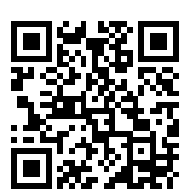

THIRD BIENNIAL REPORT

OF THE

COMMISSIONER OF HORTICULTURE

OF THE

STATE OF CALIFORNIA

FOR

1907-1908.

J. W. JEFFREY, Commissioner.

SACRAMENTO:

W. W. SHANNON - - - - - - - - - - - Superintendent State Printing

1909

CALIFORNIA STATE COMMISSION OF HORTICULTURE.

MAIN OFFICE:

CAPITOL BUILDING, SACRAMENTO, CAL.

J. W. JEFFREY, *Commissioner*.....Sacramento

O. E. BREMNER, *Secretary*.....Sacramento

MISS A. G. BIRD, *Clerk*.....Sacramento

GEORGE COMPERE, *Special Field Agent*.....Sacramento

E. J. BRANIGAN, *Field Agent*.....Sacramento

QUARANTINE DIVISION:

ROOM 11, FERRY BUILDING, SAN FRANCISCO.

EDWARD M. EHRHORN, *Deputy Commissioner*.....San Francisco

F. X. WILLIAMS, *Inspector*.....San Francisco

STATE INSECTARY:

CAPITOL PARK, SACRAMENTO.

E. K. CARNES, *Superintendent*.....Sacramento

B. B. WHITNEY, *Assistant Superintendent*.....Sacramento

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REPORT

OF THE

COMMISSIONER OF HORTICULTURE,

FOR 1908.

To the Honorable Senate and Assembly of the State of California, in Legislature assembled:

GENTLEMEN: In accordance with Section 10 of the law under which the Commission was created, and which provides that "it shall be the duty of said Commissioner to report in the month of January in each even-numbered year to the Governor, and in each odd-numbered year to the Legislature of this State, such matters as he may deem expedient or as may be required either by the Governor or the Legislature, and to include a statement of all the persons employed and of moneys expended under this Act, by itemized statement thereof," I have the honor to present the following annual report:

The work of the Commission of Horticulture is necessarily divided into three departments: the main office, State Capitol, Sacramento; Branch Office and Quarantine Station, Ferry Building, San Francisco, and State Insectary, Capitol Park, Sacramento.

Employed in the main office, including the Commissioner, is a secretary and clerk. John Isaac, the former secretary, resigned on July 1, 1908, since which time there has been no appointment, O. E. Bremner, Assistant Deputy at San Francisco, having been called to the main office to carry on this work. Miss A. G. Bird is clerk.

Branch Office, San Francisco:

Edwd. M. Ehrhorn, Deputy Commissioner and Quarantine Officer.

F. X. Williams, Assistant Deputy.

State Insectary, Sacramento, Capitol Grounds:

E. K. Carnes, Superintendent.

B. B. Whitney, Assistant. Geo. Compere, Special Field Agent.

Besides these, we have been obliged to employ for short periods assistant deputies to help carry out various quarantine orders. Those employed were Stephen Strong, C. F. Butler, E. J. Branigan.

The work of the main office is necessarily varied—the answering of inquiries that represent every phase of every subject relating to horticulture, which include in their heterogeneous assortment everything from a technical entomological description to the broadest economic

problems of the day; the programming, carrying out and printing of the State Fruit Growers' Conventions; the compiling and printing of bulletins on subjects most suited to the needs of the growers, and as an advisory head to all the County Horticultural Commissions.

The duties performed by the Deputy Commissioner and Quarantine Officer at San Francisco are essentially those of a horticultural police officer, having charge of the inspection of all nursery stock, fruit, seeds, etc., from any point outside the State of California. His work is first essentially technical, having almost solely to do with the insect pests and diseases found on such trees, plants, fruits, etc., intended for planting or consumption in California, which would prove a serious menace to our horticultural industry should they gain admission; and, secondly, as police officer, being vested with all the necessary powers to destroy or otherwise eliminate such insects or diseases in the way best suited to protect the California growers.

The State Insectary has been separated from the Quarantine Department, where it has been up to the present year, and is now formally installed in a new building in the Capitol Park, expressly built and equipped for this purpose. It is here that we rear, and from here distribute, the beneficial insects that prey upon different types of orchard and field insect pests that are so heavily taxing the growers. The success of this work in the past warrants keen expectations for the future.

REVIEW OF THE FRUIT SEASON.

The fruit season, for the past year, has, in some respects, been very satisfactory, while in others nearly the opposite. Crops in general, as regards quantity, have been far above the average, but prices have been correspondingly low. This condition applies only to our deciduous fruits, and may be due to several causes; in fact, each product may have had its own peculiar conditions that have worked to its disadvantage. This can best be explained by some typical examples.

The asparagus crop was all that could be asked for as to quality and quantity, yet canners would not handle the product, presumably on account of their inability to contend with the financial stringency. The only growers realizing a good profit were the early shippers to Eastern markets. During the height of the season, 1,500 to 2,000 boxes went begging some days on the sidewalks of our San Francisco commission district even at a price of 25 cents per 40-pound box. The fault in this case seems to partly lay with the general distribution to our local markets, for in outlying towns, where the freight or express rates would not exceed from ½ to 1 cent per pound, asparagus never sold below 12½ cents, and seldom under 15 cents per pound. It would certainly appear that somewhere between the cost in this case, not to exceed 1 to 2 cents

per pound, and a retail price of 15 cents, there is a reasonable figure at which the product could be disposed of at a little more profit to the grower and a little less expense to the consumer. To go further with this example, because the two avenues of distribution, viz.: canned and green asparagus, need never come into competition, and because of its necessarily restricted production, and because this product is so universally accepted under any reasonable conditions, there should be no difficulty in so systematizing the distribution through the medium of our local markets alone that there need never be the same conditions arising that confronted us the past season.

Our peach crop presented nearly the same conditions as that described for the asparagus. The early peaches sold comparatively well, but as the season advanced prices gradually dropped, until the growers of late peaches offered to give their product away if the consumers would merely pay the cost of handling and transportation, yet these same peaches could not be bought through the retail channels in our Capital City at any but prices ranging from 50 to 65 cents per 20-pound box. These two examples are sufficient to convey our idea, for a discussion of practically all our products, with few exceptions, from table grapes and Bartlett pears to prunes and raisins, would take us over the same field. There is certainly no fear of overproduction of these products when our own home markets are so inadequately supplied both as to quality and quantity and are sold at prices which stamps them as luxuries rather than staples, which they should be.

The prune crop was very light, ranging from a full crop in a very few localities to only ten per cent, or practically nothing, in others. Prices on dried prunes began comparatively high, but gradually fell to the lowest mark for the past three or four years.

Our pear crop was the largest and best for many years, with fair prices generally. It is safe to say that we shipped more Bartlett pears this year than in any one year in California.

The apple crop was very large in some districts, and a total failure in others, but, fortunately, in the large sections the output was fully up to the average. Prices ranged fair and quality good. In spite of the discontinuance of the mail line to New Zealand and Australia, shipments were unusually heavy to these markets. Judging from the satisfactory results so far obtained, there certainly appears to be an opening for much of our fruit in these oceanic markets if we were afforded proper shipping facilities.

A full crop of apricots is reported; something we have not had for years, and a fair price.

Of grapes, a full crop of table varieties, but, we are sorry to say, many red ink returns, resulting from a poor distribution in the Eastern markets and the competition of a full crop of Eastern fruit.

The crop of wine grapes was below the average, with prices ranging from fair to poor.

The berry crop (blackberries, loganberries, and raspberries) was good, as it always is, but prices were the lowest they have been for years, probably due to so much other canning products. Strawberries are evidently suffering from a foreign invasion, and when the Japanese have gained full control we may expect the same results that have marked their domination of the potato industry.

Our citrus shipments were not in excess of last year, and the prices did not average quite as high, but it would be unfair to judge any year's crop by such a successful season as 1907, both as to quantity and price. The season of 1908 was certainly all that could be desired from the standpoint of a citrus grower.

The past season has been very propitious for the nut industry, there being no late, cold rains or frosts. Orchards of both walnuts and almonds which have not borne a full crop for years produced an excellent yield of very good quality nuts.

PLANTING.

As to new areas being planted to trees and vines, probably no one year has been so marked by an increase along certain lines, and surely such intelligence has never been manifested previously among our growers as to variety, care, and selection of both stock and location.

As to acreage, grapes have probably led in this increase of area, with perhaps a little in excess of 15,000,000 vines. This includes, of course, table and wine grape varieties. Of this amount nearly one third have been resistant vines, and of these fully 2,000,000 have been imported from France. Of the other fruit plantings, it would be only a wild guess to state which is next, but it is noteworthy that in practically every deciduous section in the State the increase has been large. In some of the newer citrus sections the same tendency to enlarge the acreage has been fully as pronounced. This enlarged handling of nursery stock has necessarily increased the labor of the County Commissioners, and has, in connection with the regular orchard inspection, brought out conditions in the several counties requiring attention.

First, counties amply protected by County Commissioners and Inspectors are jeopardized by neighboring counties without such quarantine protection, thus allowing the introduction and spread of pernicious insect pests and diseases, as well as noxious weeds.

Secondly, the steadily increasing requirement of qualification to meet the conditions imposed on the County Commissioners and Inspectors makes some legislation necessary to increase the pay of these officers in order that more efficient service may be given.

DISEASES AND PESTS.

In considering the prevalence of insect or disease foes to the different branches of our industry, we must first consider the external conditions making for an increase or decrease in these agencies. We had a dry, warm spring; even some of our coast counties suffered from a want of late rains; less fog in all sections; less snow in the mountains, and more drying north winds than usual. The general result has been a marked decrease of both insects and diseases, with but few exceptions.

To have conditions well adapted for the rapid germination and development of fungoid and bacterial diseases we need warm, moist weather. Cold dry, hot dry, or even cold moist, but particularly the two former, are conducive to the limited spread of these diseases. We, therefore, find that the terrible pear blight (*Bacillus amylovorus*), which has so rapidly and completely devastated the pear orchards of our great interior valleys, and has spread to our coast valleys and foothill sections, has not only been checked, but has been less in evidence than for years in practically every section. Another season like the past, with the aid of careful pruning methods, would see a very marked decrease, if not almost total elimination of this blight from many of the orchards. We are, however, emphatic in our stand for the assisting process, and not for risking the job to chance elements.

The same factors which have brought about the conditions cited in the case of the pear blight have acted similarly, but perhaps in not so pronounced a manner, with regard to walnut blight, peach blight (*Coryneum beyerinkii*), pear and apple scab (*Fusicladium dendriticum*) and other similar diseases, for never have our apples, pears, and apricots been so free from scab as this year.

The codling moth (*Carpocapsa pomonella*) in many sections has not been so scarce for many years, but whether this is due to climatic conditions or the work of parasitic foes would be hard to determine. Grasshoppers have been very numerous in many foothill sections, as they always are in dry seasons, for when their natural food is lacking they are forced to migrate to other feeding grounds. The growers in the worst infested sections have successfully fought them by means of large flocks of turkeys.

The pear thrips (*Euthrips pyri*) is at present the worst enemy of our pear, prune, and cherry crops, and seems to be spreading. The United States Bureau of Entomology has been working on this problem for the past few years, and has three men at present in the field here in California. We are anxiously waiting to enforce any or all measures they may discover to either check or control this pest. The orange thrip (*Euthrips citri*) is another insect, very similar to the pear thrip, which is doing no small amount of damage to our orange crop.

The vinehopper (*Typhlocoba comes*) has not been so troublesome the past year in most of the grape sections, although very bad in some. We were fortunate in locating at Sonoma, in the infested district there, a parasite working on this hopper. As the hoppers in this locality have been gradually diminishing, particularly in the past three years, we are in great hopes that the cause of this disappearance lies with this new parasite, and we will thoroughly test this matter to the fullest extent this coming season.

The grape-root worm or flea beetle (*Adoxis vitis*) still continues to be a very troublesome pest in some of our table grape sections.

The red spiders and mites (*Tetranychidae* and *Phytoptidae*) have been particularly troublesome owing to the nature of their attack, and the depleted condition of the trees, due to the dry season, which is also favorable to this class of pests.

The scale insects (*Coccidae*) were perhaps less abundant, yet the aggregate damage done was as great, owing to the condition of the trees so infested. The control of this group will be treated to greater extent in the report of the Insectary following.

The plant lice (*Aphidae*) were much less abundant the past season in many sections, as, for example, the melon growing district of the Coachella Valley. This, however, may be due to the fact that in this special location we introduced thousands of parasites the year previous, which practically saved the crop of melons that season, and would undoubtedly account for the comparatively few numbers of the lice there this year. Shade trees throughout northern California suffered badly from this agency, particularly elms and black walnuts.

QUARANTINE SUBJECTS.

During the past year we have had one occasion to pass a quarantine order. This was in reference to the introduction of cotton seed into the new county of Imperial for the purpose of planting near El Centro. Realizing the very grave danger of introducing the boll weevil, we immediately took steps to prevent this by means of the following quarantine order:

STATE OF CALIFORNIA,
OFFICE OF THE STATE COMMISSIONER OF HORTICULTURE,
STATE CAPITOL, SACRAMENTO, CAL., April 23, 1908.

WHEREAS, Information has been received by this Commission to the effect that cotton seed is about to be imported into this State from sections affected with the cotton boll weevil (*Anthonomus grandis* Boh.), and that the same is a serious pest in such sections where it prevails; and

WHEREAS, The said cotton boll weevil (*Anthonomus grandis*) does not, nor ever has, existed in this State, and that, if introduced, the same would become a serious and dangerous pest, probably spreading to other food plants; and

WHEREAS, The cotton boll weevil (*Anthonomus grandis*), while not attacking the seed of the cotton plant, may hibernate in the hulls or be carried in the mass, and thus become established in new locations; therefore, acting upon information received from and a request made by the Bureau of Plant Industry, of the Department of Agriculture, of the United States, it is hereby

Ordered, That no cotton seed shall be admitted into this State, and a horticultural quarantine is hereby established against the same, except under the conditions herein set forth:

First, that in addition to the offices of the State Commission of Horticulture, Capitol Building, Sacramento, and Room 11, Ferry Building, San Francisco; El Centro in Imperial County, San Bernardino in San Bernardino County; Riverside in Riverside County; Los Angeles in Los Angeles County, and San Diego in San Diego County, are hereby declared horticultural quarantine stations for the inspection of all cotton seed coming or being imported into this State.

Second, the Board of Horticultural Commissioners of each of said counties, and each of them, is hereby declared a special Deputy Commissioner of Horticulture for the purpose of enforcing this order. And it is further,

Ordered, That all cotton seed brought or imported into this State shall be inspected in the county into which it is brought by one of the deputy commissioners above named. It shall then be subjected to fumigation, in a closed vessel, with bisulphide of carbon gas for a period of twenty-four hours, and shall then be held by the deputy commissioner for a sufficient time to satisfy said deputy commissioner that all possibility of infestation is removed. For the purpose of more effectively enforcing the quarantine against the cotton boll weevil, it is further

Ordered, That all cotton seed shipped or imported into this State shall be consigned to the Horticultural Commission of one of the above named counties, to be by them delivered to the consignee when they are fully assured that there is no danger of infestation.

This quarantine shall go into effect immediately upon its approval by the Governor.

.....
State Commissioner of Horticulture.

Approved by

.....
Governor of the State of California.

NOTICE TO THE COUNTY BOARDS OF HORTICULTURAL COMMISSIONERS.

OFFICE OF THE STATE COMMISSION OF HORTICULTURE,
CAPITOL BUILDING, SACRAMENTO, October 8, 1907.

WHEREAS, The Florida white fly (*Aleyrodes citri*) has appeared on citrus and other forms of vegetation in the city of Oroville, Butte County, and the same is a threatening danger to the citrus industry of California;

Notice is hereby given to the various County Boards of Horticulture, that they take all necessary measures to prevent the spread of this pest, and also that they take all necessary means to eradicate it in the districts in which it has appeared, and to prevent its introduction in those counties where it does not now exist. Owing to the location of the present infestation and the season of the year, the manner in which the present outbreak must be handled will differ in some respects from the orders issued covering previous cases of infestation by the same insect pest.

IN THE CASE OF OROVILLE, BUTTE COUNTY.

Notice is hereby given that all citrus trees, plants, shrubs, or other forms of vegetation found infested with either the Florida white fly (*Aleyrodes citri*), or yellow scale (*Chrysomphalus aurantii* var. *citrinus*), within the following boundaries: Starting at the corner of Pine and Robinson streets, a line running north on Pine to Montgomery; thence west on Montgomery to the dividing line between Lots 6 and 7, Block 34; thence in a northerly direction to Broderick street; west on Broderick to First avenue; south on First avenue to Safford; west on Safford to Second avenue; south on Second avenue to Montgomery; west on Montgomery to Third avenue; south on Third avenue to Robinson; east on Robinson to starting point, in the city of Oroville, county of Butte, State of California, are hereby condemned.

It is further ordered, That between the dates of February 1, 1908, and February 15, 1908, all infested citrus trees, plants, shrubs, or other forms of vegetation within the above-given boundaries are hereby ordered defoliated by the removal of all portions liable to infestation. In the case of trees, the entire foliage-bearing surface must be removed, as per illustration, leaving only the bare trunks, and these trunks must be treated with a coating of whitewash, composed of quicklime slaked with water. It is recommended that the stubs of such trees from which the limbs have been removed be protected with an application of grafting wax or paint, to prevent the entrance of air, and to save the trees for the growth of the new top; in the case of shrubs or small plants that are infested, the total destruction of their tops at the ground. The tops, together with all leaves, must be carefully gathered up and destroyed by burning.

Owing to the fact that the trees can not, with safety to them, be defoliated before February 1st, and that there is danger of the over-wintering brood of flies issuing about the first of March, the time for action, when this pest can be successfully fought, is, therefore, very short, and there can be no delay when the time for active

work arrives. Therefore, it will be necessary for owners of infested trees to make previous arrangements for having their trees defoliated promptly, and to have all the work completed on time.

As the work of fumigation will require more time, it will be necessary to commence this work in advance of the defoliation, and this work will have to be done between the dates of December 1, 1907, and February 1, 1908, and will be planned by the County Board of Horticultural Commissioners. Notice to eradicate will be served on owners outside the defoliation area when the fumigating outfit is available to do the work, which has to be done at night, and consists of placing a gas-tight

tent over the tree, and the generation of hydrocyanic acid gas within, by the combination of certain chemicals in sufficient strength—the amount used being governed by the size and width of the tree—to kill, by being subjected to the fumes of the gas, all the larvæ and pupæ of the pest on said trees.

It is further ordered, That all remaining citrus trees, shrubs, or plants not included in the districts heretofore mentioned that are found infested with either the white fly (*Aleyrodes citri*) or yellow scale (*Chrysomphalus aurantii* var. *citrinus*), in the city of Oroville, or county of Butte, shall be fumigated with hydrocyanic acid gas, at such time and in such manner as shall be prescribed by the County Board of Horticultural Commissioners of Butte County, or all the foliage-bearing surface of the same removed and burned, at the option of the owner or owners, or agent, of the property where the infestation occurs. This measure is absolutely necessary to rid the trees of the yellow

scale and overcome any danger of eggs or larvæ of the white fly that may have spread to other trees and escaped detection. Those owners or agents outside the boundary districts, who prefer to defoliate instead of fumigate their trees, must have the work completed between February 1 and February 15, 1908.

It is further ordered. That all infested trees, plants, shrubs, or other forms of vegetation must be treated as indicated in this notice, and that all the work must be completed by February 20, 1908.

Following is a list of the plants known to harbor the *Aleyrodes citri*, and which will have to be destroyed: All varieties of citrus trees, including oranges, lemons, and limes; the China berry tree (*Melia azederach*); Viburnum nudum; Cape jessamine (*Gardenia florida*); Japanese persimmon (*Diospores kaki*); California privet (*Ligustrum amurense*); Golden privet (*Ligustrum* sp.); mock orange (*Prunus caroliniana*); Osage orange (*Toxylon pomiferum*); lilac (*Syringa vulgari*); together with any other host plants upon which the white fly may hereafter be found.

Section 11 of an Act to create a State Commission of Horticulture, approved March 25, 1903, provides: "Any person willfully refusing to comply with orders lawfully made under and pursuant to this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not to exceed five hundred dollars.

ELWOOD COOPER,
Commissioner of Horticulture of the State of California.

WHITE FLY CAMPAIGN AT OROVILLE.

In our report to his Excellency, Governor J. N. Gillett, for the fifty-eighth fiscal year (1907), the subject of the white fly (*Aleyrodes citri*) campaign was mentioned as being in progress, which, in fact, it was, as the notices for eradication had been served October 8, 1907; but these notices ordered that the work outlined was to be performed between the dates of February 1 and 15, 1908, and therefore properly falls in the year for which this report is made.

The work was energetically carried on for the State by E. K. Carnes, F. K. Maskew, S. Strong, B. B. Whitney, and for the county of Butte by County Commissioner C. J. Dreher and Inspector E. Mills.

An outline of the work as actually carried on included, first, a careful and systematic inspection in the fall of every yard in the city of Oroville, and a plot of the same showing the exact location of every food plant of the white fly (*Aleyrodes citri*), and also designating those trees actually infested with the insect. This was done so that a careful compliance with the working orders of the eradication notice (which is herein contained) might be carried out. After this inspection was completed, each tree (host plant of *A. citri*) was tagged with a sealed weather-proof tag, stating thereon the system of treatment for every case. The total infestation was found to be contained in twelve and one half city blocks of the ninety-nine within the city limits. Those food plants, therefore, (within this area, 12½ blocks), of the white fly (*A. citri*) were defoliated according to the order, and all other food plants outside of this area were fumigated with hydrocyanic acid gas, as per the order. This work was all carefully and skillfully performed, and as to the success of the treatment, I need only to refer to the inspection made of the entire territory, during the months of May and June following, at which time it was impossible to find a single trace of a live white fly (*A. citri*) in any of its stages.

It is necessary in viewing the complete success of this campaign as compared with the partial one at Marysville, to consider the conditions and how these made possible the complete eradication in one place and not in the other. We must, therefore, take into consideration the life and habits of this insect we are dealing with. In the early spring the adult winged forms emerge from their winter resting pupal state and lay their eggs on the leaves of the host plant. These eggs hatching, go through their several stages (larval and pupa), and finally come forth in about forty days as the next winged brood. This continues throughout the summer until the late fall, the length of this life cycle depending and varying on and with the conditions encountered by each individual. It is therefore easily seen that it is impossible to catch all of the insects in any one stage, which must be done, to completely eradicate them, in the spring, summer, or fall seasons; for, should all the trees be completely defoliated, the winged adults are able to live long enough in a sheltered portion to allow a tree to put forth new leaves and then reinfest the tree by laying its eggs on these new leaves. As the trees could not all be defoliated in a single day or week, there were always new leaves for the reception of the eggs. But in the winter, for about five months, they pass the time in a practically dormant state on the leaves, in which form they are most susceptible to the defoliation or fumigation methods, as they are in a condition of absolute helplessness, being without legs or wings to aid them in escaping from the leaves of the host plant. As these larvæ (of the white fly) are found only on the leaves of a food plant, it is seen that the destruction of all the leaves means the extermination of the insects. At this season, also, the deciduous host plants are absolutely free from the insects, so that only the evergreen forms require treatment.

It is, therefore, very evident why we undertook the winter treatment, for it embraced all the destructive features of the Marysville campaign, and eliminated all danger of establishing new deciduous host plants, as was the case in that place. It accomplished at one defoliation what we were unable to do in Marysville by repeated treatments.

WHITE FLY (*ALEYRODES CITRI*) IN MARYSVILLE DURING 1908.

In the city of Marysville the white fly campaign has been continued from last year under extenuating circumstances. Our first fight at Marysville, and some of the reverses there, as I have already shown, which aided us so materially at Oroville, made it necessary to continue the work along slightly different lines. The work of the first campaign was to a great extent nullified, owing to the fact that we depended on the people fulfilling the mandatory orders of the County Commission, and, failing to act as a unit, they allowed by dilatory tactics the insect

avenues of escape in the form of new food plants, which up to this time had not been known to harbor the pest. It was, therefore, necessary to keep inspectors continually in the field, making a house to house canvass, determining and destroying such infestations as they found. The work has been disagreeable, laborious, and expensive. So much so of the latter that before our fiscal year was finished we found ourselves hopelessly in debt. An emergency appropriation of $2,500 was granted us, of which we used $1,693.85. As to the success of our efforts in this city, we would not assert that the insect has been exterminated, but we do hold that it has been kept so carefully under control that all possibilities of further spread has been reduced to practically zero. While the financial side may appeal to some as being quite an expense to the State, we must stop to consider what would happen should this insect continue to spread. In one of our sister states, where the "let alone" policy has been followed, the white fly has now reduced their citrus industry forty per cent. As our California citrus industry amounts to $30,000,000 annually, this loss would mean to us $12,000,000. One cent on every $100 of this anticipated loss would support our quarantine division for two years. It is, therefore, very evident that a very little spent in prevention or eradication saves much of losses.

THE CONVENTIONS.

During the past year we have held two State Fruit-Growers' Conventions, the first, at Riverside from April 28th to May 1st, was fairly attended. As this was held in a distinctly citrus section, the principal topics presented were of this nature. After printing the report, so great was the demand for the publication that our issue of 2,000 was soon exhausted; a second edition of 1,000 copies was struck off. and of this only about 200 remain.

We have been greatly handicapped the past year in the matter of needed publications, resulting from the very meager sum at our disposal for this work. The $2,500 allowed for all our printing needs having been used, we were obliged to procure the necessary money for this second edition from a special fund. So insistent were the growers for this work, they agreed to raise the necessary amount for publishing should the State funds prove inadequate.

Our second convention was held in Sacramento, December 1st to 4th. There was certainly no lack of enthusiasm at the meetings, and the consensus of opinion seemed to be that this was the best State Fruit-Growers' Convention ever held in California. Judging from the requests in advance, we shall have to issue a large edition of the report of this convention, or a condition similar to that which has already been cited for the previous convention will confront us.

DEMONSTRATION TRAIN.

Some six months ago the proposition of a demonstration train was discussed between the head of our Commission and a Southern Pacific Railroad official. The meritorious success of such expeditions in the East gave us every confidence in the ultimate result of such a tour through our State. We, therefore, entered into the proposition with alacrity when the opportunity came, and after some very hard work, but with very little expense, we fitted up an exhibition car, which we are told made a very creditable showing. In this car we united the work of all our departments. We dispensed spray remedies, legal and scientific knowledge, demonstrated the work of parasites, and emphasized the value of our quarantine methods. All this was exemplified in the specimens which we had on exhibition. We believe that the greatest amount of good accruing from this trip is directly responsible to the work in the demonstration cars, rather than the lectures which we gave in the halls or assembly car.

We feel much indebted to the railroad company for this opportunity of meeting the horticulturists of the different sections of the State, and in such a manner as to leave some impressions that we hope may prove of no small benefit to this industry.

Respectfully submitted.

J. W. JEFFREY,
State Commissioner of Horticulture.

By O. E. BREMNER, Deputy.

QUARANTINE DIVISION.

STATE COMMISSION OF HORTICULTURE,
SAN FRANCISCO, CAL., October 31, 1908.

HON. J. W. JEFFREY, *State Commissioner of Horticulture, Sacramento, Cal.*

DEAR SIR: I have the honor to submit to you herewith my report of the work of the Quarantine Division at San Francisco for ten months of this year, 1908.

During this period there arrived at the port of San Francisco 218 steamers which required our attention, as well as many shipments arriving by rail, and a number of packages by mail, which were examined at the Customs Bureau of the United States postoffice.

The total of all these shipments is as follows:

Number of boxes, crates, barrels, etc., of fruit and vegetables as freight by steamers and sailing vessels	48,012
Of plants, trees, and bulbs by the same carrier	942
Of small lots of fruits and plants by passengers and crew	894
Of plants and fruit as freight by rail and mail	594
Of plants, fruit, and vegetables destroyed or refused landing	1,900

I desire to call your attention to some of the more important shipments which were condemned, and either destroyed or refused a landing.

On January 1st there arrived per steamer "Buckman" 1,000 boxes of Japanese oranges. This fruit arrived at Seattle by an Oriental steamer, and was reshipped on a local steamer to this port. The fruit was badly infested with *Cladosporium citri,* a very serious fungus, which causes injury, not only to the fruit, but also to the foliage of citrus trees. This pest exists in Florida, where it was imported years ago from Japan, and where it does great damage to both oranges and lemons.

Owing to the continued arrival of Mexican oranges in small lots, from one to a couple of dozen, and which are in the possession of passengers and crew touching at Mexican ports, we exercise constant watch, lest some of the maggot-infested fruit should gain entrance into the State. Every orange and sweet-lime seized is cut open and then thrown overboard. During the past season quite a number of these were found, and many of the oranges were concealed among clothing in the baggage.

On account of the dreaded melon fly (*Dacus cucurbitae*), which has taken such hold on all melons, cucumbers, squashes, etc., in Hawaii, we have been very alert in the examination of all vegetables arriving from

these islands. During the ten months past we have had occasion to destroy four boxes of cucumbers, which were swarming with the larvæ and pupæ of *Dacus cucurbitae*. These cucumbers were first cut into small pieces, and then thrown into the bay, with all the boxes and packing. Our reason for first cutting up the cucumbers is to prevent any one from picking up the vegetable out of the water, which would be done if left whole.

Several lots of *Gardenia florida*, infested with white fly (*Aleyrodes citri*), were found among the plant shipments coming from the Orient. All the plants were promptly destroyed, the whole shipment first being fumigated with a strong dose of hydrocyanic acid gas. We have also found individual plants in the possession of passengers and crew infested with this dreaded pest, and these were seized and destroyed. The roots and stems of these plants are at times attacked by a bark borer belonging to the *Tineidae*, and the roots are very often infested with *Nematode* galls.

We are, therefore, very careful when such plants arrive to go over the lot in detail.

During the month of February there arrived at this port from Japan 800 cases of onions, which were infested with a fungus (*Sterigmatocystis phaeocephala*), Dur. & Mont. Sacc. This is the second shipment of this kind which has come under our jurisdiction. The disease has only been reported from Algiers, and is considered very serious. As our onion industry is quite extensive, such a fungus would prove quite a menace to it, if ever allowed to gain a foothold. The shipment was condemned and ordered returned to the point of shipment.

On June 1st a lot of yams were found on the steamer "Acapulco," which were badly infested with an *Aspidiotus* species, probably *Aspidiotus hartii*, one yam being simply covered with the scale. Mr. Compere reports that he has noticed yams in the Orient infested in the same manner and by probably the same scale insect. On the same yam we discovered a small miner, belonging to the *Tineidae*. The larvæ of this insect does considerable injury to the tuber, and apparently lives on the outside of it in a tube made of grass. This pest would no doubt also prove a great pest and would probably attack the sweet and Irish potato. The damage resembles that of the potato moth (*Gelechia operculella*).

On June 12th there arrived, per steamer "Ashtabula," from China, a large shipment of plants, which were in charge of Mr. F. N. Meyer, agent of the Bureau of Plant Industry. The shipment consisted mostly of bamboos, but many conifers and other plants were among them, and all were destined to the Plant Introduction Garden at Chico, Cal. We made a thorough inspection of all the bamboos, and we cut out all infested

portions, which consisted mostly of old growth. We then subjected the whole shipment to a strong fumigation of hydrocyanic acid gas for one hour and a quarter, using 2 ounces of cyanide, 2⅓ ounces sulphuric acid, and 6 ounces water to each 100 cubic feet of space. After fumigation we reinspected the shipment, and all plants which showed any infestation were cut off and destroyed. We found no less than thirteen species of scale insects, one *Aleyrodes* species, and one bag worm on the plants. Specimens of all insects were forwarded to Dr. L. O. Howard of the Bureau of Entomology, United States Department of Agriculture, Washington, D. C., as per his request, but as yet we have not received any report on the sending. I will state that the gas penetrated the soil in the tubs and boxes to such an extent as to drive out earthworms, which we found dead on the surface.

Your ruling on the requirement of fumigation of all scale infested pineapples at Honolulu and other Hawaiian ports before shipment to California, taking effect June 1st of this year, has been carried out. Official notices were sent to all shippers of this fruit, as well as to all transportation companies and consignees. The result of this ruling has been very gratifying. The fruit has not only been up to requirements regarding the scale insects, excepting a few lots, which were held and ordered refumigated on account of finding live insects, but, on the whole, the fruit has been of much better quality and condition. Rumor to the effect that the State Commission of Horticulture had destroyed pineapples and had also refused owners to refumigate their fruit arriving here with live insects, as well as the uncalled for accusation of our boycott on pineapples, has been proven ill founded, and our action is approved of by the larger growers, and satisfaction seems to prevail in the islands.

I am pleased to report that a great decrease of scale infested plants is being brought by passengers and ship's crew, and can be attributed to the firm stand taken by us in destroying all such objects instead of fumigating these, as in the past. Biotas infested with *Aphis;* dwarf maples, with *Parlatoria* species; double flowering plums, cherry, and peach trees infested generally with *Aulacaspis pentagona;* sprouting cocoanuts from Central America, Tahiti, and other islands, generally infested with *Pseudococcus nipae, Aspidiotus lataniae, Aspidiotus destructor, Aulacaspis boisduvali, and Icerya seychellarum;* Sapodillas (*Achras sapota*) infested with *Howardia biclavis,* and Anonas with *Pseudococcus pandani* and *Pseudococcus virgatus,* have all been condemned and destroyed whenever found infested with any of these pests.

The correspondence of this office has been quite extensive; upwards of 525 letters have been answered. Many of these were in regard to the identification of and remedies for insects doing damage to various crops.

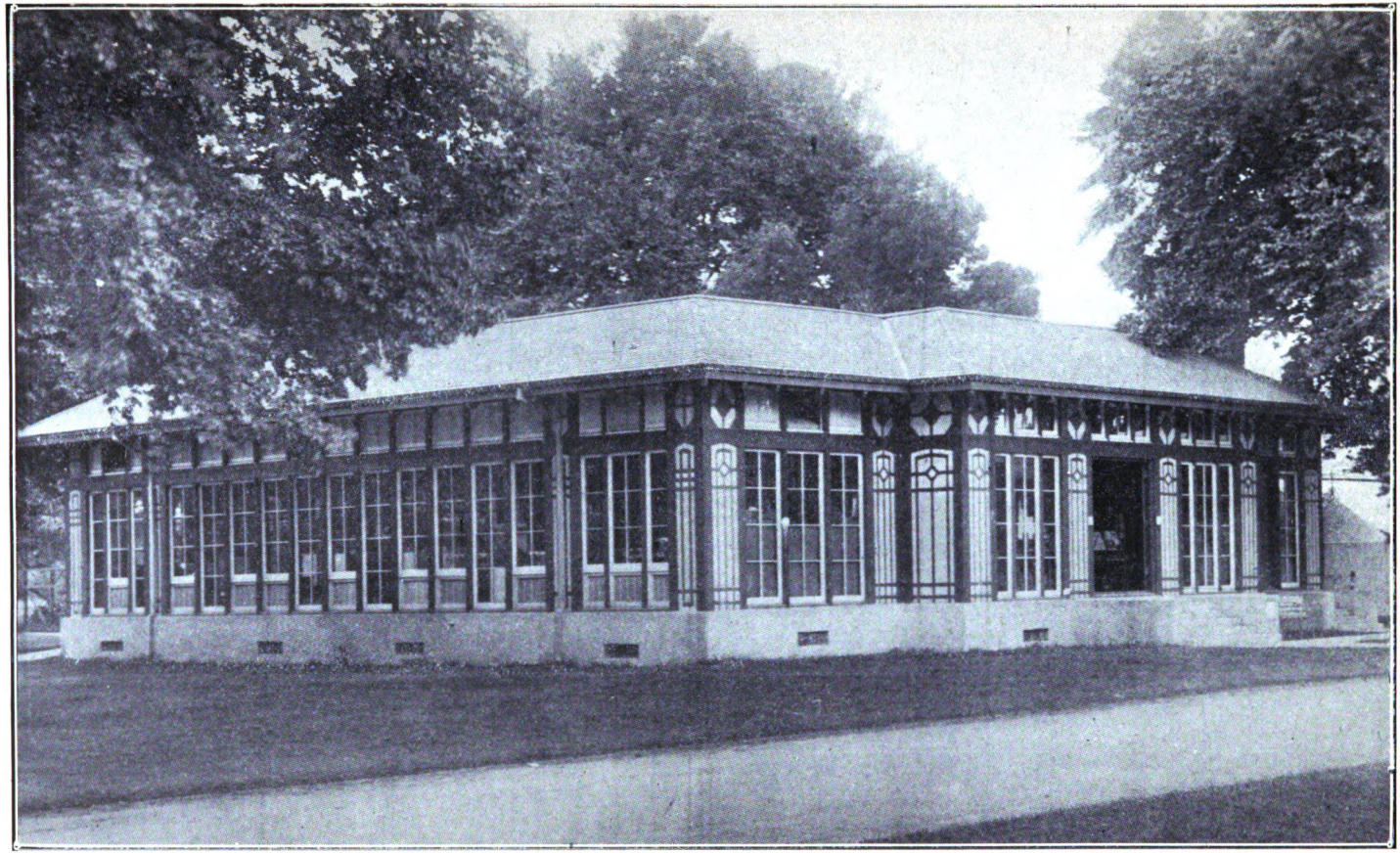
This is a very important phase of our work, and I should like to have all of the County Boards of Horticulture send in such specimens as are found doing damage in their districts, for we should know what pests exist in the different sections of our State. The Argentine ant, of which several lots were received from various sections, apparently has been in this State for six or eight years, and yet no record of its appearance has been recorded until this season. Early in May I discovered the pistol-case bearer (*Coleophora malivorella*) in two localities about twelve miles apart in the Santa Clara Valley. This is the first record made of the appearance of this pest in our State, and it was no doubt brought in on some Eastern nursery stock. Whether this pest exists in other localities or not remains to be seen, and the only hope of ascertaining this is through coöperation with those in charge of the inspection work in the various counties, and goes to show that the identification work as started by us will do much towards getting a good knowledge of the distribution of our pests. From the lot of material of the pistol-case bearers which I collected I am pleased to report that about 90 per cent were badly parasitized by a *Eurydinota* species, and from each pupa case from six to ten parasites issued. In the Eastern States this pest does considerable damage. With us, however, thus far it is apparently kept in check by parasites, but further investigations will be necessary.

