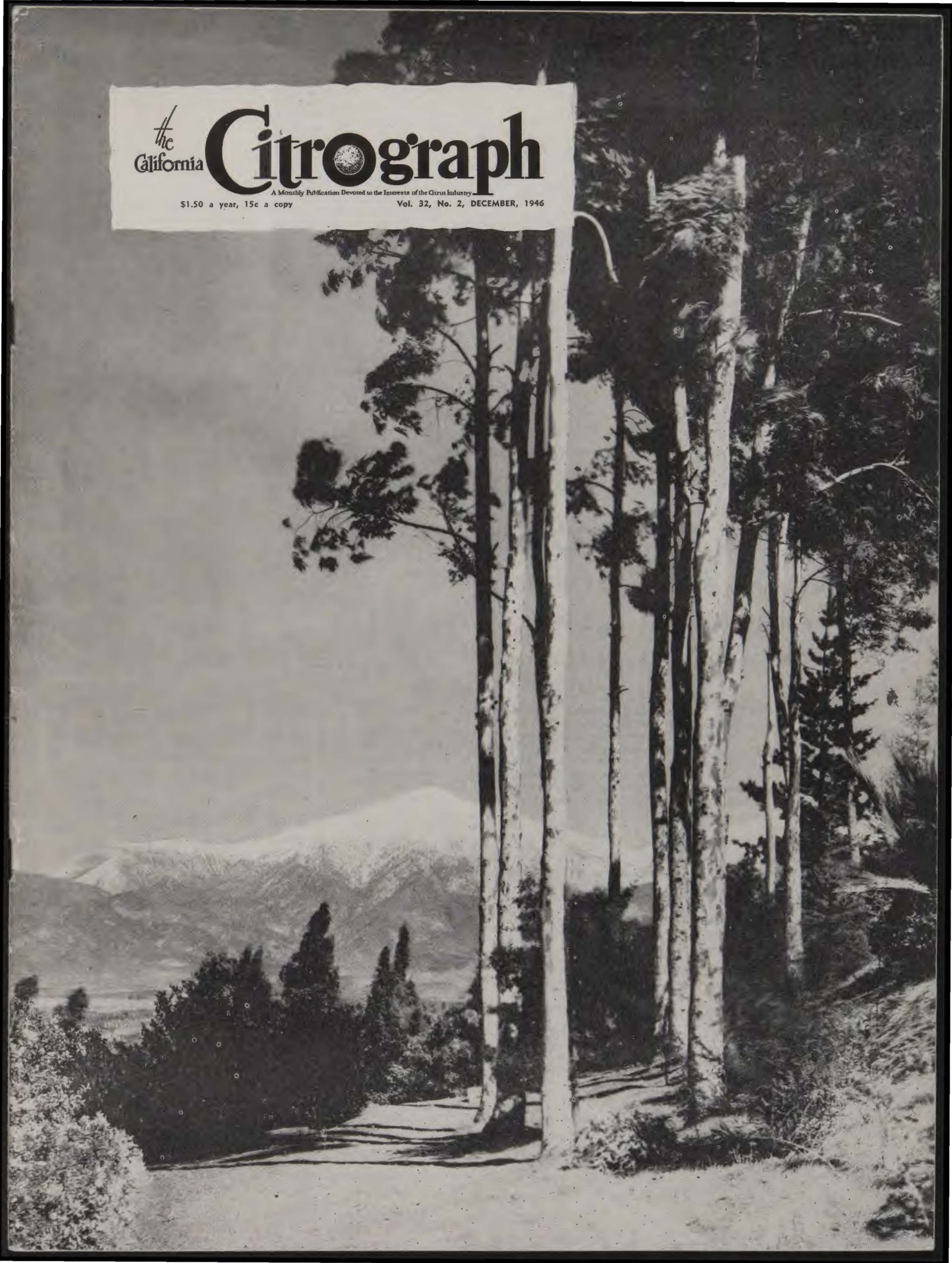
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California

# Citrograph

A Monthly Publication Devoted to the Interests of the Citrus Industry

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FOR DECEMBER**

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**THE \$364 QUESTION**

THE income of California residents is reduced by a Federal tax bite amounting to \$364 per person per year. This figure is in dazzling contrast to the little nibble of \$40 Federal tax in 1937 or the \$57 paid in in 1941, the last pre-war year.

Add to the \$364 another per capita item of \$107 for state and local property taxes and the tax load carried by the average citizen is \$471. The \$107 compares favorably with the \$118 figure for 1937 or \$152 in 1941. Nice trend.

Speaking further of still fancier figures, did you know that California paid out more than a million dollars a day in Social Security expenditures, \$378,949,000, in the fiscal year 1945-46?

This figure is astonishing when compared to the estimated cost of State and local governments in California for the same period, \$725,000,000. The equivalent of \$28 out of each \$100 of individual Federal income taxes paid by the taxpayer in the coming year will go to social security activities.

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**GREETING**

**SALUTE YOU.** *I am your friend and my love for you goes deep. There is nothing I can give you which you have not got; but there is much, very much, that, while I cannot give it, you can take.* ☺ No heaven can come to us unless our hearts find rest in today. ☺ TAKE HEAVEN! ☺ No peace lies in the future which is not hidden in this present little instant. ☺ TAKE PEACE! ☺ The gloom of the world is but a shadow. Behind it yet within our reach is joy. There is radiance a glory in the darkness, could we but see—and to see we have only to look. I beseech you to look. Life is so generous a giver but we, judging its gifts by their covering, cast them away as ugly or heavy or hard. Remove the covering and you will find beneath it a living splendour, woven of love, by wisdom, with power. Welcome it, grasp it, and you touch the angel's hand that brings it to you. ☺ Everything we call a trial, a sorrow, or a duty, believe me, that angel's hand is there; the gift is there, and the wonder of an over-shadowing Presence. ☺ Our joys too: be not content with them as joys. They, too, conceal diviner gifts. ☺ Life is so full of meaning and purpose, so full of beauty—beneath its covering—that you will find earth but cloaks your heaven. Courage then to claim it: that is all! ☺ But courage you have; and the knowledge that we are pilgrims together, wending, through unknown country, home. ☺ And so, at this CHRISTMAS time, I greet you. Not quite as the world sends greetings, but with profound esteem and with the PRAYER that for you now and forever, the day breaks, and the shadows flee away.

Extract from a letter written by Fra Giovanni, A.D. 1513



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ance, who have been sending inferior, unattractive, poorly graded or poorly packaged products, might get caught off base.

And this in a period when employment opportunities were never greater. Newly-elected and re-elected office holders please note.

War bills must be paid, but it seems only fair to ask that expenditures be cut wherever possible. And say fellows, leave the lid on the pork barrel, will you?

**HUNTERS WILL BECOME SHOPPERS**

SUPPLIES of the many things we would like to buy will sooner or later become more plentiful. Maybe sooner than you think. Consumers will become shoppers instead of hunters.

This optimistic note is in face of current scarcities, but the pipelines are being filled. Already there have been some farm commodities in surplus, and we may expect more of this as time goes on. Some national farm leaders regard this as their No. 1 problem.

Folks having things to sell will need to do some first class merchandising to hold or expand their trade. Those who have been short on perform-

Customers will probably remember slights, which would be justice. We hold a grudge against the store which sold us bob-tailed shirts with no pockets. Now having more choice in local food marts, there are some we avoid scrupulously. And wholesale buyers, procuring the needs of retailers, whether they be brussels sprouts, citrus fruits, scallions or artichokes, will favor the supplier or the brand which gave the best performance possible under the trying circumstances of recent years. And the back of their hands to the people who gouged or slighted.

Selling will take the order of the day. For some it will be in order to re-learn merchandising and those niceties of offering commodities to the trade in their best dress-up.

The big boss of all of us is the ultimate consumer, who very soon will come to market with a microscope instead of a telescope. And how will your product appear?

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This article is a somewhat condensed version of a paper presented at the meeting of the Pacific Slope Branch of the American Association of Economic Entomologists, at Riverside, California, in June, 1946. Dr. Popham is assistant chief of the Bureau of Entomology and Plant Quarantine, U.S.D.A.

## SURVEYS IN RELATION TO PEST CONTROL WORK

By W. L. POPHAM

**R**OUGHLY, one-half of all funds expended for large-scale Federal-State cooperative insect pest or plant disease control work is used simply to locate and delimit areas of infestation. That's a rather sizable bill. Any control effort that is reasonably successful is initiated, guided, and supported by surveys. Before undertaking eradication or suppressive work, we must know where the pest occurs, what are its favored hosts, how it spreads, and at what stage in its development it is most vulnerable to suppressive action. To keep track of pests that we know about is difficult enough, but in the case of new introductions we don't even know what we are looking for until we find them . . .

If we are to be reasonably successful in our efforts to minimize the damage caused by crop pests, we must first of all have the facilities for a comprehensive and sound research program. To pave the way for recommending or applying adequate protective measures without unnecessarily interfering with international, interstate, or interarea trade, or to recommend or apply control procedures intelligently, it is essential that we know something about the insects and diseases of economic importance both at home and abroad, where they occur, their reproductive and feeding habits, the environment under which they thrive, and the particular stage or stages in their annual development during which control measures may be applied most effectively.

### Modern Transportation

We all agree that one of our most productive ways of combating crop pests capable of causing extensive damage is to prevent their entry into areas where they do not occur. This means adequate inspection at ports of entry for protection against foreign inductions, and regulatory and suppressive measures to prevent further spread of pests that have become established in limited areas and threaten spread to other parts of the country. We need only reflect a moment on modern transportation to appreciate fully the magnitude and importance of adequate port-of-entry inspections. A plane leaves the Orient and in a matter of hours lands at San Francisco, Los Angeles, Seattle, Kansas City, Chicago, or Memphis.

"In my opinion, two of the most conspicuous weaknesses in our pest control work are inadequate surveys and the absence of facilities for demonstrating in a businesslike manner the findings of research. Growers will do a far better job of pest control when we are in a position to anticipate their troubles, and have improved our facilities for getting sound information to them."—W. L. Popham.

With it may come another Japanese beetle, pink bollworm, or Mediterranean fruit fly. Fresh fruits and vegetables grown by our neighbors to the south, if permitted entry, will appear at distribution centers in this country in a few hours after leaving the packing sheds. We can anticipate that some hitch-hikers will avail themselves of this opportunity to travel.

In considering foreign quarantine we are confronted with a number of perplexing problems. An international economy based on a liberal exchange of commodities between nations draws attention to the need for new ways and means of minimizing pest risk with the least possible interference with commerce. Because of war-created economic inequalities, producers and dealers in foreign nursery stock are clamoring for business in the United States and elsewhere in the Western Hemisphere. Until such time as markets in war-torn Europe return to normal and exchange values between nations are stabilized, the United States will continue to be a preferred market for surplus plants and plant products of all kinds. This situation cannot adequately be met with the port-of-entry inspection force and other pest-control facilities which gave reasonably effective coverage before the war. Cargo planes mean new ports of entry. Unprecedented travel to and from points throughout the world creates new problems and intensifies old ones. Improved transportation, improved refrigeration, an internationally conscious public, and domestic demands that temporarily far exceed supply are all factors to be considered. Developments of recent months have focused attention on virus diseases, host ranges and relationships, and vectors of both animal and plant diseases.

### More Imports Expected

The duration and intensity of the war forced American nurserymen to curtail production—or at least defer expansion—which resulted in a tremendous backlog of orders for stock of all kinds. For four years there has been little importation of nursery stock or propagating material; thus we may expect an unprecedented volume of nursery stock to move to this country from some of the liberated areas of Europe, since it is one of the few commodities which may be turned into dollars so urgently needed for rehabilitation.

Provision has been made for meeting some of these problems, but not all of them. More attention must be given to fumigants and other insecticides and fungicides suitable for commodity treatments; more dependable treating schedules for imported plants and plant products, and other commodities moving un-

der regulation; the further development of aerosols and residual sprays for protection against plant pests hitch-hiking by air. We must be alert to advances that are made in the study of virus diseases both here and abroad, and to the development of methods of safeguarding against them. Seed-borne diseases represent a problem that must be dealt with more aggressively than in the past.

### Importance of Surveys

It is unlikely that the best that can be done will be good enough to keep out all foreign pests. It is essential, therefore, that regulatory effort, whether aimed at foreign introductions or at the interstate and interarea movement of produce, be backed up by surveys which will enable responsible pest-control officials to locate promptly any new introductions that may have escaped detection at port of entry. We know too well from past experience that our chance for complete suppression or eradication of an introduced insect or plant disease diminishes rapidly as the size of the infested area grows larger. It seems to me, therefore, that the men on surveys fill a very important position in the battling order of any crop pest-control team. When an insect or plant disease penetrates our forward defenses, the most economical and effective way to deal with it is to find it and take prompt action while the infested area is small.

When attempting to suppress or eradicate introduced insects, we frequently are reminded that the public may interpret as failure any suppressive effort which does not result in prompt eradication of the pest involved. Perhaps the word "eradication" has been used rather loosely in this connection. But to arrive at a fair appraisal of the value of publicly financed pest-control work, there are other points to consider. Introduced pests that survive intensive eradication effort while infested areas are small frequently cause extensive damage or annoyance once they become firmly established in their new habitat. Therefore, anything that can be done to restrict their range while investigations are under way that may lead to improved methods of eradication or control certainly is to be encouraged.

Time is an extremely important factor in pest control. To arrive at a standard for measuring the value of time is not easy. We have refused to recognize that there is a limit to what research may provide in the way of improved methods of control. Such improvements may take the form of modifications in cultural practices, more effective insecticides, new methods of applying them, or more resistant varieties of crops. To secure information of this character is time consuming.

For just a moment let us consider

the time element in relation to surveys. When an introduced pest of some economic importance is found, we are immediately confronted with such questions as the size of the area infested; the likely methods of dispersal; the possibility that the initial find is only one of several separate introductions; and the extent to which infested host material may have been distributed, naturally or artificially, before the initial infestation was found. In any eradication effort the most discouraging thing that can happen is to have new infestations show up back of the firing line. Frequently several years of intensive study have been required to develop a reasonably satisfactory method of locating light infestations.

### Suppressive Efforts

The inspections that are basic to eradication or control programs go hand in hand with suppressive effort. But I should like to focus your attention for a moment on the situation that we face with reference to potentially serious pests that as yet may not have gained entry to this country or, if so, have not become established to the point of being singled out for legislative recognition, either Federal or State. Some States have the facilities with which to keep abreast of new developments in the crop pest fields; others do not. And I think you will agree with me that the "have nots" in this case are very much in the majority. To carry the matter a step further, the Federal Bureau is in no position at present to offer any appreciable assistance in locating incipient outbreaks of insects or plant diseases that may have escaped detection at ports of entry, or to keep States informed concerning pests known to be established in some parts of our country but not in others.

If we could have facilities for the asking, and we were to undertake to develop a more or less ideal program for protecting American agriculture from crop pests of foreign origin, we could well afford to consider assigning a few well-trained observers to cover crop areas in foreign countries engaged in extensive international trade. These men would become familiar with pests of economic importance not already established in this country, acquiring first-hand knowledge of their behavior under conditions similar to those occurring in this country. By making such information available to our port-of-entry inspectors, our domestic survey staffs, and research workers in advance of an invasion, we would be in a far better position to take prompt and intelligent suppressive action should the need arise.

However, information of this type would be of little value until such time as we have our home defenses so organized that our domestic coverage is of a character that will insure detection of new introductions promptly.

### Assistance to States

Some States have surveys that are reasonably adequate, and others do not. The Federal Bureau has auth-

(Continued on Page 58)

## PART II Costs of Marketing Fresh Citrus and Means of Reducing Them

An examination of Office of Price Administration Maximum Price Regulation 426, as amended, is useful when estimating typical margins taken during the war period, for estimating typical distribution of the consumer's dollar spent for citrus to the distributing agencies, and for examining the functions performed by those agencies. Sales of California-Arizona oranges through a terminal auction in one of 10 major terminal auction cities, November 16-April 30, during the effective period of the regulation, provides a typical instance. The retail sales price would be approximately \$8.24 per 1 2/5-bushel box, distributed as follows: \$2.65 or 32.2 percent to grower; \$1.20 or 14.5 percent to packer for performing functions of picking, packing, and hauling; \$0.07 or 0.9 percent to shippers' sales agent for selling; \$1.33 or 16.1 percent to intermarket carrier for freight and refrigeration; \$0.09 or 1.1 percent to terminal auction, \$0.29 or 3.5 percent to carlot receivers, \$0.30 or 3.7 percent to secondary jobber, the three of which agencies combine to perform the wholesaling function; and \$2.31 or 28.0 percent to retail store (if OPA class 1 or 2) for performing retailing functions.

The cost of handling citrus from tree to car, excluding packers operating profit, now constitutes about 19 percent of all marketing charges, and about 14 percent of the consumer's dollar spent for citrus. Therefore any reductions in handling costs that can be effected will definitely increase the competitive advantage of citrus, particularly if prices decline during the next few years. Comparisons of original data obtained for the latest prewar season, 1940-41, and a representative war season, 1943-44, show that certain costs of handling have increased substantially, notably labor costs and costs of packing materials. There has been also a notable increase in the percentage of total costs required by these two items. For example, total costs of handling Florida oranges in the standard wrapped box increased from \$0.868

## Readjustments In Processing and Marketing of Citrus Fruits

to \$1.122, an increase of \$0.254 or 29.3 percent, between the seasons 1940 and 1943. Of the \$0.254 increase, \$0.228 occurred in the costs of labor, including picking, wrapping and packing, and in the costs of packing materials. Another illustration of the prominent part played by these two items in total costs is that 36 percent or more of all orange-handling costs during the 1943-44 season was for labor, and from 29 to 35 percent was for shook and other packing materials, chief element of which is labor.

Unless labor costs should decrease in proportion to decreases in wholesale fruit prices within the next few years, possibilities of substantial decreases in handling costs may lie mainly in the development of labor-saving machinery. Machine filling of bags is now in practice, and may be further adopted as more machines become available. Distinctly less picking costs will be incurred in those instances where pulling the fruit rather than picking is not impracticable. Chief possibilities for reducing the costs of shook appear to lie in substitutes for the present wooden box, since timber supplies are being rapidly exhausted and since possibilities of decreased costs of wood are directly dependent upon decreased labor costs. Wood is still the most satisfactory packaging material for wholesale shipments of citrus as well as other fruits and vegetables.

Numerous small economies with a substantial aggregate are possible through more efficient plant lay-out, and there are possibilities of increased efficiency through centralized packing facilities and through integration of packing-house and processing operations.

As freight and refrigeration charges account for from 11 to 18 percent of the consumer's dollar spent for citrus, improved techniques in that service will make an important contribution

to the postwar competitive position of citrus.

In anticipation of competition from air lines, refrigerated steamships, and increased fleets of thermostatically controlled refrigerated trucks, the railroads are adopting various improvements and are considering others. Some of these are: The overhead bunker car, carrying greater loads and which may eventually make possible a 20 percent reduction in freight rate per 100 pounds; the standardized 40-foot car, facilitating better loading practices; half-stage icing grates by use of which gross weight of fruit and ice may be reduced 12 percent and a similar reduction made in tariffs; faster, Diesel-powered, short trains that may reduce running time by as much as one third; and refrigerator cars built with lightweight streamlined design, equipped with circulation fans, collapsible bunkers, distant reading thermometers, high-speed trucks equipped with more efficient shock absorbers, and heavier insulation in addition to half-stage icing grates.

Meanwhile, before the war boats were returning to a position of importance in the transportation of

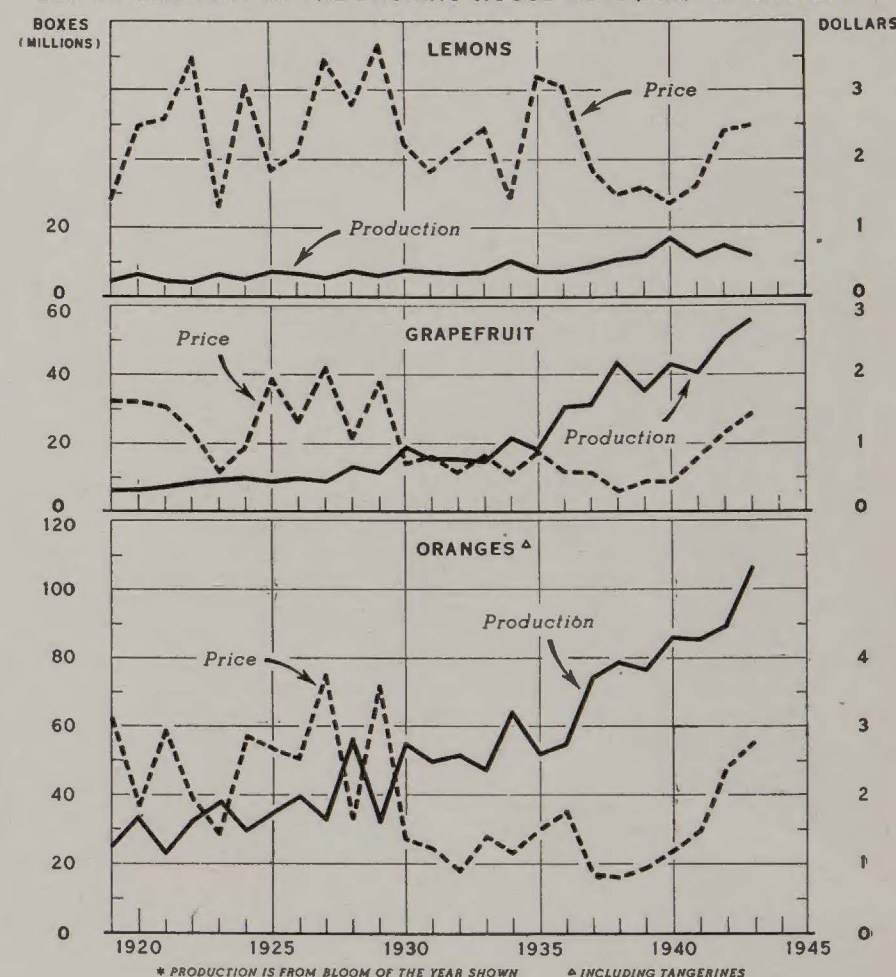
citrus, particularly in carrying Florida citrus to North Atlantic ports. Boat rates were reduced during the decade before the war, schedules were speeded up somewhat, refrigeration service was improved, and further precooling facilities at shipside were installed. Possibilities have been considered of installing a fleet of fast fruit boats which will offer competitive schedules to overland freight carriers.

Trucks were offering powerful competition to the railroads before the war, moving 17 percent of all interstate shipments of citrus from Florida during the 1944-45 season in addition to local shipments and movements to boatside and processing plants. During the same season 38.8 percent of all Texas shipments were moved by truck in addition to movements to processing plants and boatside. Trucks offer several powerful competitive advantages to both boat and rail, such as shorter hauling time, lack of necessity for icing in transit, and flexibility of construction and operation.

The varied motor-vehicle laws among States tend to limit the truck transportation in interstate citrus trade. They impose a practical difficulty upon the distributive system and bring increased costs of transportation.

Little fresh citrus may be moved by air cargo in the immediate postwar period, owing to relative costs (Continued on Page 60)

CITRUS FRUITS: PRODUCTION AND SEASON AVERAGE RETURNS PER BOX TO GROWERS AT THE PACKING-HOUSE DOOR, 1919-43 SEASONS\*

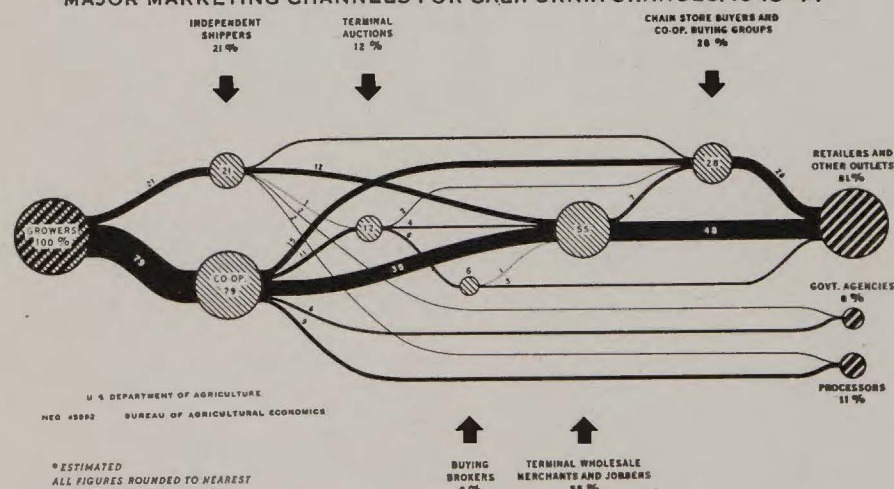


\* PRODUCTION IS FROM BLOOM OF THE YEAR SHOWN \* INCLUDING TANGERINES

U. S. DEPARTMENT OF AGRICULTURE NEG 4327 BUREAU OF AGRICULTURAL ECONOMICS

Prices for citrus fruits tended to be inversely correlated with production during the 25-year period 1919-43. During the 1920's citrus fruit was sold mainly for fresh use. Hence relatively small year-to-year changes in production tended to be associated with large but inverse changes in price. Following 1930 as increasing percentages were processed, prices reacted less sharply to changes in production.

MAJOR MARKETING CHANNELS FOR CALIFORNIA ORANGES, 1943-44\*



Estimates indicate that during the 1943-44 season about 79 percent of all California oranges marketed were handled through cooperatives. Terminal wholesale merchants and jobbers received 54.6 percent of total marketings; chain stores and cooperative buying groups, 28.3 percent; and terminal auctions and processing plants 11.1 percent each.



This article presents further progress in the control of chlorosis and is a contribution from the Divisions of Plant Physiology and Plant Pathology in the Citrus Experiment Station, University of California, Riverside.

# TREATMENTS FOR CHLOROSIS IN LEMON LEAVES

By A. R. C. HAAS and G. A. ZENTMYER

In a previous article<sup>1</sup> it was reported that chlorosis in citrus leaves was corrected by the application of Ferrate or by the use of magnetite in conjunction with some acidifying agent such as sulfur. In certain citrus areas the use of sulfur may be objectionable on account of the possibility of injury from burn, the desire in certain areas not to add to the already large sulfate concentration in the trees, or the interference of sulfur in the biological control of citrus pests.

Our studies of chlorosis were continued, making use of other relatively cheap sources of iron such as ferrous sulfate and investigating a number of reagents of assistance in maintaining a supply of soluble iron over a long interval in contact with the chlorotic leaves. In past commercial practice iron has been used in sprays that were strongly alkaline (because of alkaline water and added lime) and they were of little efficiency in the control of chlorosis. The problem is to thoroughly wet or cover the chlorotic leaves with an acid spray or dust and to maintain a source of soluble iron for rather prolonged periods. To this end the organic reagents such as dextrin, molasses, and glycerine were arbitrarily chosen. Use was made of distilled water having a pH of about 5, and in field practice it would appear desirable to lower the pH of tap water (approximately pH 8) to roughly the pH of distilled water (pH 5 or slightly higher) by means

of some acid such as citric, nitric, or phosphoric.

In chlorosis spray studies much of the success of control lies in maintaining a slight acidity (more acid than pH 6) insufficient to cause burning and in having present a suitable organic agent for assisting in maintaining the solubility of the iron in the presence of a spreader. From a practical standpoint, iron must enter the leaves in the soluble form and the dew greatly facilitates this process. In the absence of lime the effectiveness of low concentrations is increased while the residues that favor spider and scale build-up are reduced.

