

ciations could easily cooperate.

Dissemination of Information

It was the opinion of the committee that considerable progress has been made in this area. In some states agricultural briefs and preliminary experiment reports are sent to all agriculture teachers. The committee believes that this is a problem involved with improving communications in each state

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Future Activities

1. Each member of the joint committee is charged with the responsibility of reporting to his association the activities and tone of the committee. He is also charged with the responsibility of continuing to improve the relations between the two associations.

2. Each association is charged with the responsibility of considering the problem areas presented by the joint committee.

3. Each association is encouraged to invite members of representatives of the other association to its regional or national meetings.

4. Each institution within a given state is charged with the responsibilities of:

- a. upgrading instruction.
- b. improving communications.
- c. sharing ideas, philosophy, etc.
- d. working with each other.

5. The next meeting of the joint committee will be April 25, 1963 in Chicago at the Farm Foundation Building.

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WORKING RELATIONSHIPS AMONG COLLEGES

PANEL members for this discussion included: Dr. T. R. Buie, Moderator; Dean Fred N. Briggs, University of California; Professor Dean McNeilly, Modesto Junior College and Dean Lolyd Dowler, Fresno State College.

The three California representatives on the panel presented evidences of the fine working spirit of the Tripartite Higher Education system in California. Committee work was begun about 10 years ago that sought to bring a closer working relationship among the institutions giving work in the field of Agriculture.

A Master Plan for California Higher Education has been spelled out and the place of the University, the State colleges and the Junior Colleges has been determined.

Provisions for transfer of credit has been one of the areas given thought and attention. A satisfactory arrangement has been effected.

It is recognized by these men that getting acquainted with the individuals from the other schools has been the greatest single factor in improving working relationships.

This is too big a story to be told second hand, so we shall stop with the meagerest of suggestions and hope for a good article on the California Tripartite System in Higher Education in a future issue of the Journal.

Papers Given At The Subject Matter Group Meetings

At previous conferences, some time was always allotted for the delegates to get together with those in their own specific field. These meetings were always profitable but difficult to report. The 1962 Program Committee decided to make two divisions — Plant Science and Animal Science — and have prepared papers presented before concurrent sessions of these groups.

The following papers were presented: "Sprinkler Application Rates for Higher Returns" by Dr. W. C. Strong, Fresno State College; "The Use of More Machines in the Horticulture Enterprise," by O. M. Braun, Fresno State College; "Cotton Seed Meal as the Major Source of Protein Supplement in Swine Growing and Finishing Rations," by J. T. Bell, Fresno State College; and "Environmental Influences on Farm Animals," by Dr. Floyd Hixson, Fresno State College.

The article by Mr. Braun is being presented in this issue of the Journal with the expectation of being able to carry the other three papers in future issues.

THE USE OF MORE MACHINES IN THE HORTICULTURE ENTERPRISE

By O. Martin Braun

Professor of Horticulture

Fresno State College

The purpose of this paper is to give a bird's eye view of what is taking place in the mechanization of the fruit farms in California. California today produces about 10 per cent of the farm wealth of the United States. In 1961 some 25 major fruit and nut crops, planted on 1.2 million acres, produced over 6.7 million tons of produce worth 580 million dollars. California is a leader in fruit production and it is natural, then, that the California fruit growers should have many problems. Over-production; high taxes; high transportation costs; rising costs of materials, supplies and maintenance; increasing cost of labor, and protectionism for foreign imports has placed the fruit farmer of today in the greatest cost-price squeeze since the last depression.

We in the fruit production business are partly at fault. In this atomic age, in many enterprises, we are using "horse-and-buggy" methods. In most cases we prune trees, thin and harvest fruit much the same way we did fifty years ago.

The jobs of pruning, thinning and harvesting

fruit involves much more hand work than field crops do, but, as long as the fruit grower's income was high enough he wasn't too concerned about increased efficiency. Now with the threat of the unionization of farm workers and low net income we have a motivating force at work to encourage greater efficiency.

Just as machine topping of citrus trees is now considered a standard practice, so will be the topping of the older, more mature peach, plum, and nectarine trees in future years. More hand work is necessary in pruning deciduous trees, because as the trees of these species become older, much of the lower fruit wood dies out. Mr. Norman Ross, Stanislaus County farm advisor, has shown me orchards where a dormant topping, with either the sickle type or saw type machines, followed by a topping after harvest on early varieties of cling peaches has produced a new, vigorous growth in old trees. These trees came back the following year with a heavier crop of fruit and with more fruit wood in the lower part of the tree. Mechanical pruning has a tendency to give the fruit tree a "ragged" look in addition to a Dutch-cut appearance. In the Modesto cling peach orchards where the farmers had the hand pruners thin out dense fruit wood only, the savings in pruning costs were much greater than where attempts were made to thin out the stubs at the top of the trees. Mr. Ross also has shown that if the tree has the proper leaf area, spacing of the fruit evenly by thinning afterwards is not too important. The un-thinned clusters of fruit sized beyond the minimum requirement.

Last year in Stanislaus County pruning costs in some mature peach orchards which were topped, were cut from 80 cents per tree to about 55 cents per tree on the average. Some costs were higher and some lower.