Many additions have been made to our working library, a feature of much importance in our work, and one which should be encouraged. It is most important to have the necessary publications at hand, so as to be able when necessity arises to make use of these in the identification of the various insects submitted to this office, instead of having to send specimens for identification to Government specialists, which takes time and causes much delay. We have endeavored to do this work here, and whenever we have been in doubt about our work on account of the lack of literature or references, we have had our work verified by the proper authorities.

The office has been well patronized, and daily visitors have sought information on nearly every phase of horticulture, from the tilling of the soil to the harvesting of the crop.

Respectfully submitted.

EDWD. M. EHRHORN,
Deputy Commissioner.



STATE INSECTARY, CAPITOL PARK.

INSECT BREEDING ROOMS, STATE INSECTARY.

MUSEUM, STATE INSECTARY.

INTERIOR COURT, STATE INSECTARY.

INSECTARY DIVISION.

OFFICE OF STATE INSECTARY, CAPITOL PARK.

To HON J. W. JEFFREY, *State Commissioner of Horticulture, Sacramento, Cal.*

SIR: I herewith submit a brief report of the work of the Insectary Division, accomplished since its completion, and covering the time since last report in a general way.

During the last year the time of your superintendent has been largely taken up with field work, covering the eradication of the white fly (*Aleyrodes citri*), which made its appearance at three different points in this State, and which has occupied practically all of our attention, to the exclusion of all other work, deeming this of the utmost importance for the general interests of the State.

The Insectary Department was practically put out of commission by the earthquake at San Francisco, and nearly all the stock destroyed; only a few specimens of a very few species of parasites were saved by catching them on the broken window glass. These were carefully preserved, and later transferred to Sacramento and temporarily housed in a glass house especially erected for that purpose. Soon after this a shipment of plants infested with purple and red scale was received from Mr. Compere, our entomological explorer, and as they were heavily parasitized, it was thought advisable to immediately take them into the open fields where the scale was plentiful. San Diego was chosen as the desired spot, and about 25 plants were removed to Melrose, San Diego County, and housed in a building kindly provided by Mr. Heman Copeland, of the National City Land and Town Company, who furnished not only the house, but provided every assistance possible to aid in the work. As fast as the parasites issued they were liberated in the infested trees. From this point they were moved to different infested areas and distributed, and recent examination shows that the two species are establishing themselves and will, we hope, materially assist in controlling these very troublesome and expensive pests.

For some time plans had been completed for an insectary that would prove adequate for the proper handling of these importations, and after much figuring and consultation, through the good offices of Governor Gillett and the Capitol Park Commission, we were permitted to erect a good building on the Capitol grounds, Sacramento, consisting of

twelve rooms, museum and laboratory, and constructed along certain lines that would be of greatest use for this special work. The inside equipment we were compelled to build ourselves, on account of lack of funds, and have added to it gradually, until at the present time we are able to report that we have everything on a working basis and are prepared to handle any sized shipments, and at the same time guard against the possible introduction of secondary forms or the escape of anything undesirable.

On March 18th the writer personally broke the ground for the erection of the State Insectary, and June 29th moved into the Insectary. On December 2d the Insectary was formally dedicated, while the building was packed with people who were in attendance at the Fruit-Growers' Convention.

The following importations have been received from Mr. Compere since June 1, 1908 (Mr. Compere personally brought a case from China containing several hundred live internal parasites for *Pseudococcus* sp. (mealy bug). Some of these were taken directly to San Diego County and liberated in a badly infested orchard) :

From Denver, Colo.

1 box *Coccinellidae, Hippodamia convergens, Coccinella prolongata* Cr., and several sp. *Symnus.*

1 box *Coccinellidae,* duplicating the above shipment.

From New Jersey.

2 boxes *Coccinellidae, Adalia bipunctata* Linn.; *Magilla maculata* Le C.

From New York.

Ichneumon parasite on white tussock moth (*Notolophus leucastigma*).

From New York.

3 boxes *Coccinellidae.*

Scymnus manus Le C.
Adalia bipunctata Linn.
Magilla maculata Le C.
Coccinella monticola Muls.
Cocinella 9-notata Hbst.
Coccinella transverseguatata.
Brachyacantha 10-pustulata.

From Germany.

Internal chalcid parasite on *Eulecanium* sp. (wild plant).

Egg parasite on *Eulecanium* sp. On plum.

Coccinellidae, feeds on prune aphis and elm leaf aphis.

Coccinellidae, feeds on woolly aphis.
Coccinellidae, feeds on red spider.
Internal chalcid parasite on *Gossyparia spuria* (elm scale.)
Internal chalcid parasite on *Kermes* sp. On pine.
Egg parasite on *Eulecanium* sp. On gooseberry.
Internal parasite on *Eulecanium.* On peach.

(These parasites were bred out and placed on *Saissetia oleae,* and an attempt made to see if they will attack that scale.)

From Italy.

Shipment of *Coccinellidae.*

General scale feeders, several species, as yet unidentified.

From China. (Sub-station California Insectary.)

Monthly shipments of sago palms and other plants infested with purple scale (*Lepidosaphes beckii*) and red scale (*Chrysomphalus aurantii*), and containing parasites, have been received at the Insectary, until we now have 23 parasitized plants, and they have commenced to show signs of giving us a good start of the parasites for these pests. At present there have issued three species of internal chalcid parasites; these are liberated in cases containing green lemons that are heavily parasitized with purple and red scale (each species separate); time is allowed for the parasites to oviposit in the scale, and then the lemons are sent to infested groves and fastened in the trees, and the parasites allowed to escape directly into the trees. Some of these parasites will be taken directly into infested groves and adult parasites bred and liberated, as this is by far the best lot of parasites ever received for these scale pests from China.

Two species, 4 shipments, of chalcid parasites on the half-grown black scale (*Saissetia oleae*), have been received from China.

About a dozen adults have issued, and these have been liberated in cases containing half-grown black scale on oleander. The *Scutellista cyanea* of South Africa has done excellent work on the black scale, but it does not commercially clean the orchards, for it is an egg parasite, and leaves a very few scale in the groves, sufficient to smut the fruit somewhat, therefore it is necessary to introduce a species of parasite that will work on the half-grown black scale to overcome this difficulty.

The following list of *Coccinellidae* from China indicates the species received, covering several shipments arriving at different times:

Syonycha grandis Thumb.
Coelophora pupilata Schorn.
Chilocorus circumdata Gallb.
Scymnus lepidulus Matsch.

Chilomenis quadriplagiata Schorn.
Cryptogomis orbicutus Gallb.
Sospita chinensis Muls.
Clauis albidula Mots.
Caria dilata Fabr.
Thea galbula Muls.
Coleophora biplagiata Schorn.

Parasite on Lepidoptera chrysalis.

A shipment of chrysalis of the commonly called orange dog of Florida, heavily parasitized, was received, and from this shipment 312 parasites were bred and liberated against the chrysalis of the brown day moth (*Pseudohazis eglanterina nutalli*).

Shipment of Wild Pear Seed.

A shipment of wild pear seed that was collected by Mr. Compere was received. This will be used in experimenting along the lines of a resistant root for pear blight. Additional shipments will follow, the same to be distributed to different propagators throughout the State.

Parasite on Pulvinaria from China.

A shipment of *Pulvinaria* from China has been received, from which we have bred internal chalcid parasites. These were liberated against *Pulvinaria camelicola,* which is to be found outside in Sacramento.

Parasite on Pseudococcus.

A shipment of mealy bugs has been received which contains adult parasites. These are liberated in confinement on *Pseudococcus citri.*

Additional shipments of red scale (*Chrysomphalus aurantii*) and purple scale (*Lepidosaphes beckii*), black scale (*Saissetia oleae*), and hemispherical scale (*Eulecanium hemisphaericum*), containing internal parasites, have been received, as well as duplicate shipments of scale feeding ladybirds.

Cottony-cushion Scale from China, and Ladybird.

An interesting shipment was received from China, consisting of a plant which contains *Icerya purchasi* (cottony-cushion scale) and a new *Coccinellid* enemy that seems to be as proficient as *Vedalia cardinalis.* This would indicate that possibly Australia is not the original home of that pest, and that China may prove to be the home, for we find practically all the pests known to attack the citrus in China, and none of them are troublesome, being all controlled by parasitic insects. In fact, red and purple scale are extremely hard to find, and only obtainable in sufficient quantities to make a sending on plants that have been kept indoors and away from the influence of the parasites.

To prove conclusively to the citrus industry the above statement, and also that practically every pest known to attack the citrus is to be found there and controlled by parasites, and that China is the home of citrus pests, I urge that a representative grower be sent to China to make such an investigation on behalf of the growers, and that, if possible, his expenses be defrayed by the State, for in this manner, through his influence, I feel that the great possibilities of controlling the pests affecting the citrus in California would be brought home more forcibly to the growers than through any other source. It would awaken their interest in this matter, enlisting their support in a cause for their own personal benefit, which at the present time is not understood sufficiently well, or its possibilities known. If some grower is planning a trip abroad for recreation, no better service could be rendered to the industry than by that party taking this matter upon himself, and every possible assistance being granted him by this department.

The following beneficial insects have been distributed the past year:

Hippodamia convergens Coccinella californica	50,000
Lestophonus iceryæ	500
Vedalia cardinalis	2,700
Scutellista cyanea	3,500
Comys fusca	3,000
Aspidiotophagus citrinus	4,000
Coccophagus lecani Encyrtus flavus	150
Calliephialtes messor	300
Rhizobius ventralis	500
Aphelinus fuscipennis (estimated)	1,000
Cryptolæmus montrouzieri	625
Chilocorus bivulnerus	200
Internal parasite, mealy bug	250
Adalia bipunctata	75
Magilla maculata	25
Scymnus manus	25
Coccinella maculata	22
9-notata	50
transverseguatata	25
Ichneumon parasite on the tussock moth	84
Internal parasite, (Chrysalis) Lepidoptera	312
Coccinella prolongata	25
Chilomenus quadriplagiata	22
Thea galbula	18
Chilomenus biplagiata	36
Parasite half-grown black scale (Aphicus lounsburi), South Africa	12
Parasite half-grown black scale (China)	10
Scymnus monticola	10
Scymnus lepidulis	26
Total	67,502

Many hundred parasites collected all over the State, bred from native *Aspidiotus, Chionaspis, Lecanium,* etc., at the Insectary, have been liberated on commercial pests to note effect of adaptation to new species of host.

A great deal of attention to the utilization of native parasitic and predaceous insects will be given the coming season.

This department can be made of the greatest assistance to the growers of California by the hearty coöperation of that body of producers, and it is earnestly requested that the growers induce the younger members of their respective families to study insect conditions on their places, for it is becoming more and more necessary each year to have a working knowledge of insects and insect pests in order to successfully grow and market profitable crops.

As a suggestion, let every grower or producer *individualize* on insect pests. By this, I mean, make a careful study of the pests that affect or are liable to affect your particular industry. Learn to know them on sight, and the remedies and parasites for the same. A day spent at the museum of the State Insectary will teach you practically all the pests, for you will find in this museum nearly every pest that is troublesome in California, and many that are liable to get here. The museum is always open to the public, and an attendant will be glad to take you through and give you all the information desired.

The popular part of the museum and its educational feature has proven eminently satisfactory, as evidenced by the hundreds of interested visitors who have come to this institution since its doors were thrown open to the public. Especially is this true in regard to the school children, who take a great interest in the study, and this, combined with the heavy mail received containing specimens for identification and requests for information, proves that the Insectary is certainly filling a long-felt want.

Respectfully submitted.

EDWD. K. CARNES,
Superintendent State Insectary.

PROCEEDINGS

OF THE

THIRTY-FIFTH CONVENTION OF THE CALIFORNIA STATE FRUIT-GROWERS

HELD UNDER THE AUSPICES OF THE

State Commission of Horticulture, at Sacramento, December 1, 2, 3, and 4, 1908

PROCEEDINGS

OF THE

THIRTY-FIFTH CONVENTION OF THE CALIFORNIA STATE FRUIT-GROWERS,

HELD UNDER THE AUSPICES OF THE

STATE COMMISSION OF HORTICULTURE, AT SACRAMENTO, DECEMBER 1, 2, 3, AND 4, 1908.

TUESDAY, December 1, 1908.

Pursuant to call, the Convention met in Pythian Castle, Sacramento, Cal., at 9:30 o'clock A. M.

The meeting was called to order by President J. W. JEFFREY, State Commissioner of Horticulture.

REV. F. K. BAKER, of Sacramento, opened the Convention with an invocation.

PRESIDENT JEFFREY: The Convention will now hear an address of welcome by Hon. Clinton L. White, Mayor of Sacramento. I now have the pleasure of introducing Mayor White. (Applause.)

ADDRESS OF WELCOME.

BY CLINTON L. WHITE, MAYOR OF SACRAMENTO.

Mr. Chairman, Ladies and Gentlemen: The city of Sacramento, by reason of its central location and by reason of what we believe to be a fairly well-deserved reputation for hospitality, has come to be to a considerable extent a convention city. During the present year many conventions of different kinds have assembled, held their meetings in this city—conventions for political, for religious, for fraternal, for civic, and other purposes. Some of these conventions, particularly political conventions, have been attended perhaps by thousands, and all of these conventions have been considered by the State at large and by the people here as important, and they were important. It gives me pleasure to say to you that in my judgment, while they say comparisons are odious, the Fruit-Growers' Convention is the most important one that has assembled in Sacramento during the present year. There are reasons for this. You have objects to accomplish, and by meeting together, comparing ideas, getting from those best able to give instruction new ideas,

you can forward the great fruit industry to a considerable extent, and in so doing each of you individually forwards his own interests.

It was my pleasure, and profit as well, during the autumn season of last year to make a trip through some twenty-five states of the Union. Although I came from one of those states and deem myself fairly familiar with them, wherever I went I was surprised by two things: the lack of orchards and vineyards in the Eastern States and the abundance of California fruit, particularly at that season of the year—California grapes everywhere. So it seemed to me that while I before had a theoretical knowledge of the fact that California was supplying the United States with fruit, I had no actual realization of the fact until I dropped into the markets of Chicago and New York, New Haven and Hartford, Washington and Atlanta, and other cities, and saw there in the fruit markets practically nothing but California fruits.

But it seems to me that the fruit industry of California is still in its infancy, and that in order to forward the interests of this great industry you have many steps that you naturally will consider: the growing of more fruit to the acre—that is not so important, because California soil and California climate can grow plenty of fruit to the acre; growing better fruit, and that is a matter of importance. Not only the growing of better fruit, but the growing of better varieties of fruit. The California peach is one of the handsomest, the most juicy, the most palatable of fruits in the world, and yet, ladies and gentlemen, the most of you believe, and I think correctly believe, that a better peach can be grown in California than has ever been grown up to this time. And so with other fruits. There is a capability of cultivation, of obtaining better varieties, of obtaning better fruit, and this, I presume, is one of the subjects that you will consider.

Another serious subject—and I notice here among the fruit-growers some people that are directly interested in that question as shippers—is the question of how shall we get this fruit to market. If we had the California climate and the California soil and had the exclusive possession of it, as we have, but could place that in a strip in the central part of the United States, say through Ohio and Tennessee, California lands would be worth $5,000—$10,000—any number of dollars per acre that we would see fit to ask for them. But here to the east of us, and between us and the markets of the world, is this great strip of comparatively barren country, so that there is practically no market for the product of this great industry of California until we reach the Missouri River. I say no market because, while there are great communities between here and the land that I name, they are insignificant in comparison with the amount of fruit that California puts on the market. The subject, then, in which the fruit-growers are interested is that of the market, the transportation of the fruit; and in connection with this subject, I can not help but believe that while much can be done by improved methods of refrigeration, care of the fruit, etc., still an increased competition by the transportation companies is a large factor in the direction of solving this problem.

But it is not fresh fruit alone that is marketed by the fruit-growers of California. While we sent, credited to Sacramento, somewhere between 12,000 and 13,000 carloads of deciduous fruits, I take it that that is com-

paratively small share of the actual deciduous fruits of the State during the present year. Fortunately, the business of canning fruits and putting them upon the market in that form is no longer experimental. I am not a very old man—I am older than I wish I were—but I am old enough to remember the change that has occurred in the appearance of the grocery store. My first recollection of a grocery store was some boxes and barrels. There was no such thing as canned fruits or canned vegetables or canned meats. The appearance of a grocery store has absolutely changed, and that change has been occasioned by the perfection to which the tinning or canning process has been carried, so that now the retail grocery store is practically nothing but rows of cans, and by the canning of the fruits of California we are enabled to send those fruits to every corner of the world. This is a great industry; the canning of fruit is a relief, is something to fall back upon, when the fruit can not be shipped to a market that will accept it as fresh fruit.

Still farther back of that is the process of drying fruit, which, while not perfect by any means, has made great progress during the past fifteen years, and this affords the further opportunity of marketing our fruits. This present season fruit of certain kinds in this section of the State was so abundant that people tried to give it away. The good people of Loomis and Newcastle, just up above us here, telephoned to me one day that they wanted to send down several carloads of fine peaches and give them away to the people of Sacramento, and wanted me, as the chief executive of the city, to undertake the distribution. I am not certain whether my decision in that matter was right or wrong. I certainly hold in grateful remembrance the generosity, the good intention, of those people. At the same time, while they desired to be generous, and while they desired to see one of the finest products of the world not go to waste, I deemed it my duty to absolutely decline to have anything to do with the proposition of distributing fruit by the carload to the people free of charge, because I did not believe—and the thought I have given to the subject makes me still of the same opinion, though not with much firmness—I do not believe that with all the generosity of nature to the orchards of California it is a good thing for the people of California to have the fruit given to them for nothing. There is something in the proposition that seemed to me would have a bad effect upon the people themselves; that it was better for the people and better for the fruit-growers that the fruit should remain and rot under the trees rather than it should be made as a present to the people and cultivate the spirit that unfortunately comes with the proposition so frequently when people obtain something for nothing. I believe in giving value received, and I believe that the people of Sacramento were able to buy their fruit, especially when fruit was as cheap as it was during the present year.

What will be the result of your deliberations? Will you within a few years give us better peaches, better apricots, better grapes, better figs, better fruits of all kinds? And will you make them more nearly what they may be considered at present, so that these things which are considered luxuries in other countries are so cheap in California that they are considered necessaries, and they go on to the table of all the people, rich and poor?

But it is not for me to give to you a general lecture in this rambling way concerning what your convention should do. If—and I believe you

can accomplish much in that direction—if you can exchange ideas, if you can get better and easier methods of cultivation, give us better fruit, give us better markets for the fruit, give us wider, more extensive markets for the fruit—if you can do these things and other things that will suggest themselves to you, your convention will be a success.

I want to say to you that you are heartily welcome to the city of Sacramento; that we recognize that you will do much good to the city. We are glad to have people of your kind come here. We recognize the fact that a convention of fruit-growers, gathered from practically all corners of the State, is a convention of representative men—no, not hardly representative men in a sense that that term might be used, representative simply of the average community. That is not so. A convention of fruit-growers is not a convention of farmers who farm according to the old methods, but the growing of fruit successfully is almost to be ranked as one of the learned professions; it requires skill. And you as representatives of the fruit-growing interests in this State are a big set of men and women, you are above the average; so, when I say that you are a representative convention, I do not mean that you are an average set of people, but I mean—and I do not intend to flatter you by this statement—that you are far above the average in intelligence, in enterprise, in ability, and such people we are glad to welcome here to the Capital City, and I trust you will make yourselves at home, and that when you go away you will carry with you a pleasant impression of the city which you have visited and in which you have held your convention. Ladies and gentlemen, I thank you for your attention. (Applause.)

PRESIDENT JEFFREY. I would like to ask Judge Chipman to come on the platform, if he please. Governor Gillett has been struggling for weeks with very serious indisposition, and he was good enough to write me a personal letter yesterday, stating that he could not find the strength and the time to address this Convention, and we certainly feel the loss of the Governor's presence; but I know those of you who know of his condition for the past six weeks will be pleased to excuse him, and I have asked Judge N. P. Chipman, of the Third Appellate District Court, to say a few words in the Governor's stead.

ADDRESS BY GEN. N. P. CHIPMAN,

REPRESENTING GOVERNOR GILLETT.

Mr. President, Ladies and Gentlemen of the Convention: I regret very much the necessity for my appearing here in the capacity of a substitute for the Governor. I know the great interest he takes in the industry to which we have devoted our lives, and the regret he will feel in not being able to look you in the face. I do not believe we have ever had a Governor who has taken a deeper interest in the welfare of the State and who has exhibited a broader intelligence in regard to the development of its resources than Governor Gillett, and it for that reason that I know he will be exceedingly sorry he could not be here to-day himself to give expression to his own thoughts upon the subjects which will chiefly occupy your attention. As his substitute, I have got to imagine something that he might say to you, or, at least, something that I might say myself in lieu of what he might say, and in a very brief way.

I have been, as some of the older members here know, very many years associated with this movement of the fruit-growers. Some sixteen, seventeen, or eighteen years ago it was my privilege to formulate the first general report that was made upon the fruit industry that obtained any circulation or significance, a report made to the California State Board of Trade. I became impressed then with the great importance, the future importance, of this industry to the growth of the State. It seemed to me that general farming here was under no very much greater advantage than general farming in other states of the Union, and it is not to-day in any better condition. I believe that the grower of corn in Missouri and Illinois and Iowa is making more money to the acre than any of our wheat-growers are making in the growing of wheat in this State, or in any of the cereals. It looked to me then, and looks to me now, as though the dominant industry relating to the soil is and must always be fruit-growing in this State. Of course, there are incidental things to be considered in connection with the farmer. We can not all grow fruit. Our land can not all be devoted to fruit-growing. But what I mean is, it is the dominant industry, it is the industry out of which the chief agricultural wealth of the State must spring. You can see what has come of the feeling that was inspired in those early days, some twenty years ago, when I tell you that from that period up to the present time we have increased in the shipments out of the State—I do not speak now of home consumption at all, but what has gone out of the State and resulted in bringing wealth back into the State—we have grown from 16,000 carloads in 1890, of 10 tons each, including the products of our orchards and vineyards and gardens, to 90,000 carloads; the vegetable shipments out of the State do not at present amount to very much, but still something, about 5,000 carloads of 10 tons each. We still retain for the purposes of calculation the unit of 10 tons. Of course, a carload now is anything that you can get into it, from 10 tons up to 30 or 40 tons. The growth has been phenomenal. As a matter of fact, we are inviting people into this State from other states in the Union, not to grow wheat, not to grow corn, not to grow alfalfa alone, which is a profitable crop, but the truth is that we are inviting them here to occupy small pieces of land under irrigation for the purpose of growing fruit. Now, that must come from the fact that fruit-growing is profitable and must continue to be profitable, but I can say to you, my friends in this business, my fellow associates who have gone through many of the trials and struggles of fruit-growing, and have not gotten over them yet, that there is a great necessity to-day for the work that you started in to do when you organized this society—there is as great a necessity to-day, and I think even greater. We have conquered some of the pests, but not all of them. We have conquered, to some degree, the markets of the East, but we have not fully taken possession of those markets and have not fully established ourselves with the companies that carry our products across the continent.

Recently there has been brought to the attention of the State Board of Trade that this little insect called the thrips is threatening the destruction of our deciduous orchards. Some years ago, you will remember, the destruction of the citrus orchards was threatened by pests which appeared in the south. By the skill and energy thrown into the subject of fighting those pests, through the influence largely of the fruit-growers

of the State, the pests of the south have been conquered and citrus fruit growing in the south is profitable and stands at the head of the fruit growing industries of the State. But this little insect has recently developed itself in this State, particularly in the Santa Clara Valley and Contra Costa County, spreading to some extent in the interior, causing the destruction of many of the deciduous fruits—the peach escapes better than others, but largely the pears and the prunes. You must not allow yourselves for one moment to cease your efforts towards protecting this industry against the enemies which we all must fight in order to secure the final success of the industry itself. I do not know what report our Horticultural Commissioner may be able to make to you upon that subject. I hope it may be to some degree hopeful, but, at any rate, it is an exceedingly important matter.

To my mind the development of this State must depend, as it has in the past, in the future upon this industry which you are here, gentlemen, to represent, and I hope you will put the same intelligence and energy and enterprise in your deliberations here to-day that you give to the work which you may do at home in your orchards. (Applause.)

OPENING ADDRESS.

By J. W. JEFFREY, State Commissioner of Horticulture.

Twenty-seven years ago, on the 6th day of December, the first State Fruit-Growers' Convention was called to order in the Assembly Chamber in this city, with C. H. Dwinelle as President. The convention was attended by a few but very enthusiastic fruit-growers, yet they here organized an enterprise that has since held thirty-four meetings, and is now recognized as one of the most beneficial institutions which engage the attention of the fruit-growers of California. Nearly a generation has passed since the first general conference of horticulturists met at Sacramento, and few of its members are now living to wonder at the marvelous progress the fruit interests have made since they first assembled to discuss the issues to be met at that early day. Brave men and women they were—for we see the honored name of Mrs. John Bidwell upon one of the committees—courageous delegates who attacked the scale pests with vigor, and roasted the supervisors who refused to appoint horticultural commissions, the growers who failed to maintain clean orchards, and the nurserymen who sent out infected plants. They were also liberal, as well as progressive, for they assessed themselves $1.50 each to pay the expense of the convention. One of the members could now draw upon his bank account for a million times this amount, and yet there are people to-day who believe that the fruit business does not pay. When we consider how few of the scores of similar organizations formed in this State have held their membership long enough to get acquainted, is it not good evidence that our convention has some useful purposes that the fruit-growers have recognized and supported all these years? And should it not encourage them to continue to support an institution that has survived all its contemporaries and shall be made yet more useful and lasting?

With all honor to the pioneers who initiated this work, with all respect to those who have continued this work down to the present meeting, and with great misgivings as to my own part in it to-day, I believe it is

profitable to inquire at this time if we or the earlier membership have given to these conventions the full scope and importance the opportunities have offered. The programs of the past have been representative of the live issues concerning horticulture; the attendance of progressive fruit-growers has always been fair, and the conventions have spoken with candor and courage upon the affairs that concern the business of their members. There is no lack of interest in reading the reports of these meetings, or doubt as to the helpfulness of the reports. The first edition of the Riverside convention report, issued last June, was exhausted soon after it left the press. So valuable was this publication considered that when the first edition was distributed, two or three of the fruit-growers' associations offered to pay for a few hundred copies, and one of them made arrangements to have the printing done at a Los Angeles printing office at its own expense. My printing fund was all gone, with a demand for a thousand copies of this report unsatisfied. The State Board of Examiners was appealed to and from some emergency fund produced the money to pay for the last edition, and thus the fruit-growers were saved from the necessity of going down into their own pockets to pay for printing after having paid their taxes for all the purposes of State. It can not then be from lack of value in our work, or the lessening of public interest in our published proceedings, that we should inquire at this meeting, "What provinces of the whole scheme of horticultural pursuits have we overlooked or neglected at these conventions?"

I need only refer to the two conventions of which I have had the direction to demonstrate that at least these two have not made paramount what may be the chief function of these meetings, namely, the expression of the fruit-grower's convictions upon the deeper and more obscure problems that continually affect the welfare of his occupation. Of these problems are the civical and industrial policies of State; the relation of farm property to the support of government; the fundamental principles governing the sale of farm produce and the adjustment of produce merchandising to the commercial practice of the times; the executive management of the orchard as distinguished from the art of fruit-growing; the mutuality and dependence of farmers toward each other; the farm labor question and other features of rural life that touch upon profits, influence values, and affect the comfort and stability of the tenure of land. At the Marysville convention four fifths of the addresses were devoted to scientific lectures, cultural methods, and the harvesting of crops; at the Riverside convention, certainly a model of its kind, only three papers pertained directly to the resources and opportunities that have been almost ignored by many farming communities of the State. As my Irish ancestry would say, if these conventions are to rise to the measure of expectancy and opportunity, they must go down deeply into the economics that bear so largely toward success, and then these conventions should give intelligent and forceful expression of their conclusions from what is discovered. This might illuminate the horticultural literature of the State where it is in most need of light, for what does it profit a fruit-grower, for example, to grow more and better fruit and not know what to do with the harvest; or, why should he allow the commission men and speculators to absorb all the profits on the other side of the continent and then wonder why he has not

enough money to retain American labor upon his farm? The program of this convention is planned to give greater opportunity and influence to the delegates in the discussion of whatever may be to them the live topics of the day, possibly some of which I may have suggested. Instead of forty addresses and papers, the present program contains about twenty. The delegation has been assigned the time absolutely of twelve papers, as they will see by reference to the schedule. The success of this policy will depend upon the way you take up the work here provided for and conduct it yourselves.

I do not mean to minimize the value of thoroughly digested addresses, elucidating the scientific and practical features of fruit-growing. Far from this is my attitude, for from these papers the orchardist may learn principles and truths, and grasp suggestions pertaining to the cultural features of his business, and acquire from these the ability, in connection with his own experience, to master his individual problems. But suppose we fail to thresh out a single idea in practical fruit culture here, is not the National Department of Agriculture busy in our State? Is not the State College of Agriculture investigating, educating and demonstrating continually along these lines? But who are looking after the great economic problems that pertain so closely to the farmers' means of living? I have already confessed that our late conventions have not discussed extensively these problems. However, as these meetings are our own, we may be able to correct this fault in the future, if you believe, as I do, that it is a fault.

If our meetings do not give attention to the economic problems that pertain so closely to the fruit-growers' means of livelihood, where are we to turn for information? Not to the National Department of Agriculture, for that institution does not give instruction upon running the finances of the farm; not to the State Department of Agriculture at Berkeley, for that institution is devoted to teaching and demonstrating the industrial arts of farming, the protection of crops and the sciences fundamental to agriculture. It is true we have the University Department of Economics, but every instructor in that section is a professor of commerce, and must necessarily devote his time to commerce under the general acceptance of that term. But why do not our commercial schools devote some time to the principles and practices that govern the negotiation of farm produce, and not so much to the principles of banking, brokerage and shopkeeping? The elements of barter and trade are fundamental to all traffic, to be sure, but why illustrate them altogether in the countinghouse and the store, when the proper distribution of, and the returns from the products of the farm are the foundation upon which our financial security rests? Why is the farmer not to the front with his business along with the lesser industries of the country? is a question comprehensive enough to cover all our discussions. But who can answer this question? The farmer is not up-to-date in all the departments of his pursuit. He has not generally considered it within his sphere to create, control, or even influence his selling agencies. The manufacturer has not neglected this most essential matter. The manufacturer in choosing his own salesmen and accountants has created a demand for efficiency of service that is felt in every school, and thus commerce to the young man has little connection with the sale of fruit and grain from the ranch. The farmer has not created the demand for

superior service in merchandising his crop, and consequently the make-believe money and business transactions of our commercial schools speak only in the language of the factory and countinghouse. Likewise, the economics of business life, and this condition will prevail until finally a chair of farm economics will be established in each of our universities and colleges, and the study of business economics will not be confined to other industries.

Why should not the agricultural and horticultural interests of the State be served with whatever is necessary for their advancement? When these industries became self-sustaining the real and permanent prosperity of California began. Discovery, exploitation, hunting, speculation, lumbering and mining, all had an influence in the development of the commonwealth. Most of these agencies of civilization simply utilized the reserves placed here by Nature, exploiting in a transitory way the bounties found so abundantly. But agriculture is of the soil for all time, however much its conditions and requirements may change. The very permanence of farming calls for steady and concerted efforts to maintain the productiveness of the soil and to keep the farmers' business in step with all other legitimate enterprises. As a class, he can never hope to be rich, as that term is interpreted by the money-getters of to-day. But he may be comfortable, happy, and prosperous by taking advantage of the resources of the soil and the economic conditions at hand. Of all others of his class the fruit-grower of this State has grown farthest from the idea of merely trading the products of his land for the necessities of life. It is true that the larger portion of his wealth lies in the freedom and healthfulness of his pursuit, but he has also chosen to enjoy the modern conveniences and diversions of life, and hence the necessity of placing his business upon an industrial basis as firm and attractive as possible.

How long would the railroads of the country continue in business if they paid no attention to the economics of freight hauling? They follow out every detail of efficiency and thrift in their administration to the very letter. Their managers know everything about fruit-growing that affects railroading. What do the fruit-growers know about railroading that has a bearing upon freight rates on fruit? If dividends run low, the railroads do not curse their fate and do nothing. They will raise the tariff on your fruit if possible, and they are trying to do that now. But they apply other means of increasing their earnings, to which there can be no objection. For example, by improvement in roadbed construction, in car-building, in the improvement of appliances, and in all around advancement of all that relates to freight transportation they have vastly increased the tonnage that can be handled by one train crew. Twenty-four years ago the average number of tons carried by each freight train in the United States was 143; twenty years later the average was raised to 310 tons to each train. This is an increase of 117 per cent in the efficiency of a train crew, and has largely decreased the cost to the railroads of delivering freights, even allowing for the increase of the first cost of equipment and the raise of wages since 1885. What have the fruit-growers done to increase the efficiency and lessen the cost of selling their fruit through the commission merchants at the other end of the line? Is there not room for the study of economics in the business of fruit-growing?

I am taking you into freight transportation to show how an enterprise can protect itself at all points, and also to exhibit some of the complexities that should be understood by the fruit-growers. The last time I took an invoice of freight rates, which was four years ago, the average rate per ton per mile for all roads in the United States was 8.3 mills for the preceding sixteen years. With the exception of two years this average did not vary one mill during the sixteen years. The average rate per ton per mile for oranges was 10 mills per ton per mile, or only 1.7 mills below the average for all classes of freight throughout the country. The rate on oranges has lately been reduced nearly 9 per cent, notwithstanding the fact that oranges are put through on fast time, the weight of the fruit about 14 tons and of the car 17 tons, and the risk of the railroad company great. The transcontinental lines have another element to contend against that few of the eastern roads have to meet, namely, the lifting of its tonnage over great elevations. The elevations to be overcome by the Southern, Central and Union Pacific lines is 20,099 feet; the Salt Lake and Union Pacific, 19,383 feet; the Santa Fe, 19,448 feet; the Southern Pacific and Rock Island, 13,038 feet, or an average for all of them of nearly three and one half miles. These, of course, are the roads upon which the California fruit-grower must depend. All these figures are my own, and they show further that the railroads, if they return the refrigerator cars empty, were getting only 35 cents per hundred pounds for hauling the oranges, the balance of the $1.25 per hundred pounds being consumed in hauling the 17-ton refrigerator car twice across the continent, and lifting it perpendicularly 7 miles on these journeys. The same principles and difficulties apply to the transportation of deciduous fruits. Let us look into the inequalities of freight rates a moment. Four years ago, when I examined this subject, the railroads were carrying 15-ton carloads of sugar from this coast to Missouri River points for $150; their revenue for a 13-ton carload of oranges was $325. This seems an enormous discrimination in favor of the millionaire sugar producer. It may be a discrimination, but not to the extent it appears. Sugar can be shipped by water. The orange car carried two tons less freight and the car was 25 per cent heavier than the sugar car. The refrigerator car companies at that time charged the railroads for car mileage. The railroads carried the sugar at this rate on condition that no claims should be made for loss or damage on the way; on the oranges liability for damage was assumed by the carriers. Sugar can be loaded at the siding with less demurrage than fruit, and the sugar has a definite destination, is not entitled to diversion to different markets, does not have to be run into a round house en route to prevent freezing, and does not run on schedule time. We might examine a dozen circumstances of fruit transportation to show that a deep study of its economics is necessary by the fruit-grower that he may know railroading as it affects his business, and his business as it affects railroading.