### Present Investigation

The present studies were conducted with budded lemon trees growing in controlled sand cultures as previously reported<sup>1</sup>. The leaves were very chlorotic and well suited for studies of the control of chlorosis.

In some cases the treatment of the leaves consisted in applying the material in the form of a paste; in others the material was dusted by means of a DeVilbiss powder blower after atomizing with distilled water (pH 5.0); while in still others the entire chlorotic new shoot (last cycle of growth) was dipped into a liter beaker containing the dissolved and suspended materials. No spray equipment was available for handling such small pieces of chlorotic material. Distilled water (pH5) was used instead of using tap water acidified to this pH by various means. No lime was used in any of the tests and each

treatment was replicated many times.

Treatments were made about the middle of July in 1946, and on August 30, 1946 every treated shoot, and in some cases the untreated parent shoot, was removed from the trees and after being washed and wiped dry, they were examined as to the effectiveness of the treatment.

### Results

Table 1 gives a few of the treatments, their composition and effectiveness, the latter of which is more clearly shown by means of figures 1 to 8 inclusive. The Ferrate and magnetite are described fully in the previous article<sup>1</sup>, the fineness of the magnetite being an important consideration. The ferrous sulfate was finely ground just prior to being used, while the dextrin was an inexpensive yellow powder of technical grade and was obtained from the Eastman Organic Chemical Company.

With a dust mixture consisting of 8 g. Ferrate, 8 g. magnetite, 1 g. sulfur, and 1 g. dextrin, there was a uniform improvement and slight burn. Chlorotic leaves of another set of shoots were painted with a paste consisting of distilled water, 4 g. Ferrate, 4 g. magnetite, 4 g. ferrous sulfate, 1 g. sulfur, and 4 g. dextrin. The leaves (fig. 2) became dark green but tended to burn during periods of high temperature.

The leaves dusted with treatment No. 2 (table 1) generally became uniform green in color which increased in intensity with increasing time (figs. 2 and 3). While magnetite alone in a very finely divided condition as a dust or in a spray may gradually add slight improvement to the leaf color, the results are greatly en-

hanced when an acidifying agent is present, such as acidified tap water, sulfur or the like, i.e. some agent to dissolve the magnetite and in addition preferably some organic agent to maintain the iron solubility in the moisture films formed by the spray or by the subsequent dews.

In another group of affected shoots the leaf color was greatly improved following dusting with a mixture of 8 g. magnetite, 1 g. sulfur, and 1 g. dextrin.

Ferrous sulfate is a low cost source of iron, is readily soluble in water, and deserves study because of its efficiency in the greening of chlorotic pineapple plants by spraying and of eucalyptus trees by trunk injection. Excessive alkalinity (soda ash or lime and alkaline tank water) in ferrous sulfate sprays has largely prevented the making of any progress in the control of chlorosis.

When chlorotic leaves were dipped in a liter of distilled water (pH 5) containing 1 g. ferrous sulfate, uniformly good results were obtained (No. 3 in table 1). The ferrous sulfate used in these studies was a fresh bottle of c.p. grade chemical, an old or weathered supply of ferrous sulfate even of c.p. grade is frequently of no value as a source of iron.

Shoots bearing chlorotic leaves were dipped into a liter of distilled water containing 0.75 g. ferrous sulfate with good results. Effective results also following the use of 0.5 g. or 0.25 g. ferrous sulfate treatments of the same type. Considerable improvement occurred (fig. 3) when shoots were dipped as in treatment No. 4 in table 1. With the same treatment except for 0.1 g. ferrous sulfate and 3 cc. glycerine, the color, while considerably improved, was not of a sufficiently deep green. However, when the glycerine was increased to 5 cc., the treatment gave good improvement at this low concentration of iron. Excellent results with no leaf burn accompanied the use of

(Continued on Page 64)

<sup>1</sup>Haas, A.R.C., and Zentmyer, G.A. Control of chlorosis in citrus leaves. The Calif. Citrogr. 31(9): 334-335, 346-348, July 1946.

Table 1. Effect of various treatments on the control of chlorosis in lemon leaves

No.	Treatment	Date of treatment* 1946	Type of treatment	Results
1	8g. Ferrate, 8g. magnetite, 1g. ferrous sulfate, 1g. sulfur, 1g. dextrin	July 11	dust	Leaves fully green (see fig. 1; leaf upper row in fig. 2)
2	4g. magnetite, 1g. sulfur	May 1	dust	Considerable though gradual improvement (see leaves 1 and 2, lower row in fig. 2; leaf 3, in lower row, fig. 3)
3	1g. ferrous sulfate in 1 liter distilled water	July 16	dip	Improvement in leaf color
4	1g. ferrous sulfate, 0.25 g. dextrin, 5cc. glycerine, blood albumin spreader all in 1 liter distilled water	July 18	dip	Considerable increase in leaf color (see leaf 1, lower row in fig. 3)
5	1.2g. ferrous sulfate, 1.2 g. dextrin, 1.2 g. sulfur, blood albumin spreader, all in 1 liter distilled water	July 23	dip	Much color improvement (see fig. 5)
6	1g. ferrous sulfate, 0.25 g. sulfur, 5g. molasses, blood albumin spreader, all in 1 liter distilled water	July 30	dip	Uniform and often marked improvement (see figures 7 and 8; leaf 1 in lower row in fig. 6)
7	0.25g. ferric citrate, 0.25g. sulfur, 0.25g. dextrin, 1cc. glycerine, blood albumin spreader, all in 1 liter distilled water.	July 18	dip	Good color improvement

\*All photographs taken August 30, 1946, when the experiments were terminated at which time the leaves were washed and wiped dry. Leaf numbers in figures 2, 3 and 6 are from left to right.

Fig. 1. Control of chlorosis in lemon leaves by dusting with No. 1 treatment indicated in table 1. The concentrations were high and slight leaf burn of the nearly albescent (severe stage of chlorosis) leaves resulted during the extremely hot weather.

Fig. 2. Effects of various treatments in the control of chlorosis in lemon leaves: Upper row: (left to right), leaf 1, see treatment No. 1 in table 1; leaves 2 and 3 were coated with a paste consisting of a little distilled water, 4 g. Ferrate, 4 g. magnetite, 4 g. ferrous sulfate, 1 g. sulfur, and 4 g. dextrin, and show leaf injury. Lower row: left to right, leaf 1, untreated chlorotic leaf (control for leaf 2); leaf 2, dust (a mixture of 4 g. magnetite and 1 g. sulfur); leaf 3, dipped in a liter of distilled water containing 4 g. ferrous sulfate, 1 g. sulfur, 10 c.c. molasses, 5 c.c. spreader (B1956), treated August 6, 1946; leaf 4, coated with a paste consisting of 4 g. ferrous sulfate, 1 g. sulfur, and 4 g. dextrin.

Fig. 3. Improvement in color of chlorotic leaves as a result of various treatments. Upper row: (left to right), leaf 1, untreated chlorotic leaf (control for leaf 2); leaf 2, dipped on July 18, 1946 in 1 liter of distilled water containing 1.5 g. ferrous sulfate, 0.5 g. sulfur, 0.5 g. dextrin, 5 c.c. glycerine, blood albumin spreader. Lower row: (left to right), leaf 1, dipped in 1 liter distilled water containing 1 g. ferrous sulfate, 0.25 g. dextrin, 5 c.c. glycerine, blood albumin spreader; leaf 2, incomplete greening following dusting on July 16, 1946 with a mixture consisting of 1 g. ferrous sulfate, 1 g. dextrin, and 8 g. walnut shell powder; leaf 3, dusted with a mixture of 4 g. magnetite and 1 g. sulfur.

Fig. 4. Improvement in green color of chlorotic leaves when a paste consisting of distilled water, 4 g. ferrous sulfate, 1 g. sulfur, and 4 g. dextrin was supplied. Slight burning of the leaves occurred during the extremely hot weather. Leaves of



Fig. 5. Beneficial effect of dipping on July 23, 1946 a shoot bearing chlorotic leaves into a liter of distilled water containing 1.2 g. ferrous sulfate, 1.2 g. dextrin, 1.2 g. sulfur, and blood albumin spreader.

Fig. 6. Upper row: (left to right), leaf 1, magnetite 4 parts, sulfur 1 part, applied as a dust on May 1, 1946; leaf 2 untreated chlorotic leaf (control for leaf 3); leaf 3, dipped on July 18, 1946 in a liter of distilled water containing 1.5 g. ferrous sulfate, 0.5 g. sulfur, 0.5 g. dextrin, 5 c.c. glycerine and blood albumin

spreader; 4, untreated chlorotic leaf (control for leaf 5); leaf 5, dipped on July 12, 1946 in a liter of distilled water containing 1.2 g. ferrous sulfate, 1.2 g. dextrin, 1.2 g. sulfur, and blood albumin spreader. Lower row: (left to right), leaf 1, dipped in a liter of distilled water containing 1 g. ferrous sulfate, 0.25 g. sulfur, 5 g. molasses, and blood albumin spreader; leaf 2, dipped on August 6, 1946 in a liter of distilled water containing 4 g. ferrous sulfate, 1 g. sulfur, 10 g. molasses, and 5 c.c. (B1956) spreader; leaf 3, dusted on

July 22, 1946 with a mixture of 4 g. ferrous sulfate, 1 g. sulfur and 4 g. dextrin; leaf 4, dusted July 16, 1946 with a mixture of 1 g. ferrous sulfate powder, 1 g. dextrin, and 8 g. walnut shell powder. Lower row: (left to right), leaf 1, dipped in a liter of distilled water containing 1 g. ferrous sulfate, 0.25 g. sulfur, 5 g. molasses (Grandma brand), and blood albumin spreader. The treatment of the new shoot was made on July 30, 1946 and the photograph was taken on August 30, 1946. Leaves on the

new shoot were more severely chlorotic before treatment than the lower leaves (untreated parent shoot). Fig. 8. New shoot (above attached label) was dipped in a liter of distilled water containing 1 g. ferrous sulfate, 0.25 g. sulfur, 5 g. molasses (Brer Rabbit brand), and blood albumin spreader. The treatment was applied on July 30, 1946 and the photograph was taken August 30, 1946. Leaves on the new shoot (above attached label) were more chlorotic before the treatment than the untreated leaves of the parent shoot (below the attached label).



This report is from the Division of Plant Pathology, Citrus Experiment Station, University of California, Riverside.

## Evidence of the Virus Nature of Citrus Quick Decline

By H. S. FAWCETT and J. M. WALLACE

A description of orange quick decline disease and a progress report of the investigations on this disease by members of the Division of Plant Pathology, University of California Citrus Experiment Station, were published in April of 1946.<sup>1</sup> At that time the disease had not been reproduced in experimentally inoculated plants and for that reason there was no definite clue as to the nature of quick decline. The observations reported by Schneider<sup>1</sup> that the conductive tissues of the phloem in the bark at or near the bud union of affected trees gave a satisfactory explanation of why the food supply to the roots was decreased or shut off. Degeneration of the phloem sieve tubes was therefore believed to be responsible for the observed depletion of stored starch in the roots and the subsequent rotting of roots and top deterioration of the trees.

At the time intensive study of quick

<sup>1</sup>Fawcett, H. S., Henry Schneider, P. W. Rohrbach, L. J. Klotz, G. A. Zentmyer and J. M. Wallace. A progress report on quick decline studies. Calif. Citrograph 31:6, April, 1946. Also Citrus Leaves 26:4, April 1946.

decline was begun, certain phases of the investigation were devoted to a study of the possible virus nature of the disease. These studies involved extensive transmission experiments, i. e., budding and grafting from diseased to healthy trees to determine if quick decline is an infectious disease. From these studies, evidence is now accumulating that quick decline is transmissible by graft-inoculation of healthy trees and can therefore be considered to be an infectious disease. This discovery, plus the fact that thorough investigations have revealed no bacterial or fungal organisms as casual, leads to the conclusion that quick decline is a virus disease.

For a study of transmission of the disease, a large number of one-year old Valencia trees on sour orange rootstock were obtained from nurseries outside of the known quick decline area and were planted near

Covina, Calif., in April, 1945. The following June, buds were cut from quick decline Valencia trees and placed into 100 of these young healthy trees. "Spur buds" were used, each bud being cut where a short spur or shoot was present. The buds were slipped into T-shaped cuts and wrapped as in regular budding practice. Each tree received three buds in the upper portion of the trunk. Similar buds from healthy Valencia trees on sour orange root growing outside of the quick decline area were placed in 50 of the young Valencia trees in the Covina planting. Fifty similar trees were left without inoculation to serve as additional checks. These experimental trees had been planted between rows and as interplants in rows of a seven-acre block of fourteen-year old trees. Forty-five percent of the old trees had symptoms of quick decline in May, 1945. The inoculated and check trees were scattered at random throughout the block.

A survey in August, 1945, revealed that approximately as many buds from diseased trees as from healthy trees became successfully established in the young nursery trees. Forty-four trees were found with no buds living or only one bud alive and all of these were rebudded at that time with buds from the same sources as originally used.

During September, 1946, some of the young trees began to show top symptoms suggestive of quick decline. The top symptoms on different suspected trees varied somewhat widely. Certain trees showed only a lack of the normal autumn flush of growth. Others lacked fall growth but developed an off-season bloom, and, in some cases, an abnormally early set of fruit. Still other trees had one or more of these symptoms and in addition, chlorotic or bronzed leaves and a defoliation characteristic of quick decline.

A study of suspected and normal trees was then made to determine the starch content of roots, twigs and leaves. This study yielded results closely similar to those already obtained from naturally infected older trees showing varying degrees of symptoms of quick decline.<sup>2</sup> The amount of stored starch in roots varied

<sup>2</sup>Fawcett, H. S. A starch test for quick decline. Calif. Citrograph 30:122, February 1945.

from no starch in trees with the most advanced top symptoms, to slight, medium, or normal starch content, as the top symptoms were proportionately less. A number of trees that had no starch in the roots had more than normal amounts in the twigs. Tests for starch in leaves of three inoculated trees having advanced top symptoms on September 10 showed an abnormally high starch content as compared to that in healthy trees. Examination of the roots of healthy trees in comparison with roots of inoculated trees showed the degree of sloughing of the fiber roots to be proportionate to the stage of top symptoms.

Root segments from one check tree that had been budded with healthy buds failed to rot within five weeks when held in moist sand. Segments from two inoculated trees showing advanced symptoms of quick decline were completely decayed after two weeks. Root sections from two inoculated trees showing intermediate symptoms rotted slowly and irregularly. These results were comparable to the behavior of root sections from known quick decline trees tested in earlier studies.<sup>3</sup>

Four trees that had been inoculated with diseased material, which showed slight or no starch in the small roots and top symptoms apparently typical of quick decline, were dug out, sectioned lengthwise, and painted with IKI solution to determine the distribution of starch in the main roots and trunks. A half-section of each tree is shown in Fig. 1 in comparison to a section of a healthy tree. The latter was budded in the same manner as the other trees but with buds from a healthy Valencia tree growing outside of the quick decline area. It is seen that in the inoculated diseased trees the starch has completely or almost completely disappeared from the sour root portions, and, in some instances, from a part of the sweet trunks above the bud unions. The check tree on the left shows a uniform distribution of starch in both the root and the trunk.

A survey of the trees included in this transmission experiment was made in October, 1946. All trees were studied from the standpoint of top symptoms and starch content of small roots and twigs. On November 11, 1946, all trees on which there had been any question in the first survey as to the presence of definite symptoms were again examined. The check trees were likewise examined for comparison with the diseased trees. A summary of the data obtained is presented in Table 1.

<sup>3</sup>See footnote 1.

(Continued on Page 38)

Table 1. Summary of Results Obtained in Quick Decline Transmission Experiments (as of November 11, 1946)

Treatment for each tree	Source of buds for test	No. of trees in test	No. of trees diseased	Percent infection
3 spur buds	Diseased trees (Covina)	100	36	36.0
3 spur buds	Healthy trees (Riverside)	50	1	2.0
None	Not budded	50	1	2.0

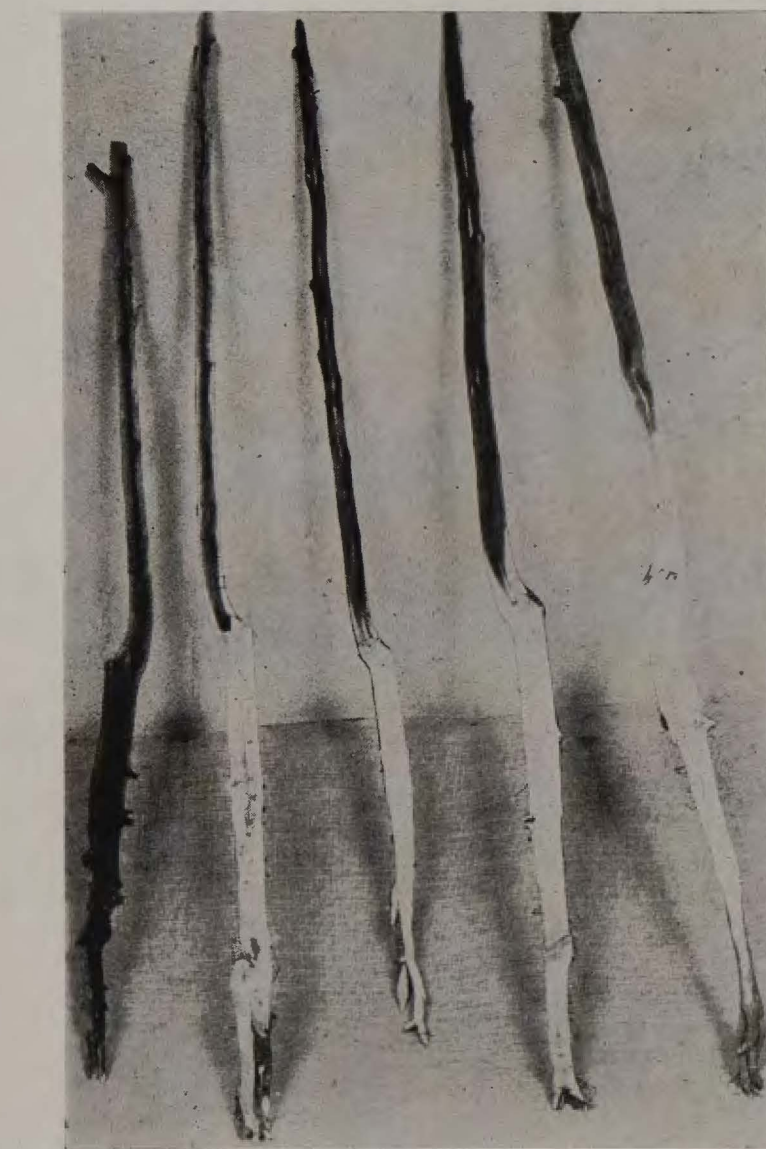


Figure 1. Young trees (Valencia on Sour) split longitudinally through the center and treated with IKI to show starch distribution. Dark areas show where starch was present. Left to right: A. Check tree. Three buds from healthy tree placed in Valencia trunk. B to E (Incl.) Similar trees, each inoculated by placing three buds from quick decline trees in Valencia trunk. These trees were budded in June 1945. Removed from field for starch test in October 1946. Photographed by L. J. Klotz.

# The Sunkist Courier

DEPARTMENT

The success of cooperation lies not so much in cooperation itself as in the individual

COMPILED MONTHLY IN THE OFFICES OF THE CALIFORNIA FRUIT GROWERS EXCHANGE

## U. S. CITRUS CROP HITS NEW HIGH VOLUME

Orange Prices Good Products Volume Higher

Total United States citrus production during the year just closed set another all-time record with 439,000 cars—about 17,000 cars more than the 1944-45 season, General Manager Paul S. Armstrong told the board of directors at the annual meeting, November 20.

"Citrus production has already reached a total of 184 million boxes annually or about 400 pounds per family and is still increasing," Armstrong stated. "The consumption of this volume demands widespread buying power, so the citrus industry has a special interest in the hope shared by everyone that a good standard of living may be enjoyed by all the people."

Orange returns were quite good during the year with the exception of small sizes at certain times. The heavy volume of small fruit presented a marketing problem throughout the entire season.

The winter lemon market was good but the summer market was disappointing and returns for the year were below those of the previous season. Unseasonable cool summer weather, a scarcity of sugar, and poor keeping quality of much of the fruit shipped all combined to adversely affect lemon returns.

The future of the citrus canning program will undoubtedly affect the future of the fresh fruit business, Armstrong stated. If the market on canned fruit remains good, it will serve as a support for the fresh fruit market. If the canned fruit price drops, it will depress the fresh market.

### Shipments Off

Total shipments for the entire California-Arizona industry were 115,111 standard cars, more than 25,000 cars less than the record-breaking 1944-45 volume. Oranges comprised 82,412 cars; lemons 22,532; and grapefruit 10,167.

Of the industry total, the Exchange shipped 82,878 standard cars, 72 percent of the industry total from California-Arizona. Oranges made up 58,731 standard cars; lemons 19,231; grapefruit 4916.

### Products Sales Higher

Total sales of citrus products by the Exchange set a new high of \$12,500,000, of which eight and a half

(Continued on Page 53)



## Merry Christmas

It's here again . . . that Yuletide season with all its happiness for young and old. Almost as traditional as Christmas itself are oranges as a part of the holiday setting. This simple table decoration and salad uses the golden fruit as a candle holder and as a major part of the molded star salad.

## LEMON MARKET GOOD ON BEST SIZES-GRADES ANNUAL SALES 4 PERCENT BELOW LAST SEASON

Diminishing supplies and a slackening of demand for anything but the better quality and sizes resulted in reduced lemon shipments towards the end of October. Good quality fruit in 360s and larger continued in good demand but heavy discounts prevailed on small sizes and fruit of less satisfactory quality.

During the fiscal year just closed, Exchange packed lemon sales totaled 17,012 standard cars, 700 less than the total sales of the previous year. Despite the slump experienced this past summer, the fob average for 1945-46 was only 32¢ per box below 1944-45.

### Products Diversion Heavy

Of the 35,684 cars of lemons shipped by the industry during the year just closed, 37 percent or 13,152 were diverted to products use. 22,532 cars moved in fresh channels during the year, 1000 cars less than fresh movement in 1945. Products took 23 percent or 7022 cars of the 1944-45 industry volume.

October products delivery totaled 296 cars compared with 414 diverted into non-fresh fruit channels the same month a year ago.

### October Volume

During October the industry moved 1201 cars of lemons in fresh form and 296 to products for a total of 1497 cars compared with total October volume a year ago of 1857 cars and 1101 two years ago. Exchange sales of packed lemons were slightly more than 1000 cars, 200 less than 1945 but 300 more than sales made in October, 1944.

### Storage Low

Industry storage as of November 3 was 830 cars compared with 874 last year. Estimated picks in November and December were 1074 and 1573 cars respectively. Based on these picking estimates, even though November and December shipments may not reach the movement for the same two months in 1945, it appears storage supplies on January 1 will be much below normal.

## ORANGE SALES LOWER PER-BOX RETURNS SHOW GAIN

Grapefruit and Navel Crops Start 1946-1947 Season

The 1945-46 orange marketing season of the Exchange saw the total sale of 49,716 standard packed cars compared with 65,718 cars in 1944-45 and 58,556 in 1943-44. The year just closed, while light in volume because of reduced production of both navels and valencias, brought more substantial average returns to Exchange growers and shippers, the fob average advancing 71¢ per box this season over last year and 34¢ more than two years ago.

The valencia crop was virtually cleaned up in October, only a few hundred cars remaining for shipment early in November. Exchange packed sales for October were just over 4200 cars compared with 7113 last year and 5793 in 1944.

### October Industry Shipments

The nation's supply of oranges in October from all producing areas was the lightest in the past three years with only 8952 cars being shipped. This quantity was made up of 2246 cars from California-Arizona; 6118 from Florida and 588 from Texas. In October last year California-Arizona shipments totaled 8148 cars; Florida 4073 and Texas 770 for a total industry movement of 12,991 cars.

With the California navel crop not expected to move in volume until the last ten days of November, consumers were largely dependent upon Florida and Texas for oranges during most of November. Light picking and local shipment of Arizona navels started early that month and picking in Central California got underway shortly after but few volume shipments were anticipated until after the middle of the month.

### Florida Prices

Although the market on California valencias was steady during October on all desirable sizes and grades, the Florida market declined towards the end of the month under heavier than normal shipments from that state. The end of October found Florida shipments more than 1400 cars greater than those made during a comparable period last year.

The first week in November, Florida restricted movement from that

(Continued on Page 54)



### NAVEL ADVERTISING STARTS WITH SHIPMENTS

#### Strong Exchange Campaign Covers Entire Population

Navel advertising will break in newspapers and magazines early in December in support of the 1946-47 crop just beginning to move to market in volume.



Russell Z. Eller, Advg. Manager

Supplementary advertising in the form of painted outdoor bulletins and painted wall boards in major markets has already started. Subway and elevated posters and street car cards are scheduled to go up right after Christmas. A schedule of radio spot announcements in 7 markets will start December 1 and continue well through the season.

"With price ceilings on oranges removed, we can expect to accomplish more with advertising than we could under price control," stated Russell Z. Eller, advertising manager. "Without price ceilings a greater reward can be obtained for adequate distribution supported by intensive advertising."

Quality advertising has been the all-out theme of navel advertising for many years and there is more reason than ever to stress that keynote, Eller said. Regardless of the amount of fruit Florida ships fresh or cans, California navel marketing depends upon the ability to market navels as a quality product justifying a premium price.

#### U. S. Crop Heavy

While the California navel crop for the coming season is estimated about the same as last year, the Florida crop is estimated at a record-breaking 81,000 cars. Total U. S. winter orange crop from all areas is figured at 230,000 cars next year compared with 189,000 last year.

What the Florida canning picture will be for the coming year is anybody's guess. Last year about 40 percent of the oranges and 70 percent of Florida grapefruit was put into cans and this fruit must be considered with fresh when estimating probable competition.

#### Covers Entire Population

Exchange advertising is designed to cover all sections of the population everywhere. Consumer surveys show that good California orange customers are not confined to the high income groups nor are they confined to any one size city. They are everywhere.

**RICHER FLAVOR!**  
**MORE VITAMINS PER GLASS!**  
**MORE WAYS TO USE!**

NO SEEDS!

CALIFORNIA Navel ORANGES

**Sunkist**

BEST FOR JUICE - and Every use!

No other oranges give you these 3 extras!

- 1. RICHER FLAVOR**  
Sweet pulp contains less water and more natural orange flavor.
- 2. MORE VITAMINS**  
More vitamins C and A. More calcium and iron. More potassium and phosphorus.
- 3. MORE WAYS TO USE**  
Easy to eat, slice, juice, or use in recipes and good eating any time.

THEY'RE HERE!  
**easy to eat navel oranges**

**Sunkist**  
CALIFORNIA Navel ORANGES  
BEST FOR JUICE - and Every use!

NO SEEDS!

**good eating any time!**

These few small oranges are easy to eat, easy to peel, and easy to juice. They are the only navel oranges that are so easy to eat and so easy to juice. They are the only navel oranges that are so easy to eat and so easy to juice.

**Sunkist**  
CALIFORNIA Navel ORANGES  
BEST FOR JUICE - and Every use!

NO SEEDS!

**Richer Flavor**  
Sweet pulp contains less water and more natural orange flavor.

**More Vitamins**  
More vitamins C and A. More calcium and iron. More potassium and phosphorus.

**More Ways to Use**  
Easy to eat, slice, juice, or use in recipes and good eating any time.

**Sunkist**  
CALIFORNIA Navel ORANGES  
BEST FOR JUICE - and Every use!

NO SEEDS!