Many practices now used by fruit growers must be changed. Trees must be headed higher and proper training of trees and spacing of scaffold limbs to accommodate equipment will be necessary. More careful selection of varieties to obtain even ripening will become more important. More advanced planning of irrigation and soil preparation in relation to harvest schedule must be made. The problem of lack of water penetration and soil compaction will become more common.

In the thinning operations, hydraulic type "tree squirrel" and platform trailer equipment is being used extensively. Fruit is also being thinned with shaker attachments. The cost of this operation will vary greatly with the kind and variety of fruit and size of the trees.

Costs have been reduced from 15 to 45 cents per tree in topped orchards. The average would be close to 30 cents per tree in reduced costs. Some of the equipment used in thinning fruit is also being used in the harvest operations. Here again we find that fruit species, tree structure and shape, the operators and workers are key factors in increased efficiency. Some fruits are more adapt-

able to thinning than others. Some tree damage in the use of shaking equipment has been reported, and has been due to too much pressure on the limbs, improper attaching of equipment and operating equipment too soon after irrigation, when the bark is more easily damaged.

About ten years ago many progressive walnut growers were completely mechanized. As one walnut grower remarked "I bought a float, side rake, walnut pick-up machine and a shaker, and cut my labor force from 45 workers to 5 during the harvest season."

Many of the almond, fig and prune growers have completely gone over to the mechanization of their harvesting and orchard work.

The harvesting of cling peaches in California and of sour cherries in Colorado and Michigan and other states is past the initial experimental stage. The use of shakers, catching frames, conveyors and pallets were planned for extensive operations during the 1962 harvest season. One machinery manufacturer reported that by shaking the cherries on catching frames and moving them by belts to pallets, 7 men with machines harvested as many cherries as 33 hand pickers on ladders. Some growers are thinking of a single picking for cling peaches. Savings will have to justify a higher loss of fruit in handling and bruising. Processors are demanding top quality fruit — so cullage losses will be higher. Losses from immature fruit and bruising are still high.

In harvesting nectarines, plums and peaches for shipping, the farmer is more concerned with maturity, size, color and firmness of the fruit. With these, fruit farmers have used self propelled hydraulic machines and platform trailers to replace the ladders.

The "tree squirrel" type of machine is built for one worker, and is quite maneuverable, while a crew of 5 to 7 operate the platform trailers.

The "quadraman" type of trailer platform is pulled down the middle of two rows. It has two quadrant arms that swing out on both sides so as to circle half of a tree. Four men operate on top, picking fruit from the ends of each quadrant first and working toward the center. Two men pick the lower part of the tree, drive the tractor and replace full boxes on the carrier rack with empties. In the Fresno State College orchard the pickers used form fitting pails strapped around their shoulders which freed both their hands for picking. In using the platform trailers the workers must operate as a team and the driver must be ready to move when the workers are through picking. Fruit sizing equipment and pallet equipment are available to be pulled behind these trailers.

The advantages of this equipment also depend upon the variety, and kinds of fruits, and on which "pick" is being made. The reported increased output from farmers in the Fresno area

varies from no increase to 45% increase, with an average of about 25% increase in picking output.

While mechanization may not lessen the fruit growers' problems, it may help him to make a profit and stay in business. When the farmer decides to mechanize he must decide whether he should buy the equipment or have a custom operator do the work. A study of the size of his operation, cost of the equipment needed to do the job, availability of cash or credit, and the availability of skilled workers to operate and maintain the equipment is needed.

Whatever he does, he may feel like he is out on a limb . . . but, isn't that where the fruit is?

How soon should a fruit grower mechanize? It is true that as the agricultural engineers develop better machines to do various jobs the older ones are bound to become more obsolescent quite rapidly and would probably qualify for an accelerated depreciation rate. All factors affecting the farming operation should be carefully evaluated before buying equipment.

Have you heard about the Australian bushman who developed a more deadly and superior boomerang that was more effective at a greater distance than the old one? The obsolete boomerang was of no more use to him. However he became frustrated and finally went crazy trying to throw the old boomerang away.

The cost of a machine and its possible use for other jobs should be carefully considered. The total possible hours of use during the year, the savings due to increased efficiency minus the many fixed and variable costs would need to be calculated.

As the fruit industry becomes more mechanized we may be confronted with the problem of the availability of transient workers. Will the workers return to the same area each year if less help is needed? They probably will not and this will cause farmers who need hand laborers to either go out of business or mechanize. A question which has arisen again and again when mechanization is mentioned is, what will happen to the unemployed farm worker? However, I should like to ask you men in the field of agricultural education, "What are our obligations to the farm youth of today in light of the kind of farmers and farm workers we shall need in the future?"

The California State Department of Labor has issued an occupational guide on "Farm Equipment Operator." This is the first notice of this kind that I have received for such a position. Where and by whom will the applicants for jobs as "farm machinery operators" be trained?

It is my hope that through the presentation of problems confronting fruit farmers in agriculture today that you will become more aware of the responsibility of the agricultural teachers in preparing the farm youth of today to assume the leadership of tomorrow.

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