It is just as important that the railroad man understand what the fruit-grower is doing for transportation. The fourteen years preceding 1904, the production of deciduous fruits increased 47 per cent; dried fruits, 376 per cent; raisins, 137 per cent; nuts, 622 per cent, and oranges, 677 per cent. Can the fruit-growers afford to remain in the business if exorbitant freight rates are maintained? Should there be no

concessions to the immense increase of tonnage the above percentages represent? Some authorities claim that the cost of transportation varies with, or depends directly upon, the amount of traffic. In other words, light tonnage means high freight rates, and heavy tonnage low freight rates. This showing on increase of products should entitle the growers of California to the best and cheapest freight service possible. Are they getting it? The railroad men know, but the fruit-growers do not know, because they have been cultivating, improving, and multiplying their fruits without giving heed as a class to the business economics that affect, or, I should say, dominate entirely the price of orchard products. I know of no way of determining what is a safe and equitable basis of rates than a thorough understanding of all the elements of transportation, by both the producer and the carrier, in handling the enormous tonnage of fruit which your enterprise has developed. What are our students, lecturers, writers, or schools doing to carry this paramount question to the understanding of the farmer? What is he doing for himself in this line?

But while you are waiting for the solution of your economic problems, your orchards must not be idle. The fruits must not be destroyed by insect enemies and diseases. The horticultural laws must be enforced, for the slower your fruit is in selling the more will these enemies despoil it. In my Riverside address last April, I explained the needs of the State Commissioner's office in quarantining the State, executing the laws, and administering the other affairs of the office and the new Insectary. I showed that if the Legislature would give my office one cent for every five bearing fruit trees in the State it would give you $80,000 a year with which to protect the orchards and advance the interests of the fruit-grower. If the coming Legislature will appropriate one cent for every twenty-five bearing trees it will give us $16,000 a year for the support of the work we are doing in guarding your coast, enforcing the laws, advising you from demonstration trains, and promoting your interests in every possible way. Instead of this, the past annual appropriations have amounted to one cent for every fifty bearing trees. One member of this Convention told the Country Life Commission last Saturday that he was assessed $50 for every fifty bearing trees he had. In this case the State took 5,000 cents in taxes on his trees and gave him back for the support of his chief horticultural office all but 4,999 cents of this tax. If the State exacts a special tax from you for the privilege of growing fruit, you should see that the trees are properly protected.

But this paper is proceeding rapidly toward the time limit, and there are very many matters that will have to be omitted concerning the welfare of the great industry you are here to represent. Plenty of time has been allowed on the program for forwarding any subject the Convention itself may wish to introduce. I will not enumerate the issues that might be profitable to discuss, and, indeed, I do not consider any or all of them as important as that which has been the theme of this address, namely, of getting down to the fundamental principles of handling the fruit markets. This involves a study of transportation, of the distribution of fruits, and of carrying the risk of getting your fruit to the consumer, for this risk falls upon the grower whether he sell for spot cash,

through commission men, or through his own agencies in the East. I have tried to show you the folly of going forward in producing more and better fruits, and yet not providing for their disposal. I have intimated that if the fruit-growers would gather in their share of the market profits they would have enough money to pay for American labor in their orchards and vineyards. I have intimated that if we do not delve into the economical problems affecting our California fruit markets overproduction is already upon us. But with all this we should not be found on the pessimistic side, for we have faith in the men who cultivate and harvest so abundantly of their golden fruits that they will work out the problems of the sale of these fruits, as they are solving the problems of the production. But let the members of this and future conventions lead in discussing these economic difficulties and join with the fruit-growers of the State in their prompt solution, recognizing the burden of this address, that they will always be at the mercy of all circumstances adverse to rural progress till they learn to secure their portion of the profits of their horticultural labors. (Applause.)

MR. JOHN ISAAC was nominated for Secretary of the Convention, the nomination was seconded, and Mr. Isaac was elected to that position.

PROFESSOR WICKSON. Mr. Chairman, I am sorry that I can not be here to participate in the discussion upon the able address which you have made. It seems to me one of the most significant and pertinent addresses to which a convention of this sort has listened for a great many years, and I would like to say a word or two now, because I can not stay through the meeting, with reference to the point that was made against the present instruction in economics, or, at least, if not against that, in favor of something better; and I want to say that from my point of view that point is exceedingly well made, and I am very glad that fruit-growers are reminded that economics, from an agricultural point of view, ought to be more circumstantially dealt with in our institutions. I have no doubt Mr. Jeffrey has looked into it, but I have the general impression that economics in our institutions are, as he says, more with reference to general instructions, and they are not illustrative by reference to agricultural conditions, particularly with reference to the agricultural commercial situation in California. I hope this Convention will deal with that feature of the President's address seriously, and will declare itself very loudly, and will specifically demand that that view of the science of economics shall be given attention to in our universities. In one sense the university and the other institutions, especially those under State control, are like a store; if you don't see what you want, you can ask for it. Perhaps that duty really devolves upon the producers, who understand the situation, and that constitutes one of the chief reasons for the existence of an organization of this kind. Such an organization ought to keep our institutions up to the mark, and ought to suggest to them things which perhaps from their academic point of view they overlook. My suggestion is this, then, that the committee which, after a time, has under consideration the address of the President shall present to this Convention something very definite; and it would be perfectly proper for them to memorialize the Board of Regents of the University, asking that this matter be given attention to and that instruc-

tion may be provided, and to ask for it reasonably hard—of course, respectfully—but you want to approach these matters as though you meant to get them and you proposed to have them, and I think there is no question at all but what such instruction will be provided. It can be just as well as not. We have men, and if we have not, the university can get men who are willing to enter into the study of this matter. Mr. Jeffrey's address itself shows you how much can be learned from looking into the subject. It discloses a situation which is manifestly exceedingly important and timely, and, therefore, my advice would be that if you appreciate the point made by the Chairman, let the committee on the President's address go into the matter somewhat definitely and ask for what you want. (Applause.)

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

Mr. A. N. Judd moved, and the motion was duly seconded and carried, that the Chair appoint a committee of three on the President's address. The Chairman appointed as such committee Mr. A. N. Judd of Watsonville, Mr. George E. King of Fair Oaks, and Mr. S. A. Pease of San Bernardino.

Mr. A. R. Sprague and Mr. George H. Cutter were unanimously chosen as Vice-Presidents by the Convention.

In the absence of Prof. A. L. Quaintance, his paper was read by Mr. Foster of the Department of Agriculture, Washington.

THE PEAR THRIPS PROBLEM IN CALIFORNIA.

By A. L. QUAINTANCE,

In Charge of Deciduous Fruit Insect Investigations, Bureau of Entomology, Washington, D. C.

The present critical situation in deciduous fruit culture in the San Francisco Bay region in California, due to the presence of the pear thrips (*Euthrips pyri*), furnishes but another illustration of how an injurious species previously obscure and unknown to science may suddenly become abundant and destructive and literally threaten the existence of a well-founded industry, representing an investment of many millions of dollars.

The pear thrips came prominently into notice in the Santa Clara Valley in the spring of 1904. The blasted condition of the buds and flowers of various fruit trees attracted the attention of several orchardists, and specimens of the "new insect" were brought to the attention of the State Horticultural Commissioner. The importance of the insect as an enemy of deciduous fruits was promptly recognized by the Horticultural Commissioner of Santa Clara County, and Mr. Dudley Moulton at once began a careful investigation of its injuries and life history, and

conducted certain experiments with remedial measures, the results of which were published in 1905 in a bulletin from the office of the State Horticultural Commission.

Upon his employment by the Bureau of Entomology in the spring of 1906, Mr. Moulton prepared an article on the pear thrips, giving the essential facts concerning the insect as determined in his earlier investigations, and also additional information subsequently obtained. This paper was issued in 1907 as Part 1 of Bulletin 68 of the Bureau of Entomology, and furnished a fairly complete account of the insect's biology.

The continued and increasing losses brought about by the ravages of the pear thrips led to the establishment by the Bureau of Entomology of a field station in deciduous fruit insect investigations, which was located at San Jose, in the Santa Clara Valley, and Mr. Moulton, under the writer's direction, was placed in immediate charge. An additional man, Mr. Chas. T. Paine, was also detailed for the work in California in the fall of 1907. Both of these men, natives of the State and trained entomologists, were regarded as exceptionally well equipped for the work, especially by reason of familiarity with local horticultural conditions. Practically all of the attention of Messrs. Moulton and Paine has been given to the pear thrips, and much additional information has been accumulated. During the spring of 1908 extensive practical experiments were carried out, and a vigorous campaign work is planned for the spring of 1909. The thrips situation was carefully investigated by the writer in 1907 and also in 1908, and Dr. Howard made a personal investigation of conditions in the thrips infested territory during September of the present year. The Bureau at Washington is therefore closely in touch with the work, and everything possible within the limits of its appropriation will be done to bring about as speedily as possible the practical control of the pest.

Distribution.—The pear thrips at present occurs quite generally in the Santa Clara Valley, and is present in orchards in Contra Costa County, in the neighborhood of Concord; in Solano County, in orchards in the vicinity of Suisun; in Yolo County, and also in Placer County, in the neighborhood of Newcastle. The insect is probably present throughout this general region of the State, and will unquestionably further spread, though perhaps not rapidly, unless introduced in localities in ways other than by its natural diffusion. It is also quite probable that the insect will eventually make its appearance in other states on the Pacific coast, and that it may make its way to Eastern orchards would be not at all surprising. The pear thrips, therefore, is an insect of more than local interest, and its satisfactory control is a matter of importance for the fruit-growing industry as a whole.

Character of Injury and Habits of Thrips.—No remedial work with an insect may be undertaken with a reasonable hope of success, except as based on a knowledge of its life history. The small size of this insect has made it an unusually difficult one to carefully study. Nevertheless, Mr. Moulton has been able to determine many facts concerning the behavior of the insect, covering its entire life cycle from year to year, and his painstaking work is much to be commended.

The adult thrips puts in its appearance on the trees late in February

and early in March, at which time such fruits as almonds, apricots, and peaches are coming into bloom. From the middle to the last of March and early in April the insects are out in maximum numbers, when prunes, cherries, and pears are in full bloom. The thrips attack the swelling buds, working down between the bud scales, and by feeding upon the essential organs of the young flower or other parts soon destroy it. In the case of some fruits, like the almond and peach, these may suffer comparatively little injury if they are not attacked until the period of full bloom. The thrips feed upon the nectar in the calyx-cup, and the little fruit itself may thus escape. The insect is worse on pear, prune, and cherry, as it is most abundant during the period of swelling of buds and of blooming, and furthermore the fruit buds are developed in clusters. Buds of these fruits are, in extreme cases, so injured that they wither and die before opening, and even after the blossom has expanded the little fruit and other parts may be attacked and prospects for a crop quite destroyed. Leaf buds are also attacked in the same way, and the destruction of these may be so general that little foliage is put out, and it may be some months before a natural growth is developed. The small size of the thrips and its habit of working within the buds and flowers is calculated to prevent its detection by fruit-growers, and much thrips injury has doubtless been attributed to the effect of cold. On the other hand, the insect has been charged with injury properly due to unfavorable weather conditions.

The adult female thrips (no males are known) deposits her eggs in almost any tender part of the plant, as the fruit and leaf stems, the midrib and veins of the leaves, etc., by the aid of a saw-like ovipositor, with which a slit is cut into the tissues and the egg inserted within. The egg hatches in the course of about four days, and the young thrips wriggles its way out, and soon begins to feed on the tender tissues of the plant. These larvæ are at first very small, and when full grown are scarcely one twelfth of an inch in length. They prefer secluded places, as on the under surface of tender leaves, the growing tips and under the protection of the dried up calyx before it has been thrown off by the swelling fruit. In this latter situation they feed upon the young and tender fruit, and in the case of prunes and pears the injured places develop as the fruit grows into scabby spots, greatly disfiguring its appearance, and resulting in serious deformities, especially with pears. This injury by the larvæ to the fruit which may have escaped the adults is very important, and in badly infested orchards a large per cent of the remaining crop may be thus injured. The scabby spots on prunes do not shrink uniformly with the rest of the skin, and stand out very conspicuous, materially reducing the grade.

When full grown, which requires about three weeks, the thrips larvæ make their way to the ground and penetrate the soil to a depth from 3 to 10 or 12 inches, depending apparently upon whether this is soft or hard, the majority in tilled orchards going down some 6 to 10 inches. Below the soil each larva constructs for itself a little earthen cell of sufficient size to accommodate its body, and here the insect remains until the following spring, to appear as an adult during the flowering period of the trees, as already stated. In late fall and winter, however, the larva transforms to the pupa stage, and in this condition is much more helpless than as a larva. It is not known how long the pupal stage con-

tinues, but it is probably several weeks. There is thus but one generation of the thrips each year, and they spend much the greater part of their time safe below the surface of the soil.

The mouth parts of thrips present an interesting difference from those of insects of other orders, and a knowledge of these organs is of importance to fruit-growers. There is a snout-like projection, armed with several spines. Within the snout are stiff setæ or stylets, with which the epidermis of the plant surface is first penetrated, and then by aid of the bristles on the rim of the snout the opening is enlarged, the tissues lacerated, and the juices thus liberated sucked up for food. The thrips thus feeds, practically, on the interior portion of plants, and can not be destroyed with arsenical or similar poisons.

Food Plants.—Practically all deciduous fruits are attacked, as almond, apple, apricot, cherry, peach, pear, plum, and prune. The insect is also recorded from fig, grape, and walnut, and such indigenous plants as madrona, wild California lilac, and poison oak.

How May the Thrips Be Controlled?—Unfortunately this question can not be satisfactorily answered at the present time. From the résumé of the life history of the pest above given the extreme difficulty of controlling the adults with sprays is evident. At first thought it might appear useless to try such methods; nevertheless, considerable time has been given to testing various sprays as to their possible efficiency against the adults, and also against the larvæ. During the past spring Mr. Moulton has tested at different strengths the following:

Whale-oil Soap; Black Leaf Tobacco Extract; Tobacco Decoction from stems boiled in water; Kerosene Emulsion; Distillate Oil; Crude Carbolic Acid Emulsion; Creosote Oil; Lime Sulphur Wash; Arsenate of Lead and Molasses Spray; Arsenate of Lead and Glucose Spray; Arsenate of Lead, and Crude Oil Emulsion.

Of these several substances none proved to be especially effective except the proprietary tobacco extract and the distillate emulsion. Mr. Moulton concluded that by timely and thorough use of either of these sprays, directed especially against the larvæ on the under surface of the leaves, these can be destroyed in such numbers as to result in the protection of the crop for the succeeding year. The possibility of doing this will be fully tested during the spring of 1909, and the work will be done under the most favorable conditions for success. To be effective, however, spraying operations must be done on a large scale to prevent possible overflow of the insects from untreated orchards. It is planned to carry out spraying operations in Santa Clara County, Contra Costa County, and, if possible, in Solano County. Spraying for the thrips, should this prove effective, will offer, however, several practical difficulties. Two or three applications of sprays perhaps will be necessary, and in so short a space of time as to tax the resources of the orchardist to accomplish the work.

The destruction of thrips during their long stay in the soil, if it may be accomplished, would be much the more practicable solution of the problem. Mr. Moulton and Mr. Paine during the past summer have been carefully investigating various points connected with subterranean life of the insect, as their distribution in the soil, the effect of cultivation as possibly disturbing them in their cells, and also the possibility

of destroying them by protracted submergence in water, as might be practiced in irrigation. This work thus far has been necessarily confined to the insect in the larval stage, but will be begun against the pupæ as soon as these appear in the early winter. While the results thus far are not especially hopeful as against the larvæ, it is not improbable that a method will be found effective against the more helpless pupæ. In addition to cultural methods, irrigation, etc., the possible effectiveness of various fertilizers, chemicals, and fumigants will be tried, and it is hoped that some practical expedient will be developed from the coming season's work.

An additional man has already been detailed to the thrips work in California, and another will be dispatched early in December. The four men thus assigned will be able to carry out experiments and demonstrations on a larger scale than has been possible heretofore.

The sudden appearance in California of the thrips in such destructive numbers suggests that it has been introduced from abroad, and the opinion has been expressed that the species is a native of southeastern Europe. The genus *Euthrips,* to which the pest belongs, is represented in the United States by several species, and also in Europe, so that nothing may be inferred as to its nativity from the distribution of its nearest relatives. A search of European literature does not reveal a thrips of similar character and habits with *Euthrips pyri.* There is the possibility that it is a native of California, as its present occurrence in such destructive numbers finds parallel among numerous other native American insects. The *Thripidae,* as a group, on account of their small size and mode of existence are relatively free from the attack of parasitic and predaceous insect enemies. The principal enemy of thrips in the United States, aside from unfavorable weather conditions, is the insidious flower bug (*Triphleps insidosus*), which searches the flowers and buds and foliage of various plants, impaling the thrips on its beak and sucking out the body juices. The alimentary canal of thrips is often infested with nematode worms, but it is not certain that these are especially injurious. A fungus has been found by Mr. Moulton which, according to his observations, is parasitic upon the thrips, destroying them in considerable numbers. On the whole, it is not considered probable that any natural enemy of the thrips may be discovered or will appear in orchards which will be of much use in bringing about its subjugation. It is likely also that the thrips will not disappear of its own accord, and that its control must be affected by definite preventive measures, as in the case of other well-established pests, such as the codling moth, scale insects, etc. (Applause.)

PRESIDENT JEFFREY. The subject of thrips is a very important one. It is an insidious insect or little creature that is coming into your orchards to give you untold trouble, to give you immense losses. The orange-growers of one of the largest new sections of the south are on the verge of a panic with regard to this little family of insects. That is the reason that this paper was presented to-day. Of what use is it for a pear-grower up at Marysville to spend a fortune in weeding out the blight if this little insect gets into his orchard, as it has at San Jose and destroys his pear crop every year? Hence it is necessary to give our close attention and our best effort in discussing this matter. Don't

imagine it is a light question. I tell you it is a very, very serious question, and will, unless soon mastered, be of paramount consideration in California. Mr. Briggs was to lead in the discussion on this subject, but he is not here. Mr. Moulton is here, and he should have followed Mr. Briggs. Mr. Moulton is of the Department of Agriculture, Bureau of Entomology, a California man, and I think he can tell you something that may be of interest to you on the matter.

MR. MOULTON. Ladies and Gentlemen: We have already investigated the orange thrips in the south, and have found that it is doing really more damage than people appreciate. I was in a packing house at Lindsay last Friday, where they were sorting out the oranges, and about 30 per cent were being classed from fancy to choice on account of the scabbing on the fruit, and about 5 per cent were going out as culls. The reduction in grade from fancy to choice means about 40 cents a box. About a third of the crop was being passed back to choice, which is a great loss itself in the value of fruit. The nursery stock is very badly affected also by the thrips feeding on the foliage and especially on the very tender branches. In the Roeding & Wood nursery I found in the neighborhood of 250,000 trees just ready for the market. The trees are sold at from $1 to $1.25 or $1.50 apiece, and the loss there is going to be tremendous in cash just by the injury on the foliage and injury on the buds. The same injury is found on mature trees, but it is not so noticeable. We hope to try some experiments on the orange thrips, beginning early in the spring, but we have not decided yet just what the line of work will be.

Question: Is the orange thrips a different variety from the other? Answer: Yes.

Question: Different habits? Answer: We don't know much about their habits. They apparently have two broods, and the first brood injures the fruit just during the period of blossoming, and causes a circular scabbing at the stem end. The second brood seems to eat very largely on the foliage and scabs the fruit at the outer end. It is not a very deep scab.

Question: What was done about that nursery stock that was found infected? Answer: It is still in the nursery, and will be sold as first-class stock, and it really is first-class stock. You can't hold out anything against the trees on account of the injury.

PRESIDENT JEFFREY. It is liable to be a pest in every section of the State. In San Bernardino County, Mr. Pease had the matter up and threshed it out for years. It is not confined to any one locality.

Question: I would like to ask the name of this particular thrips you find in Fresno County. Answer: It is a new species. I have described it and called it *Euthrips citri.*

Question: Have you any idea where this thrips exists during the period it is not found on the orange trees? Answer: It is probably in the ground. There is going to be the trouble. Wherever the thrips have been present we will probably find that the larvæ are in the ground, and since orange trees are always balled when they are transported from the nursery to the field, you will probably take thrips in every ball of earth that goes out from the nursery, and every nursery that I visited in the southern San Joaquin Valley has thrips in it.

Question: In San Bernardino County the thrips are not visible on the orange trees, but we find a species of the thrips in the blossom of the wild sunflower. Do you know whether that is the same? Answer: The thrips you have in the south is *Euthrips tritici,* but that is not the thrips that is doing damage in the San Joaquin Valley.

Question: Is it the thrips that does the damage in the prunes? Answer: No; that is the *Euthrips pyri.*

A MEMBER. The effect on the fruit is identically the same as that described, making the circular marking around the stem and blossom end of the fruit, and also on the green fruit we find the markings very distinct on what we call the off-bloom. This variety of thrips we have had as long as I have had anything to do with the orange business, but it has never developed into a pest until the last seven years; that is, it has never shown a disposition to attack the fruit, and whether it has ever decreased the yield of oranges by destroying the fruit during the blooming period of course we are not able to tell. It seems to me that this same variety, as far as we can find now, has been in southern California, and it is very much in evidence during the blooming period. It has been there for fifteen or twenty years.

MR. MOULTON. Mr. Phil Baer, of Visalia, who is probably one of the best nurserymen in the section, says he has seen this curling of leaves and marking of oranges for fifteen or eighteen years, so it is probably a thrips that has been in the orchards ever since the orchards were planted, but with the increasing acreage of oranges and lemon the thrips have developed.

A MEMBER. There is a thrips on prunes in the San Joaquin Valley also.

MR. MOULTON. I don't know what that is.

MR. CUNDIFF. I would like to ask if in your investigations in the orange section you found any difference in the severity of its attacks in different localities; that is, in the valleys or the lowlands? We find quite a decided difference in our section on the upper lands, our hill lands, very much worse than it is in the low land or valley lands.

MR. MOULTON. That is true in this San Joaquin Valley orange section, and we can find the difference within a very few yards, almost, according to the kind of soil the trees are growing in. The clay soils and the adobe soils are heavy and have the thrips on trees very much worse than in the loam or the sand, and I can explain it, or try to explain it, only in this way. We know that the pear thrips and most other thrips spend a part of their life in the ground. They drop from the tree and work down four or five or ten or twelve inches and make a little cell and stay there for several months, almost a year. In the case of the clay soil it is very easy for them to get into a small crack or opening and make their cell and thus protect themselves, but in the loam lands it seems that they can not make their cell, and I should think that as they go down into the soil the soil would rather follow after them, as you know how sand will run. I think most of the larvæ, when they drop to the ground, must die before they mature, and the damage is so much more noticeable in the clay soils than it is in the loam and lighter soils that I can explain it only in that way, but every one has noticed the difference. I think the coming orange nurseries in the southern San Joaquin Valley will be planted on low land rather than up on the high land, where they are at present.

PRESIDENT JEFFREY. Will you give the Convention some idea of the thrips as it relates to the deciduous business?

MR. MOULTON. The pear thrips that we are working the most with is distributed all over the central bay counties or around the bay, and attacks almost every variety of deciduous fruit. During the last three or four years we have been working on it it has spread, and next year it seems it will be worse than ever, from the number of thrips we have been taking from the ground. We have found under some prune trees in Santa Clara County where they run as high as 2,000 or 3,000 to the square foot under the trees. In a number of orchards we find only 100 or 200, not very many, but enough, of course, to kill all the buds. At 2,000 or 3,000 to the foot, where the trees are large, it would mean a million and a half or two million thrips to the tree, which, of course, would kill every bud before it could open at all.

Question: What state are they in at this time of the year? Answer: They are changing from the larvæ to the adult. They are mostly in a pupa stage.

Question: How do they reach the trees? Answer: They have wings when they leave the ground.

MR. SPRAGUE. At what time do they leave the pupa stage?

MR. MOULTON. There are a great many now that have developed the wings and are simply awaiting the proper time to come out of the ground.

MR. GREEN. Where the thrips stays in the ground in the winter season have you ever tried the experiment of flooding?

MR. MOULTON. We have tried that only in an experimental way. We gathered a great many squares of dirt and soil from under prune trees where we found a great many thrips, brought them into our laboratory grounds and submerged them. For instance, we took an ordinary kerosene can and brought the block of dirt in that and removed the bottom of the can so that the drainage could be normal, and kept the ground flooded for from three to six, nine, twelve, fifteen and eighteen hours, and with eighteen hours we found no thrips that were dead; that is, probably all were living. That was without disturbing the ground. I think, though, the result will be different after we have plowed or otherwise broken up the soil.

MR. CUTTER. Could gas penetrate the soil?

MR. MOULTON. I don't think the hydrocyanic acid gas would.

PRESIDENT JEFFREY. I understand it is to be a campaign perhaps of years, and there will be thousands and perhaps tens of thousands spent by the Government and perhaps the university in making this test, and I would like for Mr. Moulton to tell you how the farmers themselves can help in this investigation.

MR. MOULTON. I hardly know how to answer that, because we have found in our experiments that in cultivating or plowing we have to cover so much ground in each experiment, 20 or 40 or 100 acres if we can, in order to know that when the thrips do come out in the spring they are not coming in from outside orchards. Generally the work requires too much for an individual to carry it through, even where we are helping him, unless we pay a large part of the expense for spraying materials or labor, toward cultivating and plowing. At present we are working in five or six orchards in the Santa Clara Valley, covering in each case from

20 to 40 or 80 acres, but we have selected large orchards and places where the owners are well able to carry on the work under our directions, so there is almost no expense on our part; the growers are bearing most of the expense. That has been necessary up to now because of the lack of funds we have been struggling against. Our appropriation has been modest, and not at all adequate for the work.

Question: Would you recommend winter plowing? Answer: Yes. We are recommending winter plowing, especially during the last of December or during December; deep plowing and thorough cultivation after the plowing, in order to break the land all up and let the January rains and February rains run them together. We know the thrips can not bore their way out. They have not proper claws; they can not dig and they can not eat or bite their way out, because of their peculiar mouth parts, and our idea is to thoroughly wet the ground and let the rains run it together, hoping that they will be, in a way, sealed in. I think that will do quite a great deal of good. We hope in our experiments to plow the ground and later spray for adults when they come out to enter the buds, and spray again for larvæ before they go into the ground. We know we can get quite a large per cent of the larvæ before they get into the ground.

MR. PEASE. What would be the danger in shipping deciduous nursery stock from an infested locality? What would be the danger of transporting the insect?

MR. MOULTON. I don't know that the young nurseries are injured by the thrips.

MR. PEASE. Would the larvæ be apt to be carried if they are in the ground?

MR. MOULTON. You do not usually ship dirt with your deciduous stock; there is a little, but not much.

MR. PEASE. You think there would be no danger?

MR. MOULTON. I don't think so.

MR. PEASE. The orange stock that you have in Fresno—if you have a remedy by which you can control them, why can't the nurserymen destroy the whole of them?

MR. MOULTON. They probably could, but the matter has never been investigated.

Question: What time in the spring does the pear thrips start to work? Answer: It comes out of the ground about the last week of February and during the first week in March.

Question: If the trees were flooded during that time that would be sufficient to keep the thrips down, wouldn't it? Answer: No; I don't think so.

Question: Wouldn't it be advisable to require the roots of all nursery stock to be washed before they leave the nursery? Answer: What would you do—puddle the roots again after you have washed them?

Question: Wash them in clean water. All the dirt could be washed off. The roots could be dipped in some solution? Answer: If you washed the trees there would be no larvæ left on the trees, but if you puddled the trees again in water and mud, if there were any larvæ there they would be carried. I know some nurserymen usually puddle their trees after they have been washed.

MR. SPRAGUE. Are not these thrips found in almost every locality where deciduous trees are being raised?

MR. MOULTON. Yes, sir; all through the central part of the State.

MR. SPRAGUE. So the few thrips that would go with the trees would not be of any particular moment?

MR. MOULTON. No.

MR. PEASE. I would like to know if it is possible that the thrips might carry over the winter.

MR. MOULTON. The egg stage lasts only about four days.

PRESIDENT JEFFREY. I will now call upon Mr. E. M. Ehrhorn, the general deputy in charge of the quarantine work, for a paper upon insect pests.

NEW PESTS WE SHOULD GUARD AGAINST.

By E. M. EHRHORN.

Very few of you who have toiled in the orchards and vineyards of our State can appreciate the good fortune which California enjoys in not having more injurious insects and tree diseases. It is true that we have had a number of very bad pests, which for a time threatened some portion of our great fruit industry. We Californians have been rather fortunate though to have been able, through the progressiveness of our leaders in horticulture and viticulture, and through the untiring efforts of the State and County Boards of Horticulture, to reduce these threatening foes of our industry to a minimum. We are also to be congratulated that by the strictest quarantine against insect pests and tree diseases, we have been able to keep out many of those insects with which other countries and even our eastern neighbors have been battling for many years. It is true that we yet have some pests to contend with, which like all pests the world over, have their periods of increase and decrease, and such conditions are, to say the least, very exasperating and costly. I will venture to say, though, that with the closest attention on the part of the grower and the utmost care and the most thorough investigation by the officers of the State and County Horticultural Commissions, we should ere long be able to keep these remaining pests greatly reduced and possibly render them harmless.

It has been my good fortune to visit some of the Eastern States, and I had a good opportunity to observe and study some of the injurious pests of our eastern neighbors. I am convinced from what I have seen that we should more than ever do all in our power to strengthen our quarantine laws, and we should devise some plan, or rather pass some new laws, to compel counties that have not availed themselves of horticultural protection to immediately establish horticultural commissions, for it is through this opening, this unprotected area, that we may receive some of the most destructive pests from which we have so far been spared.

Acting as your Horticultural Quarantine Officer at the port of San Francisco, I am probably best qualified to know the many pests which are constantly being discovered on the ever-coming shipments of plants and fruits which find their way from other countries into our markets. Here again we should do all in our power to further strengthen our

horticultural quarantine laws, so as to be able to give the very best protection to our growing industry. The regulations should be broadened in such a way that all cereals and foodstuffs and other insect-infested materials, such as timber and the like, be included in the protection against new pests. Other countries have copied our laws and methods, and I assure you that they have passed more stringent laws than we have, and some countries have even closed their door against the importation of fruits and plants which come from countries where it is well known that certain dangerous pests exist to the detriment of its industries.

In our work with orchard pests we have had a great deal of experience with scale insects, and without doubt have had sufficient species to deal with, yet there are several species in other countries and in the Eastern States which, if introduced here, would cause considerable annoyance and expense. The following species may be mentioned:

The terrapin scale or peach lecanium (*Eulecanium nigrofasciatum*). This species might be called a medium-sized scale, resembling somewhat the olive scale in form. It has been known under various names in the Eastern States, and attacks the peach, plum, apple, sugar maple, hawthorn, and many other plants, showing it to be a general feeder, and it has been reported from about fourteen states and from Canada. Great care should be taken in the inspection of nursery stock, for the young scale insects could be easily overlooked.

The scurvy bark louse (*Chionaspis furfurus*) has not gained a foothold in our State, although it exists all over the Eastern States. It attacks apple, pear, cherry, quince, peach, walnut, and many roadside trees; in other words, it is a very general feeder and causes much damage.

The peach scale (*Aulacaspis pentagona*) has unfortunately become quite a pest in many of the Southern States, and as far north as Pennsylvania, infesting plum, cherry, and peach, and also at times attacking other plants. For many years this pest has been found by the Horticultural Quarantine Officer on plants arriving from the Orient, and the strictest quarantine has been maintained against it. Up to the present time it has not gained entrance into the State, but don't let us get it in on deciduous stock from the Eastern States.

The maple scale (*Phenacoccus acericola*), on account of its clustering habit during the egg period, is often mistaken for the cottony maple scale (*Pulvinaria innumerabilis*). It is much more prolific, and belongs to the mealy bug family, which are too well known to us to need much discussion. These insects are among the hardest to fight, for the eggs are enveloped in a dense cottony secretion, which is a great protection to them; in fact, it prevents any wash or even a fumigation from reaching them. It has been our experience with nearly all the mealy bugs that a pest like this one on our avenue trees would soon make them fit for the woodpile. In our mild climate there is a possibility that this species would change its habits and take to other foodplants and become a serious pest of our park trees. There are other scale insects, some of which might prove serious if ever introduced, but space will not permit their discussion.

Other insects which are to be feared are these:

Pear-tree psylla (*Psylla pyricola*). This insect, originally from Europe, resembles and is closely related to the plantlice, but can be dis-

tinguished from them by its ability to hop. It is of a reddish color, with some black markings; the wings are clear and rest roof-like over the body. The psylla at times becomes quite abundant and does considerable damage to the pear tree, which it only attacks. These attacks are a very serious menace to the tree and crop. The drain of sap and the enormous secretion of honeydew by the insect soon weaken the trees, and the foliage drops and the half-grown fruit as well. The pear-tree psylla can be readily introduced on nursery stock, because the insect hibernates as adult in any crevice or under any rough portion of the plant. Close inspection is therefore most important for the discovery of this pest on nursery stock. There are several species of psyllids in the Orient and adjacent countries, and the closest watch is kept on all plants to prevent their introduction.

Among the butterflies and moths there are many very injurious species, some so minute that their larvæ could be readily overlooked.

The cigar-case bearer (*Coleophora fletcherella*) is a widely distributed pest throughout the State of New York and is also found in Canada. It is a very small insect, the adult resembling our clothes moths in size, and is therefore hard to detect. It hibernates in winter in the larval state, and is enclosed in a small cocoon resembling a miniature cigar, hence the name. In this stage the insect rests on the twigs of the tree during the winter, and could easily be shipped into our State on nursery stock.

The bud moth (*Tmetocera oceliana*) is another small species about the size of the codling moth, and found in several states of the East. It works in the opening leaves and flower buds, and does untold injury to the blossoms and forming fruits. It has also been known to destroy young budded trees and growing nursery stock. Besides the apple, it also feeds on the pear, plum, cherry, quince, and peach, also attacking the blackberry. This pest hibernates as a half-grown larva among the buds and rough places on the trees it attacks, and is a very hard pest to detect. We have a leaf roller in some of the fruit-growing sections of our State which is giving us some trouble. If the Eastern pest should become established here, I can see a lot of expense ahead for the grower.

Two pests resembling the codling moth in their work, but doing more damage, are the Japanese apple fruit-borer (*Laverna herellera*) and pear fruit-borer (*Nephoteryx rubrizonella*). The first species was found in a 6,000-box shipment of apples arriving from Orcas Island, showing that one of the pests at least is established on this continent. Both these pests are a serious menace in Japan, and the closest inspection only will prevent their introduction.

Paramount of all injurious species is the gypsy moth (*Portheria dispar*) and its running mate, the browntail moth (*Euproctis chrysorrhoea*). There has been so much said and written about these two pests and so much money spent in the fight against them—I think it now amounts to two millions of dollars—that one would think that nearly everybody would know about them, but very few do. Although I had read and indirectly studied much about these pests, I must confess that I was greatly surprised to find them as destructive as I did on my visit to Massachusetts. I can not warn the people of this State too strongly against these foes of the forest, for as sure as either ever reach us, especially if it should get started in our beautiful forests, no power on earth would be able to eradicate it, and all we could hope for would be a check

at intervals by parasites, just as is the case in its native country, the climate of which is entirely different from ours. Possibly their native land would have the advantage over us, owing to more severe winters. These insects are known all over Europe, and at times are said to do untold damage to the forests. The defoliating of pine trees means sure death to the trees, and with our vast areas of timber, which is one of our greatest products, would mean a loss running into many millions of dollars. Either of these pests can be readily transported on nursery stock or in the packing used with the shipment, which very often contains dried leaves on which egg masses are liable to be found. These egg masses are also found in the most remarkable places, and if plants are sent from infested areas it would be the simplest matter in the world to overlook such egg masses, which, by the way, contain from 400 to 500 eggs each. Any packing box, barrel, old sack, which happens to stand or lie in any dooryard in the infested area would be apt to hold one or more such egg masses.

The introduction of the browntail moth would not be quite as easy, because the small larvæ pass the winter in what is called the winter web; this is formed by spinning together a number of leaves and forming webs in these in which as many as 200 caterpillars congregate. They are about one fourth grown by the time cold weather sets in, and they remain all winter in these leaf-covered webs. Such webs could be overlooked on nursery stock, as they have the appearance of dried leaves. If ever introduced into our State this pest would equal in its spread that of the gypsy moth, for its flight is more perfect, that of the gypsy moth being retarded by the almost inability of the female moth to fly. The egg masses of the browntail moth contain about 300 eggs each; both species are therefore very prolific and are also general feeders, and do much damage to fruit trees. There exists a species of gypsy moth in Japan which resembles the European one so much they can hardly be distinguished. This species in the larval stage was taken twice by the quarantine office on imported nursery stock.