Navel advertising starts with the movement of fruit from Central California to lend pre-holiday support to sales. Shown above are three important types of Exchange navel advertising. Upper left: posters appearing on Chicago elevated and New York subway platforms. Center: three examples of newspaper advertising which will appear in 395 daily papers in 330 markets through the season. Lower right: Full color page appearing in Sunday newspaper magazine supplements and Saturday Evening Post. In addition to advertisements shown above Sunkist copy will be used on street car cards; painted wall bulletins and on radio spot announcements. Dealer Service is back in force again with 29 men contacting the wholesale and retail trade to lend additional sales support for all citrus varieties.

(Continued on Page 53)

### LEMON HEARING SET FOR DECEMBER THIRD

Proposed amendments to the California - Arizona lemon marketing agreement and order will be considered at a public hearing to be held at 10 a.m., December 3, 1946, in Room 324, Federal Building, Los Angeles, Calif., the U. S. Department of Agriculture announces. Marketing Agreement No. 94 and Order No. 53, which regulate the handling of lemons grown in California and Arizona, have been in effect since April 10, 1941.

The hearing was requested by the California Fruit Growers Exchange. Consideration will be given to proposed amendments submitted by this marketing association and to proposals submitted by the Mutual Orange Distributors, Redlands, Calif., another cooperative marketing association handling California-Arizona lemons.

#### Limitation of Shipments

One of the proposed amendments would provide for the limitation of lemon shipments within California and Arizona, in addition to the provision for limitation of interstate shipments now included in the marketing agreement program. Another proposal would provide for the issuance of grade and size regulations. The Fruit and Vegetable Branch, Production and Marketing Administration, has proposed that the meaning of the term "first handler" be clarified, and that, if provisions for grade and size regulations are adopted, handlers be required to submit Federal-State inspection certificates when handling lemons under such grade and size regulations. None of these proposals has been approved by the Secretary of Agriculture.

On the basis of evidence presented at the hearing, the proposed amendments may be submitted to the Secretary of Agriculture for tentative approval, and if approved, they will be submitted to the industry. The amendments may then become effective if favored by at least three-fourths of the growers, by number, or at least two-thirds of the growers, by volume of lemons produced, who vote in the referendum, and if handlers of at least 80 percent of the volume of lemons shipped sign the amended agreement.

and the U. S. Department of Agriculture is being maintained with respect to tests on controlled ventilation during the winter months. These tests indicate that the theory of controlled ventilation is good but the present refrigerator cars, with the exception of those equipped with fans, are poorly designed for ventilation and need to be changed if citrus shippers are to obtain greater benefits from this method of cooling.



Presenting . . . James A. Finley, new manager of The Exchange Orange Products Company at Ontario. Finley has been with the products plant since 1926 and was plant superintendent from 1929 until his appointment as manager October 1.

#### Navel Advertising (Continued from Page 52)

Exchange navel advertising will appear in 395 daily papers in 300 markets of the U. S. Aggregate circulation of this group of newspapers is over 13 million per issue. The newspaper campaign is scheduled to start early in December and continue until late April.

Three Sunday newspaper magazine supplements, carried in 48 leading Sunday papers, will have a schedule of full color pages of navel advertising. Combined circulation of this group is over 24 million readers per issue.

#### Magazine Schedule

Navel advertising will appear in color in the Saturday Evening Post. Other magazines will carry a series of black and white advertisements. Magazines reaching the mother-and-child audience will carry a strong schedule. These are Parents, Baby Care Manual, Baby Talk and Congratulations. Farm Journal and Country Gentleman will carry a schedule directed to the rural population.

Advertising costs in all activities have shown a sharp rise in the past year. This has been especially true in the printing and lithography fields, making it extremely necessary to plan carefully for maximum value of dollar invested.

#### Grapefruit Research

A division of research work specifically devoted to grapefruit products was included in the Research Department program for the first time. This program has encompassed the study of existing and potential outlets, fundamental research and cooperation with other research agencies and control testing and standardization of grapefruit juice canned in Exchange plants.



This graphic chart shows the position of agriculture in the current job picture. Second only to manufacturing, agriculture employs slightly over 9 million people. From left to right, the bars represent manufacturing, agriculture, trade, government (federal, state and local), service and finance, transportation and utilities, military, construction, mining, all others.

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#### Annual Report

(Continued from Page 51)

million was in orange products and four million in lemon. The greatest sales gain was made in the movement of single strength canned orange juice which totaled three million dollars compared with half a million in 1944-45. The sale of canned lemon juice, while handicapped by a lack of tin for canning, showed a \$400,000 return.

Although the production of concentrated orange juice for government orders terminated with the cessation of hostilities, the demand for the product remained high and over 600,000 gallons were manufactured during the year.

The progress of export sales by the Products Department has been extremely gratifying. The department has complete sales coverage in the countries where merchandise can be shipped and American dollars received in payment. New areas will be covered as soon as they open up.

#### Exchange Operating Costs

Marketing costs of the Exchange showed a gain over the previous year due to increased costs in all phases of the marketing program and the much lighter volume of fruit shipped during the 1945-46 season. Total costs, exclusive of advertising, were seven and 5/10 cents per box.

The cost of District Exchange Service averaged one and 3/10 cents per box. This figure, added to the cost of Exchange service, gives a total operating cost of 2 percent of fob returns.

#### No Credit Losses

No credit losses were experienced during the year and the collection of

debts charged off in years past totaled \$5301.09. This has been the 5th consecutive year in which collection of bad debts has been maintained.

#### Dealer Service Increased

Dealer Service resumed normal activities during the year with a staff of 29 experienced men, most of them returned from military service, averaging 9 years of Exchange experience. During the year over 57,000 personal trade calls were made by this group.

Exchange orange advertising continued its support of the National Nutrition program in promoting the "Basic 7" foods and "better breakfasts." Reciprocal publicity efforts with a number of food advertisers brought good results.

#### Lemon Advertising

The four basic lemon campaigns were continued (1) as a food (2) as a laxative (3) for colds (4) as a beverage. Consumer surveys show that the two health campaigns have shown steady and most promising increases in number of users. The laxative campaign is continuous throughout the year while the cold campaign is seasonal.

Winter lemon sales now exceed summer lemon sales of the 5-year period 1931-35. They also exceed total annual sales, including imports for the 5-year period 1921-25. Winter lemon sales represent about one-third of the year's volume and are indicative of the basic market and a better index of sales progress than summer sales which are less stable in either supply or demand.

#### Ventilation Tests Made

Continued close cooperation between the Field Service Laboratory



# The Sunkist Courier

DEPARTMENT

Compiled in the Offices of the California Fruit Growers Exchange and  
Published by Authority of the Board of Directors

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If radio station KFI broadcast nothing else but "soap operas," cowboy music, political speeches and Hollywood back-fence chatter, it would still be doing an excellent public service job for the California agriculturist as long as the nightly Frost Warnings are broadcast during the winter season. The Frost Warning service of KFI has become so familiar to all of us that we may be inclined to take it for granted. Take that evening early in November, for example:

Floyd Young—Mr. Weatherman to the grower—and KFI don't usually start their good work until November 15 because there is seldom any frost danger before that time. They're actually standing by all the time. The morning of that early November day, Young checked his weather maps, saw sudden cold weather coming, picked up the phone and called the Farm Reporter at KFI. When he picked up that phone, Young started a chain of action that stretched from Pomona to Los Angeles to New York to Los Angeles and then spread fan-wise to every agricultural community in California and Arizona.

First of all, KFI put the weather news on three regular news shows. Growers were advised to keep tuned to the station for later news on the cold wave. Then the station went a step farther to make sure that a maximum number of growers would be listening at 8 that night. Devoting valuable "between program" time, KFI broadcast short announcements several times before 8 P.M., advising growers of the emergency broadcast. These announcements took the place of the regular announcements listing the programs to be heard during the evening. All of this occurred on Sunday when radio time is at a premium and is especially expensive.

By the time 8 o'clock rolled around, the complex timing was set and the Frost Warning was broadcast just as smoothly as if it were regularly scheduled. Growers throughout the producing areas got the information in time and KFI bowed out of the picture and went on with its evening program.

The emergency warning as well as the regular winter service doesn't mean a penny of income to KFI. On the contrary, the Frost Warnings represent a loss since KFI receives no revenue from the sponsor of the network show for the time taken for the frost warning. From the sponsor's standpoint it represents a loss of listening audience but sponsors have been generous in their cooperation with this vital program. It is impossible to measure the benefits of the Frost Warning service since no one knows what would happen to the crop on a cold night without the Frost Warning . . . and no one wants to find out. Many growers, however, can remember the slipshod haphazard methods before radio stepped in to help out.

The Frost Warning program carried by the station since 1941 is not KFI's only contribution to California agriculture. The noon Farm Reporter show is also sponsored by the station as a public service to agriculture and Nelson McIninch, the Farm Reporter, devotes his entire time to agricultural interests. KFI can gain nothing from these services except the goodwill of the California-Arizona agriculturist.

As evidence of that goodwill, the Exchange board of directors recently passed a resolution expressing appreciation of KFI's service to the citrus industry. Individual growers have addressed notes of appreciation to the station. If you think KFI is of service to you, why not address a penny postcard to the station expressing your sentiments?

## DO YOU REMEMBER . . . . . ?



. . . . . When a certain packing house not too far from Los Angeles was billed as the "largest lemon packing house in the world?" It's still one of the largest. Can you tell from this picture which house it is?

### Orange Sales

(Continued from Page 51)

state to 252s larger, U. S. No. 2 better, since it was felt such action would bolster their market.

### Desert Grapefruit Moves

The Desert grapefruit season opened with the sale of the equivalent of 13 cars of fruit in Los Angeles the week ending October 25. Early shipments moved under fair-to-good demand in the Los Angeles area but extreme competition from consumer-popular Texas Pinks was encountered in the Pacific Northwest.

The maritime strike was another factor contributing to the dull grapefruit market, for many wholesalers in San Francisco, Seattle and Portland depend upon export orders and ship stores' purchases for a good percentage of their fruit and produce business.

### Industry Shipments Decline

Industry shipments for the month of October from all producing areas totaled 4690 cars, a decline from October shipments of last year when 6238 cars were shipped. Of the 4690 cars, 215 were from California-Arizona; 3292 from Florida and 1183 from Texas.

Total Exchange packed grapefruit sales for the fiscal year 1945-46 were 3418 cars compared with 4263 in 1944-45 and 3583 in 1943-44. The average per box price for the season was 70¢ less than the average of last season.



According to reports, Phoenix, Arizona citrus growers expect to ship about 60 cars of oranges and a like amount of grapefruit during the coming season.

District managers scheduled to visit California include W. C. McPherson, San Francisco; W. A. Hunter, Columbus; H. A. Lawrence, Baltimore; George Johnson, New Orleans; G. P. Colgan, Vancouver; F. J. Colgan, Calgary; and Roe Roberts, Montreal.

The Exchange is now settled in new headquarters on the seventh and eighth floors of the Consolidated Building, Los Angeles.

Total California citrus shipments for the year ending October 31, 1921 were 48,350 cars of oranges and grapefruit and 11,797 cars of lemons having an aggregate return in excess of \$83 million.

This year, Alabama expects to ship the largest crop of Satsuma oranges ever produced in that state with more than 125 cars coming from Mobile and Baldwin counties alone.

## CITRUS SHIPMENTS

Season Carlot Shipments from November 1, to Week Ending November 9

Week's Ending	Week's Shipments Calif.-Ariz.	Week's F.O.B. Pk.-Bx.	Total Calif.-Ariz. From Nov. 1	Total U. S. From Nov. 1
<b>ORANGES</b>				
11- 9-46	238	4.97	322	3,224
11-10-45	920	3.26	1,338	3,986
11-11-44	205	4.44	514	5,558
<b>GRAPEFRUIT</b>				
11- 9-46	234	2.04	279	2,311
11-10-45	165	2.86	210	2,126
11-11-44	12	.....	18	1,798
<b>LEMONS</b>				
11- 9-46	210	5.70	276	276
11-10-45	268	4.75	386	386
11-11-44	218	5.07	328	328

"Man has been called the great disturber of nature . . . Nowhere perhaps, have his activities been more destructive than to our soils. Everywhere we see the results of thoughtless, careless or exploitive methods of farming . . . abandoned farmsteads are markers that indicate the burial of our once productive land." —Marshall Schirer, 17-year-old winner of the Future Farmers of America national public speaking contest, on NBC's National Farm and Home Hour.

Tangerine juice, canned last season for the first time, will during the current season become a large-scale industry, promises Dr. L. G. McDowell, research director of Florida Citrus commission. Based on success of Pasco Packing company's initial production of 500,000 cases of juice and 100,000 cases of frozen segments, five or six additional plants are reported as planning to add tangerine products during the season.

## WHAT IS THE MEASURE OF A GOOD LABEL ?

A good label is a most effective advertisement at the point-of-purchase. It must do three things and do them fast:

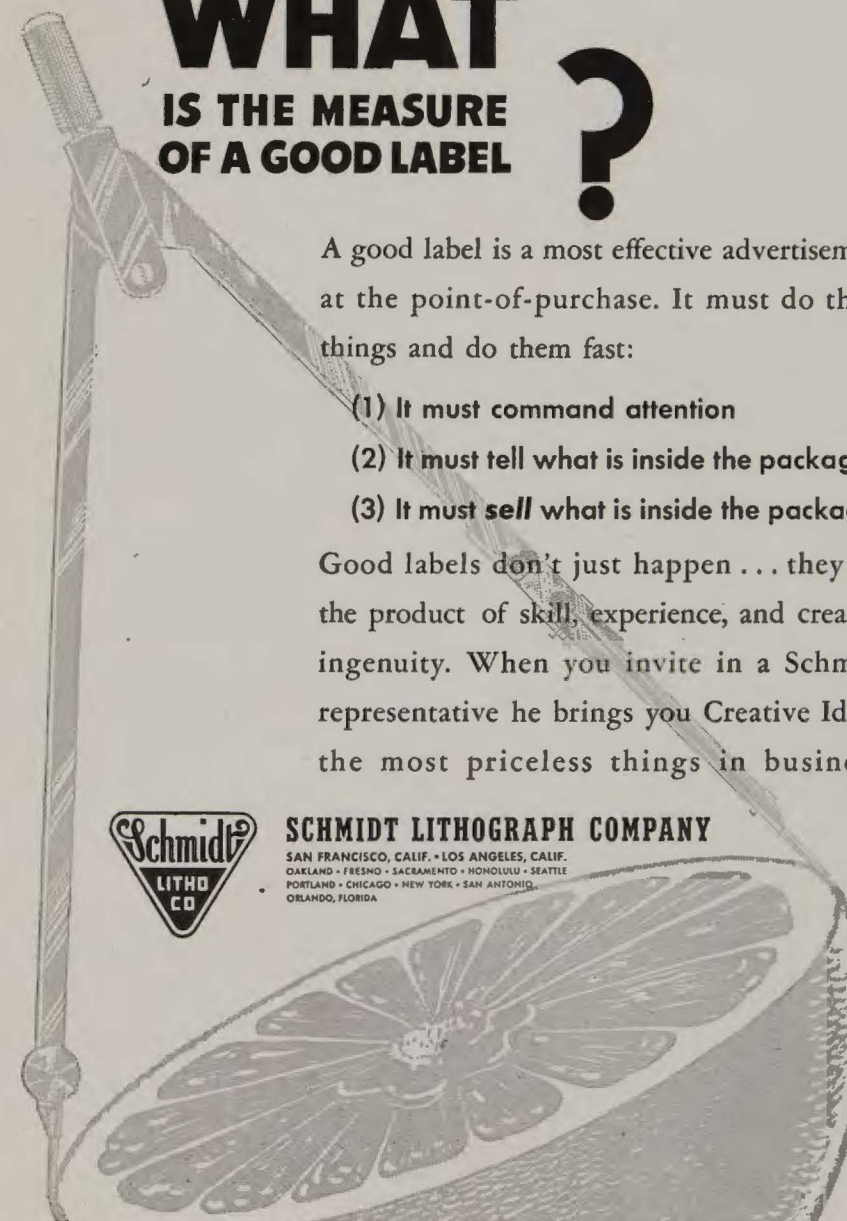
- (1) It must command attention
- (2) It must tell what is inside the package
- (3) It must sell what is inside the package

Good labels don't just happen . . . they are the product of skill, experience, and creative ingenuity. When you invite in a Schmidt representative he brings you Creative Ideas, the most priceless things in business.



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PORTLAND • CHICAGO • NEW YORK • SAN ANTONIO  
ORLANDO, FLORIDA



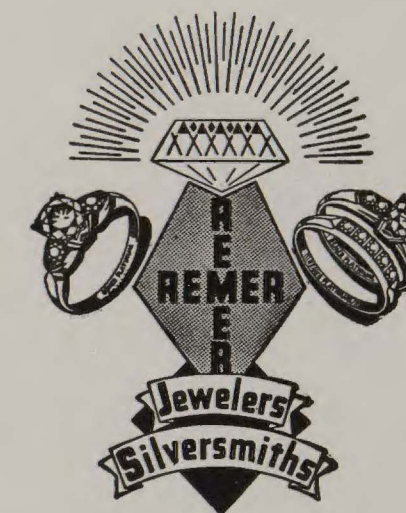
Make Your



# Christmas Gift

Selections Early

A DEPOSIT WILL HOLD YOUR SELECTIONS UNTIL CHRISTMAS



Our Reputation  
Our Success

## DIAMONDS

Nationally Advertised

WATCHES

JEWELRY

STERLING and SILVERPLATE

RADIOS

APPLIANCES



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OPEN 'TIL 9 EVERY NIGHT 'TIL XMAS  
Starting Monday, December 2.



## NEWS of INTEREST to CITRUS GROWERS

The Lindsay District Orange Co. met for their annual meeting and elected the following to serve for the coming year: A. L. Lewis, president; J. R. Benedict, vice-president; M. C. McLees, treasurer and secretary.

Harold S. Stewart, of Ontario, was elected chairman of the San Bernardino County Farm bureau's citrus department. Others on the committee are W. S. Barlow, Redlands, vice-chairman and R. Clyde Gerber, Highland, secretary.

Despite termination of army and navy orders for canned juices, markets for the product during the past season were good, says R. M. Hess, Arizona Citrus Growers.

According to the California Crop and Livestock Reporting Service, California's peach crop exceeded all records in 1946 with 533,000 tons of clingstones and 347,000 tons of freestones.

At the annual meeting of the Exeter Orchards Association the following officers were chosen to serve for the coming year: A. F. Neil, president; C. C. Botkin, vice-president and P. H. King, secretary.

When the Mesa Citrus Growers met for their annual meeting recently, L. C. Smith and C. J. Wood were named president and vice-president, respectively. R. S. Binner, treasurer and B. M. Concklin, secretary.

Richard Stiver was elected president of the Lindsay Citrus Growers Association at the annual meeting. Others named to serve are: A. R. Wakefield, vice-president and Raleigh Black, secretary.

The following were elected to office at the annual meeting of the Klink Citrus Association: President, Russell Davis; Vice-President, J. T. Fitzgerald; Secretary, L. C. Bevins and Assistant Secretary-Manager, Eugene Green.

The Arizona Citrus Exchange elected the following officers to serve for the coming year: O. M. Lassen, president; W. W. Pickrell, vice-president and treasurer; L. C. Manus, secretary.

Frank O. Sheldon was elected president of the Porterville Citrus Association at their annual meeting. Others elected are: Milton H. Shry, vice-president; L. R. Coole, treasurer-secretary-manager.

The following were elected to serve during the coming year for the Lindsay Co-op Citrus Association: President, Thomas M. Greer; Vice-President, L. E. Wright; Treasurer and Secretary, E. E. Gable; Manager, J. L. Davis.

Farmers who seek the offices of the Orange County Agricultural Extension Service, including the Home Demonstration Agent, will now find them in the former West Coast Flying Training Center building, two blocks west of the Municipal Bowl in Santa Ana. The address is 1104 W. 8th St.

L. G. Baldwin purchased a 20-acre citrus grove and residence at Alta Loma from Francis Roberts.

B. H. Crocheron, director of the Agricultural Extension Service, has announced the appointment of Ralph R. Parks as extension specialist in agricultural engineering with the Agricultural Engineering Division of the College of Agriculture.

Directors for the Citrus Pest Control District No. 2 are as follows: Don Mitchell, Indio; Max Zimmerer, Mecca; Cox Webb, Thermal; Morgan Ward, Indio and Robert Bowlin, Indio. Eradication of Red Scale of citrus is the purpose of the new district.

Growers' prices on olives in California are from \$100 to \$200 a ton higher than those of last year.

Lemon picking was started on October 3 by one of the Mesa Citrus Growers crews, a week earlier than last year. Grapefruit picking is also expected to be early.

With Arizona producing three-quarters of the total, the Desert grapefruit crop for the current season is estimated at 5,830,000 boxes.

The Arizona Citrus Growers at their annual meeting elected the following officers: H. F. Michael, president; K. B. McMicken, vice-president; H. H. Wasser, treasurer; N. E. Cook, secretary.

W. A. Welch was named president of the Richgrove Jasmine Citrus Association recently. Others elected are: Wm J. Lubking, vice-president; J. N. Fisher, treasurer and secretary-manager.

The Terra Bella Citrus Association elected the following officers to serve during the coming year: C. W. Burner, president; A. A. Mucke, vice-president; James J. Hurley, secretary.

Upland Citrus association has re-elected its entire board of directors for the coming year, P. R. Daggs, F. W. Dundas, H. S. Stewart, William Vogel and C. Earl Wetherbee.

Dean Millen has been chosen chairman of the citrus department of the Orange County Farm Bureau. He is an active member of the La Habra farm center and a citrus owner in the Brea area as well as manager of other acreage.

A Cornell survey on the consumer's expenditure of the produce dollar, 80 items listed, reveals that 11 items make up 75 percent of the volume and that oranges, grapefruit and lemons are included in the first eight in volume purchased, as follows: Potatoes 18.6c, oranges 18.3c, tomatoes 6.3c, bananas 5.7c, lettuce 3.6c, carrots 3.4c, grapefruit 3.4c, lemons 2.8c.

The Fruit Frost Service and Radio Station KFI are to be highly commended for their alertness and teamwork in getting out warnings of the impending cold snap which occurred during the first week in November, two weeks ahead of the normal frost reporting season.

Mr. and Mrs. David P. Bisbee have purchased a 10-acre citrus orchard in Covina from Roy G. Lewis.

Santa Fe proposes to operate air freight and mail service through its subsidiary, Santa Fe Skyway, according to applications filed with CAA.

The current Florida tangerine crop is expected to be the largest in history, with fresh shipments of 3,100,000 boxes (1 3/4 bu.), and an estimated 1,500,000 boxes to be used by processors. Total volume last season was 3,430,000 boxes.

Through cash purchase of common stock, Tru-Ade, Inc., has acquired the Hyland-Stanford Corp. of Los Angeles, one of the largest independent producers and processors of concentrated orange juice.

New officers of the Citrus Department of the Los Angeles County Farm Bureau are Howard Hawkins, Covina, chairman; Vern Jobe, Covina, vice-chairman; and Carl Bradley, Claremont, secretary.

In Florida during the 1945-46 season 11,500 acres were planted to oranges and about 3,000 acres to grapefruit, reports CITRUS.

Eleven thousand acres of land in Los Angeles County, much of it good farm land, has been subdivided during the past 16 months.

Les Hadley, citrus grower in the San Fernando Valley, is the new president of the Los Angeles County Farm Bureau.

Harold Crane has been appointed agricultural Commissioner of San Bernardino County, succeeding George Woodhams, resigned.

The Agricultural Committee of the L. A. C. of C. urges assignment of qualified men to foreign countries to survey crop pest and disease conditions with view to aiding in the prevention of unwanted pest introductions into this country.

The Board of Regents of the University of California at a meeting October 18, provided for continuation of the farm labor program in California under the direction of the Agricultural Extension Service. This authority for continuation extends from January 1 to June 30, 1947, or until such time within that period when another agency would be authorized and prepared to take over the responsibility of the program.

California residents are paying an average of \$364 per person per year in Federal taxes, reports Horace S. Wilson, president of the Southern California Building & Loan Association.

Henry J. Wilder, farm advisor of San Bernardino County for 22 years, now retired, will handle management and appraisal activities for the Rush Farm Management Service in Southern California, and will have his headquarters in San Bernardino.

As of Nov. 1 Texas grapefruit growers were getting \$25 to \$35 per ton for their fruit, with most purchases reported around \$30. Oranges were bringing around \$60 per ton. With shipment of 288's permitted, a flood of small sized fruit resulted in an uneasy market.

Average size of Tulare County navels this season, projected to December 1, was placed at 194 oranges per standard packed box; 196 last year.

The current navel orange tree crop in Central California, was estimated as of Nov. 1 by the Orange Administrative Committee to be 14,000 cars, plus 300 cars in Northern California, total 14,300 cars for Prorate District No. 1. Last year, 10,085 cars.

Farm Advisor Jean C. Miller of San Diego County reports 54 meetings of farm people held during October in the County with a total attendance of 2,754.

C. C. Commander, general manager of the Florida Citrus Exchange, says: "There is no surplus of canned orange juice and very little, if any, blended juice. There is some surplus of canned grapefruit juice, but by comparison with the total U. S. canned grapefruit consumption it figures very little. The reason we had any canned surplus was because Washington took ceilings off fruit for canning purposes and left ceilings on fresh citrus. Canners paid as much as \$1 per box more than permitted for fresh fruit."

The new senator from Florida, Spessard L. Holland, has long had a personal interest in the citrus industry and has actively promoted progressive legislation.

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# BARKER BROS.

SEVENTH STREET, FLOWER AND FIGUEROA

Hollywood • Long Beach • Glendale • Inglewood • Santa Monica • Alhambra • Huntington Park



**Surveys**  
(Continued from Page 46)

orization and facilities for making surveys that are an essential part of federally supported eradication or control programs. During the war funds from other than regular departmental sources were available for gathering information for specific emergencies. To a large extent these special surveys have now been discontinued. Funds appropriated for assisting States in the control of emergency and incipient outbreaks of insects and plant diseases were used during the war to alleviate emergencies created by insecticide shortages, transportation difficulties, and manpower limitations. But there is no fund available to the Bureau which may be used to assist States in assembling information on the occurrence and status of major insect pests as a basis for advising farmers and others on the timing of their control measures, or to detect promptly the presence of new pests that may occur as incipient infestations, thus paving the way for appropriate action while the areas involved are small. Likewise there is no provision for making the detailed inspections necessary to determine the presence of insects that may be subject to State quaran-

tine, or to obtain data on the status of some of our more destructive pests as an aid to insecticide manufacturers and suppliers in their efforts to make intelligent distribution of control materials, particularly those that for one cause or another may be in short supply. The value of such surveys was demonstrated repeatedly during the war, when there existed a critical shortage of many chemicals used in formulating insecticides.

A plan under consideration by the Bureau which would permit some Federal assistance to States in carrying out such a program would involve establishing several field offices, each staffed with one or more men well trained in survey procedures, the necessary clerical help, and limited authority for expanding with seasonal help when conditions warrant. These offices would provide a means of ready contact with State officials and others in a position to contribute toward an organized survey program. An important part of their assignment would be to promote interstate cooperation on problems of regional interest, to assist in coordinating the efforts of agencies or individuals in a position to gather information on the occurrence and development of crop pests, and to

serve as an assembly station and clearing house for information of interstate concern.

I firmly believe that it is a responsibility of the entomologists and plant pathologists of the country to initiate and foster a survey program which will accomplish a few fundamental objectives. For example, farmers and nurserymen might reasonably expect publicly supported entomological agencies to acquire first-hand information concerning pests of economic importance in other parts of the world, particularly those occurring in countries engaging in extensive international trade. What are the major pests in these countries, and what progress has been made toward effective measures of control? By what means would they be most likely to gain entry to this country, and what can we do to improve our defenses against them?