Two boring insects, both belonging to the clearwinged moth tribe, should be guarded against, lest one or the other should be imported. These are the squash-vine borer (*Melittia satyriniformis*) and the peach-root borer (*Sanninoidea exitiosa*). The first is something which would be entirely new to our State, for the few insects which attack our squashes and pumpkins are well known to us, and we might say that we are prepared in a way to overcome their attack, except perhaps in exceptional seasons, when we must accept the inevitable and take our loss. The record shows that the squash borer attacks the various squashes and also the cucumber, and has been known to attack muskmelons, and is recorded as a serious pest. Its life history gives us some hope, at least, that its transportation would be rather difficult; the moths pass the winter as pupæ in the ground, and unless these should be brought in soil attached to plants it would be difficult to bring the pest into California.

The second insect, the peach-root borer, sounds more familiar to us, and although we have its near cousin in a few sections of our State, yet we should not permit any infested trees containing the larvæ of the Eastern species into our State. I know that infested stock is shipped here, for we have destroyed such and have reared the adult moth from some of the condemned stock in our laboratory. This species has been

reported from Oregon, but from correspondence with Professor Cordley, I have his statement that he has never reared the Eastern species in his State, nor has this species ever been reared from material collected in California, despite the fact that rumor had it that it did exist in our State. J. H. Hale, America's most noted peach-grower, is quoted as saying: "The peach borer has killed more trees than all other causes combined." Slingerland, of Cornell, says in his bulletin on the peach-tree borer: "We suppose that but comparatively few of the peach trees which have been planted east of the Mississippi River during the last quarter of a century have lived to produce a crop of fruit without suffering more or less from this dreaded borer." And he also says: "The peach-tree borer has ranked as one of the standard and serious insect pests of the United States for nearly a century." With such statements as quoted above I don't think it will take much more to convince the planter to purchase his peach trees at home, where we do know that we have no risk of getting this dreaded pest, and it should give the County Boards of Horticulture some idea about the great chances they take with nursery stock coming from states where this pest is known to exist.

The fall webworm (*Hyphantria cunea*) is another insect which should be guarded against. It produces webs or tents resembling those of the tent caterpillars we have here, only making them in the autumn. The insect passes the winter in the chrysalis contained in a delicate cocoon which is attached to the bark of the food plant. In some parts of the East only one brood occurs, but in the more southern portions we find two broods, which would no doubt be the case in the climate of California. The records show that this species does considerable damage to fruit trees.

A pest which might prove a great detriment to our cypress hedges and other shade trees is the bagworm (*Thyridopteryx ephemeraeformis*). The larva of this moth lives in a bag formed of silk and decorated with small pieces of twigs and leaves. As the worm grows it increases the size of the bag, carrying it along as it feeds. The female is wingless, and never leaves the bag, and in the fall of the year she deposits a quantity of eggs in the bag, which remains hanging in the tree during the winter. This pest could be very easily transported on nursery stock, such as arbor vitæ or other ornamentals. There exists a much larger species in the Orient and Australia, which does serious damage to trees. This species has been found on shipments arriving at San Francisco, and a very close examination must be made of all such stock, because when the larvæ are young the bags are also very small and can be very readily overlooked.

A pest which has made its appearance in a few of the Eastern States, and is probably a recent importation from another country, is the peach sawfly (*Pamphilus persicum*). It has been reported doing serious damage to the peach, partially or wholly defoliating the trees. This pest has been noticed in Connecticut, New Jersey, and Pennsylvania.

Snout beetles, known as the plum curculio (*Conotrachelus nenuphar*), and the quince curculio (*Conotrachelus crataegi*) are considered great enemies of the Eastern fruit industries, and especially is this true of the plum curculio. Neither of these pests exists in California. For many years the growers of this State, many of them originally from the East, have been in great fear of the appearance of this pest, as it would mean a great setback to our stone fruit industries, and it would not stop at this,

for it attacks also the apple and the pear. The injury to the fruit is done by both the beetle and the larvæ, and all fruit except apples and pears usually drop before maturing, or the fruit is so badly scarred as to be unmarketable. The adult beetle passes the winter among the decaying leaves or in the grass-covered orchards or wherever any rubbish has accumulated. Owing to these conditions it is not an easy matter to transport the pest, nevertheless close watch should be kept on shipments of nursery stock, especially if any kind of rubbish-like packing, old leaves, sod and the like are used. All such materials should be immediately destroyed by burning.

Another beetle belonging to the snout beetles is the strawberry weevil (*Anthonomus signatus*). This is a very small species, but capable of doing enormous damage to the strawberry by damaging the blossoms. It is found in Canada, the Atlantic States, a portion of the Southern States, and through the Middle States. It could be easily transported in strawberry plants, as the adult hibernates and is often found among these.

Right here I wish to call attention to the reputation of snout beetles, namely, that nearly all species are serious pests of some plant or of its product. The cotton-boll weevil (*Anthonomus grandis*) is another species too well known to the cotton-grower, and although our State has no cotton industry as yet, we are now trying the growing of cotton in the Imperial Valley. The action taken by the State Commissioner of Horticulture in regard to the importation of cotton seed to prevent the introduction of this pest is very timely. The records show that this pest has cost the cotton states many millions of dollars, and if we are to start a new industry here it behooves us to start it without its greatest enemy.

Our flat-headed apple-tree borer (*Chrysobothris femorata*) is too well known to all fruit-growers to need any further remarks. What the round-headed apple-tree borer (*Saperda candida*) would do in our apple orchards can only be inferred from its record in other places. This insect lives three years in the trunk of the apple tree, and it will also attack the pear and quince tree, but has a preference for the apple. Its work is very similar to that of the flat-headed apple-tree borer, but its three-year work in the tree makes this species a much more serious pest, and would without question prove a very injurious pest to our industry should it ever gain a foothold here. It is very widely distributed through the Eastern States, and also occurs in Canada and some of the Middle and Southern States.

The mere mention of fruit-flies causes a lot of thinking among our fruit-growers, and although fruit-fly maggots could hardly be transported on nursery stock, yet it is worth while mentioning such species as are known to exist near us, and to give some idea of their work and a warning to those who travel abroad, or even to the Eastern States, not to bring any infested fruit as exhibits or curios from their travels before first ascertaining whether or not it contains one of these dreaded pests.

Foremost threatening the citrus industry may be mentioned the morelos orange maggot (*Trypeta ludens*), so destructive in its native country. This pest has been known for many years, and the strictest watch has been given all shipments at our port of entry, and so far the pest has not gained an entrance, and yet there is great danger at hand, for our eastern boundary is unprotected, and hundreds of carloads of

Mexican oranges find a market in the United States. Who can tell when even passengers from Mexico via El Paso to California will bring some of this infested fruit in their hand baggage or lunch hampers? A fruit maggot when full grown leaves the fruit and drops to the ground, where it pupates, and soon emerges as a very lively fly. An infested orange could well remain a week or ten days along the railroad track and the inmates would find good eating, and finally a good home in the warm soil of our State. Such a little start would soon furnish abundant material for a strong infestation.

Other fruit maggots are known in the Eastern States and many sections of the tropics, and have been reported as very serious pests to the fruit industries. The following are worthy of mention:

The apple maggot (*Rhagoletis pomonella*) and the cherry fruit fly (*Rhagoletis cingulata*) of the Eastern States would create a lot of trouble should either ever gain a foothold in our State.

The peach maggot of South Africa, the Queensland fruit fly, the melon maggot of Hawaii, and several other fruit flies in adjacent countries have kept us in constant terror lest one or the other should creep in unnoticed. Since our quarantine protection several lots of maggot-infested fruit and vegetables have been seized and destroyed, and the closest watch is always necessary to prevent other lots from landing.

The two species that are found in the Eastern States are distributed from Massachusetts and New York southward to Maryland and as far west as Michigan. These pests would have to be brought into our State either in the fruit as maggots or as pupæ in soil from badly infested areas.

Another pest which comes in this group is the pear midge (*Diplosis pyrivora*). This is a very small fly, resembling somewhat the hessian fly. It lays its eggs on young fruit, and as soon as these hatch the maggots enter the fruit and feed near the core, causing the fruit soon to shrivel and drop. The full-grown larvæ leave the fruit and fall to the ground, where they pupate and remain until the following spring.

Besides the maggots which attack fruits there are several species which attack vegetables, roots, and other portions of plants. The melon maggot of Hawaii has already been mentioned, but there are the cabbage maggot (*Pegomya brassicae*) and the onion maggot (*Pegomya cepetorum*) well established in the Eastern States and Canada. Both are very serious pests, and at times cause very noticeable damage.

Other pests attacking vegetables are the sweet potato root-borer (*Cylas formicaris*). This species has been reported from China, India, Cuba, Louisiana and Florida. As this pest is already recorded from the United States, there is no telling when we shall discover its presence here. The damage done to sweet potatoes is very serious; at times whole crops are a total loss.

The melon worm (*Diaphania hyalinatalis*) and the pickle worm (*Diaphania nitidalis*) are two other pests, both moths, which would cause very serious trouble to our melon industry. The first is rather abundant in the Gulf States, and the latter is reported from many of the Eastern and Middle States as well as from South America.

A pest which has paid us a visit, but which, as I am informed, has now been under control for a year, is the dreaded orange white fly (*Aleyrodes citri*). We can not use too much care in our inspection of nursery stock

coming from outside the State, because this pest has been found in greenhouses in many states, and exists in several of the Southern States of the Union, and it has also been taken on nursery stock coming from Japan by the quarantine office. The pest is very prolific, and being the enemy of citrus fruits, we can hardly blame the citrus growers of our State, with their $30,000,000 industry, for feeling alarmed when this pest made its appearance among us.

The pests of our grape industry are but few in number, and we should be very careful to avoid importing some few others which exist in other parts of the country and in Europe.

The grape-root worm of the Eastern States (*Fidia viticida*) is considered a very serious pest in the vineyards of the Atlantic coast. We here in California have had some experience with our California grape-root worm (*Adoxus vitis*), and know the seriousness of such a pest. Both species do about the same damage to the vine, and let us endeavor to keep out the other fellow.

When we in California begin to notice wormy grapes it will set a lot of us thinking and asking ourselves, What next? Wormy apples, pears, and peaches are bad enough, but wormy grapes would create some excitement, I am sure. The grape berry moth (*Polychrosis viteana*) is the cause of wormy grape in the Eastern States and Canada, and at times does enormous damage to the crops, making them unmarketable. It is an American insect, and like its European cousin (*Polychrosis botrana*) has a very bad record as a pest. It has been reported as destroying one third of the crop in some vineyards in Ohio, and is usually double brooded, the first brood feeding on the blossoms, the second in the fruit. A third brood has been reported in some of the Southern States, and this would happen with us if the pest ever got introduced here. The insect passes the winter in the pupa state, and the cocoon is fastened in the leaf of the vine, so that transportation would not be very difficult if vine or cutting were carelessly packed.

The grape-seed worm (*Isosoma vitis*) and the grape curculio (*Craponius inaequalis*) are two other pests which do equally injurious work as the foregoing.

The grape blossom-bud gnat (*Cecidomyia johnsoni*) is another pest reported from New York, which from its record would prove a very serious enemy to our industry. This insect attacks the blossom buds, and after the maggots have matured, they issue from the bud and drop to the ground, where they transform. As many as eighteen maggots were found in a bud, showing that the maggot is a very small individual. In one vineyard as many as one third of the blossom buds were destroyed by this pest.

An insect which is placed next to the phylloxera in France, owing to the enormous damage done, is a tortricid moth (*Cochylis ambiguella*). As many rooted vines are annually imported from France, great care should be used in the inspection of such stock. This species also attacks the blossoms and fruit.

There are many very small pests, such as thrips and mites, which are known to do serious damage to trees and vines in other countries, and as we have had some experience with similar species in our orchards and know how hard it is to fight or even to detect these until they become so very abundant that the plant indicates trouble, it will be necessary

to employ the very best inspectors to guard against all these minute pests. Many other injurious insects could be mentioned belonging in nearly every family of the insect world, many of which now exist in countries with which we have as yet small commercial relations; but with our growing commerce and the advent of the Panama Canal, which no doubt will bring us in closer touch with these countries, we shall be required to employ many good men, and above all we shall have to broaden our laws, so as to be ably prepared for this work when it does come.

A serious pest which would soon destroy the looks of our elm trees is the elm leaf-beetle (*Galerucella luteola*). This insect is of European origin, and has been known as a very destructive pest to the elm in most of the New England States for more than fifty years. The damage to the tree is done by the grub of the beetle, which skeletonizes the foliage of the tree and causes it soon to drop, and in a few seasons this damage so weakens the trees that many become worthless. In warmer climates this beetle is double brooded and hibernates as an adult, frequently entering houses, barns, boxes, or any place where it can get shelter from winter storms. I mention this to show that it would be an easy matter for this pest to be transported for a long distance. The fight against this insect is very costly on account of the large size of elm trees, and specially equipped outfits have to be used to do thorough work with sprays.

Eucalyptus growing in our State has taken great strides within the last few years. The idea that this tree is, so to speak, immune from insect attack seems to be general, and it might be well to mention a few of the more injurious species which attack this remarkable tree in its native country.

The gum emperor moth (*Antherea eucalypti*) is a very large moth, resembling our *Cecropias* in size and beauty. The larva of this moth does serious damage to the foliage of the tree. The eggs are laid on the leaves, and could be easily transported this way. This pest also attacks the pepper tree, which has been extensively planted in Australia.

In New South Wales and Queensland there are two very destructive tree borers, *Zeuzera macleayi* and *Leto staceyi*, which do immense injury to these trees. Both these could be brought here in samples of wood.

The wattle goat moth (*Zeuzera eucalypti*) is another tree-borer principally attacking the wattle, but also reported doing severe damage to some species of gum trees.

Several gall-forming scale insects attack the eucalyptus, and do much damage to the smaller branches, stunting the growth and injuring the symmetry of the tree. Other scale insects, such as *Eriococcus eucalypti* and *E. coriaceus*, commonly called the gum-tree scale, and some very large scale insects belonging to the *Monophlebinae* are reported as doing serious injury.

We have found scale insects attacking the blue gum in this State, and we have also found one of our twig borers (*Polycaon stoutii*) attacking this tree. How very fortunate it was for California that eucalyptus growing was started from seedlings raised here instead of from imported trees, as has been done with other plants. However, that now there is such a demand for the different varieties and a constant inquiry for some species remaining in the native land, it might be well for those

interested to take precaution and not send for trees, but continue to raise seedlings, thus preventing such pests as cited above from ever gaining entrance here.

In concluding, I may say that it has been observed that as agriculture with its various branches advances all over the world new pests are constantly appearing, and the more acreage is planted to the various crops the more enemies seem to appear, and are always to increase. Constant care and untiring vigilance is therefore necessary to keep our crops free from new invaders, and the most sincere coöperation with the various institutions who are here to help the grower should be the first thought and duty of those who are engaged in agricultural pursuits. (Applause.)

PRESIDENT JEFFREY. Mr. Maskew, of the Department of Entomology of the United States, will lead in the discussion.

MR. MASKEW. Mr. Chairman, ladies and gentlemen: As the Chairman has told you, I am to conduct the discussion. You don't know how gratified I was when he used the word "conduct." It relieves me of the grave responsibility of attempting to do full justice to the matter that Mr. Ehrhorn has just called your attention to. He has indicated a plan of action. It is for us to devise some ways and means of circumventing the danger. This is the place, now is the time; to-day is for us to do it. Gentlemen, what shall we do? Now, just as a starter, to get you to expressing your thoughts, I am going to ask Commissioner Camfield, of Orange County, to tell us what he thinks is the best thing to do.

MR. CAMFIELD. Mr. Ehrhorn includes a wide field of work. I don't know that we could cover all that field in a short time, but it seems to me we should get busy and try to do so as far as we can. There is a big territory outside of this State that we have got to look out for, and it seems to me there are not enough quarantine officers to guard the State alone. We are liable to get the morelos maggot worm in here any time, not only as Mr. Ehrhorn tells, but you may get it from Nogales. I have information from Arizona that oranges are coming in there now, and passengers are bringing them in over the railroad; so I think we had better try to get more appropriations and have more men put in the field, and try to keep out the enemies. We have already got too many here now.

MR. MASKEW. The San Francisco division of the State Board of Horticulture has shown us what is possible in quarantine work with competent men. I think I am safe in saying that probably nowhere in the world is there such a complete record as they have obtained in the past ten years. In California we think we have all the ills that trees are heir to, but the fact is that we have but a very small quota of the full complement of the injurious insects of the world. I think I am within the bounds of truth when I say that more new and different varieties of insects injurious to trees and fruit are detected and destroyed every year in the San Francisco quarantine division than we have in California. As the Commissioner from Orange County has told you, his idea is to strengthen this branch of the service by the addition of more men. We need men specially qualified for quarantine work—men who have a technical knowledge and long experience, which enables them to act

promptly and with efficiency. I see Mr. Mills from Riverside. I want him to help me a little as to what we should do.

MR. MILLS. Mr. Conductor, we will do well as horticulturists and agriculturists if we pay diligent heed to the warnings given to us in Mr. Ehrhorn's paper. Those of us from the south know full well the gravity of the situation so far as we are concerned now, and the enormous cost there is to us to fight the insects now taking charge, almost, of our orchards in some places. Personally, I have been responsible for the expenditure in two years of over $50,000 in fighting scale—a tremendous tax upon an industry; five per cent on a million dollars, a very fair dividend on a million dollars. We probably never can eradicate the white scale or the red or the purple or the yellow scales and the many others that are infesting our orchards in the southland and in the northland. There are those who say we can. I believe we can eradicate it on this tree or on this orchard, but the fact is, nevertheless, that we can not take a blanket and cover all of our orchards at the same time, and the scale pests cover the orchards very fast. I myself have had to cover one orchard three times because my neighbor has not been diligent in covering his at the same time, and the scale there has come back over my orchard. We represent the wealth-producing people of this State. This is an agricultural State, it is a horticultural State, pure and simple. You and I, who are delving in the soil, not only grow oranges, but we build cities. I may not lay bricks one on the other in San Francisco or Los Angeles or Sacramento, but, nevertheless, I am one of those numerous hosts which produces the wealth which does lay those bricks one upon the other (applause), and I am entitled, and you are entitled, as producers of wealth primarily, to protection at the hands of the Legislature of this State. It is not a selfish thing. If it is selfish at all it applies alike to the city man and the country man, and the lawyer, the doctor, the minister and the teacher, for without the horticulturists the grass would grow in the streets. We are entitled to and must demand and must get protection from our Legislature—not alone our protection, but the protection of this State, and that protection can not be given us unless we have the strongest possible quarantine laws and the strongest possible individuals to enforce those laws. Gentlemen, we lost one of the greatest men that this State ever had. He went from here to Honolulu because we could not pay the price that Hawaii paid. We must not harp at the wages demanded by men of brains. We must not only demand more service, but the highest talent. An industry such as ours is the life of the State. I am not speaking for myself, although I represent 3,000 acres of citrus orchards and manage and control them. I am speaking for you, for all of you, for all of us, for the State at large. Let us demand, and when our demand is made, let us see that we get the protection that this great industry needs, and if we are insistent and persistent we will get it; if we are not, we will not. Let us back this up at the legislative halls yonder this coming January, not ten years hence. (Applause.)

MR. KING. I am not a protectionist, but it just occurs to me in this discussion that a part of your efforts might be expedited if at the coming discussion of the tariff by the General Government the fruits from infected countries should carry so high a tariff that it would be prohibitive. Now, that is going a long way, but I believe we are justified

in that. For instance, take the orange that comes in from Mexico. If you had the tariff that prohibited it you would not have to watch your borders with men who might look after any infected fruit. And it occurs to me that it might be possible for us to have a prohibition upon the bringing in of trees and plants from foreign countries, unless they were brought into the country through a clearinghouse, that they should be consigned to a clearinghouse, and then in that way we would get protection at a minimum of cost.

MR. MASKEW. Unfortunately, very few of our insects come in that way. The state of knowledge is such that every one knows that the modern methods of transportation are so thorough and complete that the nurseryman and dealer in any part of the world is guaranteed in warranting the arrival of his plants in sound condition. How few of us stop to think that that same guarantee covers the arrival of the bug that infests the plant! Every week in California thousands of people send to the four corners of the world for new and strange varieties of plants. Many of them come through the mail, and I assure that gentleman that the risk is greater through the mail than through carloads of fruits.

MR. KING. Wouldn't it be possible to even control the bringing in of these plants and fruits through the mails?

MR. FOWLER. I have no doubt about the efficiency of our horticultural quarantine. I think they are doing a great work, and I think one of the greatest things we could do to assist them would be to ask the people not to send away for these things; and I think if Mr. Ehrhorn's paper should be published broadcast it would go a long way toward educating the people to the dangers that confront them, and they would not send off for these things.

PRESIDENT JEFFREY. The Commission of which I am the head had to borrow the money or get it through the Board of Examiners from a contingent fund of some kind to publish the last thousand copies of the Riverside Convention. I just merely throw that out to inform you how little the appropriation is for the publication of this work; $2,500 has to cover all of our bulletins, and the printing of our letterheads and furnishing of our envelopes and all of these things.

MR. CUNDIFF. I make a motion that Mr. Ehrhorn's paper be published in bulletin form and distributed to the fruit-growers throughout the State.

The motion was duly seconded and carried.

Vice-President Sprague in the Chair.

THE CHAIRMAN. I am very sorry to break in, but our time is past for this discussion. The next subject is "Present Status of the Apple," by Mr. A. N. Judd of Watsonville.

PRESENT STATUS OF THE APPLE.

BY A. N. JUDD.

I suppose each of you in filling out the monthly crop reports sent you from Washington by the Department of Agriculture think you are adding your mite in a degree to the sum total of information that is supposed to assist the fruit-grower and farmer of the Pacific coast, and yet down deep in your heart you are not wholly satisfied. You feel that

other questions are pertinent to the welfare of horticultural California. Distribution, markets, and freight rates seem to you important. It seems also that the Agricultural Department should extend the inquiry and add the number of trees and vines, the number of acres, per cent of increase or decrease in both; again, the average quantity of each kind and variety in each State, the increase and decrease of them, and their comparative market value separately. The present system is like playing Richard III. without a Richmond. What value is it to you to know the apple crop is 20 per cent below normal unless you know the normal production? Even then you should know whether or not the market is open to you through railroad discrimination or otherwise.

The Watsonville apple-grower would give much for this information; publicity they say cures many evils; then why not have crop bulletins in reference to apples, if you please, read like this: "The apple crop in the greatest apple section west of the Missouri River (Watsonville, Cal.) is the largest in its history, having 4,000 cars for shipment; the area is 15,000 acres; one third in full bearing, one third coming in, the rest young trees. The increase of annual planting about 2 per cent, but with a gradual falling off, owing to uncertain and fluctuating freight rates. The varieties are Bellefleurs and Newtowns, about equal in acreage; other varieties form one fifth of the apple territory planted. The Bellefleur is a fall apple; should be marketed in October and November, and should have a special rate, as well as a permanent one, to the west of and to Missouri River points, and not be classed with Newtown Pippins, whose market is mostly in Europe and to the Eastern markets that take no Bellefleurs. The same rate on each, of $1.00 per hundred pounds, works a hardship on Bellefleurs that are hauled but half the distance. Years ago our Bellefleurs found markets as far east as the Great Lakes, north to St. Paul, Grand Forks, and Butte, but the liberality engendered by a building up policy, and with a shrewd business sense the northern roads have, by giving a lower rate than the Southern Pacific, closed those markets to us, and are even now curtailing the rest by invading our very home markets."

Mr. Stubbs will tell you the rates are the same, for, he will tell you, he went himself to Oregon and Washington (when the apple-grower of Watsonville asked for an emergency rate equal to those northern states and owing to the stringency of the money market in Missouri points) and had the rate raised to $1.00, and it is said the schedule was accepted by the Interstate Commerce Commission, and it is understood that any violation of that schedule would be a fine of $500, but it seems that Mr. Stubbs was not equal to the protest of the entire Northwest. They saw ruin to the fruit industry; that champion of the farmer and fruit-grower, The Oregonian, came to the rescue with the aid of other papers of that country joining in with the horticulturists; the result is Mr. Ober of the Northern Pacific says the old and regular rate of 60 cents per hundred to Montana and Dakota points, and 85 cents to St. Paul, Chicago and Missouri River points, will stand, stating as a reason that when an emergency rate exceeds the regular rate, the regular rate will be the ruling rate; but I am sorry to say that that rate did not affect California, and especially the Pajaro Valley, and here are some of the results. We shipped no choice or five-tier stock at all to these points this season, and as our fancy four-tier stock is marketed in the face of a

discriminating freight rate at Butte and Grand Forks of 42½ cents per box, Denver and Pueblo of 26 cents, and in Arizona points of 15½ cents per 100 pounds, you can readily understand why the driers, canneries, vinegar and cider works are overcrowded with fruit, much of it fine, at $5 per ton or 10 cents per box. To economize many are hauling to the plants, apples in secondhand sacks. These sacks can be used over and over again, saving expense of boxes, also expense of handling, as no care is necessary in picking. This system saves more money to the grower than by shipping our Bellefleurs to a losing market. Now, let us see who is the real loser by the Southern Pacific's selfishness, as well as its short-sighted policy in finally driving the apple business out of the valley.

A full bearing orchard of Bellefleurs, with a full crop, will make a carload of 15 tons minimum weight allowed to the acre, or $300 a carload; but we can't afford to ship at that price, hence the by-product mills get them. Then what happens? Why, the Southern Pacific hauls what little they get for Eastern shipment in a dried state at $1 per hundred pounds (the same price as is charged for the green fruit), but is reduced to one ninth of a carload per acre. What little canned apples, vinegar and cider go East is met at Salt Lake and Ogden with a 62-cent rate from the East, against our 97-cent rate to those points, and the freight is even reduced here by the weight of the cores, peelings, and evaporation. Again, the mills, driers, and canneries are overstocked beyond their capacity, hence many trees are not picked at all, besides the ground is covered with good stock. Now, with a competitive rate and decent service, all this would be changed and available to the railroads at an acceptable rate to the grower of even $100 per acre in freight for all full bearing orchards.

Before our apple orchard days we raised prunes. Six years of all the traffic would bear made firewood of the prune orchards. It happened this way. Low prices prevented the use of evaporators in the Pajaro Valley; having no sun sufficiently warm to sun dry, and on the promise of the railroad company giving us a fair and reasonable rate, the fruit exchange put up extensive works for a sun drying plant at Rucker, 20 miles distant, and this was the fair and reasonable rate we got: $2 per green ton from Watsonville; $1.40 from Pajaro, 1 1-10 miles nearer the drying plant; $1.20 from Vega, 3 miles less distance, and 90 cents from Aromas, 7 miles shorter haul.

Red ink results drove us out of business at Rucker in three years, and no amount of loss to us or argument could induce the company to make a reduction, hence we moved back. This the railroad company deprecated to the extent that they offered to return and put up free of cost to us the plant and give us a 75-cent rate, if we would load the plant on the cars, and yet all this time the same railroad company was hauling sugar beets almost double the distance at a 50-cent rate per ton. But a burnt child dreads the fire, even if made of prune wood. Now, when we go back to raising sugar beets, potatoes, onions, and beans the railroad company will get, if the rate is as now, on beans 50 cents per hundred pounds, or $10 per acre if we have good crops, and mind you twice the distance they now haul our Bellefleurs at $300 per acre. Again the State and county will lose in the Pajaro Valley alone three fourths of a million of dollars in personal property for annual tax purposes, there being 48 trees to the acre and assessed $1 a tree. I mention these facts as

evidences of a woeful lack of business ability on the part of the managers of the Southern Pacific Company, and to also show their stockholders the reason their per cent of profit is zero. I quote in proof Mr. Stubbs, in his paper before the Transmississippi Congress, when he said: "Since 1900 the farmer has made 9 per cent on his investment, the railroad companies but 3⅓ per cent, divided as follows: The Great Northern, 7½ per cent; the Santa Fe, 2½; the Southern Pacific, 0."

Now, as we all know, the Santa Fe has to pro rate with the Southern Pacific in order to use the Southern Pacific's track, and is at the mercy of the Southern Pacific in that regard, and is not allowed (unless the shortage of cars is real pressing) to come into our territory at all, giving, in fact, the Southern Pacific practically a complete monopoly from the Columbia to Panama. According to Mr. Stubbs the Great Northern is making 7½ per cent, and, mind you, with three strong competitors, all hauling apples, and at 15 to 40 per cent less than we pay, which would give us a profit in place of a deficit. Besides, these northern roads give better and much quicker service and a minimum of 10 tons a carload, and mixed green fruit allowed in the same car. This is a great advantage, much greater than at first sight you would believe. This small minimum allows much smaller towns to take whole or mixed car lots, thereby saving the consumer the local rate from large cities to their points. This greatly extends the market, and at less prices to the consumer and more profit to the producer. The Great Northern is making 7½ per cent and the S. P. "0," says Mr. Stubbs, and yet California's great fertile valleys were thoroughly exploited by the Southern Pacific before the first rail was laid in those great arteries that cover the once great buffalo and Indian ranges of America.

We in California do much as citizens in the way of promotion work, fairs, etc. Every little town has its board of trade and other civic bodies, all boosting. The various counties subscribe liberally of the people's money trying to populate the best State in the Union, as far as nature's handiwork can make it so, in climate, soil, and health; but the result of all this hard work shows that the Southern Pacific Company can tear down faster than we can build up.

No one dares to move vigorously in any enterprise for fear of ruin through that octopus. The rivers of the great mountain ranges of California have a surplus energy, almost without cost, that would turn every wheel of one half of all the factories in the United States; and we have soil, mines, and climate that would furnish raw material to run them. What's doing? What has become of those enterprises that were once the pride of the coast? What has become of the rural population? Why do the cities in California increase in population all out of proportion to the country and in comparison with our North and Northwest? The last census gives some striking figures that are worth investigation. Along the Great Northern, that is making 7½ per cent, in Minnesota the increase in population from 1890 to 1900 was 33 7-10 per cent; North Dakota, 70 9-10 per cent; Idaho, 82 7-10 per cent; Montana, 70 3-10 per cent; Washington, 45 per cent. In the Santa Fe territory that is making 2½ per cent profit is Arizona, with a gain of 68 per cent; New Mexico, 24 6-10 per cent, and yet both of these territories are considered the deserts of the North American continent. How about the Southern Pacific's territory. California's increase was 22 4-10 per cent, and poor

old Nevada, that in climate, soil, and situation compares with eastern Washington and Oregon, had a decrease of 10 6-10 per cent, and this is not all. In California eleven whole counties fell off in population in those ten years, and in all but two, one or more rural townships in each county met with a loss. Is our glorious climate, the ever fertile soil, the people, or the railroad the cause? I saw Mr. Stubbs when he read his remarkable paper before the Transmississippi Congress. You could tell that he felt that he was in the house of his friends. I saw the many facial expressions used by Forest, Booth, and Irving in playing the tyrant, play around his thin cruel and lips, the glint of hate gleamed from his steel-like eyes, and the public-be-damned was depicted in every feature when he threatened California, as well as the whole country, with disaster if they were not allowed to handle their business in their own way. There was not a line of conciliation in his paper, but everything to exasperate. It is strange to me that a corporation that depends on the public patronage should maintain the position of a common enemy. It does not seem to me that a heritage of popular ill will, engendered through long years of injury, is a profitable asset for a public corporation.

What a contrast between Mr. Stubbs of the Southern Pacific, threatening our industries with disaster if we do not take our medicine, and Mr. Jas. J. Hill, the builder preëminently, not only of railroads, but of the great northwestern empire. To illustrate, Mr. Hill while being banqueted by the farmers and business men of Oregon and Washington in Portland, November 6th, on the completion of another of his great enterprises, the North Bank Railroad, at a cost of $45,000,000 (and no noise about it either). This is the way he spoke to the farmer and merchant, to Mr. Howard Elliott of the Northern Pacific, and other competitors that were present: "You will prosper as the business of the country prospers, and so will we. We have been for thirty years occupied in trying to build up; I don't want to pull down; I don't want to pull down anything; I always feel that there is room enough in the country for ourselves and for all our neighbors (great applause), and if we can not hold our own with them, and if we can not keep our prow to the front without doing any little act of discourtesy, or delay, or obstruction, or anything of the kind, I always feel that we will make a mighty poor race (tremendous applause) by being mean about it. We do not propose to do it that way. We will live and let live, and give every fellow room according to his heft and see what he can do. (Laughter and applause.) We will either prosper with your prosperity or we will be poor with you." How different was the attitude of Mr. Sproul of the Southern Pacific four years ago in replying to the President of the Pajaro Valley Board of Trade, that in the interest of the apple-grower asked for more yard room, which was wholly inadequate to accommodate our fast growing industry. He said: "If you don't stop this agitation we will move the depot and everything over to Pajaro and you will ship from there at a higher rate than now."

Then came the electric line and wharf, which gave great relief; then came a cut of 50 per cent in local rates by the Southern Pacific; then came ample yard room for loading and for packing houses, and, I am sorry to say, then came the local thieves and boodlers and stole the steamer and robbed the treasury to the end that finally Mr. Sproul's

curse has come in a way by the company hitting the apple industry, at least half of it, its death blow, unless the Interstate Commerce Commission comes to our rescue and gives us a certain and fixed rate equal with our northern neighbors. We don't want to pull them down, not a bit; but just ask for a fair show, so that we can prosper, too. I say a fixed and reasonable rate, so we can plan for the future and build accordingly, and with such an assurance we could look adversity in the face that at times is brought about by short crops, wet or dry years, fighting new and destructive pests, as well as the old ones, always at an added expense. The nurserymen could plan, too. To-day they are going out of business in our valley. How different in the north. The Oregonian of November 19th says: "In the Walla Walla country the fruit men netted a million dollars this year from less than a thousand carloads of fruit, and the orchard men are preparing to place in a large area of fruit trees this winter, the majority being apples and prunes. [Did I hear anybody say 'prunes'?] Nurserymen here can not nearly fill orders for trees, so great is the demand."

Now, it is needless to tell you that Walla Walla is in eastern Oregon, and in no respect can it be compared in climate, soil, or fertility with California, but it has something that offsets all of those inequalities, the very needful and all-important freight rate that does not tear down, but, as "Jim" Hill says, "Lives and lets live."

The good Lord helps those that help themselves. Teddy will have the canal done before we know it. We have a Government road now across the isthmus. He suggests a line of Government owned steamers from San Francisco to connect with the said line and that connects at the other side with a line of Government steamers to Atlantic ports. With such a line on the Pacific side, the monopoly enjoyed so long by the Pacific Mail Company, and the excessive rates charged by that company in order to protect its allies and real owners, the Southern Pacific Company's lines will be a thing of the past. The time is here, and now is the time for all interests, productive and commercial, to join issues. Don't listen to the siren call of the rebate or those little petty special privileges. They are only delusions. You pay it back in many other ways. Besides, they destroy stability and independence as well as retard progress in all lines of development. Uncertainty and distrust pervade all lines of business. There is no security in this, our land of gold and sunshine, as long as those abominations are abroad in the land. Give all a fair deal, so we can all prosper in each other's prosperity or be poor together.

In conclusion, I want to quote from Henry Clews & Co.'s Investment Guide, ending June 30, 1907. This will show, I think, some of the reasons why our freight rates are so high and so low on the Great Northern. All the figures are in round numbers.

Great Northern:			
Gross earnings	$57,000,000	or $9,000	per mile
Operating expenses	33,000,000	or 5,000	per mile
Fixed charges	7,000,000	or 1,100	per mile
In betterments	5,000,000	or 800	per mile
Profits	19,000,000	or 3,000	per mile
Southern Pacific:			
Gross earnings	$125,000,000	or $14,000	per mile
Operating expenses	80,000,000	or 9,000	per mile
Fixed charges	20,000,000	or 2,000	per mile
For betterments	200,000	or 20	per mile
Profits	29,000,000	or 3,000	per mile

How much of that hundred million dollars for operating expenses and fixed charges goes into rebates? and how much went into Mr. Herrin's political bureau? (Mr. Ruef only told of $14,000.) "Jim" Rea did not tell all his story. How long are the people of California to be slaves to this inglorious system, and how long are our apples to be overtaxed to pay interest on the water that is in $70,000 per mile on the Southern Pacific lines as well as an additional tax to pay that $75,000 per month subsidy to the Pacific Mail that assists so materially in keeping our noses on the grindstone and at present closes the high seas to us? And again, and finally, the fruit-grower is anxious to know if he is to be rewarded with higher freight rates as production increases. (Applause.)

MR. DARGITZ. I had a little experience with the Southern Pacific in freight and refrigeration last July that might be interesting to some of you. I had some plums, and you will recall that at that time the market for plums in the East was not very inviting. It meant red ink to ship. In seeking for some way to dispose of my plums I wired for the markets in Los Angeles, Portland, and San Francisco. The market report from Portland was very enticing. I loaded a refrigerator car, ordered it iced head end, to go through to Portland, with vents open four inches. When the fruit arrived at Portland I got a telegram that it was in perfect condition, but the market had fallen, and they did not believe they could realize the railroad's charge for the freight. They finally did, however, and after paying those charges sent me $2.40 and kept a lot of new lug boxes that I ordered returned. I took the matter up with the Southern Pacific as to the icing charges. I did not find any fault with the freight; I let that go, but it developed that they had in their tariff a kind of a joker that called for the icing of the cars in full, both ends, for shipments to Oregon, and instead of following my instructions they iced both ends full at Sacramento, and up at Ashland, Oregon, they did the same thing again, and when the car got to Portland it was almost full of ice. And then they charged a percentage in addition because the vents were left open, and I had absolutely no redress when I went to them. They said, "There is the tariff," but their agent didn't tell me what was in that tariff when I ordered the car and started the shipment. It was simply a joker in the tariff that gave them the opportunity to sell ice at enormous rates when it was not ordered and was not wanted and was not needed.

A recess was here taken until 8 o'clock P. M., to reconvene at the Chamber of Commerce.

EVENING SESSION.

PRESIDENT JEFFREY. One of the members of this Convention asked me a while ago, "What is the programme for to-night?" The programme is printed on the page there for Tuesday evening. You will notice it is not much of a programme. For many years the members of this Convention have been asking more time for discussion. As I stated in my paper to-day, the number of papers and addresses to be delivered at this Convention has been reduced to twenty or thereabouts. At Marysville one year ago we had forty papers, or nearly so. Now, to-night it depends upon you as delegates to this Convention to make this meeting a success or a failure. There has been a feeling for many years that the laws relating to the administration of the County Horticultural Commissioner's office need some improvement. We come before you to-night with this little programme to that end. I think it would be in order for the members of this Convention to present any topics for consideration on this matter that you may wish. I already have one resolution submitted by a fruit-grower, and we will, no doubt, have others. It is as follows:

Resolved, That we, the fruit-growers of California, in convention assembled, at Sacramento, December 1, 1908, favor the present horticultural law in so far as it provides for three members of the County Board of Horticultural Commissioners.

It was moved and seconded that the resolution be adopted.

MR. STABLER. Mr. Chairman, and ladies and gentlemen: As the mover of that resolution, I would like to say a few words in its advocacy. I may preface my remarks by saying that I am the oldest horticultural commissioner in the State of California. I have served continuously for nineteen years, and must necessarily have had some experience in the work of a county horticultural commissioner. For one, I contend that the present law is good, it is sufficient, it covers the ground as well as any law that might be enacted at the coming Legislature. I do not say that the law is perfect; no law is perfect, and if this law is repealed and another one is passed there will be defects arise, just as there may be in our present law, for the reason that the State of California is 750 miles long and 250 miles wide, embracing all manner of soil, climate, and other conditions; so that you can not draft a law and make it apply to every condition, making it applicable to every part of California. I was a member of the Legislature myself in 1891, and until that time I never appreciated the vast extent of the State of California. You can not pass one horticultural law that will cover all conditions any better than the present law. The present law provides for a commission of three horticultural commissioners in a county. I understand there is some objection to that, particularly in the southern part of the State, where it is felt that it would be better to have a law appointing only one county commissioner. I grant that may be correct in that part of the State, but I believe in the northern part of the State it would not be as well. But with the present law it is quite possible to have in effect one horticultural commissioner by agreement with the board of supervisors in appointing this commissioner; that one man will be understood to be

active, and the others will act in an advisory capacity, or would simply concur in the acts of the single member. My particular objection to the one man commission is this: I am satisfied if an adequate salary is added to the office and one man is appointed in the county, we immediately have the County Board of Horticulture in politics; and yet I understand the advocates of the one man commission contend that in order to take it out of politics they want a one man commission. At the present time, under this law as we have it to-day, the supervisors appoint three fruit-growers as a commission, and these three fruit-growers appoint the local inspectors, and the work of quarantine is carried out under this system. The judgment of three men, in my opinion, is better than one, because, as you all know, the present law is very drastic, and the commission has wonderful powers. If the horticultural commissioners absolutely carried out the law, as they might do, they could in many instances remove a man's orchard entirely, have it dug up and burned; but I think in no case has the commission ever adopted drastic measures. They have acted for the good of our industry.

I have seen the working of every law we have had in horticultural quarantine from 1881 to the present time, and whenever a law has been amended it has not been improved. Some of it might be improved, but it has been impossible to improve the entire feature of the law, because it has always been a drastic provision of the law. The salary is inadequate. A county commissioner gets $4.00 a day while actually employed in the discharge of his duties, but when a fruit-grower is appointed on one of these commissions he has enough interest of his own to take some interest in it, and fruit-growers are all broad minded and are willing to take some interest, and for that reason I would like to see this Convention go on record as favoring the three man commission. Remember that in the southern part of the State you have worked this up to a fine point, but in our part of the State we have many things to fight. In the first place, we have to fight the pests. Then we have to fight the nurserymen, and I am sorry to say that in many instances we have to fight the fruit-grower. We have to compel the fruit-grower to have clean trees.

MR. PEASE. Mr. Chairman, ladies and gentlemen: I have not been in the horticultural commission business quite as long as Mr. Stabler has, but I have been connected with the horticultural commission in one capacity or another almost continuously since 1891, and while he has stated the point at issue from a northern California standpoint, I would like to present some of the features from a southern California standpoint. I note what he says about one man doing the work and the other two being an advisory committee, as it were. When I was first appointed on the horticultural commission in 1896, as commissioner, the conditions that I found existing at that time were about these: There was one paper that we called a political paper, that was run in the interests of one of the old parties there, and a man was always hired to run that paper, and if a new man came in he was instructed about like this: "If you get short of news you can always jump on the horticultural commission," and that is about what they proceeded to do. We started in in a small way, and I remember of hearing two of the later commissioners talking. We were starting in the fumigation business, and they were wondering whether it would be feasible for them to order

two 100 cases of cyanide, whether they would use it all or not. We gradually built up the commission in San Bernardino County after that, and I will say that at the present time it is pretty strenuous work for one man to attend to, and yet, in every county, so far as I know, where there are three horticultural commissioners, there is one man that is responsible for the whole business; that is, there is one man that is authority, and one man must put in his whole time at that business. One hundred dollars a month for a man with a family will just about keep that family. But suppose you compare it with some of the county officers we have. It is admitted freely down where the fruit industry is the main industry that southern California is nothing if not a citrus fruit raising country; that the business of the commission there is paramount to anything that is done by any other set of people, and yet, alongside of a horticultural commissioner who is putting in his whole time for about $100 a month how are the other county officers paid? In our county we have a live stock inspector. He may put in one day in a week, and draws $1,500 a year. We have the county auditor, who draws $200 a month. Some of the other officers draw above $5,000 a year.

Now, as to the amount of work done by the horticultural commission in our county. We have purchased so far this year four cars of cyanide. A carload calls for a little over $4,700.

Now, as to some of the troubles. When I first went into the commission it used to be considered a political office. A man starting in to the work was told, "I don't think it is any use to try to inform yourself in this business, because the next election may change the complexion of the board of supervisors, and out you go." But that has changed greatly. They have found that a man that is educated in a certain line of business is better than another man not educated in that business. The pay of the inspectors is $2.50 a day. If you have work for an inspector that is going to take the whole of his time, and you get a good man, a man that informs himself, a man that knows the different pests when he finds them and knows what to do with them, that man is a valuable man to the commission. But very soon some man that is in business will find out that you have a good man. He will offer him two bits a day more, and you lose your good man and start on the ground floor again to educate another man. If a man will inform himself and keep up with the band wagon, that man should be paid as well as any other. (Applause.)

MR. MILLS. Mr. Chairman, I did not expect that this important question was going to be precipitated here to-night. It is really too big a question for us to settle here. Those of us who are largely interested in the fruit industry, our interests are greater than the interest of just a board of commissioners in any county. The question for us to determine first is, by which method will we get the greatest amount of protection for the money expended? We do not get it always. I doubt very much if it would be wise for us to-night to say to the committee you have appointed as a legislative committee that they shall do thus and so, because they have got to meet the legislators of this State in January, and there wrestle with them as to what shall be the laws provided for the guidance or appointment of the horticultural commission of any county, whether it shall be a one or three man commission. Yet it is wise for us, on this resolution of Mr. Stabler's, to look at both sides,

whether we are in favor of the one man or the three man. Mr. Stabler knows that some of the northern counties never had a commission appointed. Some of them, when the white fly came up, had no commissioners appointed. Some of them stated that they could not afford to pay a commission, that they had not fruit trees enough to protect; and if it be true that some of the counties can not afford to pay a three man commission, then it would be wise to provide that they have one, because we want to approximate to this thing. There are arguments that may be made for a one man commission, and this is one, and it is a very serious one. Here is a commissioner here and another here and another over there, and there are many times struggles as to whether or not this man is getting too much of the money. There may be ten times as much scale in Jones' section as in Smith's, and yet Smith thinks he ought to have more of the money than is necessary, approximately, for his section. This protection from the scale pests is one that the whole county has at stake. If my grove is clean and yours, ten miles away, is dirty, I must give of my money to cleanse and protect yours, because therein lays my salvation. For that reason I believe that it may be rightly argued that a one man commission is a good thing, because he can state where the money will be expended to the best advantage. And, mind you, gentlemen, we are denied the money necessary. Even in Riverside County, where vast interests are at stake, where all our money is in one basket, that of the citrus, we are denied sufficient money to give us that protection which we need. I know that I can not get my orchard inspected when I want to cyanide. The law requires that the commissioner shall go all over my land if I demand it and mark my trees and give me a schedule, and to do that we need ten times as many inspectors as we have got. The one man commission can throw his inspectors where they are most needed and where the scale is creating the most damage. Again, take Kern County. At one time they said they had not trees enough to protect. They are getting them. If one man will do them, let it do. We want the brainiest men in this business that there are to be had. Men are scarce with brains such as we have in our horticultural commissions who will work for a hundred dollars. We want a one man commission so we can pay at least $150—I would say $250—for a man who can give his life to it. We want to train men up in horticultural commissioners' offices who will make it a profession, who will study entomology; we want a man who knows when he puts his finger on a desperate scale pest that there is a new one. A one man commission will give us a better paid official, who, with intellectual ability, ability to study and acquaint himself with the necessities of the office, will give us a service we can not otherwise get by taking them haphazard.

Mr. Stabler says, let us have a three man commission; two men dead, one man alive. You very seldom can get two men that will consent to be put on as figureheads and remain dead. I think they will all seek their proportion of the income that the law allows for their office. I do not think that is a solution of the difficulty. The salary I have touched upon, that we give competent salaries, not for the commissioner only, but for the inspectors. We want the very best men for inspectors, brainy men, conscientious men, strong men, men who can work for $3.50 and support their families well. I myself am paying teamsters to-day more than the inspectors are paid in the orchards of Riverside County.

It should not be so. The men in our orchards inspecting are men competent to fill higher positions. Let us pay them sufficiently for it.

I don't want to raise antagonisms in our counties. We must endeavor to get harmony all along the line, so that we to-day who are grubbing in the soil to try and reach out to a competency may keep politics out. I think that we can keep politics out more with a one man commission than with three, for we will have only one politician to deal with where otherwise we would have three. We would have brains, we would have men that can give their time and attention to it, men who would be at the command of this county or that county, men who have started out as Ehrhorn did and as Carnes did—as most did—will be in demand by the Federal Government and State government and other counties.

Mr. Stabler says fruit-growers are appointed. Where are they appointed? Have you, Mr. Fruit-grower, time to take upon yourself the weighty duty of horticultural commissioner? No, you have not. I know the horticulturists of Riverside County work from 6 o'clock in the morning until 10 o'clock at night, for many a time I call them on the phone at 6 o'clock in the morning. No fruit-grower has time. It is a profession, and we must make it possible for the best men we have got to give their time and attention to that profession, that we may be protected as we deserve to be protected. I have been studying the matter for a very considerable time, and I feel to-night that I should say a one man commission. (Applause.)

MR. ROGERS. This is one time in my life I can agree with both sides. I think in our county we have solved this problem to the satisfaction of all. We have a horticultural commission and also a specialist, an entomologist, and everything is running very smoothly. We believe that the law is entirely adequate as it stands. The entomologist is working under special laws devised and passed by our board of supervisors. We find that in our county, if you have the right kind of people, it is not necessary to have many inspectors; it is not necessary to enforce the law. We have very little difficulty. Our orchardists have been trained to detect pests, and they go after them themselves.

MR. MILLS. You are certainly blessed.

MR. ROGERS. I don't mean to say that every man keeps his orchard as perfectly as he could, yet at the same time I don't think there are men anywhere who look after their work better. The time was when they had to be forced, but they soon found that it paid them when they learned that pests could get in and destroy their orchards.

PRESIDENT JEFFREY. Just one word on a question of law. There are four or five counties in the State which have county entomologists. In Mr. Rogers' county and the adjoining county they have three commissioners, and Mr. Volck is the entomologist of that county. The reason our law should be amended is that there is no law in California for that method of handling the pests in Santa Cruz and Santa Clara counties. The Attorney General has decided that the supervisors have no right to create the office of county entomologist, and that Mr. Volck must be only the employee of the commissioners of one of those counties, and that he must work for $2.50 a day.

MR. LIVINGSTON. I wish to ask the name of that perfect county where the gentleman comes from.

MR. ROGERS. That is Santa Cruz County.

MR. COSTELLO. I am an inspector in San Joaquin County. We have a pretty good board of commissioners there. Two years ago the army worm came along. There was an inspector in Lodi, one at Stockton, and one at the other end of the line. Of course, we had to go right to the commissioners; they were our superiors. We decided that three heads were better than one. One man might have got excited and lost his head, but the three men got together. We dug ditches until we could get word to the head of this thing, the supreme head, Mr. Ehrhorn and Mr. Jeffrey, and we found out that we were following right along in their footsteps. Now, wouldn't it have been an awful thing if there was just one commissioner and he was tied up and didn't know what to do? (Laughter.) I will recite you a little case. There was a child sick in my town about a week ago. They brought in a doctor, and he said the child had malaria. He wrote out a prescription and came back the next day and said, "I don't understand it; the medicine ain't working right. Well, I will give him another dose." So he wrote out another prescription. The next day he back and said, "I think the child has throat trouble." Well, the father got to thinking and said, "Doctor, wouldn't you call in another doctor?" "Well," he said, "maybe it would be better." The other doctor came out and said, "That child is dying with diphtheria; we have got to get more help." They got an expert and he put a tube in the child's throat and the child was saved. Now, that one man would have killed the child, and one man will kill your county. (Laughter and applause.)

MR. RUTHERFORD. I have been acting as commissioner of Stanislaus County for twelve years. I acted singly for several years, but now I go with a board, and find it much more satisfactory. Oftentimes cases come up where I want advice. Oftentimes trees come in with a certificate and we find scale on them. Of course, the man they are shipped to will object to my decision, and I find it very convenient to call in a brother commissioner to settle the question.

MR. SOUTHREY. In San Joaquin County we find plenty of work for three commissioners. The county is about 50 miles long and about 40 wide. Very often we encounter questions that one man would have trouble to decide, and I think it advisable to have three commissioners.

MR. DINGLE. We have three commissioners in Los Angeles, and we have two pretty live ones—that is, the other two, not myself. I have to stay in the office, and I want to say that I have about all I can do to answer the phones and attend to the work in Los Angeles city. The city is the smallest part of the county, and I would like to see six commissioners instead of three. Down there we serve these legal notices, and in the last six or seven months we have served sixty-seven notices, and it would keep a one man commission pretty busy to keep those things up, and I think you are making a big mistake to cut it down to one, for that one will have all he can do to sit in the office and take care of the nursery stock.

MR. CUNDIFF. I can't lay claim to having served upon the horticultural commission quite as long as my friend Mr. Stabler, but I have been actively engaged on the commission in Riverside County for about fourteen years. There have been some points brought out this evening, one by the gentleman from Watsonville, Mr. Rogers, advocating the three man commission. At the same time he admits that Mr. Volck is

the main member of the commission, or the man who is the brains behind the whole proposition. They employ him as county entomologist. In justice to Mr. Volck, why shouldn't he draw the salary and have the authority in the matter just as much as three men?

PRESIDENT JEFFREY. He does draw the salary.

MR. CUNDIFF. Then why should you have the three men? What good argument is there to employ three men, when the other man has to decide on the question? I have served during the past ten years with the commission at three, and, just as stated by Mr. Pease, I know of no commission in southern California where some one man of the commission does not have to do three fourths of the work, or else it is not done. The position of horticultural commissioner with us in the south is largely an advisory position in this way; the man who equips himself for the position is looked upon as an adviser, not necessarily in orchard pests, but in many other problems that come up in the care and cultivation of orchards. If you give a man a proper salary, a salary that is commensurate with the ability to fill such a position and do it as it should be, it seems to me that you certainly get more good in that way than you can out of three, and, as some one said, six commissioners. I think the gentleman from Los Angeles spoke about the large number of notices served. All of our counties have notices to serve. Any of that work can be done by a deputy if the commissioner has not time to do it, and by a man that draws less salary than the commissioner draws. That is simply clerical work that any one can do that has a common school education, and I don't see that there is any particular argument in the fact that we should have this work all done by commissioners. Inspectors can be appointed and the commissioner can remain and be the executive head of the work in each county. In almost every county where there are three commissioners there are times when there is friction between the different sections. I am referring to the conditions in the southern part of the State. The conditions in the northern part of the State, perhaps, are different, but where we are compelled to spend a great deal of money there is always a good deal of friction. We district our counties, and one district will assert that it is not getting a sufficient amount of protection—there isn't a sufficient amount of work being done in their district, when if we take the tax records or the taxable property in orchards in the districts they are frequently getting a good deal more than they are entitled to in proportion to the taxable orchard property that they have. The matter of efficiency of a horticultural commissioner certainly is largely the result of the time he can remain in office, the time he can devote to it. If a man is expected to remain only four years or less, at the whim of some board of supervisors, there isn't very much incentive for him to put in the amount of time that it requires to become proficient in this kind of work. I think Mr. Stabler claimed that the three man commission would not be so likely to be disturbed in a political way. I think the reverse is the fact—I know that has been the case in our county—there has been quite a lot of pulling in the board of supervisors as to who should be appointed on the horticultural commission. They may settle on one man who will be the brains of the commission, and the other two men are political appointments. As far as I am personally concerned I have no criticism of my

own county, because they have shown no disposition to work politics, but it is done in other counties—that I know.

MR. REED. I can't forego the chance to make a criticism of this discussion, that you are wasting valuable time and accomplishing very little. Whether you have one or three commissioners, the present condition of affairs is that you are not getting results, and you ought to make some change in the law. In your white fly campaign at Marysville you did a good deal of work there, and you still have the white fly there, and unless something radical is done you will have the white fly there as long as there are orange trees in California. You ought to try to get these laws so you can do some good. (Applause.)

PRESIDENT JEFFREY. The State has spent all the money at Marysville and Oroville and Bakersfield that there was in sight, and I had to get the Governor to declare a deficiency of $2,500, and then go to Los Angeles and get a bank there to advance the money until the Legislature meets in order to conduct the work.

MR. MILLS. I want to make just another point, if I may. The horticultural commissioners are executive heads. Very seldom do you see them in the orchards day by day and month by month inspecting the orchards for scale. There are three executive heads in each county, and in most of them drawing salaries. It is not contemplated, in taking them out and making a one man commission, that it shall be less efficient. We shall have a more efficient executive head, whose duty it will be to have the orchards inspected, and in place of the men now drawing salary we will have efficient inspectors. We can have two first-class inspectors. The executive head of the county, the one man commissioner, can choose the ablest, most competent men, with entomological knowledge and with executive ability as well. He can enforce the law more. The one man commissioner, knowing that he is responsible for the enforcement of the law in that county, will enforce it better than it has ever been enforced by three, because in one section it is enforced and in the others it is not.

MR. CUTTER. Suppose the commissioners were not paid a salary, were all fruit-growers, but were in their executive capacity, and we hired these men you speak of that draw a nominal salary, we would get it away from politics, but if you have the one man commissioner it is too close to politics.

MR. MILLS. My thought is that no man shall be appointed an inspector who has not passed an examination showing his ability as an entomologist. Then men would not be chosen politically, but for knowledge and ability.

MR. LIVINGSTON. I think in appointing three commissioners in our county—Placer County—they simply selected three fruit-growers of perhaps average intelligence. I believe two of our commissioners are here, and I don't believe that any of them know any more about scale insects than I do, and I am free to admit that I wouldn't know a white fly from a thrips; and, notwithstanding I believe that three fourths of the members here are commissioners, I will bet there isn't one third of them that knows anything about the scale. I believe that one man well paid, with a corps of valuable assistants or inspectors, will do much better work than three men who are not paid and who devote but very little of their time to the business.

MR. PEASE. The point I tried to bring out before was to appoint a one man commission and pay him sufficient so he could inform himself. There isn't a commissioner in California who is too well informed. I have a good deal of correspondence over the State. One commissioner, who is drawing the salary of $4 a day, sent me a twig of an orange tree. He says, "What kind of a scale is this? I could not find a bit of this scale on any other tree." If that man had been posted he would have known there would not be any. It was simply a couple of katydids. Why do you send specimens to Mr. Ehrhorn? He is one man. He is supposed to be authority.

MR. JUDD. My friend Mr. Rogers explained the matter, and it was the strongest argument for a one man commission. We have three commissioners in Santa Cruz County, and we hire Mr. Volck as an entomologist; he furnishes all the brains for two counties; the other three or four don't cut any figure.

MR. STABLER. I have watched this debate with a great deal of interest, and I believe that as a rule speakers favoring the one man commission have missed the entire point of the argument. We want three horticultural commissioners in each county, because we want the judgment of three men in the enforcement of the horticultural law. We want three men to sit in each case and decide what the law is and how it should be enforced. We have five members of the board of supervisors, and no man would advocate that we have one. Now, my good friend Mr. Mills, who represents 3,000 acres of citrus orchards, comes to this Convention from a different standpoint from those of us who have only 10 acres and work with our hands and dig and plow and spray. He says, "We want one man who is educated and who is competent to attend to the duties of this office, and to whom we can pay $150 or even $250 a month," and he enumerated this great array of talent, Mr. Maskew, Mr. Carnes, Mr. Ehrhorn, and he left out Mr. Bremner, and I want to add him to the list. There is the crux of the argument. The men who have been named are entomologists, and we don't want entomologists, we want quarantine officers, we want tree policemen, we want somebody to enforce the law. Mr. Volck works in Santa Cruz County as a student; he studies the way to destroy the codling moth. That is not the work of the horticultural commission. Their work is to enforce the law and make you kill that codling moth when he discovers just what is proper to use there. We want some one to enforce the law; we want tree policemen. An entomologist is not a tree policeman. Imagine Mr. Carnes being a tree policeman! Mr. Carnes will spend his days and nights out in this insectary studying the life history of these insects, which is of the greatest importance, but the county commissioner wants to be a hard-headed fruit-grower, farmer, man of good judgment, who will take enough interest in it for the measly $4 a day which he gets in order to apply that law and apply the knowledge which these gentlemen as entomologists have supplied to us. That is why I don't want to see one man with this arbitrary power sitting in judgment on these questions.

The question of the adoption of the resolution under discussion was then put and carried.

MR. NEWCOMB. How about this committee that was to report to-night?

PRESIDENT JEFFREY. Will you make a statement, Mr. Mills?

MR. MILLS. Mr. Chairman, the committee is not advised that it was to prepare a report for this Convention. The resolution passed at Marysville instructed them to prepare a report and submit it to the next Legislature, and we were not asked, nor have we prepared ourselves, for the submission of a report at this time. We were to appear before the next Legislature and help push through such a bill as might be drawn. Judge Shields is the chairman, and I do not think he is here.

PRESIDENT JEFFREY. Your recommendations to-night will go before that committee for their consideration, of course.

MR. MILLS. I think that was the purpose of this meeting, that you would discuss some of those things that you wish amended and changes in the law, for the guidance of the committee.

On motion of Mr. Dingle, duly seconded and carried, the Convention recommended that the salary of inspectors be raised to $3.50 per day.

Mr. Mills moved, and the motion was duly seconded, that the Convention recommend that the salary of the commissioner be raised to $5 a day.

MR. LIVINGSTON. I would think, considering the membership here, that that would be a very delicate question to put, considering that nearly all the members are horticultural commissioners. I was about to suggest that the wording of it, instead of saying, "We, the fruit-growers," say, "We, the horticultural commissioners, recommend."

MR. DINGLE. If there is going to be anything done on the raise of the horticultural commissioner's salary, I believe it would be a good thing to put this salary on a monthly basis instead of a per diem. I am not asking for any increase; I am perfectly satisfied.

PRESIDENT JEFFREY. I would like to ask Mr. Mills if he knows anything about the report the committee is going to present on this matter. Has the committee considered anything that would touch on Mr. Dingle's suggestion?

MR. MILLS. I don't think that could possibly be done. If we put it on a salary it would have to be a reasonable salary, $125 or $150. There are some counties that have not work for three commissioners at $150 a month, and we must make it uniform. The law is now that he must be paid $4 a day when actually at service.

MR. REED. In our county, if there were a stated salary, the board of supervisors would not appoint any commission at all.

MR. DINGLE. Los Angeles County says if they work all the time give them a hundred dollars. They can put that on a sliding basis, where the man that does not work does not get anything.

MR. LAMMERMAN. That would not work in Shasta County, because we would not have work enough to keep a commissioner busy for a month at a time.

MR. EHRHORN. Isn't it a fact that there is a great deal of difference in the counties? Some counties won't pay their men anything; other counties will allow them a good, fair salary. I have heard men say that their supervisors will only allow them to put in a certain number of days. I think the law should be amended in such a way that the commissioner who is employed by the supervisors shall draw his $4 or $5 a day, and then he shall get that salary for the work he performs. I know lots of commissioners that are only allowed to put in three or four

days a month. If we have a law, as we have it to-day, that the commissioners are allowed $4 a day, it is the grower's business to go to the supervisors and insist that that man be paid, whether he puts in thirty days or ten. But it never has been done in some of the counties, and for that reason we can blame the infections that we find in many counties. Some counties haven't got any commission at all. It is all very well to pass laws, but it is the grower who is to blame for not enforcing the laws.

MR. WILLIAMS. Perhaps I don't look at this matter from the standpoint of a horticultural commissioner. I look at it from the standpoint of a grower. It is all very well to talk about raising the salary of a commissioner. I am willing to do that if the measure carries with it some improvement in the laws to make it more effective. Down in my county they are advertising French grapevines, and have been doing it for two years, and all those who are posted in regard to nurseries and grapevines in France know that France is infected territory, all of it, and now we are having brought into our county vines from that infected territory; and we know, too, that it is practically impossible to discover the root louse and destroy it. There is always danger of infection where you introduce these vines. They may say they are thrifty and good vines, which they may be, and they may introduce the root louse among our vines. I have quite a good acreage of vines, and some of my neighbors have already ordered some of those French vines, and by my telling them the danger they rejected them. If we can get some kind of legislation that will prevent those things happening, very well, raise the salary; but if they are not any more efficient than they are now we might as well let it stay where it is. That is San Joaquin County.

PRESIDENT JEFFREY. When we vote on this resolution of increasing the pay of the horticultural commissioners to $5, we ask no inspector or commissioner in the audience to vote on it, and that will go on our record here.

MR. CUNDIFF. I, as commissioner, am not in favor of setting the salary at $5 a day. I think that would not be fair to many counties in this State that have not business to employ a commissioner continuously, although they should have a commissioner. I believe we should have a monthly salary, and I believe there is no legal reason against it, and that should be regulated by the county government act in each county.

PRESIDENT JEFFREY. Wouldn't you be willing for a recommendation of a raise to go to this committee on this motion and let them thresh out all these constitutional questions in their own way, just merely to show that the fruit-growers are willing that there should be a considerable raise?

MR. CUNDIFF. I haven't any objection to a question of that kind going before the committee; but the point is, that should the committee advocate an increase I am quite sure it would invite a great deal of opposition that is unnecessary, that the other plan, if it was understood and discussed, would eliminate.

PRESIDENT JEFFREY. Mr. Mills, will you change your resolution in such a way that it will voice the fruit-growers of this meeting that the horticultural commissioners under this amended law be paid adequately for their services?

MR. MILLS. Yes.

PRESIDENT JEFFREY. Mr. Brink, you seconded the resolution; will you consent to the amendment?

MR. BRINK. Yes.

MR. MILLS. I move you, Mr. Chairman, that the committee be instructed to consider the proper remuneration of the horticultural commissioners of the State, and endeavor to so make the law read that they can be paid by salary, or, if not, that they can be paid a per diem when in service.

PRESIDENT JEFFREY. That is, an increased salary or per diem?

MR. MILLS. Yes.

The motion was duly seconded.

MR. MILLS. My thought is just this. We have passed a resolution that the inspectors be paid $3.50. I believe, as an orange-grower—and am an orange-grower and one of the grubbers, if I do oversee other fellows' orchards—that the commissioner should be paid a larger salary or a larger per diem, such a salary or such a per diem as will attract to the office the ablest men we can put our hands on. We do need entomologists as our horticultural commissioners. We do need men who can quickly put their finger on a dangerous pest that is brought into our communities by the importation of citrus stock or deciduous stock. We can not wait; it will jeopardize our interests to wait to reach Mr. Ehrhorn.

The resolution was put to a vote, the horticultural commissioners and inspectors not voting, and the resolution was adopted.

MR. PEASE. I move that the Committee on Legislation be recommended to take into consideration some method to get at the qualifications of the horticultural commissioners. My point is, that in selecting a horticultural commissioner, he shall be required to pass some sort of an examination showing that he is qualified for the office of horticultural commissioner.

The motion was duly seconded.

MR. MILLS. It is said that this is a commissioners' and an inspectors' meeting, and apparently it is. They are largely in the majority. This resolution immediately and directly affects their office. I make this point, that was raised before, that commissioners and inspectors in this meeting have no right to vote on a thing which directly affects themselves; that it is a question for the fruit-growers who employ them.

MR. DINGLE. We were all asked to come up here and participate in this meeting to-night, and if we are not wanted here I will go home.

PRESIDENT JEFFREY. This is a regular session of the Fruit-Growers' Convention. One meeting we will have pretty soon when the horticultural commissioners will be invited to meet and discuss their needs.

MR. MILLS. And the fruit-growers are those who should decide this matter. I do not think, gentlemen, those of you who are commissioners and inspectors, should press this matter to-night, because we shall take direct issue. God help us if the greatest knowledge that man is gifted with is not necessary at this time in this State, and we must have knowledge.

MR. JUDD. There is one thing I don't quite understand—why we should divide the house against itself. We have got these commissioners here for the very purpose of telling us what they want. We don't know

what they want. They have had the experience. If they will tell us the kind of legislation they want the Legislature will give it to us. We are not competent ourselves to tell what we do want.

PRESIDENT JEFFREY. If somebody would whisper to you that there might be a law gotten up in this State regarding the qualifications of horticultural commissioners, allowing the State Commissioner, or a commission of five men appointed by the Governor, to pass upon the qualifications, and that law would provide that 75 per cent or 60 per cent of these qualifications should be good, sound sense and judgment and the ability to come to a reasonable conclusion, and the other 30 per cent scientific knowledge, that would be a law that I know would strike you all as being very common sense and very effective. My attitude in this matter is that we have a large number of horticultural commissioners who have years of experience, and they have sound judgment and common sense and can come to a good conclusion.

MR. CUTLER. As a fruit-grower I am in favor of what Mr. Mills and the President say. Get a commission to examine these commissioners, and let the board of supervisors then appoint them—men that are competent, and pay them a sufficient salary. If it is $250 a month, I am in favor of that. Get a man that knows a bug from a mule. (Laughter.)

MR. BREMNER. I am neither a horticultural commissioner nor a fruit-grower. I think we have been giving the horticultural commissioners a kind of a black eye here this evening. I don't believe they are all as bad men as represented. I have met quite a number of them, and I believe that a majority of the best commissioners that I know are fruit-growers and fruit-raisers who are vitally interested, and they are quarantine men, because they are protecting their property and their home, and I believe they should have some say about it; and I think you should not go down in the record as throwing any slurs on the horticultural commissioners of the State of California.

MR. GARDEN. I am an inspector and I am a fruit-grower. I own land and I have had a very wide experience in the fruit industry. I have never done anything else, practically, in my lifetime. I was born and raised in the northeast part of Scotland, followed the fruit industry there; then I had seven years in the southern part of England. Then I came to the United States and worked in one of the largest nurseries in the country. I also worked in an experimental station, and I know something of the university tendency in this State to absorb everything from the horticulturist. The State University has no trouble in getting appropriations from the State Legislature for all its requirements, but our Chairman has told us that he has had really to go in debt to fulfill his part in getting publications before the people. That is a very sad state of affairs, indeed. It looks like this to me, that the time is just about here when the whole horticultural business has to be turned over to the State University, or the growers have to take a stand and put men with influence in the Legislature so we can have appropriations to meet our needs.

MR. WILLIAMS. I think our horticultural board might just as well be good common sense farmers, and they could hire the entomologist. I think a good common sense farmer could absorb probably 75 per cent of the science of horticulture and entomology, so far as it applies to the

bugs that are injurious to his property. I know some of the bugs that are injurious to my vines, but I don't know a hundred per cent of the science that applies to these things, and need the advice of these scientific men.

MR. STABLER. As I understand Mr. Pease's motion, he asks that the qualifications of horticultural commissioners be passed upon by some higher authority. I hope this meeting will remember that there are just two things that a horticultural commissioner may be: he may be an entomologist, or he may be a horticultural commissioner. If he is an entomologist he will be an enthusiast in studying the life history of pestiferous insects. He may be a very poor entomologist, but a first-class tree policeman, who can enforce the law. The only qualification a commissioner need have is the qualification of enforcing the present law. As the gentleman from the San Joaquin Valley says, it will be quite possible to employ entomologists, and the commissioners should employ them. The average commissioner, I think myself, has not the ability to pass on the insects. When we heard Mr. Ehrhorn's list to-day of about a hundred thousand pests which might invade our shores, think of the horticultural commissioners who could intelligently pass on that! But I don't want to see this Convention confuse the idea of a horticultural commissioner being an entomologist on the one hand and being an executive officer on the other hand, with the idea of enforcing the law. Keep that matter in mind, whether or not we want entomologists or executive officers.

Vice-President Cutter at this point assumed the Chair.

MR. LIVINGSTON. I would like to ask Mr. Stabler if it is possible for a man to be a first-class tree policeman without being an entomologist?

MR. STABLER. I want to say that I do think a first-class tree policeman does not need to be an entomologist, because with the list Mr. Ehrhorn has presented it would be a life study of a hundred men. We can not expect throughout the length and breadth of the State of California to have at our beck and call entomologists who are competent to pass on all these pests. My policy has been to pass all suspected cases to the State Entomologist.

MR. EHRHORN. There is one point I wish to draw attention to. They have a horticultural commissioner at Marysville, and as far as we can ascertain the white fly existed three years in Marysville before that man knew it. If he had been an entomologist, but not a scientist, if he had an education that would allow him to tell a white fly from a grasshopper, he would have discovered the white fly as soon as it appeared. If your tree policeman has those qualifications he will be all right; but if he has not, he will be all wrong, because in your county some pest might exist for three or four years and be spreading all that time before he would be able to discover it or before somebody else discovered it. In regard to inspecting nursery stock and referring it to our office, that is all very fine, but you have got to be able to protect your own county. How can we tell in San Francisco that a man is packing something into your county that will all of a sudden give you a plague?

MR. STABLER. I admit what Mr. Ehrhorn says about our horticultural commissioner, but Mr. Ehrhorn came up, and he didn't know

whether the white fly was a citrus fly, and passed it up to Washington to be sure of it.

THE CHAIRMAN. What is this instruction? Is it to instruct the committee that has been appointed on legislation to act? Are they to hand us a revision of this law, Mr. Jeffrey?

MR. JEFFREY. The motion under which this committee was appointed was made at Marysville one year ago. It instructed me to appoint a committee of five men, which I did at Riverside, to be known as the Committee on Legislation. It was their duty to present some needed laws to the Legislature. The committee was not required to report to this meeting or any other meeting, and the committee is operating under that instruction, which you will find in the report of the Thirty-third Convention.

THE CHAIRMAN. Then where does this instruction this evening come in?