**Ports of Entry**

Assuming that more freedom in the exchange of commodities between nations is a solution to some of the economic evils that beset the world, what can we do to minimize the pest risk when such commodities begin to move in greater volume? Adequate coverage of ports of entry is a first



consideration, but beyond that there is a conspicuous need for improvements in our commodity-treatment procedures, and for surveys so organized that they may be relied upon as a second line of defense. Importers might well consider that they are entitled to simple, effective, and prompt handling of shipments that are permitted entry into this country.

Damaging outbreaks of many of our more destructive pests of crops and forests do not occur every year. We recognize many of the factors that are instrumental in keeping them in balance most of the time, but how far have we progressed in our efforts to determine the factors that pave the way for these irregular outbreaks, and what might be done to prevent them? Because of the difficulties of financing preventive entomology, is it not possible that we may be overlooking opportunities for initiating more work of a preventive character which might greatly reduce the ultimate cost of control?

**Opportunities Are at Hand**

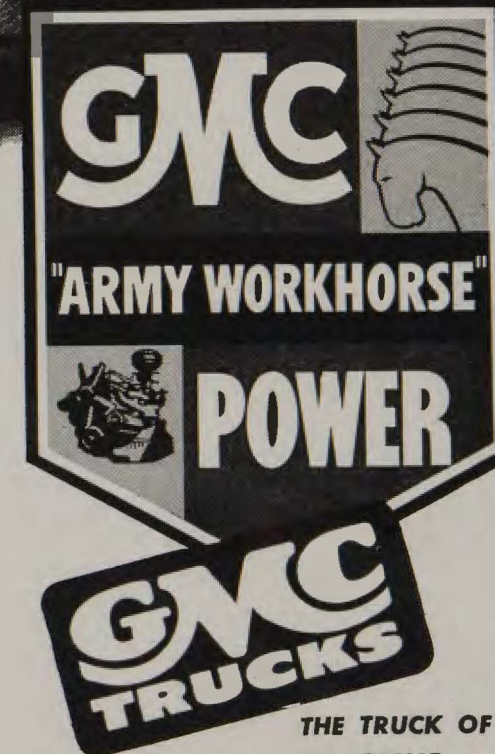
Surveys of one type or another are fundamental to sound research, quarantine, or control; yet for the country as a whole we have put little into them. Often we have been unaware of a newly introduced pest until confronted with an emergency that has developed to a point that suppressive action of any kind is ineffective and costly. With new insecticides constantly coming into the picture, and with new and improved methods available for applying them, opportunities for revolutionary developments in the field of pest control are at hand. To make optimum use of these facilities and to bridge the gap between research and farmer application of the principles developed by research, we must certainly modernize our procedures for learning what pests we have, where they occur, how they happened to get there, and how they are behaving. In my opinion, two of the most conspicuous weaknesses in our pest-control work are inadequate surveys and the absence of facilities for demonstrating in a businesslike manner the findings of research. Growers will do a far better job of pest control when we are in a position to anticipate their troubles, and have improved our facilities of getting sound information to them.

# "My Vote Goes to The Truck I Drove In The Army"



Returning veterans, working on jobs where motor trucks are purchased or used, just naturally go for GMC. For wherever they served . . . Africa or the Aleutians, Europe or the Pacific . . . their number one source of truck transport was the famous GMC "six-by-six." And whatever their branch of the Army . . . ground forces or air forces, combat or supply . . . GMC "Army Workhorse" power proved its ability to handle the toughest assignments.

Civilian GMCs benefit by the same manufacturing facilities, incorporate the same all-truck construction and feature engines of the same basic design as their military brothers . . . nearly 600,000 strong. Offered in a wide range of models, chassis types and sizes, 1/2 to 20 tons, new GMC trucks provide war-proved power, performance and dependability for all kinds of peacetime hauling.



Traffic accidents have increased at an alarming rate since the war. Careless driving, jaywalking and neglect of needed repairs are mainly responsible. Do your part to prevent accidents by obeying all traffic laws . . . by driving safely and walking carefully . . . by having your car or truck inspected regularly, repaired promptly and properly.

THE TRUCK OF VALUE  
GASOLINE • DIESEL

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

## MONEY working for Wages

**CONDENSED FINANCIAL STATEMENT**  
AS OF JUNE 30, 1946

<b>ASSETS</b>	
Cash and U. S. Bonds . . .	\$1,764,393.52
Loans on Real Estate . . .	14,742,043.33
Other Loans and Real Estate Contracts	49,191.77
Other Assets and Deferred Charges . . .	171,663.80
<b>TOTAL</b>	<b>\$16,727,292.42</b>
<b>LIABILITIES, CAPITAL AND RESERVES</b>	
Investment Certificates . . .	\$12,465,803.16
Incomplete Loans and Other Liabilities . . .	2,507,179.64
Pledged Membership Shares	5,303.79
Capital, Surplus, and Reserves . . . . .	1,749,005.83
<b>TOTAL</b>	<b>\$16,727,292.42</b>

We invite consideration of investors who wish to employ their funds constructively for themselves, their community and their fellow man. Money invested in this Association goes to work immediately in the area of Metropolitan Los Angeles.

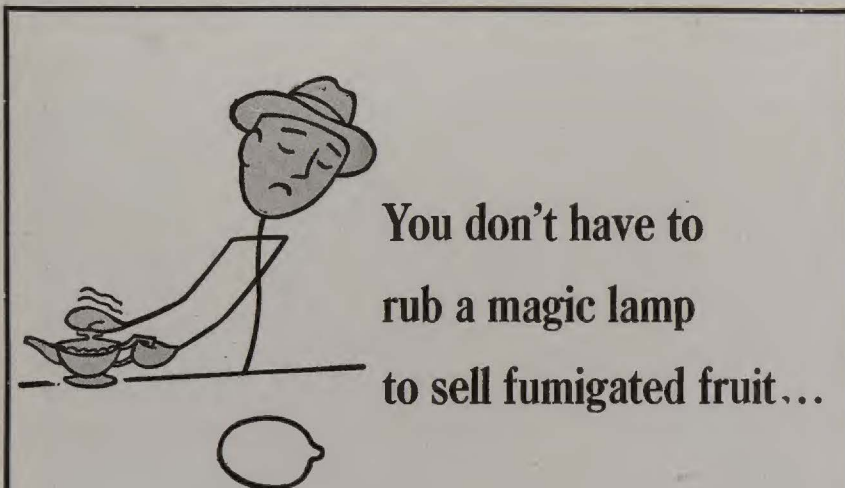
It helps buy, build or refinance homes for useful citizens. It produces good income, dependably and safely for the investor. The investment remains at par and when re-converted to cash the original sum is intact.

We invite investors' money at this time in order to extend and maintain our usefulness to citizens of this area in need of homes.

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You don't have to rub a magic lamp to sell fumigated fruit...

Buyers pay the most for the best!



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Yes, uniform, good-looking, good-tasting fruit that's clean and scale-free will bring you top prices! Today, now that labor and canvas are more abundant, you can make sure your fruit consistently meets those qualifications by using Du Pont "Hydro-Cy" fumigation.

"Hydro-Cy" is an effective control for scale insects. It

reaches every part of the tree, but leaves no residue—doesn't interfere with normal, healthy tree growth—doesn't affect flavor. Yet it is economical to use!

Learn how you can get more fruit profits by consulting your local "Hydro-Cy" fumigator today! And for further information just write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., El Monte, California.

**DU PONT "HYDRO-CY"**

FUMIGANT



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

**Readjustments**

(Continued from Page 47)

of this type of transportation for heavy, bulky products and owing to the fact that citrus can stand a longer transit period without serious deterioration.

The comparative advantage of one type of transportation is never a fixed factor. A sound policy would appear to be for State and other regulatory agencies to encourage rapid development of boat, rail, and trucking facilities, and for growers and shippers to remain alert to the relative advantages. It is apparent that producers and consumers will benefit where there is healthy competition between all alternative carriers.

In addition to the above cost reductions, modernization of terminal marketing facilities would decrease rental, depreciation, handling, cartage, spoilage, and waste; direct selling and pool-car purchases would reduce brokerage and commissions; and the practice of consumer packaging, would reduce waste and spoilage. The amount of operating profit necessary would be reduced by minimizing uncertainties of the market, which may be accomplished through marketing agreement and similar devices.

**Processing**

The citrus processing industry has made considerable progress during the last two decades. The number and size of the plants have increased considerably and some of them are now a large-scale operation. The methods of processing and other operations have undergone considerable changes and at present are standardized to the extent that they are relatively uniform in most modern plants. Many hand operations, particularly in handling, slicing, and reaming the fruit, have been replaced by automatic machinery. The utilization of waste through making byproducts brought about the integration of this industry, though not every plant will put out a complete line of citrus products and byproducts.

The customary products of the processing industry are juices, preserved by flash pasteurization, freezing, concentration, and drying; and segments frozen or canned. The per capita consumption of canned juices during the war increased considerably because of the rationing program and because of improved quality.

In general, rationing restrictions were less rigid on canned citrus juices than on other fruits and fruit and vegetable juices, such as pineapple and tomato. It is difficult to isolate the amount of increased per capita consumption which may have been due to consumer purchases as substitutes for other products.

Improvements in flash pasteurization and in extractors, which resulted in less peel oil in the juices, combined to increase the palatability of the 1944 pack of orange juice. The part of the increased national per capita consumption which is owing to technological improvements will doubtless continue for the next few years.

War needs have curtailed the production of frozen juices, but packers and marketing men predict a good postwar prospect for the product. Production in 1940 was 3.4 million pounds, but decreased to 700,000 pounds in the 1941 season, a quantity which, though small, compared with total juice processed indicates that freezing has advanced to a commercial scale. The juice is extracted in the same way as for canning, is deaerated, and may or may not be pasteurized before it is frozen. The tube freezer adopted for freezing juices in tin cans has found considerable favor.

Concentration by evaporation under vacuum is extensively used in the commercial production of fruit-juice concentrates. Other methods of producing concentrates include concentration by freezing and centrifuging; concentration by high vacuum, low temperature, followed by freezing; and concentration by dehydration, accomplished by spray drying, drum drying, or sublimation from the frozen product under vacuum.

During the war the bulk of the concentrates were prepared by vacuum concentration, the most feasible method, and were shipped abroad under lend-lease arrangements as a source of vitamin C. These concentrates were usually 65° Brix. Several types of concentrates are made for peacetime uses, including the regular concentrate of 6.75-1, a bottlers' beverage base at 4.5 to 1, and dairy bases at 2.5 to 1. These products are used in making carbonated beverages, are served as reconstituted juices by institutions, and are used to a limited extent in confectionery and bakery products. Little if any concentrate has yet been sold at retail.

The process of vacuum concentra-

tion to 65° Brix for lend-lease contracts during the period 1943-44 cost about 60 cents gross per gallon in Florida and 73 cents gross per gallon in California, exclusive of raw material costs. Raw material costs averaged about \$2.89 and \$3.68 in Florida and California, respectively. Raw material and conversion costs combined, minus byproducts credit averaged about \$3.43 and \$4.08 for Florida and California, respectively.

The ultimate use of juice powder is in reconstituted form, combined with water. Consequently, the market would be for manufacture of beverage bases and for confectionery and baking purposes. The dry powder would compete to a certain extent with fresh juices, canned juices, fresh fruits, and other fruit powders, and would have the advantage of being a uniform stable product. The reduction in volume and saving in space and shipping costs also are noteworthy factors. Typical estimates of total costs of production, including raw material, for orange-juice crystals by sublimation drying, as of 1945, indicated a cost of \$1.07 per pound of finished product.

Production of canned grapefruit segments decreased from 4,229,000 cases in the 1938 season to 897,000 in the 1942 season, this marked decrease being chiefly owing to the shortage of tin, the considerable hand labor involved, and the general labor shortage. 29.6 percent of the 1942 grapefruit pack, 0.1 percent of the orange, and 5.6 percent of the grapefruit and orange blend was canned in form of sections. Before the war, canned segments enjoyed a good market both in this country and for export. It can be expected that the postwar market will require even more than the prewar market. The cost of producing natural grapefruit segments in Florida for a dozen No. 2 cans was about 86 cents in 1942; for sweet orange juice segments about \$1.29; and for the orange and grapefruit sweet salad, about \$1.08.

Approximately 750,000 pounds of frozen grapefruit segments was prepared in Florida during 1943 to 1944. Previous production was not of commercial importance and during the 1944-45 season the packing of frozen segments was prohibited as a conservation measure. The chief advantage of frozen segments is that since the fruit is not cooked the flavor and freshness more nearly resemble fresh fruit, but this must be balanced against the higher cost of production and storage. With larger production units and advances in freezing equipment, the cost of preparing and handling frozen citrus should decrease and a much larger market should develop.

Many byproducts have been developed from the citrus-processing industry. These include cattle feed from pulp, citrus molasses, alcohol, essential oils, seed oil, ascorbic acid, citric acid, yeast, enzyme, pectin, marmalades and jelly, bland syrup, candied peel, and brined peel. So far, byproducts have been helpful to the



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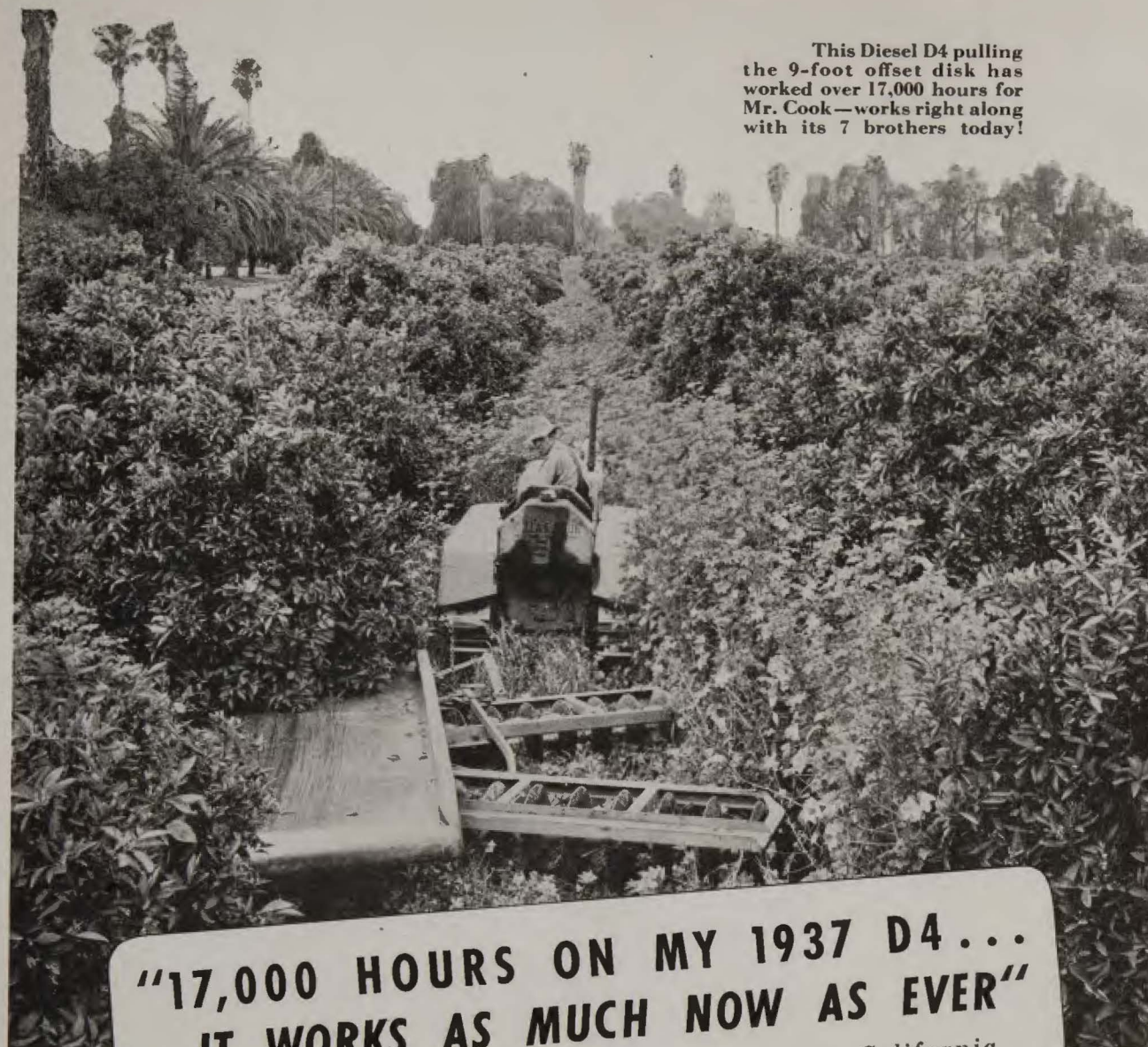
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A man that sticks to one make for 23 years has to be downright sure he's "on the right tracks". Mr. Cook is sure!

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processors only in reducing costs on the major profit items, such as single-strength juices. Probably no one of the byproducts could be made into a major profit item, though possibly all byproducts combined might realize a sales value equivalent to or exceeding the conversion costs of the major profit item. In those highly efficient plants where this could be achieved, single-strength juices, concentrates, segments, and similar products can be sold at a price strongly competitive with all forms of processed fruits and vegetable juices.

Some market specialists believe that cattle feed containing molasses and citrus pectin are possibly the most promising byproducts now being commercially produced. Before the war, cattle feed from citrus pulp was being produced at around \$16 a ton and sold for around \$22 a ton, as a carbohydrate livestock feed, which at the same time contained substantial quantities of fat and mineral. Costs of producing molasses averaged around \$14 per ton and the sales price ranged around \$20. War-time sales prices of these two products were \$37.50 and \$34.00 per ton, respectively; costs are not available for comparison. In 1943-44 about 102,000 tons of feed were marketed from waste peel. The dry-pulp feeds are strongly competitive with beet pulp and the molasses feed is competitive with the regular grain sweet feeds. If necessary for competitive pricing with other feeds, the expense of waste disposal for accounting purposes in the plant could be charged to the major product and credited to cattle feed. About 4 million pounds of the 6 million pounds of 100-grade pectin produced in 1944 was citrus pectin. About 40 to 50 percent of this quantity was used by lend-lease and the armed forces. The price of 100-grade pectin before the war was as low as 60 cents a pound. Some manufacturers of citrus pectin think that in the postwar period 100-grade pectin can be made to sell at from 35 to 50 cents per pound. If so, this byproduct will be strongly competitive to apple pectin and may reach a substantial export market in addition to the domestic market.

The postwar period is finding a greatly expanded citrus industry with surplus fruit and fruit products. Growers will find it necessary, however, to continue the present trend of putting a larger proportion of fruit into processing each year. It will therefore be necessary to find new products and byproducts to expand the use of citrus. One such product would be a jellied citrus juice obtained with low methoxyl pectins. It would seem that such a product would be readily accepted by housewives who may merely open a can and remove the jellied juice for salads. Another product, upon which considerable work has been done and which is covered by a patent, is a hard tablet of citrus juice. At one time small amounts of grapefruit seed oil were produced in Florida. The producing plant closed but it is generally thought that production of oil from seeds may be feasible.

#### Some Competitive Aspects of Processed Marketing

Traditionally the greatest total returns to citrus growers have been received from fresh marketing. Some have feared that processed forms of citrus would disturb the fresh market and have therefore been inclined to regard processing as an outlet to be resorted to only in emergency. Although the processed forms suggest markets often unreached by the fresh fruit, there is some replacement of fresh with processed whenever both are marketed. But this study suggests that competition should not retard all possible efforts to develop the processing outlet. The situation is not simply one of competition between fresh and processed citrus: in addition, fresh citrus faces competition of other fruits as well as the impact of current technological developments. Even though fresh citrus may hold its own with other fresh fruits and with canned citrus as now developed, this may not continue indefinitely in the face of technological developments which give the housewife a better product in more convenient form. The per capita consumption of fresh citrus may be approaching a peak, and if the rapidly increasing production is to be marketed, other outlets must be reached.

Examination of prices returned from processing outlets, compared with fresh since 1938, show that grower returns per box often approach the returns from fresh market, particularly when the difference in grades customarily so marketed is taken into account.

The most favorable price for oranges for processing compared with the price for the fresh market is found in the case of the Florida early and midseason varieties and Valencias. This price was not entirely due to the war conditions, since this comparison was almost as favorable in 1938 as in 1943 for those preferred varieties. In general, however, the price for processing compared with the price for the fresh market has improved very much since 1940. The most unfavorable comparison exists in the case of navel and miscellaneous varieties produced in California. Prices of oranges in that category for processing are low because only recently has the navel orange been considered acceptable for processing and even now is not preferred. Because seeded varieties of Florida grapefruit are preferred for juice, those varieties show a stronger price for processing; that price even exceeded the price for the fresh market during the 1943 season. The processing price appears to have been less favorable in Texas and California than in Florida, though it was considered to be good, on the average.

The price paid for lemons for processing provides a much lower relative return than the price for either oranges or grapefruit. As a joint outlet for the total lemon supply, however, processing provides a means of utilizing the entire crop with higher total returns to the growers than if the total supply were sold or if part were destroyed.

Obviously several abnormal war-time factors influenced the favorable prices for processing since 1941, but some price analysts believe that processors can continue to pay competitive prices during the next few years. Certain economies may help to make this possible, including savings in picking costs; utilization of byproducts; transportation savings, as no refrigeration is required; reduction in spoilage and shrinkage, and savings in costs of retail distribution. Examination of production and utilization figures for grapefruit indicates that much of the increased production has gone into processing. Whereas during the period from 1928-29 through 1940-41 the total available supply of grapefruit increased from about 13½ million to about 43 million boxes (an increase of 218 percent) the quantity sold to the fresh market has about doubled.

As the total supply of oranges has increased during the above period, the total quantity marketed fresh has similarly increased. This contrasts with the tendency observed with grapefruit. The full impact of possible competition between the canned orange juices and fresh oranges has not yet been felt. As the volume of oranges that are processed increases and as the quality of processed orange juices is improved, the effect on the volume of oranges shipped fresh will become more pronounced. But this competition for the sake of the industry as a whole, should not hinder active efforts to develop acceptable canned and frozen juices and to promote their marketing. If the products are made to be thoroughly comparable with the fresh in quality, the volume of processed juices, segments, and other processed items may outstrip present sales of the fresh fruit. Emphasis in the future marketing of fresh oranges may be placed upon the better grades, wrapped in cellulose or foils, and shipped rapidly, for uses other than for juicing.

#### Farm Wage Rates

Farm wage rates continue to rise in the United States. Recent figures of the U. S. Dept. of Agriculture tell us that farm wage rates throughout the United States have increased approximately 380% since the base period of 1910 to 1914, and 118% since the prewar average base period of 1915 to 1939. On the Pacific Coast, which includes California, these increases have been 426% and 129%, respectively. In setting maximum wages for farm labor it is interesting to note that rates set by the labor branch of the Department of Agriculture this year in two main agricultural counties in Oregon, for general farm work other than specialized work, are \$210.00 per month, plus board and lodging, with a flat hourly wage rate of \$1.00 per hour for common farm labor. These maximum wage rates ordinarily establish the going rates for the areas or states affected.

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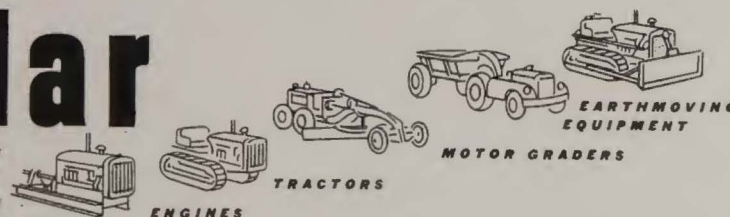
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## DIESEL





## Chlorosis

(Continued from Page 48)

0.25 g. instead of 0.1 g. ferrous sulfate, 0.5 g. dextrin, 1 cc. glycerine, and blood albumin spreader. When the glycerine in this solution was increased to 20 cc., the greening was more spotty. The complete wetting of the leaves is quite important in the use of ferrous sulfate and very severely chlorotic leaves are frequently difficult to wet completely.

Too concentrated a solution of ferrous sulfate is not desirable. A paste consisting of distilled water, 4 g. ferrous sulfate, 1 g. sulfur, and 1 g. dextrin was applied to chlorotic leaves, and although the leaves became dark green, they showed slight burning along the veins. In such cases the factors of concentration, temperature, and interference in the gaseous and moisture exchange in the treated leaves require consideration. Similar treatment except for 4 g. dextrin gave the results shown in figure 2.

A somewhat similar improvement in color accompanied by slight burning during high temperatures is seen in figure 4. When the same high concentrations in the presence of excessive sulfur was used as a dust, a more blotchy green resulted, together with slight leaf burn during high temperatures.

Figure 5 shows the improved color in chlorotic leaves dipped as in treatment No. 5 in table 1. A dust consisting of 1 g. ferrous sulfate powder, 1 g. dextrin, and 8 g. walnut shell powder gave only slight improvement in some cases (fig. 3), while in other cases the improvement was greater (fig. 6). The greening appeared to be greater when the walnut shell powder was omitted from the dust.

The improvement in the chlorotic leaves after being dipped in a liter of distilled water containing 2.4 g. ferrous sulfate, 2.4 g. sulfur, 2.4 g. dextrin, and blood albumin spreader was not as complete as was the case with lower concentrations.

Molasses (which contains iron among other things) may be of value in maintaining a supply of soluble iron in a spray mixture. In treatment No. 6 in table 1, it was included in the solution used in the dipping of chlorotic leaves (fig. 7).

The same treatment as No. 6 in table 1 was used for another series of shoots with equally good results (fig. 8) when another brand of molasses was used during the same period. An improved though somewhat green-spotted leaf from such treatment is shown in figure 6.

Iron citrate also was tested as a source of iron and as indicated in treatment No. 7 in table 1, the response was excellent with no evidence of burn.

It is suggested that citric acid may serve as a useful acidifying agent for spray solutions, as it not only would tend to buffer the solution to the desired pH but would also, because of its organic nature, be of assistance



*Pruning is a job me and Pedro like. Mucho. Boss, he say look around orange trees and don't do too much cutting. There are few healthy trees that need any pruning, maybe snip a little here and there to make more pretty. If big dead wood, OK to take it out. But don't bother with the little stuff. In good orange orchard best excuse for pruning job is to look around for gopher mounds and diseased trees—and maybe take ill' siesta on warm sunny afternoon. Too much pruning with lemon trees. No siesta.*

in maintaining the supply of soluble iron.

Since no lime or soda ash is used to precipitate or remove from solution some of the added ingredients, it is necessary and desirable that relatively low concentrations be employed, especially in a slightly acid medium. It is also advantageous to correct chlorosis before it becomes very severe because leaves in which the green color is practically absent, (albescence) have little vitality or resistance and are more readily injured than other less affected leaves. In any case, even in the presence of soluble iron, it is essential that the solution adhere uniformly over the entire leaf surface (fully wet the leaf surface).

## Summary

Certain iron-contained sprays or dusts are of value in overcoming citrus chlorosis. Of supplementary value is the control of soil moisture as well as of other soil practices such as fertilization.

However, in order to obtain large fruit sizes or to prevent surface layers of soil from becoming too dry when located over a deep tile drained but wet subsoil, problems of excessive soil moisture in the deeper layers of soil may occur in certain areas especially with lemons and the use of iron sprays or dusts may prove of value under these or other soil conditions.