MR. JEFFREY. To advise them. I am not going to speak now for more than three minutes, and I don't want to influence the delegates one way or the other, only this, as to the qualifications of the horticultural commissioners. In my judgment, the field where the university is doing such good work in this State is entirely separate from my office. I apprehend that Professor Wickson's field is investigational and experimental, scientific examination of the fundamental principles of all these things and the best way to handle these pests and the best ways to keep them out, and it is not executive in any sense; it is scientific in every sense; and Professor Wickson is trying to make it scientific. It is one of the greatest works we have in the United States to-day. Now, that touches directly on the point Mr. Pease has made, that is, that in the execution of the laws a great deal of scientific knowledge is not necessary, unless you can have with it the ability and the firmness and the courage and all that that goes to make a good horticultural commissioner, to execute the laws that your Legislature has given you. If I can make you see that they are two entirely separate fields, with no conflict, not even overlapping, you will see at once that you must not require your horticultural commissioner to be a scientific entomologist. I think a scientific entomologist might have the least judgment in the world as to how to advise farmers as to many points in their orchard work. When I was in the office in Los Angeles for six years I was asked more questions relating to the trees than I was as to the insect pests. One of the main requisites of a horticultural commissioner is good judgment, good sense, based on sound experience, and ability to come to a conclusion regarding many, many matters that are not connected at all with insect pests. You might have that with your entomologist. The probabilities are, if he is a young man, you would not. There is one working now over here; his functions are experimental; he is representing your State. I refer to Mr. Volck's experiment. Mr. Volck might or might not have any ability to give those orchardists advice in many of the cultural functions. The fields are entirely separate, and you must have a good horticultural commissioner, with good judgment, and leave the young man to go out into the field where Professor Wickson has not enough men.

PROFESSOR WICKSON. I have no objection to the definition, except that Mr. Jeffrey, unintentionally, no doubt, left out the word "educational." He gave us credit for all sorts of good things, but did

not say anything about the educational function, which I think is the chief one we have to perform, and if he will include that I have no objection to his statement.

MR. MILLS. Mr. Stabler wishes to put particular stress upon one thing, that a tree policeman need not be necessarily a commissioner; that the commissioner is separate and apart from the technical knowledge that we are asking for. He says that we can get entomologists to do that work for us in our several counties. Now, gentlemen, if you know where they are, point them out. I believe that most of the entomologists in this State, working in this line, are right here. We have more counties in this State, pretty near a dozen times over, for the entomologists we have to go around. A Mr. Maskew or a Mr. Ehrhorn or a Mr. Bremner or a Mr. Carnes can pass over no more ground in an orchard than the ordinary horticultural commissioner. An inspector must have knowledge, for the quarantine law says that if any infested stock come into the State it shall be shipped out of the State or destroyed. Shall we wait to send a suspected case of the *Aleyrodes* to the State University or to your office? The possibility is that the county will be infested. We must have men with entomological knowledge in that position. If you say that we will employ an entomologist, why not have that included in your commissioner? Why should I, a horticulturist, having my every cent involved in the industry, spending, as I do, for myself and others, over $50,000 in twenty-four months in fighting scale—why should I be jeopardized by reason of the fact that there is not in the office of commissioner of our county a man who is competent to tell me if there is a scale introduced into that county, and if it is a dangerous scale? We must have that, gentlemen; you orange-growers who are paying heavily of your taxes and bearing the burdens of this great tax upon us know that we must have in that office, first, knowledge, and horse sense afterwards. A commissioner without some considerable knowledge of entomology is no commissioner. He is no tree policeman, for he can not tell the very pest that is jeopardizing your orchard. If we will choose men wisely, if we will demand that they pass an examination as to their qualifications to fill that important office—and it is a more important office than the supervisor's, a more important office than any other county office, because it has in charge the protection of an enormous industry, in which your very existence is involved. Gentlemen may laugh. I laugh not because I know the terrible tax on the majority. A man said to me the other day, "I can not get my bread and butter because of the determination to wipe out this scale. My orchard is infected, and it takes all my income to cleanse it." That is true, because it has been allowed to come in there through ignorance of the scale that we are endeavoring now to protect ourselves against. But you are told by Mr. Ehrhorn of that dangerous pest in Mexico, the dangerous pests in the Mediterranean, in Australia, and in Florida. You must have protection that you are entitled to. I beg of you, gentlemen, that you do not hesitate on this question, but that you shall demand and get men who are competent, intellectual men who are competent by reason of their knowledge of entomological questions, to fill an office that is one of the most important in this State. I beg of you to give this great consideration, serious consideration, and that you shall demand and get com-

petency and knowledge, for it is knowledge that we need if we are going to get protection.

MR. FOWLER. Mr. Mills argues eloquently and long here in regard to the need of an entomologist as a horticultural commissioner, and yet he names four or five men in California that are entomologists. I would like to ask where he is going to get his commissioners.

MR. MILLS. You have answered the question for me. There are only a few men of the standard of Ehrhorn and Bremner and Carnes. They are entomologists. I do not say that you shall get an Ehrhorn, because you can not get him, but you can get a Pease or a Cundiff or a Jeffrey. You can get men who are sufficiently endowed with intellect and absorb knowledge enough—not a scale bug from a mule only, but that he shall know the pests that are now infesting our orchards; that he shall know those that are likely to infest our orchards, and that he shall be able at once to put his finger on it, and not send it to Mr. Ehrhorn by telegram. I plead with you, gentlemen, to demand and get that necessary knowledge which will sufficiently qualify him to fill that important office.

THE CHAIRMAN. I think the question could be boiled down to two points. One faction thinks the horticultural commissioners should not have any more than the common knowledge of the common fruit-grower; the other faction feels that the commissioners should have a certain amount of knowledge. I believe you both agree that the average fruit-grower who is making his livelihood from the business will pass such an examination as Mr. Jeffrey suggests. I don't believe that the gentlemen here expect too much of horticultural commissioners. I am speaking as a horticultural commissioner. There are many diseases and many insects that I know in a general way, and those that are detrimental to my county I believe I could pass an examination on.

MR. REED. I want to repeat what I said before, that I think we waste lots of time. I see they are jumping on some of our scientific friends. The horticultural people do not work with success. It will be impossible, probably, to get in every county of this State a horticultural commissioner that will work to any advantage. I know that it is only where we have such brains as Ehrhorn and Carnes furnish that we accomplish anything. It is a bad thing to have a horticultural commissioner who is a resident in his community, because he hates to do anything that will hurt his neighbor. Take the white fly at Marysville. Mr. Harney made a great many enemies there, and he injured his business, and he to-day, perhaps, would rather not be a commissioner than to be one. I think if we are to get anything in a practical way we should all back up the State Board of Horticulture, to give it more men and to put the county horticultural business in the background. We just fritter away our time, and these pests get in and get established in spite of us. I am a horticultural commissioner, and I would not give two cents for my knowledge. We have to go to Mr. Carnes or Mr. Ehrhorn to get it. We have to go to a big, strong State Commission, and we have got to go to Professor Wickson to get that knowledge and that help. (Applause.)

MR. PEASE. I would like to say just one more word. I think that the horticultural commission of our county probably spends more money

than any other commission in the State. We are backed by the people. I started in without any knowledge in this line, but any man who has good judgment and likes this kind of work can write to Professor Wickson for his books and pamphlets; he can get them from the Department of Agriculture; he can send his insects to them and get them determined. If he reads of any pest that is not in his locality, he can send to Washington and get specimens of those insects and have an insect case. That is what I have. I think almost any of the insects that are liable to come in here I have got where I could show them to you. Further than that, I have accumulated a library of about 3,000 publications. Also, with the aid of my wife, I have a card index of that, so I can turn to any subject in a minute.

The motion of Mr. Pease was put to a vote and was carried.

MR. MILLS. I move that the law which provides that stock infested with scale which is brought into the State shall be shipped out or destroyed be amended to strike out "shipped out of the State" and left "destroyed."

The motion was duly seconded and unanimously carried.

The Convention then adjourned until December 2, 1908, at 9:30 o'clock A. M.

PROCEEDINGS OF SECOND DAY.

SACRAMENTO, CAL., December 2, 1908.

President Jeffrey called the Convention to order at 9:30 o'clock A. M.

PRESIDENT JEFFREY. I am requested by Mr. Isaac to state that he is going out of town and will not attend any further meetings of the Convention, so we will have to select some one as Secretary.

Mr. O. E. Bremner was unanimously chosen to act as Secretary of the Convention.

PRESIDENT JEFFREY. The first paper this morning is "Sprays and Their Application," by W. H. Volck. I will explain in behalf of Mr. Volck that he is the county entomologist of two counties largely engaged in apple growing. I believe that the spray question in northern California is one of the big questions to be considered by everybody who is growing fruits, whether it is grapes or peaches. Mr. Volck worked for our commission in Los Angeles County for four or five months when he was a boy, and between that and the university he got his start in the work he is doing. I am glad to present to you Mr. W. H. Volck of Pajaro Valley. (Applause.)

SPRAYS AND THEIR APPLICATION.

BY W. H. VOLCK.

In considering this subject I am impressed with the idea that it is one of considerable breadth and rather difficult to cover in the space of a single paper. Lodeman has published a book of nearly four hundred pages in fine print, and, added to this, many other special works have appeared, which, along with numerous experiment station and Government bulletins, now make up a large total of literature on spraying.

Spraying is such a familiar operation to most California orchardists as scarcely to need defining or preliminary explanation. In the broadest sense we mean by spraying the application of a liquid or solid compound or mixture to the above ground surface of living plants. As ordinarily considered, spraying means a liquid application, or at least a liquid carrier for whatever solid body may be in the mixture. We have, however, to consider the form of application in which the active material is used as a dry powder or dust carried in a current of air, hence the broadest definition must be accepted under this title.

Any agricultural operation involves expense which, if considered in an economic way, must have an end justifying the means. Spraying is no exception to this rule, and the farmer applies spray materials to his crop with the expectation of preventing the appearance of some undesirable condition or the creation of a new and more desirable development. Then the economic result and consequent justification of a

spraying operation, for a given crop, is measured by comparing the net returns of a sprayed area with a comparable unsprayed area for a season or term of seasons.

Viewed in this light there is sufficient definite and recurring phenomena in connection with spraying operations to justify the hope that the subject may one day be looked upon as a science. Probably, since the dawn of reason, men have recognized an analogy between plants and animals, or, in other words, a relationship in all life. Then it is not surprising that there were attempts to cure sick conditions in plants by administering medicines, even in very early times. The crudity of these early attempts to control plant diseases would no doubt bring a smile to our faces if we could have them described to us. Even those of recent enough date to be chronicled are often quite amusing, but every now and then the delver into the ancient history of spraying is surprised by the accuracy with which some of the formulas hit the mark, even in the light of modern investigations.

While recognizing a general analogy between plants and animals, the early experimenters must soon have been impressed with one important difference. With plants it is impracticable to introduce a medicine or drug directly into the internal structure of the organism, and there have it accomplish a healing process. For this reason plant remedies usually partook of the nature of liniments or surface applications. Fortunately for the success of man's efforts, the great majority of plant disorders are controllable by surface treatments.

Decoctions of herbs and strong smelling substances entered largely into the composition of the early plant remedies. Of course, only such simple chemical substances as were available could be tried. Milk of lime and limewater must have been used at a very early date, and has been frequently and strongly recommended, both as an insecticide and a fungicide. Sulphur was also among the first of the materials used in plant medication. This substance was available to man at comparatively small cost, even when the arts were in a very crude stage of development. Then, with the knowledge or belief in the efficiency of sulphur and lime, what was more natural than to combine the two, and get a double value. Such combinations were often made and applied with good results, but the value of prolonged boiling of the two ingredients together in water seems to have been a comparatively recent discovery.

As time went on the list of substances and compounds tried out by the experimenters must have included practically everything within the range of their experience, but this work was for the most part fruitless, because not conducted in an orderly and scientific manner. Perhaps the substance was of value for some trouble, but not for the one in question, or it may have been a proper remedy, but applied at a wrong time, or again, it may have been of no value whatever. Under any of these circumstances the substance was rejected by the experimenter, because he did not have the necessary knowledge of plant diseases, chemistry, and allied sciences to enable him to discriminate between the three cases. Still another cause often led to error. The trouble in question may have been just ready to abate from natural causes. Then the application of almost any substance or mixture would give good results, a state of affairs that often led to a belief in the value of really worthless methods

of treatment. Even the modern horticulturist is not immune to error from this cause where the practice of comparing the treated with untreated plots is not rigidly followed.

The continued application of various compounds and mixtures did, however, eventually result in a right combination, so that several of our most valuable insecticides and fungicides are handed down to us as a result of this unguided experimentation. Viewed in this light we should be thankful for the past, but have no desire to live it over. There is no longer any need for this kind of guesswork, when trained specialists provided at the public expense devote their time to such problems.

Notwithstanding the comparatively early discovery of good insecticides and fungicides, the application of them commercially on anything like an extensive scale is a matter of recent history. This backwardness in practical development was due largely to the great cost of spray materials and their application. Not until the arts and sciences had progressed to something like their present state of perfection was it possible for the agriculturist to make use of the gardener's knowledge. Fancy what some of our modern horticulturists, who object to the arduous task of spraying, would say if they were instructed to go forth with brooms and whisk some rank mixture upon their trees. Then cheap spray materials and the modern spray pump have contributed quite as largely to the commercial development of spraying as has the great dissemination of knowledge concerning the value of such work.

Modern Spraying.—We now come to the consideration of the modern practice and science of spraying. It is well known that the diseases and disorders of plants are largely due to animal and vegetable parasites which, during a portion of their life, are external to the plant body. During the development of these parasites on the surface of the plant there is usually a vulnerable period when the application of the proper insecticide or fungicide will result in the death of the disease producing organisms. It is in the determination of the proper timing of spray applications that the great value of scientific studies in the life history of plant parasites becomes apparent. The critical period with some fungus diseases is so short that the delay of a week may mean all the difference between failure and success.

In the treatment of vegetable parasites of plants, spray materials are used that have the general designation of fungicides. The fungicides, as may be inferred from the name, are capable of killing various fungous parasites of plants at some stage of their development. These fungous parasites are in general propagated by means of spores or seed-like bodies, which are produced in enormous numbers by the mature stages of the fungus plant.

The lodgment of the spores of a parasitic fungus on the surface of the proper host plant marks the first stage in the process of infection. The further development of the parasite requires the germination of these spores and the growth of fungus plants from them, which either penetrate into the tissue of the host or spread out over its surface. The germination of fungus spores, like that of ordinary seeds, requires the proper amount of heat and moisture. The water of fogs, dews, and rains supplies this moisture, and unless such climatic agencies are operative for a sufficient length of time there can be no fungus infection.

Hence, at times we find that the weather has very marked fungicidal properties, and dry seasons are usually characterized by the absence of blights and mildews. So far, very good, but man can not control the weather, and what the climate did for him one season may be exactly reversed in another. In casting about for the solution of this problem it is evident that if the water of fogs, dews, and rains could be tinctured with a substance that would prevent spore germination the desired result might be obtained. Such a substance could be sprayed over the plant to be protected at or just previous to the time of spore germination. The water of the spray, as well as that from dews, rains, and fogs, would then bring a solution of this substance in contact with the fungus spores.

A substance which can act successfully as a fungicide on the surface of a living plant must in general have the following properties: First, a very dilute solution should be effective; second, the deposit should be enduring, that is, not all washed away by the first rain; third, the substance must not be injurious to the plant to which it is applied as a protection. Substances which will kill fungus spores in very dilute solutions were known in the early part of the nineteenth century. The great efficiency of copper sulphate in that respect was discovered at this time, and the chemists of the same period were familiar with the blue precipitate produced by mixing limewater with bluestone solution. The knowledge of the chemist and biologist were then sufficient if put together to have produced the Bordeaux mixture. The matter looks very simple to us now, but the practical value of these discoveries remained unknown until 1882.

The Bordeaux mixture is now regarded as the standard fungicide. In general, it conforms quite closely to the requirements laid down. It retains its fungicidal properties long after the date of application; in fact, the writer has found the deposits of this fungicide remaining on apple leaves four months after spraying, still capable of preventing the germination of apple scab fungus spores. With regard to plant injury the Bordeaux mixture is not perfect, and more fault has been found with it as the quantity used has increased. No injury has ever been reported from the use of Bordeaux mixture on dormant trees, and the hardy field crops, such as potatoes, seem to be uninjured by summer applications. Apple and pear foliage is seldom injured, but the fruit may be badly russeted if the application is followed by much rain. Peach foliage is very sensitive to Bordeaux injury, and complete defoliation may occur even after light applications. No change in the formulas has yet corrected this tendency to injure, and from a chemical standpoint it is not easy to see how the use of greatly excessive quantities of lime can improve matters. Then, with these limitations in mind, the Bordeaux mixture is a satisfactory remedy for the pear and apple scabs, peach blight, potato blight, and other similar fungus diseases. It is not especially effective against mildews, and is seldom recommended as a remedy for that class of fungi. Bordeaux is a slightly soluble compound of copper in the form of a fine precipitate, which is readily sustained in water by agitation. The fineness of the precipitate seems to have much to do with the efficiency of the mixture, and modern formulas are calculated to produce a compound that remains in suspension a long time without agitation. This is accomplished by diluting the copper sulphate solution

and milk of lime with large amounts of water before pouring them together.

The Bordeaux mixture is not necessarily a liquid application, but the precipitate may be dried and reduced to a fine powder. In this form it has been used in dust mixtures, to be applied with a blower. The results obtained with dust applications of Bordeaux appear, however, to be much inferior to the liquid applications.

Other compounds of copper are occasionally used as fungicides, such as ammoniacal copper carbonate and soda Bordeaux. These compounds are used on nearly ripe fruit, or where the stain left by ordinary Bordeaux might be objectionable.

Science is now acquainted with a long list of substances and compounds that have pronounced germicidal value, and it would appear that many of them might be used as fungicides. I do not doubt that the future orchardist may make successful use of some of these compounds, but at present the only element that takes rank alongside of copper as a fungicide is sulphur and certain sulphur compounds. Pure sulphur has long been recognized as a specific remedy for mildews. The element appears to act through the agency of its fumes, and it is only necessary to dust the mildewed plants with finely powdered or sublimed sulphur to get the result in the simplest cases. The oidium grape mildew is perhaps the best example of complete control by sulphur dusting. In general, however, sulphur compounds require a more intimate contact with the disease producing organism than can be obtained by the dusting method. This necessarily implies liquid applications. Finely divided sulphur can be mixed with water by agitation, and so applied as a spray. In this form sulphur is much more efficient, especially if a small amount of flour paste is added to insure the adhesion of the particles. Contact of the spray with the parasite is made still more perfect by dissolving the sulphur and using this solution as a spray. These sulphur solutions are usually compounds of the element with lime or some other alkali, and as such may be very effective fungicides. Soluble sulphur, however, is liable to cause injury to plants in foliage on account of its power of penetration. Danger of plant injury then limits the use of sulphur in its most effective form, and causes it to be regarded as a winter spray for dormant trees. It is true that by diluting greatly, and applying with care, the lime-sulphur solution is a good remedy for grape mildew in moist, cool climates, where dry sulphuring is not effective. The lime-sulphur solution promises to be a good remedy for the apple and pear scabs when applied just as the first blossoms are opening. At this time the trees withstand the full winter strength without suffering permanent injury. In short, sulphur appears to be able to accomplish much the same work as the compounds of copper, and often with less danger of injury to the treated plants. Several insect parasites are also controlled by these same sulphur applications, being in this respect entirely different from Bordeaux, which is not known to have insecticidal properties. By precipitating the soluble sulphides with iron a compound is formed which has many of the properties of the Bordeaux mixture, and also to a fair degree the insecticidal and fungicidal ability of the sulphur solutions. This insoluble sulphide has been shown to be a practical remedy for the powdery mildew

of the apple, and promises to control the scab and other diseases as well. The plant injury appears to be less than that caused by Bordeaux, and russeting has not been noticed from its use.

Recent investigations have also shown that the old and so-called self-boiled lime and sulphur solution is an effective and comparatively harmless summer fungicide. This formula is seldom ever more than a mixture of powdered sulphur and whitewash, and is in reality a return to the first principles. Thus it is seen that modern investigators are turning their attention to the compounds of sulphur as a possible relief from the shortcomings of the Bordeaux mixture.

Insecticides.—Turning now to the spray materials designed to control insects, we find a great diversity of requirements, and, consequently, a much greater variety of materials in use than with the fungicides. Except in the case of sulphur and its compounds, insecticides seldom have any fungicidal value. The most notable and widely applicable of the sulphur compounds, with both insecticidal and fungicidal properties, is known as the lime-sulphur solution.

We have seen that the requirements of a fungicide are that under various climatic conditions it must be able to prevent the germination of fungus spores, and yet not prove injurious to the sprayed plants. An insecticide must, on the other hand, be able to kill insects, either by outward contact or internal poisoning. The lime-sulphur solution is a contact insecticide; that is, when applied as a spray it is capable of killing certain insects with which it comes in contact. Even the deposit left by the spray has killing properties with certain very small insects. This enduring property of the sulphur insecticides greatly enhances their value, for those insects not killed at the time of application may afterwards succumb to the effect of the spray deposit.

The lime-sulphur solution as a tree spray appears to have originated in California, and was first employed as a remedy for the San Jose scale. The old formulas all called for comparatively large quantities of lime, as well as salt, and were both difficult to prepare and expensive. The effectiveness of the lime, sulphur, and salt wash was very apparent, and when the San Jose scale made destructive progress in the Eastern States it attracted the attention of scientific investigators. Various modifications of the formula were tried, and attempts made to discover the effective portions of the wash. The chemist was even consulted in the matter. As a result of these investigations it was found that the effectiveness of the lime-sulphur solution depended on a soluble compound of sulphur, known to chemists as calcium polysulphide. Evidently, then, the formula best adapted to the production of this compound is the one that should be chosen for the preparation of the wash. The elimination of unnecessary ingredients and complications from the lime-sulphur formula has greatly simplified its preparation, and so reduced the cost. The strictly modern formula reads something as follows:

To make 200 gallons of spray of proper strength for the San Jose scale use: Sulphur, 66 pounds; lime, 33 pounds; water (to prepare), 50 gallons. Place the water in a boiling vat that will carry the quantity safely without danger of boiling over. Then, when fairly hot, add the lime, stirring to insure the formation of a smooth milk of lime. The

sulphur should now be added, and the mixture boiled moderately for forty-five minutes to an hour. During the boiling stir every few minutes by raking over the bottom of the vat with a hoe.

When this formula has boiled sufficiently it will be a very dark-colored, rather thin, liquid, with only a small amount of sulphur left undissolved. The solution is now ready for straining, when it may be diluted with water to make 200 gallons. If extra lime is desired, well strained milk of lime may be added along with the water.

This formula is given in detail, because it illustrates the great advantage that scientific investigations can be to the horticulturist. Those orchardists who are familiar with the old lime, sulphur, and salt formula will at once be impressed with the comparative simplicity and cheapness of the new formula.

The lime-sulphur solution has its proper place as an insecticide and fungicide, but is by no means a cure-all. The insect troubles best controlled by it are the San Jose scale and closely allied species and mites. It is seldom of value against large sized insects, and the deposit left by the sulphur solutions is not poisonous to chewing insects. The peach worm is an exception to the rule, for here the lime-sulphur solution is effective against a rather large insect.

Fortunately, other contact insecticides are known which will work where the lime-sulphur solution fails. These are chiefly soaps and oils and mixtures of the two known as emulsions. Kerosene oil emulsion and whale-oil soap were among the first of these to come into general use, and are still in good repute as insecticides. Of late years various crude oil products, and even crude oil itself, have been used in the form of emulsions and mechanical mixtures to control insect pests. Many of these mineral oils are very deadly to insects, but they are also quite dangerous to plants, especially in foliage, and must be handled with extreme care. Some of these oil sprays are quite cheap, and so offer a strong temptation as a substitute for more expensive methods. Practical orchardists have frequently been so infatuated with the apparent virtues of distillate oil as a scaleicide for orange trees that they have persisted in its use even after scientific investigations had shown the principal contention of the oil advocates to be based on a fallacy.

The trouble with most mineral oils is that they are of a nonvolatile nature, and so succeed in injuring the foliage before they have dried away. Kerosene is an exception to this rule, and may be used on the foliage of citrus trees at an 8 to 10 per cent dilution, and on apple, pear, and peach foliage at 5 to 8 per cent. The oil may be used in the form of a soap emulsion or the mechanical mixture with pure water. The kerosene oil spray so applied is a good remedy for plant lice, mites, and certain scale insects.

On dormant plants injury is not so likely to occur, and so they may be sprayed with some of the other oil emulsions, including even crude oil. The distillate lye mechanical mixture is perhaps the best known to California orchardists, and is a good remedy for the brown apricot scale and black scale on dormant trees. Crude oil emulsion is used to some extent, and apparently gives good results as a scaleicide. The oil sprays have very little, if any, fungicidal value, and should not be used where the lime-sulphur solution will serve as well.

We can not well leave the subject of contact insecticides without mentioning tobacco or nicotine extracts. From the standpoint of effectiveness in very small quantities, nicotine is by far the most potent of the contact insecticides. Tobacco decoctions, such as are used in spraying for aphids, seldom contain more than .01 per cent of nicotine. Nicotine is effective against aphids, mites, and other small insects, including thrips, and has this advantage over other spray materials recommended for such purposes in that it is free from foliage injuring properties. The cost of nicotine sprays is, however, somewhat expensive when the quantity used is sufficient to give good results under orchard conditions. Here, then, is a problem for the chemist, namely, to reduce the cost of nicotine or provide some substitute.

Internal Poisons.—With the class of insects that eat the tissue of plants it is possible to introduce into their stomachs along with the food some substance which will cause death much in the same manner that larger animals are poisoned. Stomach poisons for insects are now limited to the compounds of arsenic, for, although in these days of rapid progress there are hints of other things, none have yet been demonstrated to be practical. Arsenic, while a potent poison for insects, is also deadly to plants, hence this element must be prepared in such a way for spraying that it can not penetrate the plant tissue. The problem of preparing a safe arsenical spray has occupied the minds of chemists and entomologists for a long period. Various expedients have been recommended to prevent burning from paris green, such as the addition of lime or the Bordeaux mixture. The results obtained by different experimenters varied enormously, and there was much confusion as to recommendations.

The trouble was diagnosed correctly to be due to water soluble arsenic, but the source of this dissolved arsenic caused confusion. The usual explanation was that the free or uncombined arsenic present in the various arsenical compounds, such as paris green and arsenite of lime, caused all the trouble. The statement found in standard works on chemistry to the effect that these arsenical compounds themselves were insoluble in water was accepted as exact truth. Efforts were made to perfect the existing arsenicals and produce them in such purity that there would be no uncombined arsenic, and consequently no damage.

About this time a chemist in the employ of the Gypsy-moth Commission took arsenate of lead down from the shelf of chemical curiosities, and proposed to use it as an insecticide. In the early work with this substance it was found that very large amounts could be applied to foliage apparently without injury; but, as we shall see later, it was yet too soon to generalize in the matter.

In the spring of 1903 there was begun in the Pajaro Valley of this State an investigation of the codling moth problem. The State University, coöperating with the local Orchardists' Association, furnished the means for this investigation. In the beginning it was intended to make of this work a sort of demonstration campaign, so a considerable acreage was sprayed with paris green. The paris green was carefully tested to determine its purity, and all other known precautions were taken to prevent foliage injury. As a result of this year's work the codling moth was well controlled, but the trees suffered great injury,

both to foilage and fruit. Such was the magnitude of the damage done that it became imperative to make a study of the causes of arsenical injury. It fell to the lot of the writer to take charge of this work, and, with due acknowledgment of all the assistance that has been received from many sources, we are able to report a final and complete success.

The failure of paris green was found to be due to the leaching effect of wet fogs and dews so characteristic of the coast climate. The arsenical might not be sufficiently soluble to dissolve appreciably in the spray tank, but weeks of continued wettings after it had been deposited on the leaves caused enough arsenic to go into solution to penetrate and poison the tissue of the plant. A great variety of arsenic compounds were tried out on the foliage of tender plants, and most of them failed in the same manner as paris green. The only arsenicals that stood the foliage tests were certain samples of arsenate of lead, strangely; others that were apparently as pure burned the foliage. We finally recommended Swift's arsenate of lead, because the samples we had tested proved satisfactory. Ultimately it developed that no two lots of this material were alike, and while some were entirely satisfactory others did serious injury.

The uncertainty in the action of arsenate of lead, which we soon found to be a common fault of all the existing brands, made it necessary to continue the investigation. It was not until an exhaustive chemical study of these compounds had been made that the cause of trouble was finally discovered. Arsenate of lead as commonly manufactured was found to be a mixture of two different compounds of arsenic. One of these carried more of the poisonous element than it could hold under the leaching action of wet fogs and dews, which resulted in the formation of an arsenical solution, with consequent poisoning of the foliage. The other compound contained only such arsenic as it could hold, and so was entirely safe. The next and final step was to perfect a process of manufacture by which this desirable compound (orthoarsenate of lead) could be made cheaply and with certainty. Such, in brief, is the story of the evolution of an arsenical designed to meet very exacting requirements, but also equally applicable to general conditions.

After having obtained a proper arsenical it is necessary to use it in such a manner as to make it effective. The arsenical must be of such a nature that it will not dissolve in water, and yet will yield its poison to the digestive juices of the insect's stomach. Necessarily only those insects that feed on the surface tissue of plants can be poisoned by arsenical sprays, and in some cases a special period in the life history of the insect must be chosen for the application of the poison. This is true with the codling worm, which can only be poisoned during the brief period between the hatching of the egg and the entrance of the young worm into the apple. Notwithstanding this short period of vulnerability, it is possible to gain complete control of the codling moth by spraying with arsenate of lead. Other insects of the moth order, as well as beetles and sawflies, are largely controlled by the use of this arsenical. In a very few instances arsenate of lead is not a sufficiently strong poison, the tussock caterpillar being a very good example. This insect is a leaf feeder, and must eat whatever is applied to the foliage as a spray, but so resistant is the caterpillar to arsenical poisoning that double doses of arsenate of lead seldom produce a noticeable effect. For

the tussock caterpillar we have been trying a much stronger arsenical poison, known as arsenite of zinc, and with fair promise of success. Zinc arsenite is new as an arsenical, and gives promise of being quite valuable for special purposes.

Diseases Not Controlled by Spraying, and Limitations.—While the great majority of plant troubles now yield to the proper spraying methods, still there are certain ones that are not yet controllable in this way. The physiological diseases, or cases in which plants are sick without an apparent cause, and those parasitic troubles where the pest is at all times invulnerable to spraying methods, are in this class. The diseases of the roots of plants usually can not be reached by spraying or outward application, but fortunately with these and other refractory cases special means have been devised that give satisfactory control.

Even where spraying is effective it is seldom more than a means of control rather than eradication of any given pest. This is due to the fact that it is not possible to so spray tree or plant in such a way as to insure the complete covering of every part. Such missed portions are often very considerable in general fieldwork, and so the parasite remains in reduced numbers to again multiply and require treatment later. It is with due acknowledgment of the limitations of spraying that we at the same time contend in favor of such methods in the majority of cases, on the grounds that they are a complete economic success.

The Application of Sprays.—Thus far the remedies have been discussed with only a casual reference to the way in which they can be applied. For liquid mixtures the spray pump is familiar to all, but there are many kinds of pumps, some of which are much better adapted to their purpose than others. The requirement of a spraying outfit is that it apply the liquid thoroughly and in an economical manner. It requires considerable power to force liquids through the spray nozzles in a copious and well divided spray. The difficulty of supplying this power is the chief fault with hand pumps. It is not sufficient to break the liquid up into a fine mist, but for economical and efficient work there must be considerable volume and force as well. Carrying force and covering power are of more importance than the fineness of the mist. The owners of hard working hand pumps will find that they can greatly increase the ease and efficiency of operation by using Bordeaux nozzles, opened out to carry well, and not attempting to maintain a high pressure.

In general, the modern power outfit, when equipped with a good revolving agitator, is the most efficient and economical machine. The agitator is a point of considerable importance, and should be capable of mechanically mixing oils. Paddles working back and forth are not capable of doing this, and therefore constitute a serious fault in any outfit equipped with them. With power outfits the best results are obtained by working at high pressure, for then large volumes of well divided spray are delivered with proper force.

When once equipped with the proper outfit much then depends on the skill of the man handling the nozzle. To spray a tree properly is no easy matter, and a rather difficult thing to teach men. The main thing to remember is to keep the nozzles directed at the tops and higher portions of the trees until these are thoroughly sprayed, then the lower

branches can be quickly finished, because the drip from the tops has already partly wet them.

Such are the general rules for liquid spraying, but spray materials are also applied in the form of a dust by means of blowers. The advocacy of dust spraying is a special hobby with some, and evidently has its proper place in modern economics. There is no difficulty in constructing blowers that will deliver great clouds of dust, and with sufficient force to drive it entirely through large trees. The distribution of dust over the foliage is, however, less uniform than the deposits of liquid sprays. Some portions of the foliage are usually heavily coated with the powder, while other large areas will show scarcely a trace. The efficiency of dusting is largely determined by the nature of the trouble to be controlled. As a distributer of arsenical poisons the method is fairly successful, and good control of the codling moth can be obtained in this way. For the application of sulphur as a control for mildew, asparagus rust, and red spiders, the method is of undoubted value. On the other hand, such fungus diseases as the apple and pear scabs appear to be very poorly, if at all, controlled by dusting. For scale insects dust spraying is evidently valueless. Hence, to meet all conditions, the orchardist must be provided with a liquid outfit, and unless the economic advantage of the dusting method is very great it will not pay to bother with it. The dust spray advocates usually claim a very much reduced cost of application as compared with liquid spraying, but in the opinion of the writer, if they used the quantities of dust and applied the same with the thoroughness required to insure efficiency there might not be so much difference. In general, the most successful users of dust sprays are those that really have very little to spray for. As a means of controlling the codling moth in hillside orchards the duster is worthy of attention.

Commercial Spray Materials.—It is entirely in keeping with modern methods that attempts should be made to manufacture and vend ready for use spray materials. There is undoubtedly a legitimate field for such efforts, with benefit for both the manufacturer and consumer. Unfortunately, however, we can not give an unqualified recommendation to the spray manufacturer. The history of plant theraputics has been much the same as that of human medicine, and the quack plant doctor is a familiar sight to the horticulturist. These charlatans are usually characterized by their advocacy of some special cure-all that will restore any plant to a state of perfect health. Another characteristic, quite as certain as a means of identification, is the open warfare that these individuals maintain with the university professors and other authorities. The consumer should refuse to have anything to do with any material that is not fully recommended for the purpose in question by the Horticultural Commissioners, the State University, or the Government Department of Agriculture.

Turning to those legitimate producers of really valuable materials, we can be just as positive in commendation of them as in condemning quackery. The proper production of spray materials has much to do with the science of chemistry, a knowledge of which, I regret to say, is not very general among the horticulturists. Commercial spray manufacturers can, on the other hand, afford to hire such expert assistance as

is necessary to produce a uniform and desirable product. Further, by cheapening and removing many disagreeable features from the spraying operation, the commercial manufacturer can greatly increase the amount of such spraying, with resultant general improvement in conditions.

The spray manufacturer should in general be able to supply ready to apply insecticides and fungicides cheaper than the consumer can prepare them, when all things are considered, and they are not doing their full duty unless they strive to meet this condition. There are some materials which the consumer can not successfully produce himself, and are, therefore, entirely in the hands of the commercial manufacturer.

This is the case with neutral or orthoarsenate of lead. The orchardists of the Pajaro Valley would not be able to take advantage of the discovery that their money had paid for if a spray chemical company had not been organized to make and place the material on the market. The spray manufacturer also has a legitimate field in the production of lime-sulphur solution, oil emulsions, Bordeaux, and many other sprays.

It is almost certain that in the near future the manufacture and sale of spray materials will be regulated by State and Federal laws. This will give the consumer the necessary protection against adulterations and quack remedies. (Applause.)

PRESIDENT JEFFREY. I am now ready to announce the Committee on Resolutions, and I would like to have that committee get together just as soon as they can. I will appoint James Mills, George Chambers, A. N. Judd, P. D. Fowler, and George H. Hecke. The next paper is by Mr. R. S. Woglum, "The Latest in Fumigation."

THE LATEST IN FUMIGATION.

BY R. S. WOGLUM.