Among the low cost sources of iron is that of magnetite. In certain areas the use of sulfur to produce acidity for bringing the iron of the magnetite into solution may interfere with the biological control of citrus pests and with other orchard practices. The lowering of the pH of tap water to approach that of distilled water (pH 5 or slightly higher) is quite necessary for iron sprays. Dilute sprays with minimum residues are desirable in order not to build up the population of citrus pests, and to reduce costs and tree injury. Citric or other organic or inorganic acids may be desirable as acidifying agents for use as a substitute for sulfur in certain areas.

Soluble iron salts such as ferrous sulfate may be employed provided an active and not a weathered source

December, 1946.

of material is used. Organic salts of iron such as iron citrate may prove very useful, although they dissolve rather slowly in water and are required in lower concentrations. In any case, the pH of the spray should be acid instead of alkaline and the use of organic materials such as dextrin, glycerine, molasses and the like, together with an organic spreader such as blood albumin, may serve to keep the soluble iron in solution and maintain the effectiveness of the iron over a long period in contact with the leaves. Uniform distribution of the iron on the surface of the leaf is very important.

When lemon leaves are even partially improved in color, their intake of soil moisture and minerals increases and the production of plant carbohydrates is stepped up. Numerous illustrations are given to show the effectiveness of various materials in improving the quality of lemon leaves. An improvement in the quality of the leaves is a prerequisite to an improvement in the quality of the fruit.

## Order Early!

ORDER Early! Earliest ordering will help; manufacturers need to know.

Growers, dealers and distributors should act on this advice, because of the possibility that insecticides and fungicides will be in shorter supply during 1947 than in any of the war years.

Such an early notice of their intentions will be the greatest single aid to adequate production and distribution. The industry is asking for their cooperation. Never has it been so badly needed as now, when much of the American economy seems to have crippled engines and grinding brakes because of confusions, controls, shortages, strikes and transportation tieups.

The industry still has its plant capacity, its know-how and its distribution system. But so many blockades, beyond the industry's control, have been in effect or now exist or threaten, that the manufacturers need to know as early as possible what will be wanted—so that they can start producing.

One favorable development is that OPA and the Secretary of Agriculture have voluntarily decontrolled most of the finished insecticides and fungicides. This is a realistic step, one of several needed. But this alone does not clear the way.

Today some raw materials not only are critically short but uncertain. Today there is no carryover to cushion shortages; stocks on hand are down to the "bottom of the barrel." Today too the consumer demand for finished products is uncertain, since new materials hold a wide appeal. For example a manufacturer is equipped to supply several materials—but until he knows which will be demanded next year in a major fruit section, on which shall he concentrate production?

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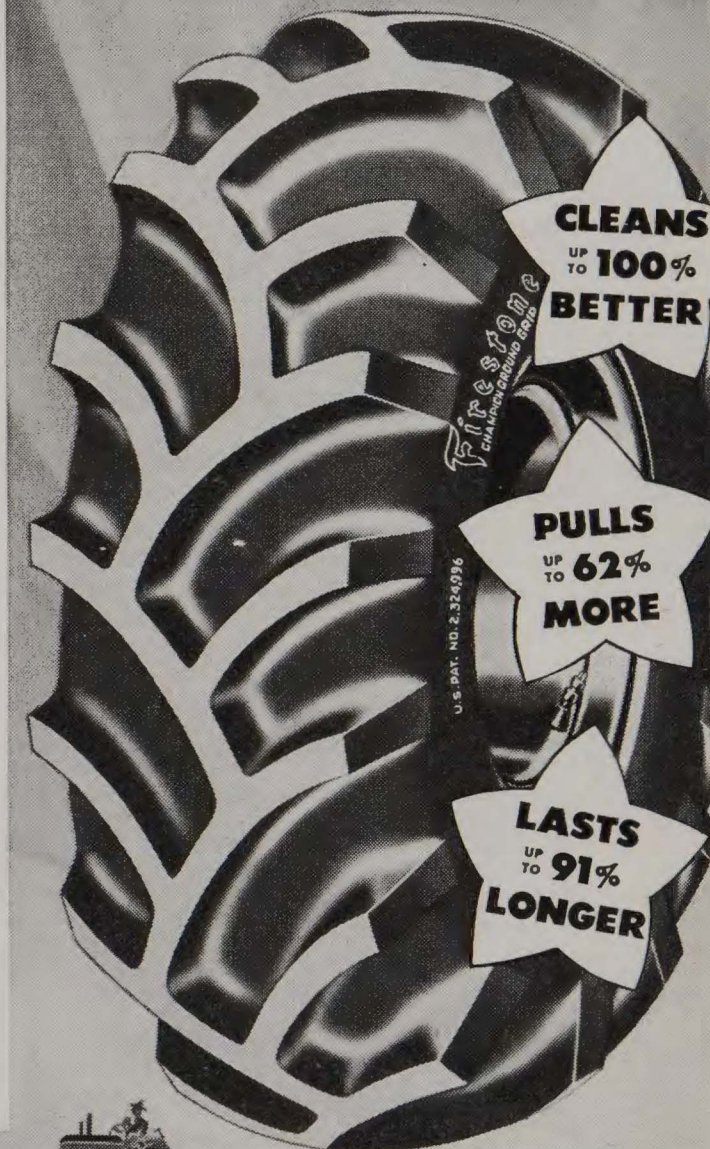
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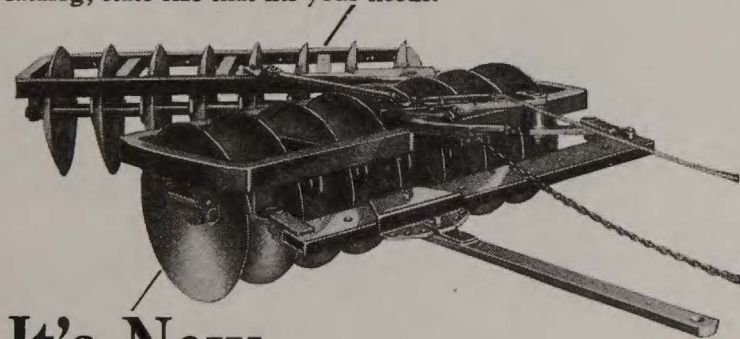




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## Soil Structure in Citrus Orchards

By DANIEL G. ALDRICH, Jr.

This article is part of a talk given before members of the Citrus Department of the Tulare County Farm Bureau. Dr. Aldrich, after service in the U. S. Army, has rejoined the staff of the Citrus Experiment Station of the University of California as assistant chemist.

THE problem of producing and maintaining good soil structure in citrus orchards is a matter of concern to all growers. It is definitely recognized that the productivity of the soil is vitally influenced by the structural arrangement of the soil particles and the structural arrangement in turn by the particle size, their relative proportions, their chemical composition, and the cultural practice or care exercised when the soil is tilled. As a matter of fact, the changes wrought by a grower in making his soil better suited as a foothold for trees are structural rather than textural.

The textural composition of a soil concerns the particle sizes, such as sand, silt, and clay, without regard to their arrangement or distribution. Texture is more or less permanent and we therefore speak of soils as having a coarse, medium, or fine texture. The structural composition of the soil concerns the state of aggregation or dispersion. That is, it refers to the arrangement or grouping of particles. The compacting of a light soil or the loosening of a heavy one is merely a change in the arrangement of the soil grains and in the physical relationship of the colloidal complexes.

From a practical viewpoint we recognize three structural groups, namely, single grain, crumb, and puddled.

The first group is of course exemplified by sand. Such a soil is loose and open, with large individual pore spaces which allow a ready circulation of air and water. Its cultivation is extremely easy.

The second group, and the one having the ideal structural condition for grove operation is most likely to occur in a loam soil. In such a soil some of the particles are large and function separately; others are medium in size and tend to form the nuclei around which smaller particles, both colloidal and non-colloidal may cluster to form granules, or aggregates. There are thus large pore spaces as in sand which facilitate drainage and air movement and numberless small interstices as in clay in which water is retained.

The complex structure of the third group is usually developed in heavy soils. Here the individual aggregates are made up of many particles, the colloidal material acting as a binding agent. Improper handling of this soil may run the complexes together and an impervious and puddled condition may result. On the other hand proper handling may result in a soil which is loose, open, and friable if granules of the proper size and nature are developed.

Thus from what has already been stated regarding soil structure it is evident that its control cannot be discussed fully without reference to

physical properties imparted by matter in a colloidal (non-crystalline) state. It is necessary to keep in mind that there are two distinct types of such materials in soil, namely, mineral and organic. In some ways their influences are similar, in other respects decidedly antagonistic. The former is made up of complex silicates, normally gel-like in character and highly plastic and cohesive. The latter, consisting of partly decayed organic residues, is low in plasticity and cohesion. Both types of colloidal matter have high absorption, are markedly dynamic, and are active catalytic agents.

The scarcity of inorganic colloidal matter in sandy soils has certain obvious advantages. Looseness, friability, good aeration and drainage, and easy tillage are characteristics. On the other hand such soils are often too loose and open, and lack capacity to absorb and hold sufficient moisture and nutrient materials. They are as a consequence likely to be droughty and lacking in fertility. There is only one method of improving in a practical field way the structure of such a soil and that is by the addition of organic matter. Organic matter, if it undergoes favorable decomposition when incorporated with the soil, will not only act as a binding material for the particles but will also increase the water capacity. A sandy soil high in humus is almost ideal from a structural standpoint.

The modification of the structural condition of a clayey soil is not such a simple problem as that of a sandy one. In the latter the plasticity and cohesion are always high due to the presence of large amounts of complex hydrated aluminum silicates in a colloidal condition. The more plastic a soil becomes the more likely it is to puddle especially if worked when wet. Moreover a soil of high plasticity is prone to become hard and cloddy when dry, due to the cohesive tendencies of the small particles. Such soils must, therefore, be treated very carefully, especially in tillage operation. If plowed too wet, the aggregation of particles is broken down and an unfavorable structure is sure to result. If plowed too dry, great clods are turned up which are difficult to work down into a good seed bed. In a sandy soil no such difficulties usually are encountered.

Granulation, or the production of compound grain structure, is the only means of correcting the physical condition of a heavy fine grained soil. In this process the small particles are drawn toward innumerable suitable nuclei and a porous crumb-like structure is developed. The spaces between the granules become large, lines of seepage are established, and air and water drainage is facilitated. This structural condition in reality stimulates a single-grain state with the important difference that the aggregates are porous and not solid. Thus two types of pore space exist, that between the particles and that within the sponge-like granules. Unless a heavy soil possesses at

least some granulation, its slow aeration and its inadequate drainage will more or less make it unfit for growing trees.

Climatic forces, additions both natural and artificial, and cultural practices tend to develop or facilitate a granular structure in soils. The individual factors may be listed under the following headings: (1) wetting and drying; (2) action of roots and animals; (3) addition of organic matter; (4) influence of active calcium; and (5) tillage.

While it is thus possible to list the factors that tend to encourage granulation in soils, it is difficult to state just why this phenomenon takes place or to picture its development. It has been suggested that much of the granule formation in the soil is due to the contraction of the moisture films around the particles when, for any reason, the water content is reduced. It is known that soil particles tend to be drawn together by this reduction of soil moisture, due to the pulling power of the thinner films.

If at the same time there is present a material which not only intensifies this drawing power or loss of moisture, but also exerts a binding influence as well, the process should become much more pronounced. This second factor in granulation is thought to be the mineral colloids. These complex silicates, instead of functioning uniformly as when the soil is puddled, are localized. The internal stresses and strains of the soil become unequal and a tendency arises for the mass to divide into

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comparatively large groups—the soil granules. The binding capacity of the mineral colloidal material tends to make such a crumb structure more or less permanent. The physical influence of wetting and drying, and of the mechanical action of plants and animals can thus in some degree be pictured.

Organic matter, the third factor in granule promotion, is loose and porous and it has a corresponding influence on the soil mass. It increases the size of certain of the pore spaces, creating lines of weakness and promoting more ready air and water movement. At the same time it mingles with the mineral colloidal matter, not only lowering the plasticity and cohesion of the latter but also localizing its influence. Its high absorptive capacity for water tends to intensify the disruptive effects of temperature changes and moisture fluctuations. In fact the granulation of a clay soil cannot be promoted adequately without the presence of a certain amount of humus. Its maintenance, therefore, is of great practical concern not only chemically and biologically but physically as well.

One of the outstanding characteristics of the colloidal complexes of the soil, both mineral and organic, is in the ability to absorb cations (positive ions). Many different positive ions are held by colloidal nuclei in a replaceable condition. Moreover, the domination or even partial domination of certain of these cations tends to develop more or less definite

physical conditions. The absorption of calcium ion promotes granulation by a phenomenon called flocculation. When this occurs the colloidal matter, especially that of a highly viscous and gelatinous nature, is coagulated and a localization occurs. This disrupts the soil mass and tends to develop the crumb structure which is so desirable. Most soils highly charged with native calcium exhibit granulation to a marked degree.

Soil tillage, the fifth granulation influence, is utilized for a number of purposes. The soil is loosened and aerated by tillage, the organic matter is thoroughly mixed with the mineral constituents, and conditions are made more favorable for the activity of the natural forces of granulation. As has been pointed out, any treatment that increases lines of weakness in the soil facilitates the granulating influence of the fluctuating moisture films, of living plants and animals, of the constantly added organic matter, and of the active calcium and other constituents.

Seeking to enter citrus in the soft-drink beverage field, the Florida Citrus commission authorized action to seek or develop a suitable counter dispenser that uses juice from larger size commercial cans for distribution in cups or glasses of consumer size. "I don't care what it costs—" said C. C. Commander of Florida Citrus exchange. "The most important thing facing us today is to find new outlets for distribution of our fruit."

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## Selecting Citrus Nursery Trees

By J. C. JOHNSTON

Mr. Johnston is Extension Specialist in Citriculture, Agricultural Extension Service, University of California.

**SUCCESS** in the production of citrus fruits is determined to a large extent by the vigor and inherent productive capacity of the trees. No combination of good soil and water, favorable climate, and skillful management can overcome the handicap of poor trees. For this reason it is wise to buy the best trees obtainable. Even a slight increase in production will quickly repay the small added cost of superior trees.

Practically all citrus nursery trees grown in California are propagated by budding the various varieties on seedling rootstocks. In most cases these seedlings are grown in a seed-bed for one year, then transplanted to nursery rows where they remain for 6 to 12 months before they are budded to the desired varieties. The trees are usually topped at about 30 inches and are ready to plant in the orchard one or two growing seasons after budding. They are known, accordingly, as one- or two-year buds, the age indicating the number of growing seasons after insertion of the bud. A one-year bud will usually be on a three-year old rootstock. The part of the tree growing from the inserted bud is called the bud or scion, and the part below the bud union is called the rootstock or stock.

### Choosing the Trees

**General appearance.** Good citrus nursery trees will have large, thrifty leaves, and bright, clean bark. The trunks of the trees should have grown in one continuous flush. If the growth has been checked at intervals, this will be indicated by joints or markings on the bark at the points where growth stopped. The bud union should be smooth and at least 6 inches above the soil level, to avoid possible infection by the organisms which cause gummosis. Rootstocks which have stood in the nursery too long before budding should be avoided because they are likely to be less vigorous. These older rootstocks can be identified by the dark gray bark and the marked difference in diameter between stocks and scion. The scion should be nearly as thick as the stock.

**Age and Size of Trees.** Citrus nursery trees are usually dug one or two years after budding, but most growers prefer one-year buds because it takes a good tree to reach marketable size in one growing season after budding. One-year buds can be identified easily because they have leaves on their trunks, whereas older trees do not.

The trees are graded according to the diameter of the trunk 1 inch above the union of the bud with the

serve as much of the root system as possible. They should be examined carefully, and any on which the soil has been broken away from the roots by careless handling should be rejected. The soil in the ball should be as near as possible like that in which the tree is to be planted; otherwise, it will be difficult to irrigate satisfactorily.

Occasionally trees are dug with bare roots. This makes it possible to leave more of the large roots on the tree and permits inspection for disease or other defects in the root system. Trees that are to be shipped long distances are usually handled in this way. Citrus roots are very easily killed by drying, and the utmost care must be used in handling bare-root trees to keep the roots moist at all times by covering them with damp moss or other suitable material. They should not be kept in water. Such practice often causes serious root injury.

**Productive capacity.** Nursery trees should be well grown, but productive capacity cannot be judged entirely by appearance. The buds should come from trees which are true to the variety desired, and which are known to be productive and free from disease. The rootstock and scion varieties should be congenial, and both stock and scion should be suited to the soil and locality in which the trees are to be planted.

Because it is necessary to take the word of the nurseryman as to the source of the buds and the kind of rootstock used, it is important to deal with experienced and reliable persons. It is also desirable to obtain a record of the location and registration numbers (see below) of the trees from which the buds were taken, and to obtain a record of the rootstock used.

### The Importance of Bud Selection

The commercial citrus varieties grown in California are more or less

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unstable. Bud variations or "bud sports," occur frequently. To date, none of the variations has proved to be as satisfactory as the established variety from which it rose. In addition certain varieties which closely resemble the commercial varieties have found their way into orchards through careless selection of buds. It is therefore necessary to use great care in selecting buds to see that they come from trees which are typical of the variety and have a record of consistently high production.

Citrus trees are subject to a number of virus diseases, such as scaly bark, which are carried to nursery trees by the buds used in propagation. To date no remedy has been found for virus diseases, but they may be avoided by propagating from disease-free parent trees. The California State Department of Agriculture maintains a nursery inspection service and registers virus-free parent trees in order to provide nurserymen with a reliable source of disease-free bud wood.

### Rootstocks

The rootstocks most commonly used are the sweet and the sour orange. Grapefruit and Rough lemon are used to a lesser extent, and occasional propagations are made on trifoliolate orange. Sampson tangelo is coming into use as an experimental stock, especially where lemon decline is a problem. The numerous varieties of sweet and sour orange, grapefruit, and trifoliolate orange differ in their suitability as rootstocks. For this reason these stocks should be grown from seed of vigorous old trees which have remained free from disease, and which are known to produce uniform, vigorous seedlings that make good trees when budded to the variety to be grown. Only limited quantities of such seed are now available, but the better nurserymen own or have access to such trees.

The sweet orange is an excellent stock for all commercial varieties of citrus. Its chief weakness is its susceptibility to brown rot gummosis. It is best adapted to soils ranging from light to medium loams, or loams which have good drainage. Because of its susceptibility to gummosis, sweet stock is not so well suited to clay loam or adobe soils.

The sour orange is hardy and resistant to disease. It has a deep root system which enables it to grow under a wide range of soil conditions, but it appears to be more susceptible to injury from excess moisture than sweet stock, possibly because its roots are deep. It has given good results with oranges and is especially favored for grapefruit. In recent years, however, Washington Navel and Valencia oranges on this stock have been affected in limited areas by an unidentified disease called "quick decline," which causes a rapid decline or sudden death of the trees. The importance of this disease cannot be judged at this time, but needless to say, this stock is not recommended for oranges in or adjacent to areas affected by quick decline.

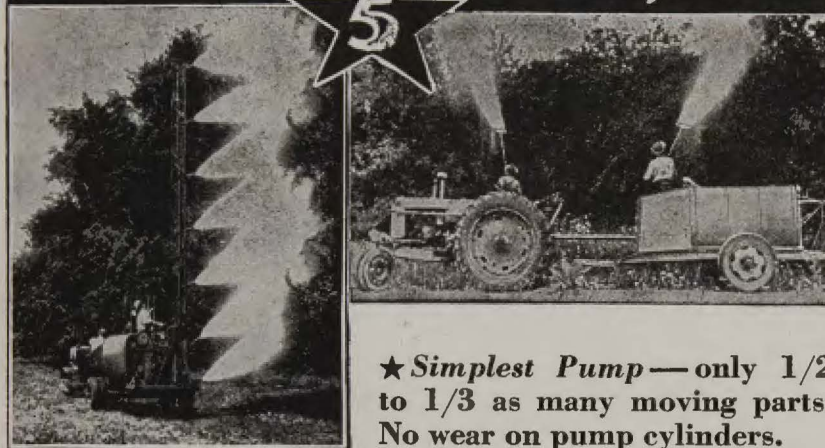
Eureka lemons are not compatible with most sour-orange seedlings, for with few exceptions the trees deteriorate at an early age. This is the reason why sour stock cannot be recommended for this variety of lemon. There are, however, some successful orchards of Lisbon lemon trees on sour rootstock.

The grapefruit has been used as a rootstock in California—occasionally in the past and more frequently in recent years—especially for lemons. Its use is still experimental, however, for conflicting results have been reported from various districts. In certain trials in which the trees were propagated by using buds from a single parent tree, those budded on

grapefruit rootstocks proved to be less productive than those budded on either sweet- or sour-orange rootstocks; in other trials the reverse has been true. Results in commercial orchards have not only been variable, but also frequently unsatisfactory. As a rootstock for citrus trees, grapefruit should therefore be used with caution.

The Rough lemon, as a rootstock for commercial citrus varieties in California, cannot be recommended for general use because it has not been tried under the many variations of climate and soil conditions in this state. The Rough lemon has given excellent results on the lighter soils of the interior valleys, where the fruit

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is regularly harvested early. Because of its vigor, this rootstock causes both tree and fruit to grow rapidly. It tends to produce very large trees. The fruit matures early but is low in both sugar and acid and often is coarse in texture. Valencia orange trees on roots of Rough lemon produce more granulated fruits than are normally found when other stocks are used. Both trees and fruit on this stock are more susceptible to cold injury than are trees on other rootstocks in common use. For this reason, Rough lemon should not be used as rootstock in cold locations.

The trifoliolate orange has been used to some extent as a rootstock in the past, but because of its slow growth and dwarfing tendencies it is not suited for use with most of the species and varieties of citrus grown in California orchards. The Valencia orange, however, seems to be an exception, for this variety has done well in some sections when budded on trifoliolate-orange rootstocks. As a rootstock for ornamental varieties of citrus and for home-orchard trees where small size is desired, the trifoliolate orange is still used by some nurserymen. It is one of the hardiest of all rootstocks, but with most varieties it produces small, slow growing trees.

The Sampson tangelo (tangerine crossed with grapefruit) and the Morton citrange (sweet orange crossed with trifoliolate orange) are hybrid varieties which are giving considerable promise as rootstocks for the commercial citrus varieties. They cannot be recommended as yet, however, because of a lack of propagating material and sufficient experience with them under orchard conditions.

### Tractor of the Future

ULTIMATELY the all-purpose farm tractor will be a two-way machine having the same speeds forward and reverse, according to the opinion of a group of agricultural engineers and some farmers expressed to Arthur W. Turner, assistant chief in charge of agricultural engineering research in the USDA Bureau of Plant Industry, Soils, and Agricultural Engineering. In general those consultants said that such a

tractor has a real place in modern farming.

Based on the judgment of the group, which included leading engineers and machine designers in the farm equipment field, numerous considerations were recently outlined by Mr. Turner as involved in the design of a practical two-way farm tractor. Such a power unit should have all the functional machines mounted on it and these should be interchangeable, perhaps through a power hoist attached to and operated by the engine. It should be designed as an all-around mobile unit for field and farm work and farm-to-market transportation. Safety, flexibility, convenience, and power must be combined in any such innovation in farm tractors, Mr. Turner advises.

### Farm Costs and Prices

SOME significant comparisons to illustrate the narrowing margin between farmers' high production costs and the prospect of lower prices for some of their 1947 products are supplied by Arthur Shultis, specialist in farm management of the Agricultural Extension Service.

The U. S. Department of Agriculture reports farmers out-of-pocket costs in 1945 were \$11,300,000,000 compared with \$6,200,000,000 in 1940. Of course, part of this higher cost was because of increased quantity produced, but costs rose 60 per cent per unit of product during the five-year period.

The war brought great increases in gross income of farmers, but costs rose greatly on equipment and supplies, and particularly on labor.

Farm labor is now receiving two and one-half to three times the pre-war hourly rate. Total labor costs rose more than wage rates because of lower efficiency, increased labor procurement costs, increased utilization of labor contractors, and higher housing costs. Farm wage rates are probably at their peak, but there will be greater resistance to lower wage rates as the price of farm products decline.

Other costs of the farmer, such as machinery, equipment, building materials, fertilizers, and supplies will be higher in general in 1947 than in 1946.

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## ZONING OF FARM LANDS

By JACK MARTIN

The following is a transcript of a radio discussion (KFI, October 31) in which Mr. Jack Martin was interviewed by D. M. Rutherford. Mr. Martin, an agricultural engineer, is now in the employ of the Agriculture Department of the Los Angeles Chamber of Commerce, and not so long ago was a Lieutenant Commander in Uncle Sam's Navy. Through his background of pre-war experience he is well qualified to discuss zoning of lands.

To most of us the word "zoning" means a restriction on the type of home we can build, how far back from the street, or how close to the lot line our house can be placed, and whether or not we are apt to wake up some morning and find a paint factory next door. Farming operations near residential areas have often been considered objectionable, and were to be zoned-out wherever possible.

Can you tell us what farm people can gain from zoning for agriculture?

Farmers, quite naturally, in the past, have been fearful of any zoning of their lands whatever, because they have most often been the victim rather than the beneficiary of zoning plans. But now, farmers can have their land zoned for agricultural uses, if they so desire. This will help keep out unwise subdivision. It can preserve in cultivation those soils which are needed for the production of food for the surrounding communities. Most of our listeners know of one or more subdivisions that have taken over walnut orchards, alfalfa fields or a grape vineyard within the past year in their communities. Many of these are part of a healthy development resulting from our great increase in population. This raises a very important question. How many of these subdivisions are taking good land out of cultivation, land which might better have remained in agriculture, for the welfare of all the people?

In the real estate boom of the hilarious twenties, many tracts of land were subdivided, lots were staked out, streets were constructed, a few houses were built, and then no more. So the entire subdivision was no longer usable for farming, but neither was it a successful realty development. Now, it is very important for the farm people to guard against waste of good farm land through this type of subdivision. Zoning is one way to do it.

What progress has been made with zoning agricultural lands in Southern California?

So far as I know, the first real zoning of agricultural lands in the United States was done in Southern California. Farm property owners in a number of districts have recognized the need of zoning protection to keep

their lands in agriculture and they have asked their planning commission to draw up plans accordingly. One County ordinance provides for five agricultural zones. Four of these zones permit all types of light agriculture, such as fruit and vegetable growing, poultry and rabbit raising and other similar uses. The fifth zone includes all the light agricultural uses and, in addition, such heavy agriculture as concentrated cattle feed lots, sales yards, fruit and vegetable packing houses, etc.

These five zones have different acreage requirements ranging from about half an acre to five acres as a minimum. In the vicinity of Glendora in Los Angeles County, an area of about 9,000 acres was recently zoned for agriculture. Here, in an orange growing district, farming will continue on acreages not less than 1, 2 or 5 acres, until the majority of farm property owners might vote a change. A number of other requests for agricultural zoning are now being acted upon.

Does zoning have any effect on property tax assessments?

Yes it does. While zoning does not determine what the assessed valuation will be, it does influence market values of property, and such values determine assessed valuations. Some of the tax assessors are using zoning maps as an aid in arriving at proper assessments.

What types of agriculture are most likely to suffer if zoning plans are not developed?

Probably the first types of farming to feel the pinch would be those having a disagreeable odor or noise, and those cultivated lands lying close to cities and towns. For example: In a dairy district, if enough small homes were built for people who were not interested in the dairy business, they might, by sheer weight of votes, declare the dairies in their vicinity to be a nuisance and have them zoned out. Vegetable lands, located close to the centers of population, because of the nearness to markets, are particularly vulnerable. Also, many farm property owners can be easily talked into parting with their farms, when offered a good price by a real estate developer.

How can the farmers go about getting their farm lands zoned into agricultural classifications?

Each County and City usually has a planning commission to prepare zoning plans. As a rule, these commissions will only zone those areas where there is enough interest among the property owners to demand a zoning plan. Therefore, farmers who are interested in protecting their land from unwise subdivision or from being forced out by disinterested non-farm people, should consult their County or City planning commission to determine what can be done to

develop a zoning plan for their properties.

You mentioned earlier that much agricultural land is now being removed from cultivation. Why are these better lands being subdivided now in preference to poorer farming areas?

One of the main reasons is the present high cost of building and the price ceilings placed on new construction. The combination of these two factors forces new home construction on to flat lands, where many of the most fertile soils are located. Here the cost of building roads, installing water mains, sewers and other utilities, and the actual costs of building the houses are less than it would cost on hilly or uneven lots. Some of the best vegetable, citrus, walnut, and alfalfa soils in Southern California have already been subdivided into residential lots. We all realize that good sound development of a community is very beneficial, but in today's mad scramble for homes, we must guard against over-development and the removal of land from agriculture which might better be left in food production for the good of the community.

We have been talking about the importance of zoning to farmers. It occurs to me that perhaps the city folks, as well, may have a stake in agricultural zoning.

Yes, they certainly do have. Most of the food raised in the country is eaten in the cities. Here in Southern California, our food cost of living has always been low, because much of what we eat is produced close to the cities. As more and more of our fertile farm land is taken over for homes and industry, the cost of rais-

ing our food and getting it to market will go up. So the consumer in the city should be very much concerned over the destiny of agricultural land.

Suppose some farm folks decide that they should look into this matter of zoning—what steps should they take?

First, they should phone, write, or go to see the planning commission in their County, usually located at or near the County seat. Here they can get the details on just what to do. From there on, they can decide by group action what type of zoning is needed, how far it should extend, and other details.

### National Advisory Committee on Research

THE appointment of an 11-man National Advisory Committee on Research was announced by Secretary of Agriculture Clinton P. Anderson on October 25. Provision for the appointment was made in the recently enacted Research and Marketing Act of 1946 (Public Law 733).

The members of the committee are: H. E. Babcock, Ithaca, N. Y.; Fred Bailey, Washington, D. C.; Robert Coker, Hartsville, S. C.; John H. Davis, Washington, D. C.; Charles F. Kettering, Dayton, Ohio; C. W. Kitchen, Washington, D. C.; Albert Mitchell, Bell Ranch, N. M.; James G. Patton, Denver, Colo.; Walter L. Randolph, Fayette, Ala.; H. J. Reed, West Lafayette, Ind. and Kerr Scott, Raleigh, N. C.

Appointment of the Committee is in preparation for carrying out an expanded program of agricultural research and marketing services as directed by Congress. The newly appointed Committee will consult with the Secretary of Agriculture on broad overall phases of this program. The Act provides that the Secretary of Agriculture shall be Chairman of the Committee.

In addition to the National Advisory Committee, it is expected that special committees will be named to help in developing research and marketing programs in particular fields, commodities or subjects.

Congress passed the legislation just beyond adjournment and no funds have yet been appropriated under its authorization. Planning and administering the program will require the cooperation of many Federal and State agencies and private industry as well as farm groups. The Department plans to call upon these groups in the near future for aid in planning the work to be undertaken when funds become available.

Government reports continue to show new employment peaks. Federal Security Agency says employment in establishments covered by state unemployment insurance laws reached a new postwar high of 29,200,000 in mid-June and estimates that other workers would have brought the total at that time to 55,900,000.

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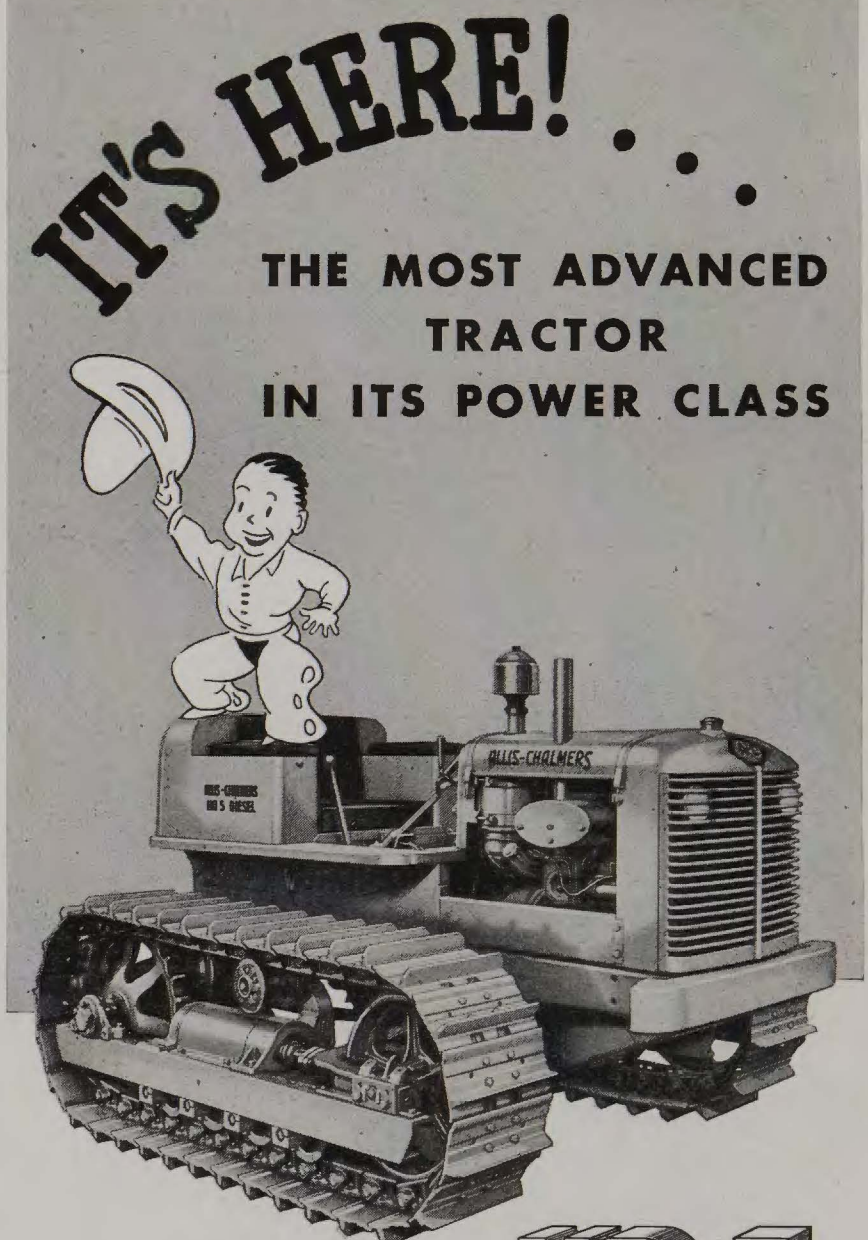
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NOT so long ago R. L. (Dick) Taylor, manager of the College Heights Orange and Lemon Association, bought an orange orchard in the Claremont district. The grove is one of the first planted in the section and there was reason to believe that there might be some interesting history attached to the property. Mr. George R. Tyler of Pomona, a local nurseryman, now retired, had been in the section for many years and might know some of the details. It was arranged for us to go with Dick Taylor to visit Mr. Tyler.

Mr. Tyler came to the section in 1890. He had a through ticket to Los Angeles, but when the train stopped at Lordsburg (now La Verne), he said the country looked so good to

## Recollections of Yesterday

By D. M. RUTHERFORD

him that he got off the train, left his baggage at a rooming house, started looking for a job, and didn't get to Los Angeles until some years later. There were more men than jobs, but he eventually got steady employment because he had a way with horses, learned as a farm boy in the mid-west.

Speaking of horses we got sidetracked by a bear story. Shortly after his arrival in California Tyler was hauling lumber with a six horse team for some building construction in the

foothills. Rounding a turn in the road the horses stopped short with heads high, snorting, showing great excitement. He slid down quickly from his seat and seized the bridles of his lead team, at the same time seeing the cause for the commotion, a black bear and a pair of cubs in the road some distance beyond. Pretty soon the mother bear and her cubs wandered away. The horses quieted down somewhat, but they were mighty anxious to be somewhere else. The rest of the trip was made in record time.

As was his usual custom, he unhitched and took off the bridles of the first team, so they could go to the water trough. But, heads in the air and still snorting, they didn't have time for a drink. They wanted the security of the barn and made a break for the barn door. Both tried to enter at the same time. They nearly wrecked the building and didn't do themselves any good. The other horses didn't want a drink either. With six excited horses on his hands at once he had some very busy and anxious moments, Mr. Tyler recalled with a chuckle.

The orchard in question, now owned by Dick Taylor, was planted by the Rev. Charles F. Loop, an Episco-

pal minister. He planted seedlings and Mediterranean Sweets, also olives. Combining with Mr. A. R. Meserve who was also developing citrus orchard property, they plowed a ditch six miles or so in length from San Antonio Canyon and filed on 200 inches of water. This became the Loop-Meserve Water Company. In the years 1897-99 the rainfall was scant and the whole district was short of water.

The orchard was irregularly planted, with trees 30 feet apart, later interset with lemons.

Loop sold the property eventually to a Dr. Campbell and later it was purchased by F. H. Clements. Somewhere along the line oranges were budded onto the lemon tops.

Loop planted a number of orchards in the general area, according to the recollection of Mr. Tyler, including the one now owned by Raymond Carroll, which would now be about 73 years old. The trees are on grapefruit rootstock.

Speaking of rootstock, Mr. Tyler says that the combined damage due to wind, heat, drought and flood does not add up to the amount of damage caused by using poor rootstock under citrus trees—the observation of a man who has spent most of his life with trees.

Rev. Charles F. Loop was a man of some means. At one time he took a trip to the Mediterranean region and, incidentally, brought back a bundle of lemon bud stocks. They were



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grown on roots of what Mr. Tyler refers to as "Mediterranean Bitter," a fruit somewhat resembling a grapefruit, which is eaten in the "old country" with salt. Mr. Loop was able to grow three lemon trees. This, Mr. Tyler says, occurred 83 years ago, and was related to him by Mr. Loop. When the trees began to bear, Mr. Loop gave them the name "Eureka." This seems to be coincidence, since it does not jibe with other information relating to the history of the widely planted Eureka variety. One tree was given to A. R. Meserve, the tree being removed by a later owner. Dr. Parsons received another lemon tree; a subsequent owner had it budded to another variety. The third tree was planted on the Loop place and still survives in Dick Taylor's orchard. It was in reasonably good condition when we examined it recently; no evidence of diseases. It was badly damaged some years ago when the nearby residence burned, but recovered in due time.

### The Supply of Pest Control Materials

THE insecticide and fungicide industry is interlinked with mining, heavy chemical, botanical and still other industries. Problems in each of these become part of the supply problem in pest control materials, reports the industry trade association. For example:

Copper production is improving, according to the Copper Institute, but not yet equal to a year ago. Scrap is almost unobtainable, reportedly because of control policies.

Lead now is urgently wanted for storage batteries, paint and other civilian necessities. The Lead Industries Association reports a raw lead demand of 80,000 tons a month, domestic mine production of 25,000 to 30,000 tons, and total imports limited by the government to about 8000 tons.

At time of going to press, one of the largest lead mines was strike-bound, involving about 40 per cent of the national production.

Peru is still the only source of rotenone, of which the industry expects about 8,000,000 pounds, roughly equal to last year, when demand exceeded supply. Shipping strikes again have delayed seasonal arrivals. Future supplies depend on shipping and on the willingness of Peru to sell after next spring. The trade agreement expires May 7.

The arsenic shortage affects calcium arsenate output.

Cryolite stocks are the lowest on record. These can be re-established if growers make known their requirements early.

Nicotine supplies should equal last year—not enough to meet demand.



Exports to fill government requirements must still be continued.

Pyrethrum supplies should be adequate. Fairly large stocks are on hand. Shipping strikes of course will determine future arrivals.

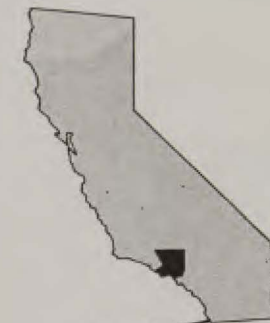
The sulfur outlook is good. DDT production can equal last year but demands will increase. Chlorine for its manufacture is scarce, and the adequacy of DDT insecticides can better be estimated in

a month or two. Many other new organics, such as hexachlorocyclohexane and 2,4-D, also require chlorine, so that their production cannot be estimated.

Between now and the shipping season, labor relations in the raw materials industries will be important. Railroad transportation suffers from lack of cars. Many shipments more-over will have to be made in less-than-carload lots, with resulting in-

creased costs. Supplies of containers are irregular and short.

These are the highlights of today's situation. Any definite forecast is not yet possible. The industry will produce every possible pound. With continued cooperation from the Bureau of Entomology and Plant Quarantine, the State Stations, and the distributors and dealers, this will be distributed to the best possible advantage.



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RECENT VISITORS TO CITRUS EXPERIMENT STATION

Mr. and Mrs. Armando L. Garcia Quintanilla of C. Valles, S. L. P. Mexico, were interested in viewing the lemon and Valencia orange rootstock plots. Mr. Quintanilla has 20,000 citrus trees, half of them lemons, and half oranges. He has his own nursery and was interested in observing the results secured from different rootstock included in the experiment.

John Katrakus, Assistant Director of Central Laboratory for Soil Research, Athens, Greece, spent a week at the Experiment Station discussing the work of different divisions with the head of each division. Since he is engaged in soils research, he was particularly interested in fertilizer plots.

Dr. Jacob Perlberger, Plant Pathologist from Rehovot, Palestine, spent two days at the Station. He is a pathologist and was particularly interested in the work of the Division of Pathology. While in this country he is looking into quick freeze methods and the operation of lemon packing houses.

T. E. Cooper of Waterford and W. M. Black of Los Gatos were in the south studying non-cultivation

of orchards. They paid a short visit to the Experiment Station to discuss non-cultivation. They expect to try it experimentally in their own orchards.

Mr. Pericles Papaionnou of the Department of Agriculture, Cyprus, was interested in olive and fig culture, and spent considerable time with Dr. I. J. Condit.

Mr. C. J. McKeon, Director of Agriculture, Queensland, Australia, and Mr. H. A. Grantham, Agronomist, New South Wales, Australia, have spent several months in the United States studying orchard management practices. While at the Citrus Experiment Station they inspected the Navel orange orchard fertilizer experiments and other experimental plantings.

C. J. Booth and class of Chaffey College, Ontario, visited the Station and also inspected the Navel orange orchard fertilizer experiment.

A group of 35 Tulare county citrus growers visited the Station recently. During the afternoon, they heard a series of lectures by the Station staff, and in the afternoon inspected the orange rootstock experiments and the Navel orange orchard fertilization experiment. The visit was arranged by E. C. Moore, Asst. Farm Advisor.

Mr. V. W. Thalman, Hawaiian Pineapple Company, Honolulu, recently visited the Station to investigate the non-cultivation of orchards practice and overhead sprinkling. Mr. Thalman stated that the pineapple growers are considering the use of both methods in Hawaii. The experimental work they have done to date looks promising for both practices.

M. M. Winslow of the Station staff recently addressed students and instructors at the California Polytechnic School at San Dimas regarding the work of the Citrus Experiment Station. Classes from this school expect to visit the Station later to learn about the rootstock and fertilizer experiments.

Dr. J. Van der Vecht, Entomologist, and Dr. Th. Van Eek, Plant Pathologist, have just left the Station after several weeks of study here. They addressed the staff regarding the conditions in Java, and discussed some of the methods used in that country to control insect pests and plant diseases.

*"It would be a dangerous delusion if our confidence in the men of our choice should silence our fears for the safety of our rights. Confidence is everywhere the parent of despotism. Free government is founded on jealousy, not in confidence. It is jealously and not confidence, which prescribes limited constitutions to bind down those whom we are obliged to trust with power. . . . In questions of power, then, let no more be heard of confidence in man, but bind him down from mischief by the chains of the Constitution."* Thomas Jefferson.

SUPER-STRAIN PURPLE VETCH for late cover cropping

We could fill this page with arguments in favor of this fine legume, but we'd rather let our field men tell you all the advantages of growing a cover crop which is particularly adapted to the Southland and will give you a good green tonnage in a minimum length of time.

Purple Vetch can be planted as late as January 1st and will mature in from 120 to 150 days. When turned under, it will disintegrate rapidly. And that's just part of the story our field men will tell you!

If you prefer mustard, we recommend our All-Weather Mustard Mixture. Blended of several fine varieties, its advantage is that if weather and soil conditions do not suit one variety of this mix, it will suit some others, thus assuring a good stand under practically any growing conditions.

Our Super-Strain Field Pea is another good cover crop, which can be planted as late as February 15th. They mature in from 90 to 120 days and when turned under will disintegrate completely in about three weeks.



Purple Vetch, showing root system. Planted October 1st. Picture taken January 29th.



Super-Strain All-Weather Mustard planted September 14, 1943, on E. C. Kimball Ranch in Ventura County. Picture taken March 8, 1944.

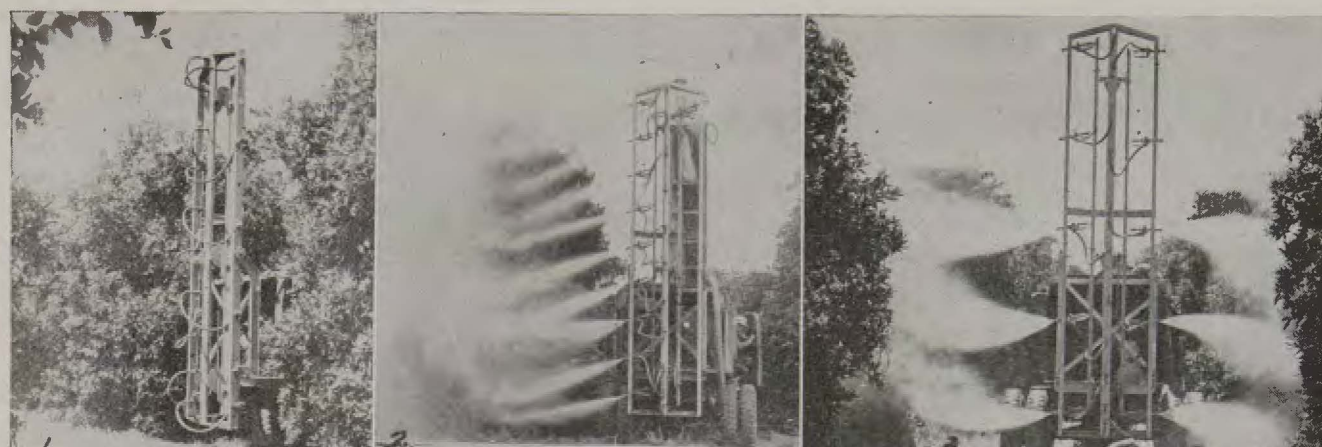
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A Rotary Motion Boom Sprayer

MOST spray booms used in California citrus orchards have been constructed with vertical movement. On a recently introduced patented boom, known as the Rotary Orchard Spray, manufactured by the South Coast Company of Newport Beach, the spray guns are operated with a rotary motion. Mr. Henry I. Pollard, citrus grower of Puente, conceived the original idea for this boom.

Several of these booms are in use in southern and central California. One, operated by the Leffingwell Co., is powered by a Hardie 80 pump which has a capacity of 15 to 20 gallons per minute more than the normal high capacity citrus spray machine. The guns, ten in number, are set on an upright frame (1). It

is possible to arrange these guns to apply the spray all in one direction (2) or to direct the guns five each in opposite directions (3). In large trees the outfit may be operated with a tower man to supplement the top coverage (2). The boom operates off the pump shaft through a gear box. Nos. 6, 7 and 8 discs are used. The pressure at the gauge runs 750 to 900 pounds. The nozzles rotate approximately 100 revolutions per minute, and by the continuous circular motion the force of the stream is not broken as is the case with an up and down motion.

The sprayer is operated on both sides for thrips, aphid and minor elements; on one side for scale, spider and such pests as require a more thorough interior coverage.—R. S. Woglum, C.F.G.E. Bureau of Pest Control.

Less Smoke From Orchard Heaters

If orchard heaters are kept clean, have tight fitting lids and stacks, and are properly regulated, the amount of smoke produced will be greatly reduced.

The four major essentials of smoke reduction are: Clean the soot off the

stacks and lids; see that vents, stacks, and lids fit tightly with no air leaks; use clean oil only and discard the sludge; and regulate the heaters carefully and make the first adjustment within two or three minutes after lighting.

When temperatures get cold, don't attempt to burn a few heaters at a high rate, but light more heaters. Burning at too high a rate produces needless smoke. Heaters should not be forced to burn over three-fourths of a gallon per hour.

After 20 to 25 hours of burning, lids and stacks should be removed and cleaned. Removal from the heater before cleaning is essential to keep the soot from falling into the oil.—Kenneth M. Smoyer, Assistant Farm Advisor, Los Angeles County.

*"My favorite British maxim: Live as if you are going to die tomorrow, Farm as if you are going to live forever!"—Mr. John Green, BBC Agricultural Liaison Officer, in an ABC Broadcast.*

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## Report from Meeting of National Reclamation Association

By HOWARD A. MILLER

Those who have been interested in the recent didos of the U. S. Bureau of Reclamation will be interested in this report of Mr. Howard A. Miller, manager of the Agriculture Department, of the L. A. Chamber of Commerce to the Board of Directors. He attended the 15th annual meeting of the National Reclamation Association, an organization of water users and others interested in irrigation development in the seventeen western states.

At its Fifteenth Annual Convention at Omaha, early in October, the National Reclamation Association was addressed by two United States Senators, two Governors, and several Congressmen. Much of the program consisted of speeches by government officials from the U. S. Department of Interior, the Army Engineer Corps and the United States Department of Agriculture.

In times past the Association's policy has been one of going all out for additional projects and, in my opinion, too often without particular regard to the economic desirability of bringing in new irrigated lands. Furthermore, the policy and activities of the Association have, in no small degree, been dominated by the Bureau of Reclamation. Until the last year or so, they have worked together, that is, the privately established Association and the Federal Bureau, as one closely knit unit. However, during the past two or three years, there has been a growing realization by some of the leaders in the Association that the Bureau was pushing them into some proposals that might lead to grave dangers. In fact, Floyd Hagie, who recently resigned as Secretary-Manager of the Association to become General Manager of the Seattle Chamber of Commerce, in his statement to the Convention, referred to dissent for the first time in fifteen years between the Bureau and the Association, as to what constitutes sound legislative policy. Mr. Hagie said:

"The Bureau's proposals seek a subsidy, by subterfuge, from the national taxpayer, for the commercial power features of federal reclamation projects. Such a procedure is economically unsound, morally unfair, and politically short-sighted. Because they seek all this in the name of the federal reclamation program under the Federal Reclamation Act, our whole program might easily be jeopardized, if not completely lost.

"The Bureau seeks, by misinterpretation if possible, otherwise by complicated legislation, to have extended from fifty years, to its own estimate of what might be the life of the property (100 or 200 years), the amortization period under which the Secretary of the Interior can authorize, without congressional approval, construction of commercial power

plants in connection with reclamation projects.

"In another move, through misinterpretation of present laws, the Bureau hopes to avoid the necessity of repaying the principal invested in the commercial power features of any future reclamation projects.

"Another scheme of the Bureau's is to find a way of avoiding the necessity for investments in power paying any interest to the federal government for use of money so invested.

"They constitute a whole list of expedients designed to federalize the power industry of the West, all of which are poor substitutes for a frank and honest presentation of all the issues to Congress on a project-by-project basis as provided for in the present reclamation laws."

Mr. Hagie's statement has to do largely with the public power issue and I think that, in all frankness, we should say that the fears of the Association in this regard have been largely prompted by a belief that the preferments, and what actually amount to subsidies to new irrigation development, would suffer because of these policies. I believe, though, that there is also an appreciation on the part of Association leaders that it is possible to damage the cause of jus-

tifiable reclamation by asking for too much in the way of irrigation subsidy.

I think that I can best convey the attitude and ideas of the Bureau of Reclamation, and its parent, the Department of Interior, by quoting from the remarks made to the Convention by officials of the Federal Agency. Mr. Warner W. Gardner, Assistant Secretary of the Interior, said:

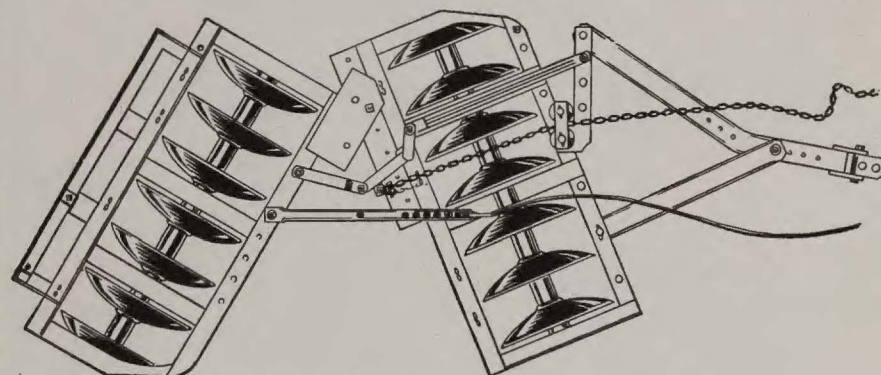
"The basic element in our future planning must be the fact that our country in general, and the West in particular, needs to grow more food.

"Even if we take the fullest possible advantage of regional planning and regional operation, I believe it will soon be necessary to face the fact that some of the most worthwhile projects of the future are not 'feasible' within the strict accounting standards prescribed by the Reclamation Act of 1939.

"The country is before long going to be faced with a square choice: shall water go to waste or shall arid lands be made productive even though it may cost 10 to 20 percent more than the water and power users can be expected to repay directly to the Treasury."

I hardly need to point out that if the great need for food exists as claimed, there should be a resultant price that would make feasible repayment for the projects. As to paying out construction costs of 10 to 20 percent more than the repayable values resulting from projects, I have no idea as to why Mr. Gardner stopped at such figures, rather than

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going to 50 or 100, or even a larger percentage.

Mr. Michael Straus, Commissioner of Reclamation, boasted of the recent authorization by Congress of the largest appropriation ever made available for irrigation development. He did not mention that Federal funds are already being used for price supports on some agricultural commodities from already established agriculture. Mr. Straus stated that "the velocity that the Reclamation program actually attained (first half of 1946) was at the rate of \$210,000,000 a year"; that it is his personal conviction that "the Bureau must be enabled to double that velocity in coming years." He pointed out that Congress has already authorized nearly two billion dollars' worth of reclamation work but funds therefore have not yet been provided. In support of his philosophy for liberalizing reclamation repayment requirements, Mr. Straus said:

"It is time we see to it that Re-

clamation is segregated from other categories of works and is accorded its proper preferred position as a unique Federal regenerative activity. It is dynamic in its effects on industry and business throughout the nation and a pre-requisite if the United States is going to clothe, feed, and maintain its steadily increasing population up to American standards.



"During the last days of the 79th Congress, we obtained a new law (Public Law 732) worthy of your

attention, which authorized allocations on a basis that the irrigator need not repay the part of the cost of our reclamation projects that can properly be allocated to benefits to fish and wildlife.

"Why now should the Reclamation Laws not be amended in the same way with respect to purely recreational features of a reservoir so that these benefits are achieved without saddling the expense of the vacationist or the nature lover at reclamation

reservoirs on the local water users—as required by present law? The Bureau of the Budget and the President have already approved a proposal by Reclamation to have recreation benefits allocated as non-reimbursable national benefits, thus lifting this fiscal burden from the backs of the irrigationists.