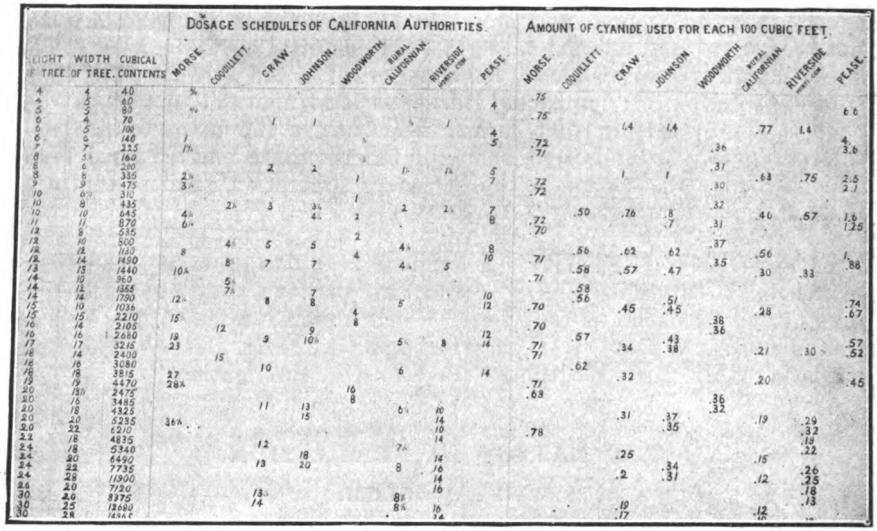
Fumigation.—At the last meeting of this Convention I presented a paper on fumigation, covering the field of our activities up to that time. Our honorable President requested me to continue the discussion commenced at that meeting by addressing you on the problems of investigation through which we have passed between that period and the present date. As this field has been a very broad and disconnected one, it will be possible to touch but briefly on the more important phases of this work within the limited time of a single address. For a more thorough discussion of the field of fumigation I would refer you to my report on California work, which will be issued by the United States Bureau of Entomology in the near future.

Condition of the Present Literature on California Gas Work.—In my Riverside address I discussed briefly the chaotic condition of dosage scheduling as published by some of the more authoritative writers on California fumigation since its incipiency. By way of introduction to statements to follow, I wish to touch again briefly on this point, but in a more exhaustive manner than formerly. This I will do by means of the following chart, which has been so prepared as to give an analytical com-

parison of the dosages proposed by the leading California authorities in their publication:

First, we have the dimensions of the trees, followed by the cubical contents represented by these dimensions. Then comes the dosage schedules suggested by the different authorities, which are so grouped that they can be compared with each other for trees of any desired sizes. The last section consists of a comparison of dosage-rates, or the amount of cyanide used for each hundred cubic feet in the different sized trees.

The table is self-explanatory, yet I will make a few statements to call attention to the great irregularities of the different tables, as shown by this analysis. In looking through the dosage-rate section we find that Morse, Coquillett, and Woodworth dosed their trees exactly in proportion to the contents. Not so in any of the other tables, which exihibit



SCHEDULE OF DOSAGE FOR TREES.

no knowledge whatever of the contents represented by trees of different dimensions. Craw's dosage-rate for his smallest tree is eight times that for his largest; that of the Riverside Horticultural Commission is thirteen times that of the largest. The other tables are about equally variable. Run through and compare the dosages suggested by the different authorities for a tree 6 by 4; one 10 by 8; one 16 by 16. Then compare the dosage-rates of these different men for these different sized trees. After you have finished I think you will agree with me that they are widely separated from so-called uniformity. A half hour of such comparison in this table is interesting as well as instructive.

It leads us to the knowledge that no two authorities agree. If a man who is contemplating entering the fumigation practice should examine our literature for information as to what dosage he should use, he at once finds himself among a bewildering array of losely prepared dosage tables, which are impediments rather than aids to the economic advancement of this great practice. The subsequent result on the condition of to-day I will briefly mention.

Condition of Practical Work.—In the generation of hydrocyanic acid gas, potassium cyanide, sulphuric acid, and water are required. To each ounce of cyanide we use one liquid ounce of acid and three of water.

The basis of fumigation is the dosage. Within certain limits it might be said that the greater strength of dosage we use, the more insects will be destroyed.

Under the present system of fumigation the dosage is obtained for the most part in the following way: A man carrying a plat of the orchard, which consists of a piece of paper marked off into squares, walks through the orchard between two rows of trees. As he passes along he marks down on this piece of paper the dosages (as represented by cyanide in ounces) which he believes these trees should receive. He secures this dosage by looking at the trees and *guessing* at what he believes they should receive, his eye being the only measuring instrument that he employs. Some men walk through the orchard slowly, examining the trees in the rows at either side with some care. The majority, however, walk through the field very rapidly, taking 2, 4, or even 6 rows at a time. Under such hasty work it is possible to see only the tops, or a side of some of the trees at most.

I have found from very careful observation and measurements made after many fumigators, that the variation in dosage under this guess method of scheduling is very great, even among the most careful of workers. The variation under the careless estimater is remarkable, sometimes approaching the 100 per cent mark.

In the accompanying diagrams are arranged the dosages given trees by three practical fumigators, all of whom are considered to be among the more experienced workers in southern California. These trees have not been selected promiscuously because of their irregularity, but comprise a continuous number of trees taken from a single row or set. I have, however, rearranged the sequence of the trees in order to facilitate comparison. The volume of the trees was obtained after they had been covered with tents.

Dosage Table of Fumigator I.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	11 oz.	1690 cu. ft.	150
2	10	1369	136
3	10	1380	138
4	12	1350	110
5	12	2050	170
6	12	1440	120
7	12	1663	140
8	12	1755	145
9	12	1940	165
10	12	2096	175
11	9	1175	130
12	10	1516	150
13	11	1450	130
14	10	1380	140
15	11	1440	130

Dosage Table of Fumigator II.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	11 oz.	1000 cu. ft.	90
2	7	400	60
3	15	1800	120
4	10	600	60
5	15	2200	145
6	18	2200	120
7	17	2200	130
8	16	2200	140
9	16	2400	150
10	16	2000	125
11	16	2500	156
12	15	1800	120
13	12	1250	105
14	12	800	65
15	12	1200	100

Dosage Table of Fumigator III.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	6 oz.	1500 cu. ft.	250
2	4	1100	275
3	4	800	200
4	5	1200	240
5	4	1100	275
6	4	900	225
7	4	950	238
8	5	950	190
9	5	900	180
10	5	1300	260
11	5	1150	230
12	5	1200	240
13	5	1350	270
14	6	1550	258
15	5	1150	230

Comparison of Dosages of Fumigators I, II, and III.

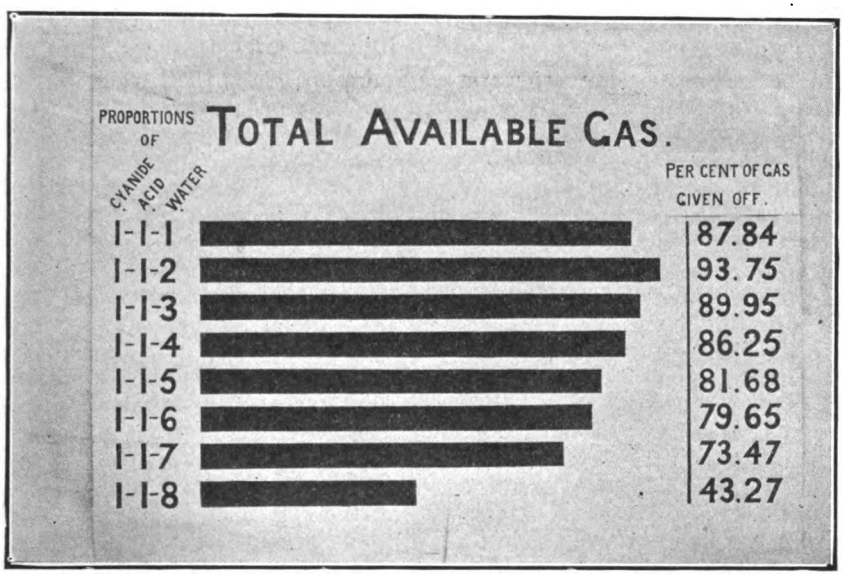
Contents of Tree.	Dosage of Fumigator I.	Dosage of Fumigator II.	Dosage of Fumigator III.
900 cu. ft.	.. oz.	11 oz.	4 ozs.
1200	9	12	5
1500	10	..	6
2000	12	16	8

Although there are many striking instances of variation in these tables, I will cite a single example from each case for the sake of brevity. In the case of fumigator I, we find that 12 ounces are used for each tree of number 4 to 10, inclusive. The contents of these different trees vary from 1,350 to 2,096 cubic feet, a range of over 700 cubic feet. In the table of fumigator II, trees 5, 6, 7, and 8 were each found to contain 2,200 cubic feet. The dosages used were sufficiently variable as to result in a range of from 120 to 145 cubic feet for each

ounce of cyanide used. Fumigator III gave 5 ounces to trees varying from 900 to 1,350 cubic feet.

The dosages of I and III were used for the purple scale, and II for the red scale. These two insects are considered by most of our practical workers to be about equally difficult to destroy, and the so-called double dosage is almost invariably resorted to in each case. A comparison of the dosages used by these fumigators for different sized trees shows that the results secured by these men must be widely different. The dosages used for a tree containing 1,200 cubic feet are 9, 12, and 5 ounces, respectively, a range of indeed great variation. These rambling remarks are sufficient, I believe, to demonstrate that the system of scheduling in practice to-day is quite as irregular as the dosages suggested in literature.

Under this system the cyanide and acid for a complete row of tents



or set, as it is called, is usually measured out beforehand at the commissary and placed into small cans and pitchers, which are arranged on a tray. The man who does the generating carries this great weight, together with a bucket of water, from tree to tree, dosing the trees as he comes to them. The water remains to be measured out at the tree.

I have previously stated that in my fumigation work I use three parts of water. The proportion of water used by different fumigators has been found to vary all the way from 2 to 8 parts; some men even varying widely in their individual work. Coming to a tree, the generator man first looks at his can of cyanide for that tree and then guesses as to how many ounces he thinks it contains. If he is using two parts of water he will use twice the amount of water that he thinks there is cyanide in the can; if three parts, then three times the amount of cyanide he thinks to be in the can, etc. Now, the receptacles used for measuring water vary all the way from half pint dippers to quart pitchers and old tin cans.

Think of measuring with accuracy the required amount of water for a 4-ounce tree, using therefor a quart pitcher.

Frequently I have had fumigators tell me that during their work they would sometimes find on looking at a can of cyanide that it apparently contained a heavy dosage, whereas the tree to be dosed appeared small. They would then put in excess water to feel sure of preventing burning. I have frequently seen fumigators in measuring the water for a tree first measure out what they thought to be the proper amount of water; hesitating about it being the correct amount, they would take a second dip or even a third.

What is the effect of this irregular use of water? Does the proportion of water used have any effect on the generation of gas? It does, and a very marked one, too, as shown by the accompanying diagram.

This diagram is the result of analyses of the residue in experiments wherein different proportions of water were used. The work was performed for me by the United States Bureau of Chemistry.

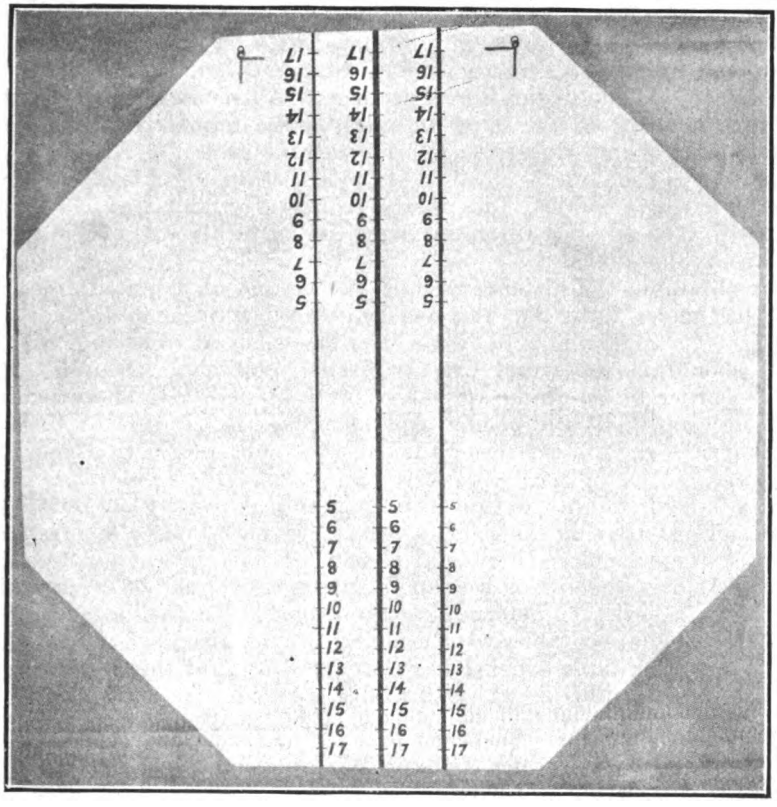
The first columns of figures, as 1—1—1, 1—1—2, etc., designate the proportions of cyanide, acid, and water, respectively, the former in dry ounces, the latter two in liquid ounces. The per cent column to the right represents the total amount of gas given off where these different proportions are used. As the proportion of water is increased above two parts, the amount of gas given off is decreased. At eight parts of water we get less than half as much gas as with two parts. In other words, two ounces of cyanide with eight parts of water appear to produce less available gas than one ounce with two parts of water. Those second and third dips of water meant less available gas, and the common multifold guessing in the measure of water under the present system is a condemnation of good work. In fact, of the different ingredients used in the generation of hydrocyanic acid gas and the various details of operation undergone in its employment in the fumigation of citrus trees, I am of the opinion that no one factor (other than that of dosage-scheduling) has entered more closely into the variability of results secured than the erratic use of water.

Although two parts of water produce the most gas, it is impractical to use this proportion in fieldwork with the present style of generating vessel. The residue of generations where two parts of water are used frequently congeal, requiring some little time for its removal from the constricted neck fumigating pot. This is an impediment to rapid fieldwork. With three parts of water the residue seldom congeals. I recommend the use of three parts of water.

There are many other factors which enter into the accomplishment of poor results under the present procedure of fumigation, but I will burden you with but one or two more of these at this time. The small cans into which the dosages are placed at the commissary are seldom marked. Sometimes these become mixed on the tray, with the result of some trees receiving the dosages scheduled for other trees. Another illustration: When the dosage for a row of trees is measured out, a pencil mark is usually drawn through this row on the dosage plat to show that it has been fumigated. A mistake of failing to cross off a row, or crossing off an extra row by mistake, would throw out the dosage for the remainder of the orchard. Such cases have been known to occur.

I have stated to you with exactness, and, in some detail, the condition of fumigation as it is found to-day. It is *impossible* for us to expect most excellent results from these irregular conditions, yet some fumigators are doing very good work. The number is, however, very small, and can cover only a small part of the great acreage to be treated every year.

After this portrayal of conditions, I believe you will realize as thoroughly as I did the necessity of systematizing the practice of fumi-



METHOD OF MARKING TENT.

gation, with the idea of eliminating some of these guesses if possible. The result of my efforts in this direction I will expose to you in the remainder of my address.

In order to secure uniformity of results it was evident that the dosage must be calculated in respect to the contents of tented trees. As mentioned at the Riverside Convention, a method was worked out in which, by knowing the distance around the bottom and over the top of the tented tree, the contents can be readily determined. These measurements were at first secured by means of a tape line. This was a laborious process, especially so in securing the distance over the top of the tree. Early this year, while doing some fumigation work in Florida

with Mr. Morrill, another agent of the United States Bureau of Entomology, I was acquainted with a system of marking tents whereby the distance over the top of the tree can be easily secured. A diagram readily represents this scheme.

Three parallel lines running in the direction of the strips of cloth of which the tent is made are spaced about 4 feet apart. The middle one of these lines runs through the center of the tent. Commencing at the center of the tent as zero, this line is marked off into foot spaces toward either edge. If the first mark for a 45-foot tent is placed 5 feet from the center it suffices. The other two lines are marked after the manner of the center line.

Suppose we have the middle line of a marked tent running over the top of a tree. The distance over is then obtained by adding together the two numbers on the opposite sides of the tented tree which are closest to the points where the line touches the ground. As the center of the tent is very often pulled to one side in covering a tree, the presence of a single marked line would require that the tent be always centered. The presence of an auxiliary line on either side of the center line avoids this difficulty.

For obtaining the distance around the bottom of a tented tree, our work has shown to us that this can be secured with much accuracy by pacing. The man who is to obtain the dimensions of trees on a regular outfit should make several practice trials beforehand around tented trees in order to determine what his length of pace is, and to regulate it, if necessary. While pacing around a tree the reading of the line running over the top can also be taken, thus obtaining both dimensions at once.

Thus I have shown you an entirely practical way of obtaining the dimensions of trees in the field; a way in which no other apparatus is required than a marked tent and a man. I have already stated that from these two dimensions we can calculate the volume of trees, which affords us a basis for determining the dosage. To facilitate work in the field calculation tables of some kind are required. I will explain to you shortly a table which I have prepared to meet this requirement, and the fundamentals on which this table is based.

The Leakage of Gas.—We know that for uniform work trees must be dosed in proportion to their contents. If we were using great air-tight boxes for fumigating citrus trees, we know that such a box containing 2,000 cubic feet would require twice as much cyanide as one containing 1,000 cubic feet, and twenty times as much as for one containing 100 cubic feet. This same principle holds good in general with the present character of fumigation tents, but there is another factor which enters into this latter case, and must be taken into consideration along with the volume; a factor which, to my knowledge, has been considered in only one instance by all the writers on California fumigation, and that in a recent table by Professor Woodworth of the State University. Trees dosed directly in proportion to their contents, without regard to leakage of gas, results in irregular work. In using the present kind of fumigation tents, trees are usually covered for one hour. At the end of that period the gas has usually all escaped, or, at most, very little remains under the tent. The condition of the atmosphere modifies this

escape of gas to some extent. I will now bring before you a fact showing that gas escapes faster from small trees than from large, which fact must be taken into consideration in the preparation of a dosage table.

Table of Leakage of Gas.

Dimensions of Tree. Around—Over.	Contents or Volume of Tented Tree.	Exposed Surface of Tent.	Ratio of Leakage Surface to Volume.
20 x 12 ft.	99 cu. ft.	85 sq. ft.	.86
30 x 19	364	205	.56
40 x 28	1040	420	.40
50 x 36	2147	675	.31
60 x 44	3819	995	.26
70 x 54	6605	1445	.22

In the first column is given the dimensions of trees which for our purpose we will suppose to be covered with tents. In the second column the contents or volume of the tented trees is given; in the third the exposed surface of the tent, while in the last column we have the ratio of the leakage surface to the contents of the tree, which gives us the information we desire.

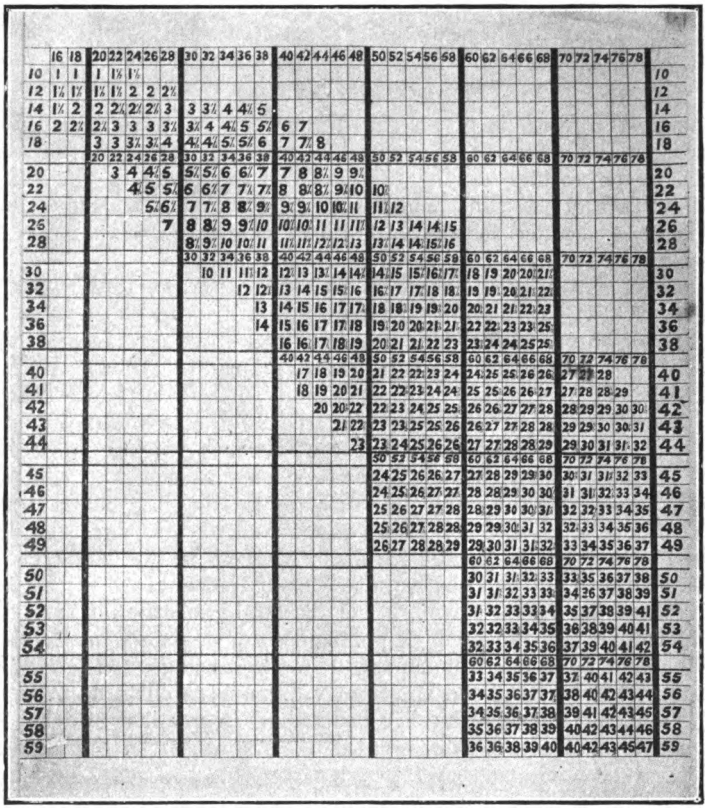
Let us look through this table to feel sure that we understand what it means. We will take the first tree, 20 feet around by 12 over, which represents a volume of 99 cubic feet and has 89 square feet of exposed surface of tent. The ratio of leakage surface to volume is .86. In other words, for each cubic foot of volume in the tent there is .86 of a square foot of tent surface. In the tree 70 feet around by 54 over, there is but .22 of a square foot of tent surface to each cubic foot of volume. Suppose that these tented trees were gassed, and that all the gas would escape through the tent in a given time. For the first tree, 20 by 12, there would be .86 of a square foot of tent surface for each cubic foot of volume to escape through, whereas in the last tree, 70 by 54, there would be but .22 of a square foot of tent surface for each cubic foot of volume to escape through. This would mean that there would be about four times as much opportunity for leakage, or the leakage would be about four times more rapid in the small as in the large tree. This state of affairs has been frequently demonstrated to us in the field, one very striking example having been cited in my last address before this Convention in some experimental work against the purple scale.

Dosage-schedule.—Some of the citrus growers in southern California in the section about Whittier desired to have their groves fumigated during last July, at a time when the fruit was of small size. I was requested to determine what dosage could be used at that time without injury to the fruit. An extensive series of experiments demonstrated that trees from about 10 to 15 feet high could stand a strength of an ounce to the hundred cubic feet without injuring fruit which had attained fully an inch in diameter, or, roughly speaking, about the size of a walnut. Smaller trees would stand a greater strength. As this was the limited dosage which could be used at that time without burning, I prepared a schedule based on this data. A tree 40 feet around by 28 feet over (which would be about 10 feet tall) was taken as a basis.

After determining its contents, it was dosed at the rate of an ounce to the hundred cubic feet. I then worked out the contents of another tree, and also determined its leakage ratio after the manner shown in the previous discussion of the leakage of gas. In determining the dosage for this second tree, I based it at the rate of an ounce to the hundred cubic feet, as done for the first tree, but also took into consideration its leakage rate, as compared with that of the 40 by 28 tree. The result was that if the tree was smaller the actual dosage was

Distance around tree.

Distance over tree.



Dosage-schedule No. 1.

increased; if larger, it was decreased, and in all cases by just enough to offset the difference in leakage between the two trees. This process was carried out for a large series, after which a chart was made, and the dosages placed in it. The result is this schedule shown herewith, which I call Dosage-schedule No. 1, by reason of the type or basic tree having been dosed at the rate of an ounce to the hundred cubic feet.

This schedule is one of uniformity. Based, as it is, on the proper assumptions, we would expect the same percentage of killing from whatever portion of the chart is put to use, whether for small trees or

for large. I do not contend, however, that this chart is perfect to the small fraction of an ounce for every dosage, but I have held ever since its preparation that it was sufficiently accurate to obtain uniform results in practical fieldwork.

I have had people tell me that I am a theorist; that my dosage schedule, as colloquially stated, "would not hold water when put to a practical test." As I have already shown you, the dosage table was founded on facts, not theories. Let us now look at the practical side. This schedule has been used in fieldwork this season in fumigating thousands of trees, probably in excess of a hundred thousand. Very extensive experiments have also been carried on by us in thoroughly testing it. The past three weeks have been largely employed in examining these results, and we have found after exhaustive examination that this table does as good work on the smallest trees as on the largest, and vice versa. To those critics of biased opinion I would say that this schedule is no longer a so-called theory of paper value, but a schedule of demonstrated facts.

The row of numbers at the top of the chart represents the distance around the tree in feet. The vertical columns to the right and left represent the distance over the tent in feet. The dosage for a tree of given dimensions is found where the lines running from these dimensions intersect. Thus it can be seen that in practical fieldwork, as soon as we determine the distance around and over the tent, a glance at this table will give us the dosage required.

This dosage-schedule No. 1 was prepared for use against the purple scale in the coastal region at a time while the fruit was small. Its continued use during the present season has shown that it is very close to the maximum strength that could be used throughout the fall in the coastal section of southern California without more or less injury to the fruit, due to the changing conditions of the atmosphere. There occur periods, however, during which double this dosage can be used without injury. Then some varieties of citrus fruits are more susceptible to injury than others. Among the varieties most susceptible to injury may be classed the Homosassa, the St. Michael, and the Mediterranean Sweet. So far as I have been able to observe, this strength dosage will cause burning with the two former varieties under the most favorable conditions.

As this dosage-schedule No. 1 is one of uniformity, it can be manipulated in any manner desired. This schedule is not only available for the purple scale, but can be used for any other scale. Although of a fixed and definite strength in itself, it readily allows of an increase or decrease in strength to meet any and all dosage requirements. If a person in fumigating for the black scale or some other particular insect desires to use a strength one fourth or one half less than that given in schedule No. 1, he can secure such a dosage strength by decreasing each dosage given in chart I by one fourth or one half of itself. If he desires a strength one fourth or one half greater than schedule No. 1 he can secure such a dosage strength by increasing each dosage in chart I by one fourth or one half of itself. The chart can be increased or decreased in any proportion desired, and so long as each dosage in chart I is increased or decreased in that same proportion, the resulting chart will be one of uniformity exactly as is the original one.

Procedure.—In fumigating under this system it is advisable to have a commissary of such character as will allow the measuring of the dosage at the tree. A two-wheeled push-cart equipped with convenient receptacles for holding the chemicals has been found most satisfactory for general use.

To properly carry on fumigation under this system five men are required, two tent pullers, one man to estimate the trees, and two to measure the chemicals and dose the tree. In actual fieldwork, after the tent pullers have commenced pulling the tents on to a row of trees, the commissary cart is brought up to the first tree of the row. The estimater paces around the tree, securing the distance around and the distance over. He determines the dosage from one of my schedules, which he carries. The two commissary men measure out the chemicals and dose the tree, after which the cart is moved on to the next tree. Meanwhile, the estimater has proceeded to the second tree, taken its measurements, obtained its dosage, and also has the generator jar in readiness by the time the commissary is brought up. The second tree is then dosed. In like manner the procedure is continued until the entire row has been dosed. Complete sets of 32 tents are covered and dosed in from 40 to 45 minutes. As tents remain on the trees one hour, the operation is sufficiently rapid for practical work.

Advantages of Improved Procedure.—This system of fumigation which I have been installing in southern California has many advantages for its recommendation. In the first place, it does away with all the errors due to guesswork in estimation, on which, as I have shown you in the first part of this address, the present system is entirely based. The general result is more efficient work and the saving of much cyanide and acid. Uniform results are secured. If we use a dosage of sufficient strength to destroy 90 per cent of the insects on the tree, we may expect that 90 per cent will be destroyed on all the trees, not 90 per cent on some and 50 per cent more or less on others, as occurs under the present system of guesswork.

The dosage is obtained at each tree, and the chemicals are accurately measured out at the tree, using them in the proportion of one liquid ounce of acid and three of water to each ounce of cyanide. Thus every tree receives the chemicals meant for it, and in the proper proportions, which eliminates the further irregular work under the present guess system, due to the several guesses of the amount of water, the mixing of cans, etc.

Another important point corrected under this improved system is that all trees receive the same length of exposure. Under the old system the tent pullers frequently hasten through the row, sometimes getting as much as ten minutes or more ahead of the generator man by the time the end of the row is reached. By reason of this condition of affairs the last trees in a set receive a much shorter length of exposure than the first ones. This new procedure places such requirements on the tent pullers that they are seldom more than one or two trees ahead of the commissary cart, thus avoiding another of the old faults.

In the introduction of an improved procedure in fumigation there are more conditions which have to be satisfied than one would at first realize. The accomplishment of such a task is in no way a chance hap-

pening, but rather follows only after hard and persistent effort. In my work I have been placed between three more or less opposing forces, the fruit-grower, the fumigation contractor, and the fumigation crew. The former requires the best possible work at the least possible expense. He does not care how it is done, as long as these two conditions are satisfied. The contractor demands that he secure as much profit as he ever did. He also knows that it is to his interest to satisfy the grower by doing the best work of which he is able. The fumigation crew desire as large wages as they can secure, and at the same time that the work be as easy as possible. The system which I have put into operation has met all these various requirements as closely, I believe, as is possible under any system. Although the apparent cost to the grower is usually some in excess of the old way, he is entirely satisfied by reason of the better results secured. The contractor gets his commission and also satisfies the grower. In the fumigation crew the estimater can be set aside, for he is not needed as in the old way. The generator man has exchanged the heavy burden of a tray, under which he has struggled in the past, to assisting in pulling the commissary cart. Generator men who have worked for years under the old tray system tell me with entire accord, after having tried the new way, that they prefer it. The only men who could possibly complain are the tent pullers. They are required to kick in the edges of the tent in addition to covering the trees.

In the section about Whittier, in which our headquarters are located, two practical outfits have been proceeding under this improved system since July, with the result that the majority of the growers have become so well satisfied with the new way that they will have their work done in no other manner. To have a new practice received heartily by practical growers readily demonstrates its practicability and economics.

Results Secured.—Careful examination of several commercial orchards fumigated with my dosage-schedule No. 1 under the improved system has shown that the dosage is of sufficient strength to destroy all the live insects and 98 per cent or above of the eggs of the purple scale on the leaves and branches in the open section near the coast. I have examined some orchards in which over 99 per cent of the eggs were destroyed.

Eradication of the purple scale on the leaves and branches requires a dosage of between one fourth and one half more than schedule No. 1. For absolute safety in eradication, I recommend this dosage schedule increased one half. The trees, however, are not in a condition at all times to stand this excess dosage, besides there are several other considerations to be taken into account before its recommendation. Destruction of the scale on the fruit requires a heavier dosage than on the leaves and branches. If possible, it is advisable to remove the scaly fruit before or immediately after fumigation.

One season's fumigation with the schedule now used will leave a purple scale infested orchard in fairly clean condition. If this practice is repeated the second year, I am inclined to believe, figuring from the character of work done this season, that many orchards can escape fumigation on the third year, and possibly on almost every other year thereafter. To look for complete eradication of the purple scale from

any large citrus district at present severely infested, is, in my mind, a very remote accomplishment.

As to the dosage for red, yellow, and black scale, I would say that I have not as yet found the time to determine the required dosage for these. Frequently, I am asked regarding a dosage for the red scale, so I might say a word on this point. I discontinued examining the results of some experiments which we had performed against the red scale to prepare this address. If I was compelled to state what I believed to be the most suitable dosage to use for the red scale from my present knowledge, I would be inclined to place forward dosage-schedule No. 1. Let it be understood, however, that I do not say that this *is* the most suitable dosage to use. Experiments might show that the most economical dosage-rate is a little less or a little more. My examinations so far in this particular experiment show that excellent work was done with the proposed schedule No. 1. Other fumigators who have used this schedule against the red scale have gone so far as to state that it has killed all the insects.

Conclusion.—I have been asked to state how the fruit-grower can get most out of this work which we have been doing, and how to enforce the application of better methods. I am of the opinion that no person of unbiased mind can fail to see the advantages in economy and various other details of this new method of procedure over the slipshod method now generally resorted to. It has been a favorite accomplishment of many practical fumigators to veil their operations in mysticism, whereby they could secure a reputation of being authorities of a practice which they would make appear complicated and difficult of understanding. The fact that this new system is entirely mechanical, and shows how simple the process of fumigation is—that a careful man of no knowledge of fumigation whatever, can after a couple of hours' practice do better work than a man under the old way who has been at the business all of his lifetime, usually does not leave these men in the pleasantest of spirits toward the new innovation. And no blame can be placed on these men, for we would probably feel the same if we were placed under similar circumstances. The new system will not be adopted universally until it is demanded by the fruit-growers and encouraged by the horticultural officers. The fumigation contractor sees no advantage in its use for him, hence his efforts and assistance can be little counted on; in some instances they are more likely to be an impediment.

One decided advantage is that the fruit-grower is no longer entirely dependent on practical fumigators for carrying out his work. Large orchardists, citrus associations, or communities can obtain outfits, and, after breaking in their men for a few hours, are enabled to do as good work as anybody. Careful and conscientious workers is the one requisite above all others. Experience is unnecessary, as the procedure is entirely mechanical.

PRESIDENT JEFFREY. The reason I asked for this paper from the Bureau of Entomology was that fumigation in northern California is coming to the front. Spraying in northern California is going to reach immense proportions, but fumigation will have to be resorted to

in some instances. They are fumigating now in Fair Oaks for the black scale on the olive. Fumigation in the north is already a necessity. They are planting a large grove of oranges at Orland, 600 miles from the lower citrus extremity, and I want to state in lieu of the discussion that I find that is an absolute necessity now in some parts of northern California. I now have the pleasure of introducing Mr. W. I. Newcomb of Sonoma, who will read a paper on the drying of apples.

THE EVAPORATION OF APPLES.

By W. I. NEWCOMB.

The disposition of fruit not suitable for green shipment, or for canning purposes, has, and always will be more or less of a problem for the fruit-grower. In these days when the market calls more and more for better quality, the apple-grower finds, after his best packing fruit is sold, still much fruit on his hands to dispose of—windfalls, that bruised in packing, and small sizes. This amount is largely dependent upon the thoroughness of the spraying methods employed, the season, and the pruning and thinning work done.

While evaporated apples to-day are a by-product of our orchards, a glimpse at the early history of the business in Sonoma County shows that it was to provide a market for the product of the orchards that were put out by the first settlers. The early pioneers were quick to recognize in the cool coast summers a suitable climate for the apple. Every home had its three or four acres, and some as many as thirty, planted with a multitude of varieties. The fruit of these young orchards, which yielded so abundantly, was often allowed to go to waste for lack of proper market facilities.

In 1874 the late W. J. Hunt bought an Alden evaporator that was shipped out from New York. This was an expensive, cumbersome machine to operate, being sixty trays high and requiring three floors, the fruit being elevated the entire height by chain pulleys on the side. Owing to the cost of operation, Mr. Hunt did not run it again until 1876, when he made another attempt, putting up the fruit in two-pound cartons. The press to pack these packages cost $130. Although the fruit sold for 25 cents per pound, the venture did not show a profit, and the machine was never used again. However, the price obtained for the fruit was an incentive for further effort by Mr. Hunt and others. By 1879 and 1880 Santa Rosa had two, and Petaluma, Bloomfield, and Sebastopol each had one large dryer where the farmers sold their apples by the ton, hauling them in some instances ten or twelve miles. But these long hauls of fruit, which when ready for market, were only about one seventh of the weight delivered, soon opened the eyes of the apple men to the advantages of operating on a smaller scale at home. By 1885 a number of dryers, as they are called, were built throughout the apple section, and to-day we have 100 or more scattered about the coast hills of western Sonoma.

The Chinamen were quick to "catch on" to this kind of work. Their habits of rigid economy and thrift soon put the evaporated apple output in their hands, usually working the fruit on a share basis. But the Chinaman's thrift and economy often prompted him to apply too much

moisture to his apples to make them pack easy. His horror of waste kept him from "trimming" as he should have done, and he was apt to put in inferior fruit, consequently "China" apples became a trade term. Now, the Chinamen are getting old and not much account. The Japanese and Hindus have not taken up this kind of work. Our own young people, however, are becoming very proficient in the art, together with the packing of the green fruit, the two operations going hand in hand. This pleasant occupation furnishes employment to many for four or five months in the summer and fall, and is helping us to solve some of the problems of "Our Country Life."

The dryers we have about the country are cheaply constructed as far as the building is concerned on account of fire liability. Scarcely a season passes without two or three of these buildings going up in smoke, consequently few insurance companies care to handle this class of risks. What do charge from 5 to 7 per cent.

Our dryers are nearly all built on the same plan, the upright, two trays wide, and from twelve to fifteen trays high, being the style settled on as being the cheapest and most easily operated. The size of the tray is a personal preference. Usually sloping ground is preferred for a site, in order to get the fire box or furnace low down, to prevent the scorching of fruit. The upper side will then be more convenient for unloading the green fruit from the orchard truck or wagon. The furnace is enclosed within brick walls, on which the evaporator is set. These walls should be high enough to give from four to seven feet of air space between the top of the furnace and the bottom tray. Connected with the furnace is a double run of pipes, making a double turn the length of the evaporator. These are to prevent loss of heat. Usually a large drum is connected with the pipes at the back to further hold the heat. The evaporator is made of matched lumber, constructed in "runs" the size of the trays. A ventilator projects from the evaporator through the roof of the building to carry away the moisture in the air. This hot air draft is furnished by cold air ventilators, through openings in the brick walls about a foot square at the ground level. It is more convenient to have the sides of the evaporator all doors for convenience in putting in and taking out the fruit. On one side of the evaporator is a room for receiving the dried fruit, on the other a larger one for receiving the apples, peeling, and placing them on the trays. This work is usually done by a man or stout boy to run the peeler, and one or two girls or women to "trim" and "spread" the fruit on the trays. After the apples are placed on the tray they are put in the sulphur box and exposed to the fumes of burning sulphur to preserve the natural color of the apple. This exposure requires from twenty to forty minutes, according to the variety of apple. The earlier and more open grained apple requiring less, while the hard late apple takes more time. When Ruling No. 76 of the Pure Food Law was announced last year, the apple men came in for their share of consternation, but tests soon proved that apples contained less than one half of the sulphur dioxide allowed under the law. As taken from the sulphur box it contains two or three times the amount allowed, but from 75 to 90 per cent passes off in the process of evaporation. From the sulphur box the trays are placed in the evaporator and heat applied. It is possible to fill and get dry the capacity of the dryer each day by some firing a part

of the night. After the fruit is dry it is taken out and the trays emptied in the packing room, where it is packed or sold or removed for safety.