"Why should we insist, as the law now does, that water users return all allocated costs of construction in 40 to 50 years for dams, reservoirs, and

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canals with a proven useful life of 100 or 200 years or, for all I know, thousands of years? *Why* does the great United States, when it undertakes to aid its own citizens develop their own national resources, impose such harsh terms?"

What Mr. Straus fails to mention is that the repayment requirements for the irrigation features of reclamation projects do not include any charge for interest during the 40 to 50-year repayment period. Mr. Straus

goes on to say: "When irrigation creates from the desert or sagebrush a Phoenix, a Boise, or Scottsbluff, are we not broadening the tax base? Can we afford not to build these reclamation projects and broaden our tax base? Can we halt inflation and balance the budget without creating this real new wealth?"—and ended his talk with: "Now is the time to liberalize the reclamation laws."

I might add here that his proposals are incorrectly labeled as "liberal-

izing the Reclamation Laws." What he proposed is simply saddling a larger, or perhaps the total, cost on the Federal Treasury. Attempt to liberalize the reclamation laws with respect to the "land limitation" clause, and other features, have steadily been resisted by Reclamation officials.

A Bureau sponsored resolution, which would have placed the Association on record in support of a greater subsidy for reclamation de-

velopment, was the only contested resolution and was defeated under the leadership of the California delegation.

California's concern in the policies and programs of the Bureau of Reclamation is not only related to our portion of the tax burden for subsidized projects, or the matter of subsidized competition from both agriculture and power but we are, of course, concerned as to how these matters affect our water supplies, particularly in the Colorado Basin. Subsidized development will permit other areas to take and use water for which California agencies have already contracted and made huge investments.

But the Assistant Commissioner of Reclamation, Mr. William Warne, advances this novel idea:

"The development of the Colorado River Basin to the point at which the last drop of water that can be provided will be put to beneficial use is 100 years away and perhaps much farther. We should not create obstacles to our present progress by borrowing troubles from the future, troubles that I believe will prove to have been imaginary. The second stage should be a 10 or a 15, or at most, a 20-year program that can be completed with comfortable water margins around all edges."

To those having any slight knowledge of Western water laws, comment on Mr. Warne's carefree philosophy seems unnecessary.

If further proof were needed as to the type of thinking that is going on in one of our great public agencies, I can pull out some additional choice morsels from the speeches. However, at the moment, I only want to add that the proposals of these men are not being wasted in ideal dreams or even in pigeon holes. They have been and continue to be formulated into legislation and bureaucratic policies and are becoming the law of the land.

Rural traffic deaths increased 24 per cent in 1945, according to the National Safety Council. Rural deaths were 60 per cent of the total traffic toll in 1945.

**Lemon Men Meet Dec. 4**

THE Lemon Men's Club will hold a meeting in the Board Room of the Sunkist Building, 707 West 5th Street, Los Angeles, Calif., Wednesday afternoon, December 4, 1946, at 1:30.

The general subject of the meeting will be, "Application of Engineering Principles to Agriculture." Prof. Harry B. Walker, Professor of Agricultural Engineering at the Experiment Station, Davis, will discuss "The Principles of Agricultural Engineering Applied to Packing House Problems," and Prof. Roy Rainer, Professor of Agricultural Engineering at Davis, will discuss, "Engineering Principles Applied to Production Problems."

This should be an outstanding program, and all citrus growers and packing house men are invited to attend.

**Fumigation Hazardous on Nights of Freezing Weather**

WE are now approaching the time of year when freezing temperatures may be experienced. Records of past experience show that fumigation on nights when orchard temperatures drop below the freezing point of citrus fruit (28 to 30° F.) is hazardous, even when the minimum may occur several hours following the fumigation, according to R. S. Woglum, C.F.G.E. entomologist.

Last year several cases of rather severe fruit damage from fumigation on nights of subfreezing temperatures occurred during November and December. This damage amounted to "scalding" or burning of fruit with subsequent drop, which in some cases was excessive, particularly on the last rows of the nights' run. Valencias were most severely affected. It appears that the susceptibility to this injury is correlated more or less with the maturity and hardness of the tree and fruit, which accounts for the more severe damage from fumigation during periods of subfreezing temperatures in November and early December than later in the winter.

Therefore, it is important that fumigators watch the minimum temperature forecasts closely during this period and, on nights of forecast temperatures below 30° F. for a particular district, not fumigate in that area, or stop work at 40° F., in order to allow several hours between work stoppage and the night's minimum.

On nights of forecast minimums of 26° F. or below, fumigation should not be started at all.

It is well known that the U. S. Fruit Frost Service, with headquarters at Pomona, forecasts minimum temperatures for the citrus belt beginning regularly on November 15. These forecasts are released over Radio Station KFI nightly at 8:00 p.m. Prior information may be obtained by telephone from the Fruit Frost Service, Pomona 1074, or from district agents whose names and telephone numbers are given below:

- Floyd D. Young..... Pomona 1074
- Claude A. Cole..... Covina 632-83
- Leland Johnson..... Corona 519
- Roy Simpson.....\*El Centro
- Wayne E. Harman.....\*El Cajon
- Charles Allen..... Lindsay 29
- Edwin M. Legg..... Redlands 7768
- Wm. J. Rogers.....\*Santa Paula
- R. J. Rogers.....†Upland 312-427
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NOTE: It is well to avoid oil sprays prior to severe freezing weather.

\* Telephone being installed.  
† Temporary.

**Administrative Committees Orange and Lemon**

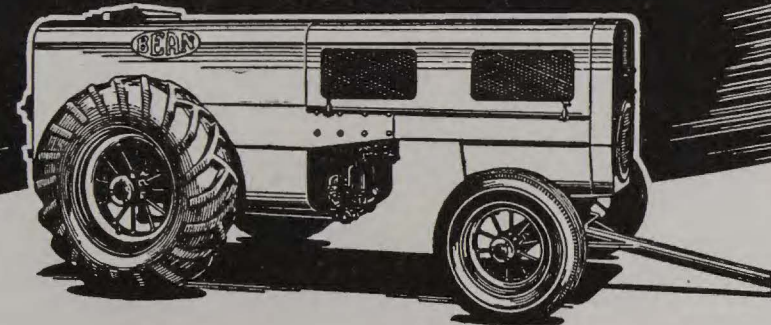
MEMBERSHIP of the California-Arizona Orange and Lemon Administrative Committee for the federal marketing orders regulating the handling of these two fruits was announced recently by R. M. Walker, Chief of the Western Field Marketing Office, P&MA Fruit and Vegetable Branch, USDA.

Both committees will serve during a two-year period beginning November 1, 1946. Their principal function is to investigate supply and demand conditions and recommend to the USDA the quantities of lemons or oranges which should be shipped weekly in interstate commerce and to Canada. The federal order on oranges also applies to shipments to Alaska.

The California-Arizona Orange Administrative Committee, as announced today, consists of: Leroy E. Lyon, Fullerton; R. K. Pitzer, Pomona; Roy R. McLain, Visalia; J. A. Porter, Orange; R. P. Allen, Santa Ana; and H. L. Shepherd, Riverside. Alternate members are: A. M. Otis, Whittier; H. M. Johnson, Los Angeles, and A. D. Mays, Riverside; plus three new appointees: C. L. Sheldon, Santa Paula; Harold Daniels, Redlands; and Paul R. Jennings, East Highlands.

The personnel for the next two years of the California-Arizona Lemon Administrative Committee includes two new members: Philip S. Wit, Riverside and Glen Shepherd, Etiwanda. Continuing to serve will be: R. L. Willits, Corona; C. P. Strickland, Santa Paula; and Hugh M. Caldwell, Oxnard. Alternates are: L. W. Fowler, Santa Barbara; J. A. Moffett, Lemon Cove; J. J. Gain, Escondido; Herbert H. Blodgett, Fillmore; and Willard B. Gerry, Camarillo.

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# Now's the Time

By D. M. RUTHERFORD

MAYBE oakroot fungus infections (Armillaria Root Rot) in orchards are not the most important citrus malady extant, but to an orchard owner a good going case may spread enough in a few years to put him out of profitable growing, and that's pretty important. One need not travel far to secure the evidence.

At this stage of affairs it is probably true that scaly bark has put more trees out of business than oakroot fungus. Likewise a herd of unattended gophers may gnaw more trees into economic oblivion than the Armillaria organism. But when the migrating ability of oakroot fungus is considered it takes no great stretch of imagination to see the slowly spreading and devilishly persistent fungus outranking scaly bark and pocket gophers by an uncomfortable margin as time goes on. Write this down in your little black memo book.

Oakroot fungus is more widely spread in some districts than most people like to admit. We are heir to a human frailty that makes us look the other way rather than face an unpleasant and work-involved fact. Our friends and neighbors may know about this hidden sorrow in our orchard, but many of us can't be brought face to face with it in sufficient velocity to do something about it. Seems to be a social stigma attached—like having a brother-in-law in the penitentiary—not a subject for conversation.

Oakroot fungus is not sensational. Trees do not die overnight because of it. They may live for years—with an annual production of a hatful of fruit. The fungus is insidious. It works slowly, but with deathly sureness, like cancer. Many growers have the infections in their orchards and are blithely unaware of it. Which

suggests that more citrus growers, particularly the newly deeded owners, could well know more about citrus growing, never a front porch occupation.

Oakroot fungus is a disease of roots. It is not readily seen, unless one goes looking for it with an instrument not favored by many, a shovel. At this time of year, after the first rains, visible symptoms may be seen: toadstools, many of them, in a clump. Buff colored toadstools, about the size of a silver dollar, if you remember those, or roughly two inches or so in diameter. The gills under the toadstool cap are a dirty white or a tell-tale gray. The toadstools come in dense clusters. BUT, the infection may be present even though the toadstools may not make an appearance.

Some orchards now are so badly infected with oakroot fungus that eradication economically is not feasible. The alternative is to learn to live with the malady, although the best methods of control known to date are costly, laborious and time consuming. If an orchard is badly infected and on the verge of being put out of business, the only use for the land is production of quick growing annual crops—unless the land is disinfected at a heavy expenditure of labor and money.

One man we know, owner of a sizeable citrus acreage, has several spots infected with Armillaria root rot. He has been very diligent, attacking each infection as soon as it was discovered. He has eradicated the infection in each instance. New trees have been planted, well cared for, and the orchard as managed will continue to be productive. In another orchard in the same vicinity the problem either has been ignored or the job put off



Toadstools of the oakroot fungus (Armillaria mellea) at the base of a dead tree.

until someone could get around to attending to it, and now so many trees are involved that abandonment as a citrus orchard would probably be the cheapest way out.

The chief cause for spread of oakroot fungus is the failure of growers to recognize that the infection is present in their orchards and often, in complete innocence, dragging roots and bark across their property, spreading infective material.

What are the first signs? Often a tree shows symptoms first by going bad on the side where the root infection occurs. It is, as we have said, a root-borne disease, and the visible symptoms are like those of any other damage to the root structure, caused by gophers, root cutting or dying from one cause or another.

Oakroot fungus spreads like ring-waves caused when you toss a stone in still water, but in very slow motion, perhaps only a few feet in a season. From the source, maybe a single tree, the spread is to the trees surrounding the focus of the infection, then to the trees surrounding them, and so on, until acres are involved. This may take several years, but it works while you sleep.

Now let's get down to cases. Look for some toadstools as described above, a bunch of them, seeming to come from one point. Or look for a sick tree that is not a scaly, or one you can swear hasn't been feeding a gopher, and dig along the roots. Roots infected by the oakroot fungus have mushy, decayed bark which has a characteristic toadstool odor. Long infected roots may be mushy or punky all the way through. Peeling back the loose bark will reveal a fan-like fungus growth, white to buff in color, the mycelia. Sometimes on the outside of the roots will be found dark purple strands, darker and less branched than citrus feeder roots, these rhizomorphs are the exploring strands by which the infection goes from one root to the next. They are hard to see, but if you find them you can be sure that you are in touch with oakroot fungus.

With a few infected trees control measures are difficult enough, but if a sizable area is involved the treatment may become heroic. There are two approaches. Eradication involves taking out all the trees in the infected patch, disinfecting the soil with carbon bisulfide, and replanting. Or you can learn to live with it and have an extra chore on your work docket



White, mycelial fans of Armillaria mellea between the bark and wood of an infected citrus root. The disease had been moving inward along this root toward the root crown. Its development was arrested, however, when the advancing lesion entered the dry atmosphere of a pit dug earlier around the root crown.

for the rest of your natural life. Remove the trees as they become unproductive, sterilizing the soil up to the "drip" of the surrounding trees. Reset young trees in the disinfected area as soon as the odor of the soil disinfectant has disappeared, 6 to 8 weeks. This rarely eliminates the fungus because by the time you do the job the infective rhizomorphs have already made contact with roots of the surrounding trees, and in a year or two or three you have some more trees to take out in an ever widening circle. Thus some day you or your children will have a new orchard and probably also the opportunity to start over again as new foci of infection reveal themselves behind the operational front. But a good job of soil sterilization will reduce the hazard of new trees becoming infected, and may prolong the useful life of the orchard indefinitely.

We see no need here of going into the intimate details of treatment of oakroot fungus infections. A comprehensive article on the subject was

published in this journal in March, 1945. A circular on the subject (Armillaria Root Rot) is available at the office of your County Agricultural Extension Office and is highly recommended for homework.

Now is the time to look for signs of the infection. If discovered, now is the time to plan, and get advice as to correct procedure. Pull trees when soil conditions are right—pull trees in order to take out as much of the infective root structure as possible. Soil sterilization is best done in the summer or fall when the ground has had opportunity to dry out thoroughly.

Now's the time. Get acquainted with what's doing in your orchard.

## FRUIT DROP AND SPLIT FRUIT

AN unusually heavy drop of immature navel oranges is occurring in many sections of Los Angeles county, reports Kenneth M. Smoyer,

assistant farm advisor in Los Angeles county.

The drop is exceedingly spotted, he reports. In some orchards fruit is dropping from only a few scattered trees. In some cases, one orchard will be dropping its fruit and the next one shows little or no drop.

The cause of fruit drop in oranges is not known, he declared. There seems to be no correlation of irrigation, spraying, fumigation, soil types, or other conditions which will explain it. Neither is there any control known.

He reports that Dr. William S. Stewart, assistant plant physiologist, University of California Citrus Experiment Station, is investigating the problem.

Another baffling problem is the tendency of navel oranges to split, but neither cause nor cure is known. More splitting is occurring this year than normal, Smoyer says.

A new item in the fruit field: Field frozen pineapple chunks.

# Protect Your Crop Investment

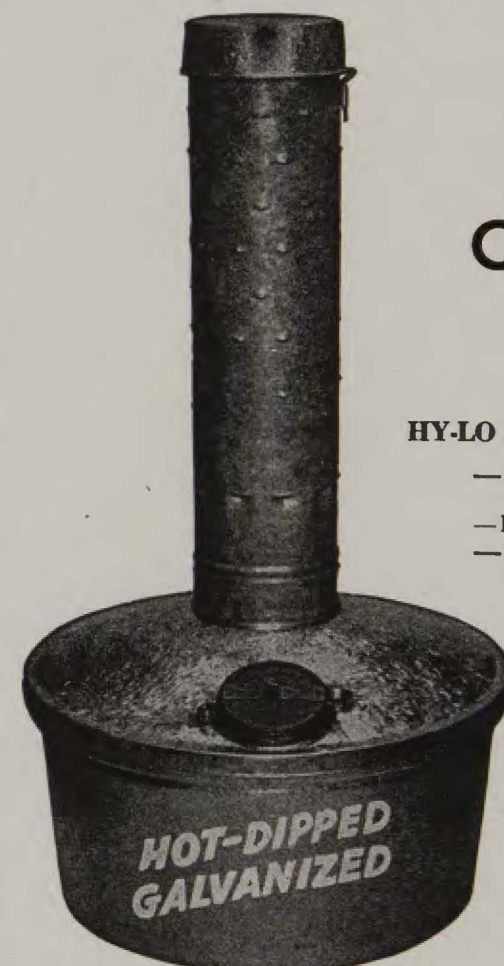
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Since there have been many transfers of ownership of citrus properties in recent months and many new owners not well acquainted with the financial structure of cooperative grower-owned packing house associations, we felt that it would be well to publish an article on the subject. It seemed in order to ask a packing house manager how he would explain the matter to a prospective member. Mr. W. E. Birkel, secretary-manager of the West Ontario Citrus Association, has kindly done the job for us.

ONE of the questions that a packing house manager is called upon most often to answer in solicitation for membership in a cooperative is: "What will it cost me?"

My usual answer to this question is: "It costs you nothing to join, but . . . every member, to the extent of his patronage and use of the house will be called upon to contribute to our Revolving Fund.

## CO-OP FINANCING

By W. L. BIRKEL

The next question is: "What is that?" This gives me an opportunity to go into the question of how a cooperative is financed and generally obtains its operating capital.

In the early days of cooperative history the usual procedure for financing a cooperative was to sell the prospective member stock in the cooperative, usually so much per acre. The average pay-up for membership was \$30.00 per acre. Generally arrangements were made to withhold from the members fruit returns a certain amount per box until the stock was fully paid for. Then, if and when the grove was sold or changed hands for any reason, the stock was usually passed along with the transfer of the acreage to the new

owner. Sometimes, in case of sale of the grove, the stock was retained by the original owner who hoped to realize something for it in due course. The new owner, if he is affiliated with the same house, had to start all over again acquiring stock. This of course tended for the time being to give the cooperative additional working capital. However the time would come when there was an abundance of stock outstanding with a corresponding lack of demand for it. "That which by us is lightly gained, is by us least esteemed," and the value, in which a membership in a cooperative should be held, suffered.

In comparatively modern history of cooperatives, the issue of stock was and is being replaced by a Re-

volving Fund set-up. The revolving fund is the capital in the financial set-up of the cooperative. A membership is gained simply by signing the by-laws of the cooperative. Among other things said by-laws provide: "There is hereby created a fund to be designated and carried on the books of the cooperative as the Revolving Fund. From any money otherwise payable to any member, there shall be withheld, or retained by the cooperative, a sum specified in these by-laws for each box or other unit of citrus fruits handled by the cooperative for such member. The retains for each season shall be placed in said revolving fund as of the conclusion of the season during which it has been retained to the credit of the respective members from whom retained and each member shall be credited upon the books of the cooperative under an appropriate designation indicating the purpose of the amount retained from him for said revolving fund, said amount so credited being sometimes herein referred to as Revolving Fund Credits."

In our Association the amount of money retained per packed box is five cents. If a grower member has three thousand packed boxes, the retain for revolving fund credits will be \$150.00. The total amount of money withheld from all of the grower members constitutes the capital of the cooperative. Assuming now that the cooperative is on a five-year revolving basis, this \$150.00 will be used by the cooperative for five years and then paid back to the contributor member. In other words, the cooperative borrows this money from the grower-member and it is paid back with or without interest, depending upon the by-laws of the cooperative. Usually no interest is paid.

It is thought that since the money collected represents capital, and if it were not for the fact that the membership provides this money, an equivalent amount would have to be borrowed from lending agencies on which interest would have to be paid. This interest payment has to come out of the operating fund of the cooperative. Since a cooperative operates at cost, interest payments would increase this cost. Seen in its true perspective, it is readily seen that it is more economical for the member not to receive interest on his revolving fund credit.

Usually the by-laws also provide that only a complete series of credits can be repaid so that every member in any given year has the same consideration in the return of his money. This is a continuous process and the collections from this year's revolving fund retain are used to pay back the grower members who contributed to the revolving fund five years ago.

The voting power in stock companies is in the hands of the growers in accordance with the number of shares of stock each grower has. In cooperatives that have a revolving fund, the voting may be done in accordance with the dollar interest an active grower-member has in the re-

volving fund. It is to be realized that the cooperative with a revolving fund gives an advantage to its members in that it automatically liquidates its capital obligations. Also when a grower terminates his membership, his capital investment is refunded to him. He does not have to do anything about it. The grower, when selling his grove, retains title to his interest in the revolving fund. However when he no longer delivers his fruit to the cooperative, he no longer has any voting rights in the business meetings of the cooperative. Therefore the affairs of the cooperative are always in the hands of active growers. Most of the newer cooperatives and many older ones, formerly on a stock basis, have adopted the Revolving Fund principle in their operations.

### The Fruit Situation

DEMAND for fresh and processed fruit is expected to continue strong this fall and winter. Prices for most processed fruits, a few fresh fruits, and walnuts and pecans probably will remain above comparable prices a year earlier. But prices for most fresh fruits and almonds and filberts are expected to continue below last year's levels mainly because of increased production. Even so, prices generally will be well above prewar levels. Production of deciduous and citrus fruit is at new record-high levels this season, and,

as a result, total supplies of fruit for domestic consumption also are at new record-highs.

The 1946-47 citrus crop is estimated to be about one-eighth larger than the previous record set in 1945-46. The commercial apple crop is about average but much lower than the record-small 1945 crop. The 1946 pear crop has topped, by a small margin, the record set last year. Demand for grapes for all uses has been unusually strong. Because of the stronger market for grapes for fresh and processing uses, a somewhat smaller tonnage of fresh grapes will be converted to raisins than last year. The cranberry crop is the second largest on record, but prices thus far this season have run considerably higher than prices last year, when ceilings were in effect.

The 1946-47 total commercial packs of dried fruits and of frozen fruits are expected to approximate the packs of the previous season. Total supplies of tree nuts in 1946-47 are expected to be slightly smaller than a year earlier, partly because of a decline in domestic production of pecans and partly because of smaller imports.—U.S.D.A., Nov. 7.

"Research is definitely an investment in the future. Industry has used it for years and found that it pays high dividends. It is equally important in the agricultural field."—C. F. Speh, assistant chief, Bureau of Agricultural and Industrial Chemistry, at National Farm Chemurgic Council conference.

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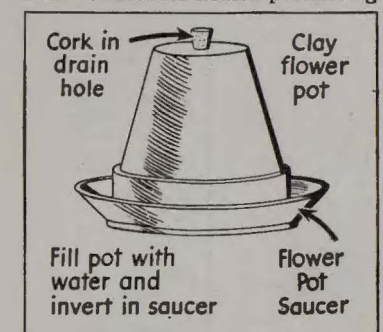
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VOL. IV NO. 11 ISSUED MONTHLY by STANDARD OF CALIFORNIA DECEMBER • 1946

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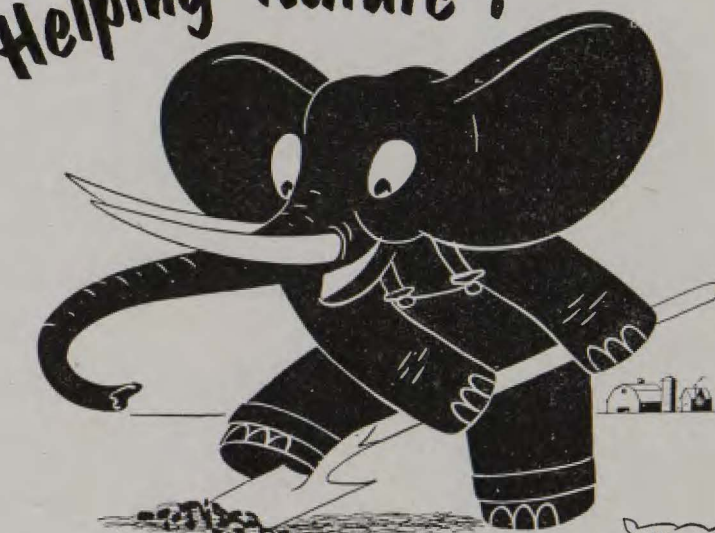
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**COOPERATION** as a means of maintaining economic security by democratic action with individual liberty in the choice and production of farm crops highlighted the talks given at Purdue University, Lafayette, Indiana, at the 5-day session of the American Institute of Cooperation, August 26 to 30.

Speaking to groups ranging upward to 1,800 were such nationally known speakers as Chester C. Davis, Claude R. Wickard, E. G. Nourse, H. E. Babcock, and W. I. Myers of the United States. They stressed the fundamental need of a sound agriculture to the stability of the nation and

## REPORT FROM THE AMERICAN INSTITUTE OF COOPERATION

the need for intelligent cooperation to bring this about.

International aspects and needs for cooperation were discussed by Father M. M. Coady of Antigonish, Nova Scotia, and A. B. MacDonald of Ottawa, Ontario. Pierre Gillouard of Beaugrenier-Montjvovault, France, discussed cooperative problems in France.

Reincarnation of the cooperative movement in the enlarged program of the American Institute of Cooperation should "not merely signalize the resumption of sessions after the wartime interruption," asserted Dr. E. G. Nourse, newly appointed chairman of the Economic Advisory Committee under the Full Employment Act.

"It should, if it is to take its place in the march of the modern scientific world, become a carefully planned and adequately financed research organization, probing more deeply into the still unfathomed mysteries of what 'equitable association of farmers' (referring to Rochdale terminology) means in the political and economic sense, not alone to their own members but to the whole society of which they are a part and from which in the long run they can expect economic reward only in proportion as they render economic service."

### Higher Standards for Others

Chester C. Davis challenged co-op leaders to take an even more active part in the international leadership involved in helping other countries to gain higher standards of living. In turn, he pointed out, this would improve the ability of such countries to trade with the United States. It is in the immediate interests of the United States to modernize backward peoples, not merely by shipping supplies of food when famine threatens but by furnishing them with the know-how to produce food in abundance to strengthen their ability to buy other goods from us.

It is poor planning, in the opinion of H. E. Babcock of Ithaca, N. Y., unless "children are entitled to as much consideration as pigs, calves and chickens." He emphasized the fact that human nutrition has received less research and emphasis than that for livestock.

The "way of living" is too frequently lost sight of by some cooperative leaders intent on building a strong capital structure and large volume, charged M. G. Mann, general manager of the Farmers Cooperative Exchange, Raleigh, N. C., during the discussions on cooperative philosophy.

"The purpose of cooperatives," he declared, "is to provide better living conditions for our rural people. That can come only through better farming and better business. There are three betters—better farming, better business and better living—and the most important of these is the end product, better living."

Businesses buying and selling commodities in performing essential distribution services are in effect the purchasing agents of consumers, in the opinion of Paul S. Armstrong of the California Fruit Growers Exchange. He pointed out how such service was performed by a cooperative organization—farmers pooling their skill and resources to make possible economies and efficiencies similar to those achieved by large commercial and industrial corporations.

"In doing all these things," Armstrong declared, "it serves to benefit both the producer and consumer. In fact, no cooperative can serve its producer members well unless in doing so it likewise serves the consumer upon whose buying decisions the destiny of the producer ultimately is made."

E. G. Burland, deputy executive director of Cooperative for American Remittances to Europe, Inc., said,

"CARE is an experiment in cooperation. It is a joint venture of some 20 American charities of all types and in addition includes the Cooperative League of the U.S.A. and the welfare branches of the C.I.O. and the A.F. of L."

### Cooperation Promotes Peace

World peace is hampered by competition and promoted by cooperation, declared A. B. MacDonald, general secretary of the Cooperative Union of Canada. "How can man possibly dispel war unless he means to dispel want and the fear of want which breeds war?" he asked. "Cooperation between nations is a fantastic dream unless it presupposes cooperation between men. But it is difficult for man to cooperate with his neighbor when the whole economic tradition and code of economic morals has taught him that he must compete to survive. The answer is simple and clear and every man knows it in his heart. The answer is that competition for the necessities of life must be condemned forever, and men as well as nations must practice the art of cooperation."

This is partly a question of habit, he concludes, so that "when men learn and practice the technique of sharing, with the same zeal they now practice the technique of competition, the world will wonder why wars were ever fought and man will have reached his greatest era of social development."

William I. Myers, dean of the college of agriculture, Cornell University, trustee of the Rockefeller Foundation, and chairman of the board of trustees of the American Institute of Cooperation, just returned from a 6-week tour of four European countries, declared:

"The German and Austrian people will not elect a communist government in a free election soon unless they become desperate through continued misery. Conditions that make people hungry, cold, shabby, overcrowded, tired and discouraged also breed desperation and revolution. From my observations as a cooperator looking at postwar Europe, it is my conviction that the first and most important step needed to strengthen the democratic governments in Europe is the improvement of standards of living in all countries."

"We can be thankful that England and France are making good progress with the assistance of loans and help from the United States."

After describing the difficulties of present quadripartite control of Germany, he concludes, "We in the United States are fortunate beyond belief. A round trip to Europe—when travel becomes available—would do more to make us realize our blessings than any other single thing."

### Research Means Progress

Dr. Frank Robotke, of Iowa State College and long-time trustee of the Institute, stressed the fact that "research in modern times is the price of survival and progress is axiomatic. Before the day of scientific research there was little progress, and most of that was the result of accidents. Today, the nations, industries and firms that are doing the most research are setting the pace. World War II was largely a race of technical research, which toward the end reached a point of feverish intensity. "Cooperation is no exception to this general rule," Robotke believes.

Cooperation is a bulwark against isms, Father M. M. Coady of St. Francis Xavier University, Antigonish, Nova Scotia, asserted. He is credited with organizing Nova Scotia fishermen into cooperatives that have gained international attention.

"Democracy was conceived," he declared, "in the idea that if all the people ruled they would share in more or less equal measure the good things of life. The very reason for this kind of social organization is to get away from the aristocracy of blood and money. By using the techniques of cooperation, the people of a democracy can stay where they are and get for themselves a new share of the national income that was never dreamed of by their fathers. Economic cooperation lets all the people into business, and that is a good thing. In the past, business has given economic, social and political standing to all those who have engaged in it. If it is a good thing for the great on the earth, there is no reason why it should not be equally good for the lowly. Without recourse to any rough, extreme revolutionary tactics, cooperation offers in reality a silent but needed and real social revolution."

Raymond W. Miller, president and general counsel of the Institute, closed the 18th annual session with an invitation to come to the 19th annual session of the American Institute of Cooperation to be held August 25 to 29, 1947, at Fort Collins, Colorado.—From Nulaid News, October, 1946.

000,000 population gain, and a growth of industry stimulated by war.

Also, during the war, the traffic rode west, while now it has reversed itself, and flows east, as in prewar days.

Many freight cars wore out in war traffic, and have not yet been replaced.

Shippers have relaxed from wartime loading to capacity.

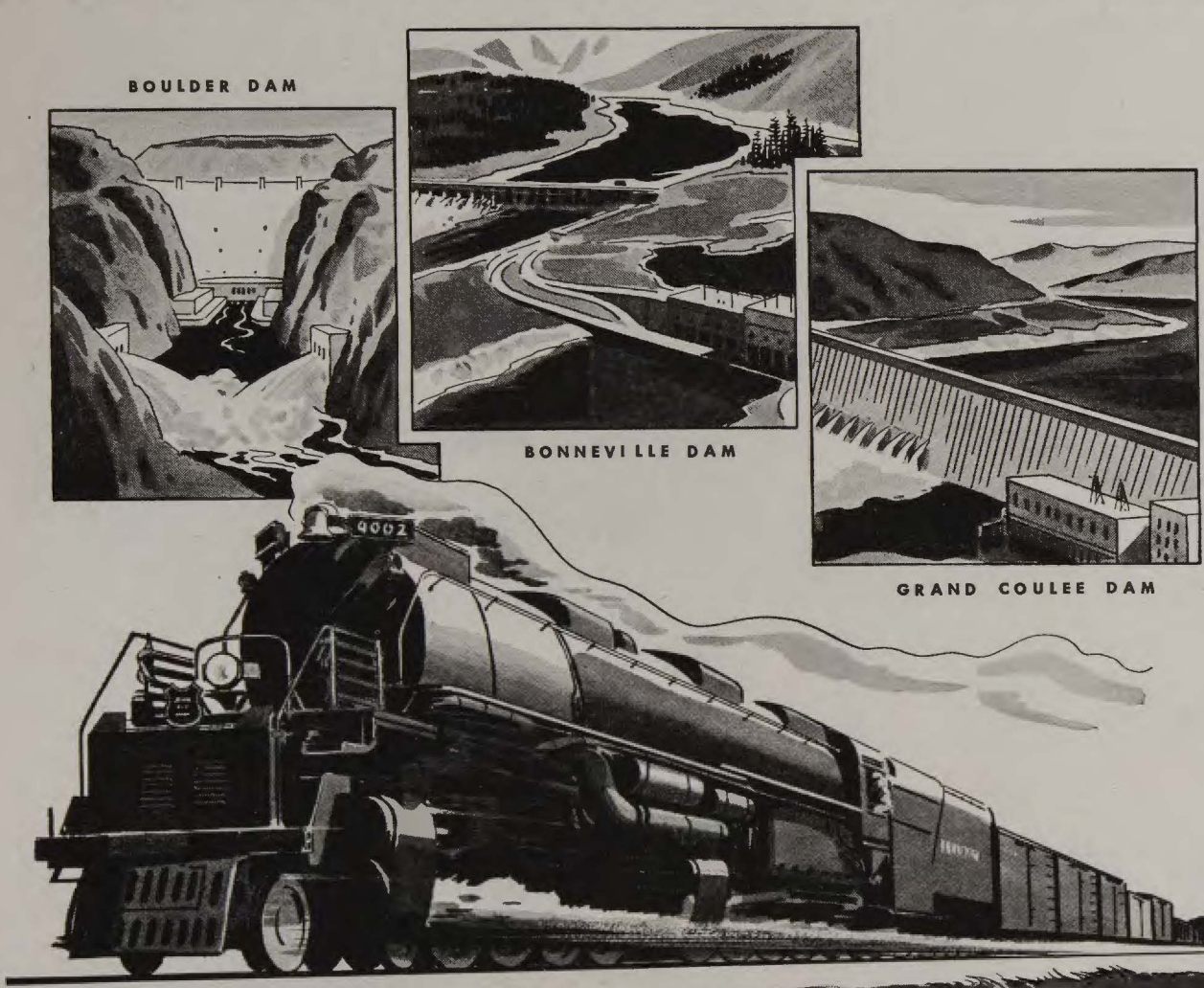
Most industries are back on the five-day week, and thus cars stand idle over week-ends.

Manpower shortages hamper the railroads in keeping locomotives and repairable cars in service.

War traffic was handled with less labor than peacetime loadings—whole trainloads were dispatched for the Government, where now the loadings are split up among many industries.

So, count railroad freight service as one of the things that is having reconversion difficulties.

## A MESSAGE TO THE CITRUS INDUSTRY



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**The CITRUS GROWER'S QUESTION BOX**

By J. C. Johnston, Extension Specialist in Citriculture, University of California

★

Readers are invited to send in their questions on cultural problems.

Q. Do windbreaks, in competing with citrus trees, cost more than they give in benefit?

A. No. Not if properly managed. A survey conducted by the Agricultural Extension Service in Orange County during a series of windy years revealed that windbreak protected orchards produced almost 50 percent more boxes of fruit per acre than unprotected orchards in the same districts. Returns per acre were in greater proportion because of the better quality and less marred fruit in the protected orchards. Windbreaks need extra watering, extra fertilizer, root cutting every second or third year and trimming of overhanging branches. Although production may be reduced in the first and second tree row next to the windbreak, the extra production in the balance of the orchard particularly in windy years far over balances this competitive loss. In districts subject to harsh winds, we believe ten percent of the orchard property can profitably be devoted to windbreak protection. — Harold E. Wahlberg, Farm Advisor, Orange County.

Will the College of Agriculture analyze a sample of my soil to show what it will grow?

This question is often asked by farmers and the answer is NO, because no laboratory test of soil can be depended upon to tell what will grow on the land from which the sample came. Neither will it tell the total amount of available nutrients in the soil.

A laboratory test may prove helpful in determining changes which take place in certain types of soil, but not in predicting what might be grown in it.

If certain crops are not performing satisfactorily in the soil, it may be the fault of management practices rather than the soil itself. Faulty soil management practices are common. Perhaps the land has been planted to the same crop for a succession of years without adequate fertilizer. Other factors may interfere with normal assimilation of plant food.

Plow pan and cultivator sole are fairly common in some irrigated sections when complaints are heard that orchards are going backward.

Field examination of soils is generally more satisfactory. The appearances of trees or crops often indicates to trained observers what may be

wrong. Only actual field experience and a knowledge of why plants fail to grow will help much in determining why a crop is not doing well.—WARREN R. SCHOONOVER.

Q. I have carried on a noncultivation program for 2 years. I would like to change the furrowing. How much of the benefits I have gained would be lost by cultivation at this time?

A. Tillage will cut roots but if it is shallow very little harm would be done. Tillage will bring up new weed seed and you will likely get a heavy weed growth which will require more frequent spraying for a time. The effect of tilling the soil once will not be important. It is the long continued use of this practice which is injurious.—J.C.J.

Q. Do you consider that dairy fertilizer can be used with economy on a grove that is under nontillage with weeds controlled by oil?

A. So far as I know, there is no experimental evidence on this point to the answer; must be a personal opinion. I do not believe dairy manure can be used with economy on nontilled orchards. It is being used and no doubt does some good but I see no advantage over groves where only chemicals are used and the cost is greater.

**Quick Decline**  
 (Continued from Page 50)

The occurrence of one quick decline tree in each of the two check groups indicates that at least some natural infection has taken place. Two additional check trees have shown very slight indications of being in the early stages of quick decline but cannot be classed as definitely diseased at this time. In the group of trees inoculated by means of buds from quick decline trees, 36 percent had symptoms which appear identical to those of quick decline. If it is assumed that in that group also two percent of the diseased trees may have resulted from natural infection, there remains an increase of 34 percent infection in the inoculated group over the check group and it seems safe to conclude that approximately that percentage of diseased trees has resulted from the inoculations these trees received 15 to 16 months earlier.

Additional evidence that at least a slight amount of natural infection is occurring in young trees is evident from results of a survey of 303 Valencia on sour planted in June, 1945, in an area of the experimental block from which all old trees had been removed. None of these young trees were included in the regular transmission tests but in early November of 1946, four of them, or 1.3 percent, showed typical advanced symptoms of quick decline. This percentage is in close agreement with that found in the non-inoculated check trees of the

transmission experiment.

Schneider<sup>3</sup> has called attention to the striking analogy between the collapse or degeneration of the sieve tubes in the region of the bud union of quick decline trees and the condition found previously in certain grafted cherry trees affected with the Green Valley Buckskin virus.<sup>4</sup> The reproduction of quick decline symptoms in young trees inoculated by means of tissue grafts is proof that quick decline is an infectious disease. The failure of intensive study to reveal organisms, bacteria or fungi to be primarily involved in the etiology of quick decline places the disease in the virus category.

The urgency of an understanding of the nature of this potentially disastrous disease warrants this somewhat preliminary report. Further reports will be presented as the investigations progress and data are accumulated.—University of California, Citrus Experiment Station, Riverside, Calif., Nov. 14, 1946.

<sup>3</sup>See footnote 1.  
<sup>4</sup>Schneider, Henry. Anatomy of Buckskin-diseased peach and cherry. Phytopath. 35:610-635. 1945.

**TRENDS IN AVOCADO OPERATIONS**

AVOCADO growers in Orange County have on the average, cut-down on the amount of water used, fertilizer applied, and cultivation operation in the last 16 years, according to long time orchard records recently summarized by Farm Advisor H. E. Wahlberg.

Orchard data showing trends of practices in Orange County avocado groves were presented by the Farm Advisor to over 300 growers at the 17th Annual Avocado Growers Meeting at La Habra.

**Less Irrigation Water**

In 1930 when the study was started, the average water use was 20.6 acre inches per acre. The cost averaged \$36.12 per acre. In recent years the trend has been downward in amount of water and cost per acre. Last year, in 1945, the average use was 15.4 acre inches per acre and the cost averaged \$22.27 per acre.

Fertilizer costs per acre have gone down from \$33.27 per acre in 1930 and \$46.09 in 1931 to \$28.78 per acre in 1945. Avocado trees, said Wahlberg, are better feeders and appear to get along with less fertilizer than citrus under equal conditions.

**Less Cultivation**

The amount of cultivation has decreased in the same period. Whereas the cultivation costs averaged \$20.19 per acre in 1931, the 1945 reports showed an average of \$13.55 per acre. Cultivation costs in the past 5 years have been as low as \$6.80 per acre.

The average yield per acre reported by the twenty orchards in the study ranged from 1276 lbs. in 1938 to 8006 lbs. in 1944. The average for the 16 years was 3964 lbs. per acre.

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# ★ The Home Page ★

## Save Last-Minute Rush

PREPARING and stuffing the Holiday turkey in advance and then putting it in the freezing locker until the day before the holiday dinner is the way some housewives like to cut down the rush of last minute preparation.

Mrs. Sara Mott, San Bernardino County home demonstration agent, has some suggestions for those wishing to try it.

1. Extreme care must be taken that all materials in the stuffing are fresh and clean.

2. The dressing should be completely chilled before stuffing, and

the bird should also be chilled before being stuffed. It should then be transferred to the locker at once for freezing.

3. Stuffed birds probably should not be held in freezing storage longer than a month because highly seasoned foods such as stuffings change flavor and it is likely to permeate the bird and produce off-flavors.

4. The bird should be thawed unwrapped at room temperature. More time will be required than thawing of unstuffed drawn turkeys, which require 12 to 14 hours. Perhaps large turkeys, 12 pounds or more, should not be stuffed for freezing. A few suggestions may help in



## On the way! A better service for farm telephone users

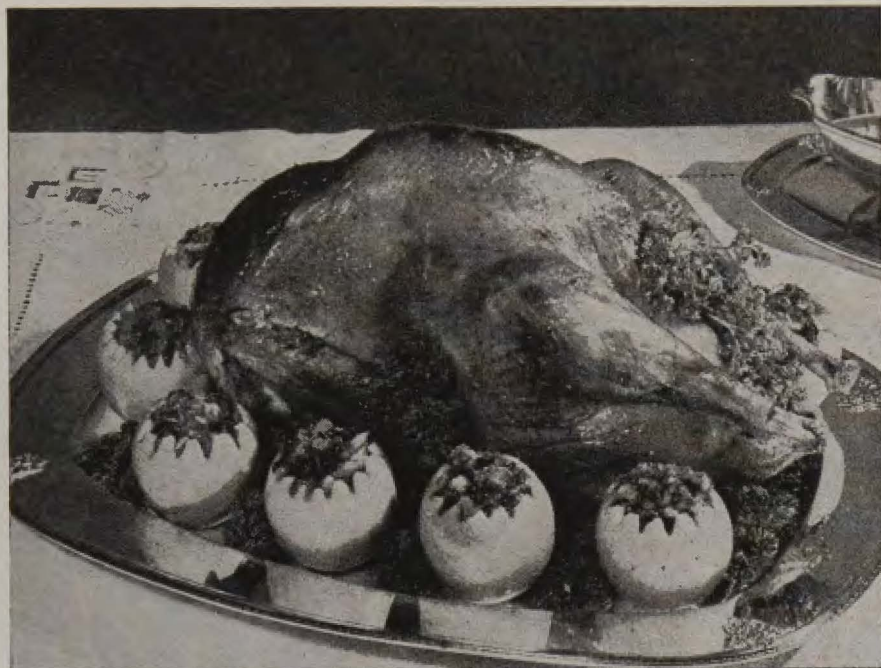
Telephone service has long been regarded by many farmers as essential. It's a valuable aid for business contacts and for pleasant friendly purposes. Now it is rapidly being improved and extended. Our \$180,000,000, 5-year expansion program will bring real benefits to every rural telephone user.

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To learn about telephone service for your farm, and the improvements that are on the way to make rural service even better than it is today, talk to your local Telephone representative.

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Cranberry-Orange Relish in Fluted Orange Shells

CRANBERRY-ORANGE Relish is one of those outstanding recipes that has climbed on to the band wagon of traditional foods for Thanksgiving and Christmas. Corn syrup is used as a partial substitute for scarce sugar. Individual service in a charming manner is accomplished with the use of clean golden shells of California navel oranges.

Cranberry-Orange Relish—Put 4

cups of fresh cranberries through food chopper. Quarter 2 whole seedless navel oranges and put through chopper. Add 1 cup sugar and 1 cup corn syrup. Mix well. Chill before serving. Makes 1 1/4 quarts relish.

Fluted Shells—To flute the shells of the orange, cut with a sharp knife by piercing to center of orange with zig-zag strokes that meet to make points of the scallops. Separate the two orange halves and remove pulp.

making the dressing for birds intended for freezing storage:

1. Freezing increases the potency of pepper, and this should be cut down markedly in the dressing.

2. Onions may fade out, and you probably need more onions. The onion has a tendency to change flavor some on long storage.

3. The salt sometimes is not as noticeable after freezing, but it would probably be better to wait and add the salt when serving.

### Potato Salad

Hot—Cook 3/4 cup diced salt pork until crisp. Add 1/4 cup vinegar, 1/4 cup water, 1 medium-sized chopped onion, and 1 quart cubed cooked potatoes. Season with salt and pepper. Heat well.

Cold—Slice or dice cold cooked potatoes. Season with salt, chopped onion, and salad dressing. If desired, add sliced hard-cooked eggs.

### Broccoli with Onion Sauce

(Serves 4)

1 pound bunch broccoli  
3 tablespoons minced onions  
1 tablespoon lemon juice  
3 tablespoons meat drippings or other fat  
Dash of salt  
Dash of pepper

Cut off woody portions of broccoli and the large outer leaves. Wash and soak in salted water, heads down, a few minutes. Drain, split thick stalks twice at right angles from bottom to save cooking time. If stalks are long, tie in bunches for serving and stand upright in deep kettle. Boil in salted

water until tender. Tips of broccoli cook tender in the steam. Drain and keep hot. Fry onion in fat until light brown. To onion add salt, pepper and lemon juice. Pour sauce over broccoli and heat about 2 minutes.

## KFI Items



for the RANCHER

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## Holiday Sweets that Spare Sugar

Sweet rolls such as cinnamon rolls, orange rolls, or tea rings make tasty desserts and fill the need for holiday sweets without causing too great a drain on the family supply of sugar.

These rolls can be made with either the emergency flour now available or the regular all-purpose flour soon to be released again.

Directions for the preparation of sweet rolls are contained in the circular Yeast Breads. The circular is available from the Agricultural Extension Service.

## Potato Puff

To 3 cups mashed potatoes, add 1 egg yolk, hot milk to moisten, 2 tablespoons melted fat, salt, and any other seasoning you like. Beat well. Then fold in 1 stiffly beaten egg white. Pile lightly into a greased baking dish. Bake in a moderately hot oven (375° F.) 30 minutes or until puffy and brown.

## Care of Your Iron

DO you get the most from your electric iron? What you get out of your electric iron largely depends on the care you give it.

For example, you should always take hold of the plug when detaching a cord from an outlet or an appliance. Pulling on the cord may loosen the connections or even pull the cord from the plug.

It is always preferable to connect the iron to a convenient outlet. A 1,000-watt iron should never be attached to a drop cord. The standard light socket is designed to carry only 250 watts.

If you disconnect the cord from the iron while the current is on that may cause sparking. In time, this will ruin the plug and may necessitate replacement of the connector terminals on the iron.

Let the iron cool before storing it. Keep the cords clean and dry. Roll them up loosely and hang them over something round.

Remember that overheating will shorten the life of your iron.

You can remove the starch from the sole plate by wiping with a damp cloth. It is a good idea to occasionally rub the sole plate lightly with paraffin or beeswax and polish it with a dry soft cloth.

Of course, you must be careful not to drop the iron.

It's dangerous to leave the iron connected when not in use.

## Brushes Best Dried by Turning Bristles Down

THE best way to dry all kinds of household brushes after washing or using is to turn them with their bristles down instead of on their backs.

The common practice of turning brushes on their backs to dry allows water to stand where the bristles are fastened, tending to loosen them. Brushes with wooden backs are most likely to be harmed by this practice.

Many brushes, brooms included, may best be hung up to dry and kept in that position when not in use. Flat brushes including brooms and paint brushes are hung with bristles down. Many brushes are made with a hole or screw eye at the end of the handle for this purpose. These may be easily added to those not made that way.

## To Clean Old Galoshes

Don't throw away a good pair of galoshes, just because the inside is dirty and likely to ruin your hose. The lining can be cleaned as easily as the outside.

Simply turn the overshoes inside out and dunk in a tub of warm soapy water and let them soak a few minutes. Then with a small, fairly soft brush, scrub over the entire lining.

For very soiled galoshes, you may need to repeat the operation.

Rinse them thoroughly, and place to dry away from sunlight or direct heat.

Galoshes will stand many, many washings, if you handle them with care.

Carrets are good to be eaten with salt fish. Therefore sow Carrets in your Gardens, and humbly praise God for them, as for a singular and great blessing; so thus much for the use and benefit had in the commonwealth by Carrets. Admit if it should please God that any City or town should be besieged with the Enemy, what better provision for the greatest number of people can be, then every garden to be sufficiently planted with Carrets.—Richard Gardiner (1597).

—So reports Western Grower and Shipper at this late date.

Ice trays should be washed with soap and hot water at least once a week.

Save soap slivers—place in dish of water by sink, use on greasy pots and pans.

Clean those dirt-collecting crevices and corners in wicker furniture with a well-lathered brush and water. Rinse thoroughly and wipe dry.

Dark gray, blue, green or brown cotton flannel, washed several times in good suds before using, makes the best polishing cloth. One yard makes 4 cloths, 18x18 inches.

Fats and oils should be tightly covered and stored in a cool, dry place, away from light. Strain fat drippings or used fats.

Preferably, do not serve uncooked egg white, especially without the yolk. Cook milk or milk-and-egg dishes in an opaque pan, with a lid when possible, or in the oven.

In cooking dry beans, cook until thoroughly soft or tender. Do not use soda in cooking dried beans. If the water is very hard, try to secure soft water for cooking the beans.

Dresser drawers will slide easily if you rub the sticking parts with laundry soap.

A stiff chamois will soften if rinsed in 2 quarts luke-warm water to which 1 tablespoon olive oil has been added.

## INFRA RED RAY

FOR

## Frost Control FULLY AUTOMATIC

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CORONA, CALIFORNIA



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Rates: Fifty cents a line, cash with order. Minimum \$1.00.

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Buds and rootstock carefully selected.  
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Located on Berrydale between 17th St. & Trank Ave.

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## CITRUS SEEDLINGS

Orders accepted for early 1947 delivery of Rough Lemon, Sweet, Sour, Grapefruit and Tangelo seedlings. In tarpaper tubes if desired.

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East Telegraph Road, Fillmore, Calif.  
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FOR SALE: Best Mexican Thinkin Avocado seed.  
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44 acres, principally oranges, in excellent citrus district; with State Highway frontage; 23 acres 18-year navels; 7 acres 9-year Valencias; 10 acres 22-year Placencia walnuts; 4 acres open crop land. All are sound, good trees; not diseased. Grove is in a frost-free area (no smudging); has ample water and sandy loam soil. Improvements include small stucco house, two-car garage and complete irrigation system.  
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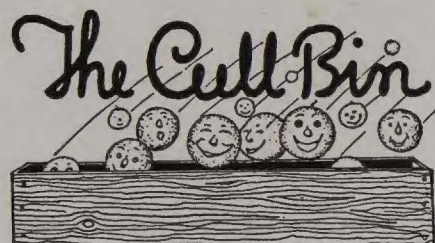
FOR SALE—Choice Citrus properties, any size, in the Lindsay-Porterville districts, Tulare county. Courtesy to brokers. Call or write, Al N. Green, Broker, 130 E. Honolulu St., Lindsay, Calif.

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To settle estate, 40 acre orange grove, 20 acres navels, 20 acres valencias, with 10-room modern home; also 5 room modern tenant house. Grove in good condition. Water supply plentiful. Located between Strathmore and Lindsay. Price includes crop and equipment. \$118,000. 50% down, terms on balance. Would consider selling one-half.

Packing house, including boxes and equipment. Ready to operate, \$78,750.

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Rastus: "I hear you got cut in the fracas last night."  
Sambo: "No suh, I just got my arm cut some."

"That's a nice hat you're wearing, Jim."  
"Yeah, Bill, I bought it six years ago, had it cleaned four times, changed it twice in a restaurant, and it's still like new."

The following correction appeared in a small town paper:  
"Our paper carried the notice last week that Mr. John Doe is a defective in the police force. This was a typographical error. Mr. Doe is really a detective in the police force."

## Rain Bird SPRINKLERS

### MODERN IRRIGATION

Plan now for modern irrigation. Install Rain Bird Sprinklers to insure effective watering of row crops, orchards or pasture. Buy now at your neighborhood dealer.



Reducing exercise: Move the head slowly from side to side, when asked to have a second helping.

Angry Father: "What do you mean by bringing my daughter in at this hour in the morning."  
Gay Blade: "Have to be at work at seven."

A seasick sailor was leaning over the rail. The captain, standing nearby, said sternly, "you can't be sick here."

The sailor regarded the captain a minute, then said, sadly, "Watch."

A negro, riding home on his mule, passed under an apple tree, so he stopped and reached up for a tasty apple on a high branch. Just as he did so, the mule started off, leaving Mose hanging perilously. Just then the owner of the orchard came along. "What are you doing up there?" he demanded.

"Befo' de Lawd," said Mose, "Ah jes' fell off mah mule!"

Tramp: "Have you got any old cast-off husband's clothes?"

Lady at the door: "No, we're still living together."

Ardent Swain: Your hair is like spun gold. Your eyes, like two pools. Your lips—gee, what a mess you must make on the rim of a coffee cup.

Ad in English paper: Owner of tractor wishes to correspond with widow who owns a modern thresher; object matrimony; send photograph of machine.

The torpedoman on a submarine was home on a furlough. He was dozing in front of the kitchen stove with the cat on his lap as his wife cooked supper. Suddenly the kitchen curtains caught on fire.

"Fire" screamed the terrified wife. The sleep-befuddled sailor jumped to his feet, opened the oven door, tossed the cat in, slammed it shut, and yelled: "Fire two!"

A meddling old woman accused one of the contractor's workmen of having reverted to drink because "with her own eyes," she had seen his wheelbarrow standing outside the tavern. The accused man made no verbal defense, but that evening he placed his wheelbarrow outside her door and left it there all night.

Moe: "Do you believe a rabbit's foot brings good luck?"  
Joe: "You bet! My wife felt one in my pocket once and thought it was a mouse."

A proud father was teaching his small daughter to tell time.

"These are the hours, these are the minutes, and these are the seconds," he said, pointing them out.

The small girl looked rather puzzled. "But where are the 'jiffies'?"

Roses are red,  
Violets are blue,  
But they don't get around  
Like the dandelions do.

Photographer (after taking photograph): "You may look unpleasant again now, madam."

## If You Wish to Sell Your Property?

There are lots of people here in Los Angeles looking for Citrus Groves, both large and small. We need good listings and will give you prompt action. Give full description in letter and we will then get in touch with you immediately.

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Tested in fields, orchards, nurseries—on vegetables, fruits and ornamentals—under glass, lath and in the open.

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HYPO-CLOR is the most effective means available for destroying green and blue molds as well as many other causes of decay. It is a cold bath sterilization process that leaves the fruit near storage and shipping temperatures.

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ARE YOUR BRANDS ON THE PREFERRED LIST AT MARKET?



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