About 100 pounds per day for each person employed is an average day's work. One crew of seven this fall put out 1,060 pounds in ten hours, two "peelers," four "spreaders," and one dryer tender. From one and one half to two cords of four-foot pine wood is required to evaporate one ton of dried fruit, and from five to eight pounds of sulphur. Two and one half cents is about the average cost of drying and packing in fifty-pound boxes, which is the standard package, although some markets, Germany for instance, prefer the twenty-five-pound box. Some ten, five, and one-pound boxes are put out. It would seem that retail trade would be stimulated by small packages of more attractive fruit. The buyers continually deplore the quality of our fruit, and suggest Government inspection as a remedy. This might be accomplished under the Pure Food Law. The shrinkage is generally estimated at about seven to one, early varieties shrinking more and the late less. By actual weight, 100 pounds of windfall Baldwins gave 16 pounds of dried fruit, the shrinkage being 6¼ to 1. Of the 100 pounds, 28 pounds went into the peeling, core, and scrap box, leaving 72 pounds for evaporation, showing a shrinkage of the prepared fruit of 4½ to 1. This quite large percentage of waste can be utilized by sun-drying, there being a small market for this product at the jelly factories, prices ranging from $15 to $25 per ton. But a better way is to feed it directly to hogs, as the seeds are quite nutritious and make a very good stock hog feed. Hogs weighing 100 pounds or more thrive better on this diet. Hard grain can not be fed with the peelings, as the hogs get tender teeth.

This year Sonoma County will turn out about four million pounds, Watsonville district two and one half million pounds, Mendocino and other districts enough to make eight million pounds.

Germany takes some of our apples, but the most are consumed in our own country. Alaska takes a part, as do the Rocky Mountain and Middle West points. Texas, too, is a large buyer, as is also Uncle Sam, for his army and navy and Indian reservations. New York State being the largest producer of evaporated apples, largely controls the market price.

Apples are quoted fancy, choice, standard, and prime, with a variation of two to three cents per pound on the extremes. It is claimed that our choice sell on a par with the New York standards. As our output is rapidly increasing, we will have to look more to the quality of our fruit. Some day the American people will awake to the fact that the best returns are not always obtained by the maximum of production. (Applause.)

MR. ANDERSON. I would like to ask Mr. Newcomb what is the average market price for this product?

MR. NEWCOMB. It fluctuates a great deal.

MR. ANDERSON. But the average, say for five years?

MR. NEWCOMB. This year we are getting 5 and 5½ cents, and last year we got 8 and 10, and in some cases as high as 11 cents, but if we get 5 cents we feel that we have not lost any money; if we get 6 cents

we have done fairly well, and if we get 6½ or 7 it is a very paying proposition.

PRESIDENT JEFFREY. We have here Mr. W. M. Bowen of Los Angeles, who has a scheme which will be of direct advantage to every fruit-grower in California, and I am going to ask Mr. Bowen to speak a few minutes on this matter.

MR. BOWEN. Mr. Chairman, ladies and gentlemen: I did not expect when I came to Sacramento to have the privilege of talking to this Convention, because I did not know that it was going to be in session, but I came up here upon a matter that I believe is of vital interest to every one of you gentlemen. In laying the matter before your leader here he stated that this was a very proper and appropriate time and place to make some suggestions, that it might get out over the State and out among the people who are interested in this matter. I attended the Convention last night, and was very much interested in the plans and in the information that I received at that time concerning the product and the handling of the product and the handling of the difficulties that you have to meet. Now, that is all well and good, and is a very important part of the business; but there is another phase of it that is equally as important, as was suggested by this gentleman over here who answered as to the price of the product that was turned out, and that is a market for your products.

The State of California has, inside of the limits of the city of Los Angeles, 110 acres of land belonging to the State, that is worth to-day a million dollars. I am from Los Angeles, but I am modest, and I am not going to overstate things. The property is limited in the purposes and objects for which it may be used by the trust deed that was made in 1880, by which and through which the State acquired title to this property. It is our purpose and intention to erect an exposition building upon this ground in the near future for the purpose of maintaining a permanent exhibit of the industries of this State by the respective counties. Primarily, the property is set apart for that particular purpose of encouraging and promoting the different industries of the State, and we are going to ask the State Legislature for an appropriation for the construction of a building there, and when it is constructed will invite every county in the State, free of expense, except a small expense of taking care of their own exhibit in their own way, if they see fit; but so far as any other expenses are concerned, entirely free of every expense to every county in the State to maintain the most splendid exhibit that they possibly can. I think that that would appeal to you representatives of the great industries of this State as being a very advantageous thing, for the reason that there are thousands of people that visit southern California who never see the balance of this magnificent State or become familiar with our industries and our wonderful products. If a scheme of this kind was kept on foot it would be so attractive that every person from the East visiting Los Angeles would visit this exposition, and there absorb all of the information and knowledge that each one of the counties saw fit to give them, and seeing the beauties of their products, the fertility of their soil, and the wonderful products that we turn out in every county in this State, it would induce

them to select any county that struck their fancy, whether interested in mining, fruit-growing, stock-raising or other of our varied and wonderful resources here; and anything that would appeal to them in a special line they would have the information, the data in their hands at once, and would know what county to go to seek out this information and locate and engage in like industries. Now, that is the plan and the scheme that we have on foot. The Chamber of Commerce of Los Angeles County maintains a splendid exhibit. The matter has been taken up with them. By the way, there are several counties that are maintaining at quite an expense an exhibit at our Chamber of Commerce now, but the room is so limited that it is impossible to accommodate but very few, and very scantily at that, but the idea of this will be to have ample space for every county in the State to maintain a separate permanent exhibit, and the Chamber of Commerce of Los Angeles is heartily in accord with this plan, and would be glad to have every county in the State vie with every other county in making one of the most splendid exhibits of our products there that is possible. The land is limited to uses and purposes of this kind, can be used for no other purpose, and it is the object and intention and purpose, when this building is erected, to improve the balance of it with possibly other State buildings along the same line and for the purpose of showing the resources of our State, and then beautify the balance of it so that it will be an exhibit that every tourist that comes to the State will want to see before he leaves. The idea, also, is to construct a building entirely, if possible, out of California products; to not go out of the State for anything that is possible to get within the State, making it a monument itself to the object and purposes which we seek to promulgate.

If this matter meets with your approval as representatives of the great fruit industry of this State, we should be glad to have your coöperation and assistance, through your representatives in the Legislature and through your boards of supervisors in carrying out this project, because we believe, with the outlook for the future for Los Angeles as a great metropolis, as a great center, that it will be one of the greatest and grandest opportunities that this State has ever had or ever will have to embark upon a perfectly sane and legitimate advertising or educational—I would make it more an educational institution—of educating people who come here and who want to learn the resources of our State, to be able to get it, and get it with very little expense, and to get a bird's-eye view of the situation with reference to the industries of the entire State. If this meets with your approval, we should be glad to have your coöperation and assistance in carrying this out and making it a success, because it can only be made a success in the event the different counties of the State take hold of it and make use of it, in the event we are successful in launching it, and your success means our success, and there is no part of the State than can succeed or grow any, whether it be the farthest north or the farthest south, unless other counties grow with it. So in this matter we would be working all together for one common purpose and one common aim, and that is the upbuilding of the State, the encouragement of the different industries, and the drawing of the class of people here that we desire to become part of us and infusing an information and knowledge that we so much

lack. If the people of the East knew of the opportunities, of the resources that lie within the boundaries of California, you would not see these vast fields between here and the southland being simply plowed up with six and eight-mule teams; you would see them dotted with homes, all improved and making incomes. That is what we want, and what we will have when the people on the outside understand the resources we have here, and what we have really got that people want. (Applause.)

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

PRESIDENT JEFFREY. Mr. Frank Femmons, who was to present a paper, wrote me a letter recently. He is an elderly man, one of the old pioneers, and one of the best hearted men in the State of California. He wrote that he found it impossible to attend the Convention, owing to his age and other circumstances. He sent in a paper, according to promise, which will be read Friday and printed in the records of the meeting. That leaves us without anything for that particular number. Through some mistake of somebody, between my office and the Department of Agriculture, Professor Swingle was left off the programme. He is engaged in a new work in this State, a work that may be of vast importance to the people of northern California. If there is no objection, Mr. Swingle will make a short statement regarding the caprification of the fig and what the United States Government is doing at this time to make it possible to raise perfect figs throughout the State of California. It is a new thing to all of you. His announcements will be new and interesting and valuable. I will ask Mr. Swingle to come forward.

THE MASLIN SEEDLING FIG ORCHARD AT LOOMIS, CALIFORNIA, AND ITS BEARING ON THE SMYRNA FIG INDUSTRY OF THIS COUNTRY.

By WALTER T. SWINGLE,

Physiologist in Charge of Plant Life History Investigations, U. S. Department of Agriculture.

I had the pleasure of presenting to the Thirty-fourth Fruit-Growers' Convention, held at Riverside last spring, a paper* on the history of the caprification of the fig, in which I referred to interesting new varieties of caprifigs that have originated in the seedling fig orchard planted by Mr. E. W. Maslin at Loomis, Placer County, California, some quarter of a century ago.

*Some Points in the History of Caprification and in the Life History of the Fig. By Walter T. Swingle. In the official report of the Thirty-fourth Fruit-Growers' Convention of the State of California, held at Riverside, California, April 28 to May 1, 1908, pp. 178-187. Sacramento, Cal., 1908.

Since then I have spent some time investigating this remarkable fig orchard, and it is my purpose to give you briefly the principal results of this study.

The Planting of the Maslin Fig Orchard.—In 1885, when Mr. Maslin first started out to grow Smyrna figs from seeds, true Smyrna figs of the standard variety, Lob Ingir, had been growing in California for five years, the cuttings having been introduced by Mr. G. P. Rixford for the San Francisco Bulletin, through Consul E. J. Smithers of Smyrna. These trees had borne no fruit, and many believed that the Smyrniots had not sent the regular Smyrna fig at all, but had maliciously substituted some sterile and worthless variety. It was while the matter was in this state that Mr. Maslin resolved to grow some true Smyrna figs from seed. We now know that the failure of the Bulletin Smyrna fig trees to bear fruit was due to the absence of the Blastophaga, or fig insect, but in 1885 the need for caprification was not recognized by any one except Dr. Gustav Eisen.

Mr. Maslin gave an account of the planting of this orchard in a paper read before the twelfth session of the California State Fruit-Growers' Convention at Fresno, California, November 5, 1889, and I can not do better than quote those portions of his article giving the history of the plantation up to 1889:

In the spring of 1885 I bought in San Francisco a box of the largest Smyrna figs I could find, and sowed the seeds in a hotbed, letting the growth remain until 1888, when the trees were planted on a hillside in deep, warm granite soil. They made a wonderful growth, the trunks being from four to six inches in diameter, and the trees ten to fifteen feet high. They have never been irrigated, but have been cultivated. They have borne this year an abundance of fruit, while it remains on the trees not matured. The figs are about the size of a pigeon's egg, the receptacle well filled with flowers, but so far I have not observed any seeds. My impression is that the forces of the trees have been expended in making wood instead of fruit.

Determined to have the best fig in the country, I wrote, in January, 1886, to H. K. Thurber, of New York, one of the leading importing merchants in the United States, requesting him to obtain for me a box of the very best Smyrna figs, telling him my purpose. He replied as follows:

NEW YORK, February 1, 1886.

The best grades of Smyrna figs are sometimes described as "Eleme," "Imperial," "Choice Layers," or "London Layers." I have ordered sent to you a box of "Imperial," which are the best in the market. There is no charge for them. I should be only too glad if in your wonderful soil and climate you should successfully raise a fig equal to the Smyrna fig.

Very respectfully yours,

H. K. THURBER.

The seeds of these figs I sowed in a hothouse; fully a month elapsed before there was a sign of growth. Later in the spring of 1886 the young trees were transplanted to a nursery and planted in rows two feet apart and eight inches apart in the rows, and immediately covered with straw to shield them from the sun. They received no irrigation. In the spring of 1887 they were set out in orchard twenty-five feet apart, hexagon or triangular form. They were allowed to grow as many branches and trunks as came, for the purpose of inducing extensive root growth. In the spring of 1888 they were cut down close to the ground, and of the sprouts which came, one, the strongest, was selected, and the others removed. As the stem or trunk grew, the lateral branches were pinched back, but not removed; pinched only that the stocky growth might shade the trunk, and not allowed to grow, that the forces of the sap might be concentrated to make a leading shoot and a stocky trunk. * * *

These trees bore fruit this year upon the wood growth of 1889. I have ten acres planted altogether, seven acres of the sowing of 1886, and three acres of the first sowing. The fruit did not drop, but remained on the trees until the late storm. A few days after the storm began, I found on four of the trees about a dozen perfectly ripe figs. They were about the size of a pigeon's egg, cuneate or wedge shape, but rather flatter than the White Adriatic, with a short stem. Their color was a lively yellow, the flesh amber, decidedly sweet. The other and immature fruit was well

packed with tissue, and except that it was green did not differ in appearance or shape from the ripe fig.

One fact to which I wish to call attention, and a very important one in relation to the necessity of caprification, is that the leaves of all the fig trees grown from the seed obtained from Mr. Thurber are identical in type. There is not the slightest indication of the cross-fertilization by the wild fig, such as wild or scraggling growth or difference in the color of the bark. The growth of the tree is very upright, and the color of the wood is the same. The small size of the ripe fruit I ascribe to the lateness of maturing and the growth of the tree. I have brought with me some of the leaves of the trees which bore the ripe figs, to which I invite your attention.

From his manuscript notes and orchard plots, kindly placed at my disposition by Mr. Maslin, I am enabled to supplement in a few particulars the account he published in 1889. In the first place, the seven-acre orchard planted with seedlings of the Thurber figs in quincunx was so severely injured by a very heavy pruning given in 1890 that it was abandoned, and all the trees are now dead. However, a tract of about an acre was planted in square with seedlings of the Thurber figs alongside of the two acres planted the previous year with seedlings grown from figs purchased in San Francisco. In all, 100 trees were planted in 1886 and 53 in 1887. Of these 153 seedlings, 147 are alive now and 139 are bearing trees.

Recent History of the Maslin Fig Orchard.—Mr. Maslin continued to take notes on these trees until the summer of 1891, by which time it had become apparent that these seedling trees would not yield edible figs in commercial quantities. This was because these figs are all of the Smyrna type, and require caprification in order to set fruit. Partly because of these expensive experiments, Mr. Maslin found his ranch unprofitable, and about this time disposed of it, no further care being given to the orchard for more than a decade. In 1893 Mr. Gustav Eisen found gall flowers and male flowers in the fruits of one of the Maslin seedlings, which must of course have been a caprifig. In the late autumn of 1899 I made my first visit to the orchard in company with Mr. Maslin, and in photographing the larger trees, noted the presence of a very promising caprifig, which has since proven to be one of the best in the orchard. In the spring of 1899 I had sent the Blastophaga from Algiers, which became established in Mr. Geo. C. Roeding's orchard at Fresno. A year or two later Mr. Roeding noticed the Maslin orchard from the car window, while riding through Loomis on the train. He then took steps to introduce the Blastophaga into the orchard, sending profichi full of insects ready to emerge to Mr. J. C. Mazal, whose father was then the tenant on the Maslin ranch. In examining the trees carefully a few days after the profichi had been suspended in the trees, Mr. Mazal was surprised to find that the *Blastophaga was already established* in the orchard, being found by him in two carpifig trees, both, curiously enough, bearing purple profichi, and the only two bearing purple fruit at this time. The Blastophaga were found by Mr. Mazal ready to issue in three profichi on the two trees, so, of course, they must have developed from eggs laid by the Blastophagas that entered in early spring, long before the profichi were sent from Fresno. Mr. J. C. Mazal is of the opinion that the Blastophaga reached the orchard from Mr. Van Lennep's place at Auburn, some 12 miles to the northeast, where the Blastophaga had been introduced the year previously. It has since been found that the Blastophaga is able to spread

to considerable distances, probably by being caught and carried by strong winds.*

As soon as the Blastophaga was introduced into the Maslin orchard it was seen that there were valuable caprifigs among the seedlings. Accordingly the chaparral, that at the time of my first visit in 1899 had nearly choked out some of the trees, was now cleared away, and the fig trees were pruned and cultivated by Mr. L. May, who had leased the ranch from November 1, 1903, on. Mr. Roeding sent a man to Loomis to attend to the packing and shipping of the profichi crop during the two seasons he rented the orchard from Mr. May. Considerable numbers of mamme, or winter generation caprifigs, were also sent to Fresno by Mr. May. During the past two summers the orchard has been rented to an Armenian, Mr. K. Arakelian, interested in fig culture at Fresno, and in 1908 no fewer than 452 boxes, each containing 20 pounds of caprifigs, were shipped from the Maslin orchard to Fresno. Of these, 21 boxes were mamme gathered in April, and the rest profichi harvested at the end of June or early in July.

Maslin Fig Orchard Leased by the Department of Agriculture.—As a result of an investigation made in the spring of 1908, I found that exorbitant prices were being charged for profichi and mamme, and many fig-growers had become doubtful as to the possibility of ever growing an adequate supply of Blastophaga on their own places, because of rumors as to the dependence being placed on imported caprifigs by the Fresno growers. If the part played by the Maslin seedling fig orchard had been explained publicly by those who knew about it, there would probably have been no such deep-seated distrust aroused. As it was, I found many of the growers were discouraged, and some had even dug up orchards of Smyrna figs just coming into bearing, because they were uncertain as to ever being able to get profichi when they needed them to caprify their trees, or without paying exorbitant prices.

This being the state of affairs, it was decided by the Bureau of Plant Industry to lease the Maslin seedling fig orchard and place it at the disposal of the Smyrna fig-growers of this country. This was accomplished largely through the good offices of Mr. Andrew Ryder of Loomis, and since November 1, 1908, the orchard has been in the possession of the Department of Agriculture.

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*Since preparing the paper, I have received a letter from Mr. Van Lennep that throws some light on the history of the introduction of the Blastophaga into the Maslin orchard at Loomis. The part of the letter concerning this matter is as follows:

AUBURN, CALIFORNIA, January 18, 1909.

Mr. Walter T. Swingle, Monterey, California:

DEAR SIR: Your letter of January 7th is before me. The capri figs containing Blastophaga were sent me by Mr. Geo. C. Roeding in April, 1901, since which time they have been established here.

Possibly those found by Mr. Mazal before receiving from Mr. Roeding were blown from here, as we know they have been carried in that direction half that distance to trees taken from our nursery.

My [capri fig] trees were from cuttings sent me from Smyrna by my brother, Reinhard Van Lennep, Dutch Consul in Smyrna (my native city), in the spring of 1884.

For years they set abundance of fruit, but would fall to the ground at a certain size, as did also the Erbili, until the insect was obtained.

Yours respectfully,

(Signed) DAVID VAN LENNEP.

Valuable New Varieties of Figs and Caprifigs Found in the Maslin Orchard.—In August, 1906, Prof. S. C. Mason of the Bureau of Plant Industry had found very promising Smyrna figs among the seedlings, and at his request Mr. Ryder cured a few sample figs from half a dozen of the best trees in September, 1906. I was very much impressed with the quality of some of these dried figs, and in September, 1908, I made a trip to Loomis to be able to see these figs in the fresh state, and to make observations on the possibility of curing them on a commercial scale. Mr. G. P. Rixford very kindly gave me the benefit of his experience by looking over with me the new varieties found in the Maslin orchard. Of the 139 trees in bearing, 74, or slightly over half, are caprifigs, and 65 are Smyrna figs. A number of these edible figs are very promising new varieties. At least one in ten of these figs is worthy of careful trial with a view to commercial culture, and at least two, and possibly more of them, show a very valuable characteristic not known in any fig of the Smyrna type now cultivated—the fruits become sealed automatically as they ripen.

The Rixford Self-Sealing Fig.—The best studied of these self-sealing varieties I have named the Rixford, in honor of Mr. G. P. Rixford, who first introduced Smyrna figs and caprifigs into California. It is a medium-sized, thin-skinned fig, with light amber-colored pulp of good flavor. As it ripens a drop of pellucid gum gradually hardens in the mouth of the fig, effectually sealing it against filth, beetles, and all other insects. This variety does not sour, because the germs that cause fermentation can not effect an entrance. The tree is very fruitful, and is of immense size; 2,600 cuttings were taken from it in the fall of 1908 without crippling it seriously. These cuttings are available for free distribution throughout the country, as will be explained below.

Another self-sealing variety was discovered on October 20, 1908, by Mr. A. H. Brydges of Loomis, because its fruits had withstood without injury two soaking rains that had ruined the fruits of all other varieties growing in this part of the orchard.

The Maslin Orchard a Capital Breeding Place for Blastophaga.—Probably the greatest value of the Maslin orchard lies in the fine assortment of caprifigs it contains. A score or more of these caprifigs are valuable for planting in Smyrna fig orchards to provide a breeding place for the Blastophaga. Some of the new caprifigs are valuable because of their large profichi full of insects and pollen; others, as was noted in my paper read at the Riverside meeting last spring, because they support the fig insects in midsummer, when few can find lodgment on the ordinary varieties of caprifigs; still others are of value in producing mamme very late in spring, when they are very useful in infecting profichi buds that push late. All of these varieties are available for free distribution on the same terms as the new fig.

It may be readily imagined what a splendid breeding place for Blastophaga is made by the Maslin orchard, containing, as it does, 74 different varieties of caprifigs, and being the largest caprifig plantation known in the world.

Distribution of Young Seedling Figs by the Department of Agriculture.—In view of the remarkably large proportion of valuable figs and caprifigs that have been found among the seedlings planted by Mr.

Maslin, it becomes evident that the Lob Ingir (Bulletin Smyrna, Commercial Smyrna, Calimyrna) fig is not a highly bred variety, but is, doubtless, merely a chance seedling that originated in the Meander Valley in Asia Minor perhaps many hundreds of years ago. The foothills in the vicinity of Aidin have been celebrated for the high quality of the figs they produce for at least 2,000 years.

The Bureau of Plant Industry has grown several thousand seedling figs from the best obtainable Smyrna figs, including the Lob Ingir and the Rixford varieties, and these one-year-old pot-grown trees are now available for free distribution to all who apply. In order to encourage the planting of seedling figs, and thereby the breeding of new varieties of figs and caprifigs especially well adapted to California conditions, the Department of Agriculture will give one cutting of a new fig or new caprifig from the Maslin orchard for every three seedling figs set out at least 25 by 8⅓ feet apart. Those who plant out seedling figs under these terms will be considered as coöperating in the fig breeding work of the Department, and will be preferred in the distribution of new varieties that may be originated in the experimental fig orchards of the Bureau of Plant Industry, besides receiving all publications on fig culture or fig varieties to be issued by the Bureau. Cuttings from the Maslin seedling fig orchard will be sent *only* to such coöperators.

Mamme and Profichi From the Maslin Orchard Placed at the Disposition of Fig-Growers.—One of the chief objects of the Department of Agriculture in leasing the Maslin orchard was to prevent anything like a corner in caprifigs. The mamme and profichi produced by the orchard will, for the present at least, be placed at the disposition of fig-growers who do not have enough profichi to caprify their own orchard, and who wish an additional supply for their own use and not for sale. So far as possible mamme will be sent in small boxes by mail free of all charges, but the profichi must be shipped by express, and the grower must arrange to gather them himself, or else pay the caretaker the actual cost of picking and packing. Coöperators who have planted out seedling figs will be preferred in the distribution of mamme and profichi.

Names of All Fig-Growers Desired by the Department of Agriculture.—A concise circular and a fuller bulletin are being prepared for distribution to fig-growers by the Bureau of Plant Industry. These publications will give detailed information as to how to grow caprifigs, and will explain fully how to secure the new figs and caprifigs as a bonus for planting seedling figs.

All fig-growers are therefore requested to send at once their names and full addresses to the Department of Agriculture in Washington, so they can be placed on the mailing lists to receive the circulars mentioned above.

Now, the reason I wish to speak to you is just this, that in view of the fact that the ranch is offered for sale, that it is leased for only a single year at a time, it was uncertain as to the future of this orchard, and the Department of Agriculture has taken over a lease of this seedling fig orchard, and will run it for the benefit of the fig-growers of California; that is to say, the cuttings of the valuable caprifigs will be distributed

to fig-growers under certain conditions, and those who need a supply of the fig insects will be furnished free of charge. Those who wish to use the caprifigs for caprifying their orchards can obtain them at the actual cost of picking, packing, and shipping. When I tell you that 452 boxes, weighing 20 pounds each, were shipped last season, you will realize that quite a large bulk is involved, too large a bulk for the Department to ship free of all charges; but for the growers who need these caprifigs for their own use, not for sale, they will be furnished at the actual cost of picking and packing.

Now, as to the condition under which the Government will do this. Years ago I was shown conclusively that it is necessary to maintain an abundant supply of fig insects that have an abundant assortment of male figs. It is not sufficient to buy one or two of the best caprifigs; that is, the largest insects and the most pollen; you must have those, too, but you must also have other varieties in which the insect can live throughout the other months of the year. Every fig grower should plant in his orchard a small caprifig orchard. They can be planted thickly, and he should have at least eight or ten varieties. We have been for years collecting in the old world cuttings of all the best known caprifigs. We have 65 varieties in the orchard at Loomis. These cuttings of capri trees will be distributed free to all growers throughout this State and other states upon application, upon this condition, that for every fig tree they receive they agree to plant out ten seedling fig trees, which the Department will furnish free of all cost. To tell you why I make this condition, it is to prevent the miscellaneous request for free trees with which we would be overwhelmed otherwise, and secondly, to encourage the planting of seedling fig trees. Mr. Rixford and I have been fortunate in having been able to make an investigation of the fig trees in Mr. Maslin's orchard, and we assume that at least 10 per cent of these figs are excellent new varieties of high value; that is, I mean edible figs. At least 10 per cent of the caprifigs are also very satisfactory varieties. So, in asking the grower to plant ten seedling trees, we are not asking him to throw his money away, but to carry on one step further the experiment Mr. Maslin made years ago, and I think you will find it interesting to watch these new varieties as they come into bearing. They can be planted rather thickly. I am making this announcement primarily to ask the fig growers in this State to send their names and addresses to Walter T. Swingle, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C., in order that they may receive circulars giving the exact conditions of this distribution, and explaining in detail why we are leasing this orchard.

Now, I want to ask the permission of the Chairman that Mr. Rixford explain something of the value of the variety of edible figs found in this orchard. I am not myself an expert on edible figs. I want to say just one word, which I am sure your Chairman will be interested in. Through chance we have secured the finest strain of the fig insect there is in the world. I say this because I visited the fig centers of the old world several times, and all through there the fig trees are infested by two fig insects, the Blastophaga, the true fig insect, and the Philotrypesis, which occupies a space that the fig insect should have occupied. In some places in North Africa I found that more than one half the insects were these worthless Philotrypesis, the messmate of the Blasto-

phaga, and the value in the old world is partly governed by the value of this insect. Fortunately, in California we have simon pure strain of Blastophaga. It has no parasite, and I wish to make this public announcement to discourage any further attempt to introduce new Blastophaga from the old world, an attempt fraught with the danger of introducing the Philotrypesis. We have countless millions of Blastophaga in the State. There is, of course, no earthly reason for reinforcing. I give this as a warning to not reimport the fig insect.

MR. ONSTADT. When were those insects introduced up here at Maslin's place?

MR. SWINGLE. They were introduced by Mr. Roeding, I think, in 1891. That is a few miles up the road. They were introduced a few years later to Mr. Maslin's place through Mr. Mazel, then the tenant, but in putting the insect on the trees Mr. Mazel noticed that there were a few insects there. They had extended from another place about 13 miles away.

MR. ONSTADT. I am about 35 miles away from Maslin's. How did the insects get there?

MR. SWINGLE. They are blown through the air. It is an insect which can stay in the air for several hours.

PRESIDENT JEFFREY. I would like for Mr. Rixford to make it clear what trees are benefited by this. There are some fig orchards, of course, where there is no use for the insect.

MR. RIXFORD. Speaking of caprifying different varieties of figs, Dr. Schwartz in 1893 at Fresno found several varieties that do not actually require caprification were greatly benefited when caprified. There is a certain flavor to the seeds which contain the kernels that is beneficial to the fig as an eating fig. You perhaps may not be aware that in all of the ordinary California figs that do not require caprification the seeds are empty shells, contain no kernels, and will not germinate. I have gathered recently about sixty varieties of seeds from the London horticultural collection, and a large number of those had not been caprified; the seeds would float on the water, and those that were growing in the neighborhood of the capri trees were all heavy, so it was very easy to tell the fertile ones from the infertile ones. We have given considerable attention to the Loomis orchard, and have found several varieties that are of superlative merit. There is one fig in particular which Mr. Swingle's sharp eye detected first. It is a fig that he calls a self-sealer. We found that the figs laying upon the ground, those that had been caprified, generally had the eye quite open, so that after laying on the ground a short time beetles of different kinds entered them, laid their eggs, and in a few days they were full of maggots. There are two trees there in the fruit of which the opening is stopped up by a little drop of syrup. We have an idea that it may be quite an advantage to propagate that variety. I have some samples here of two of them. These figs have undergone no treatment; they are just as we picked them off the ground.

MR. SWINGLE. I might say that the ordinary fig with the open mouth is entered by all kinds of insects, and frequently it carries bacteria. This fig is protected. I have been asked if cuttings of this variety can be obtained under the terms and conditions I spoke of.

They can. I will state that we will distribute a limited number of the cuttings of this variety. That is the Rixford fig, named in honor of Mr. Rixford, the first to introduce the Smyrna fig in this State. In regard to the pistache nut; we sent an expert to Cicily, who got the first commercial varieties of pistache nuts. The entomologist at Washington discovered a new, and they believed a very dangerous pest, a bettle burrowing in the buds, and no shipments were allowed to be sent out. We dug up trees, and they were shipped back to Washington and repotted. Out of the 500 we only saved six or eight, and I make this explanation. You will obtain them. We have some up at Chico; they are growing rapidly, but we are, unfortunately, unable to supply the buds at the time stated. It was the discovery of this unknown pest, which had not been known in the world at all.

PRESIDENT JEFFREY. Mr. O. E. Bremner, of the State Horticultural Commissioner's office, will now read a paper entitled "Humors of the Demonstration Train."

HUMORS OF THE DEMONSTRATION TRAIN.

By O. E. BREMNER.

It does not matter when or where the *idea* of the Demonstration Train originated, but it is *noteworthy* that on October 21st it was determined as to the nature of the train, and that it would start November 9th. Right then and there it was passed up to the boys to see to it that the exhibition cars were in order, so away they scurried, one to the south for insect pests and diseases, one to the north for noxious weeds and more pests, and one to the coast counties for a like load of the *scum* of our orchards and fields.

There is no *time* to tell of the thrilling auto rides for miles for samples from a known infested orchard, or of how one boy's horse ran away, and, in dragging the overturned buggy, uprooted a grapevine which proved to be a wonderfully fine specimen of the dreaded phylloxera. There is just room to say that it was "work, work," Sunday and all; and then all too quickly the morning of the 9th arrived.

Hurrying to the electric cars, we were confronted by the old San Francisco story—"no juice," and our train to leave at 7:30 sharp! After about three long delays, by dint of good luck rather than foresight, I arrived and flagged the conductor. I said: "Give them five minutes more and they will be here," and my dead reckoning was *correct,* for soon there hove in sight a rotund gentleman puffing like a river boat upstream, and away in his wake, a bad second, followed an abbreviated figure, all suit case and grip.

Then we were off for Davis, where the rest of the party met us, and after switching the hayseed car into its proper position, we rolled away toward Woodland. But why were we here? Well, we didn't find that out ourselves until the second day, when the oratorical general freight agent turned loose broadside after broadside of such eloquence that it left the populous too amazed for counter. And this, in plain language, is what he said:

The Southern Pacific Company, noticing the remarkable decrease in *produce* tonnage throughout its system, and particularly in the Sacramento and San Joaquin valleys, undertook to fathom the mystery. The *producers* told them that the land was worn out. The *horticultural* and *agricultural* authorities said *no,* just a wrong system of cultivation and care. So Mr. S. P. says, we'll take you if you will come and show them how it should be done. So that's why we went.

When we started we considered that the personnel of the outfit consisted of professors, doctors, horticultural and agricultural experts, but after a few days we found we were composed of demonstrators and train crew, and we finished as a unit, a train crew. For after those freight and passenger agents had set the pace, the train crew, led by the head brakeman, our rabbit's foot, took possession, and all the scientific men really had to do was to show the visitors the way to the cars, and the boys did the rest. Now, *really,* did these trainmen talk to the people? For the first few days they listened attentively, and followed us closely as we explained the exhibits, and then if you could have come upon that same brakeman unawares, as we did, haranguing a crowd of fifteen or more on the mystics of parasitism and the intracies of fumigation methods, you wouldn't have asked.

The questions were handed out freely, and fell alike on all of us, so we had to be prepared for any emergency. One wise lady criticized our olive grafts and buds, which consisted of some dummy olive branches about one foot long nailed to a small piece of board, with grafts and buds inserted as if they were portions of a tree. She said: "Well, it doesn't look as if your grafts were doing very well." The man explained that it was not the fault of the graft, but of the root system of the tree. "Well, what's the matter with that?" "Well," he said, "you see the root system of this tree consists of a tenpenny nail driven through this bit of board." And then she wondered why everybody laughed.

You ask me if we were able to convince our hearers as to the benefits to be derived from following our advice? I remember at one station where olive trees were growing by the side of the track, that the whole crew were expatiating on the delicate flavor of a ripe olive plucked fresh from the tree. Of course, we all took one, and rolling it harmlessly in our mouths, moved away from the tree with an expression of entire satisfaction on our countenances. Mr. Old Resident, who was attentively watching, now slyly approached, and carefully plucking one of the enchanting fruit—bit—and just then we all turned and smiled. I leave it to you if such convincing ability as that *could* be doubted.

When one of the speakers referred to the condition of plowed soils, and said, you sometimes turn up clods as big as your fist, they laughed. He didn't know. Then when he said, as big as your head, they smiled. He had guessed pretty close. But when he said as big as a barrel, they grinned. He certainly did know.

We tried to tell them things they should know, and how they were related to conditions with which they were familiar, in terms that were clear and understandable to them. In other words, not scientific and hidden, but practical and plain. One fellow said, "Why we knew them thar things 200 years ago." "Yes," said his friend, "but you must have

forgotten them some years ago, judging from the looks of your place and the crops you harvest."

We talked of fertilizers, we talked cover crops, cultivation, implements, diseases of cattle and poultry, diseases of trees and plants, insect pests, how to get and plant better nursery stock, grafting, and budding, and pruning. We talked home sanitation. We even talked temperance in the dry town. And then, after talking from thirty to forty-five minutes, we opened the demonstration cars, and showed them just what each individual wanted to see, and explained how, when, where, and why. How to keep from getting something you do not want, and how to get rid of it after you have it. There were noxious weeds and grasses—Johnson grass and Russian thistle, cocklebur, and teasel. Insect pests of every kind, phylloxera of the vine, black scale, red scale, purple scale, yellow scale, white scale, green bug, fleas, flies, hoppers, and mosquitoes, weevils, beetles, and ladybugs, and bugs eating bugs. A score of varieties of wheat, barley, oats, and alfalfa; eucalyptus, and all the dairy products, excepting the maid; also, diseases of animals and fowls, with remedies and appliances for treatment. Is there any wonder, then, that everyone seemed satisfied?

You may think there were no tough questions to answer, but there were, and our rule was to tell them the best we knew. As a result this was reported from an overflow meeting on the outside of the car, conducted by a railroad official: An attentive listener, of much whiskers and long boots, suddenly inquired: "What do them thar fellers inside mean by a rotation crop?" "Why," says the railroad man, "you see it is one of those you cultivate with a rotary plow." Another railroad man is reported as saying the only way you could harvest beardless barley sucessfully was by using a safety razor attachment on your mowing machine!

Did any one come to hear us and see the exhibits in the cars? At Bogue, a siding without a platform, and so small at that we had to take the crowd on board and go to the next station to let a train pass. We had an audience here of at least 150, an average of the attendance for all the places, not excepting Marysville and Oroville, where scarcely a score turned out; we had over 125 at each and every meeting. Now, considering that we held thirty-five meetings in the eight days, you will see that we talked and showed our exhibits to fully 5,000, and these were not curious minded, but vitally interested people.

Then why was the train a success? Because the company's commissary department maintained such an adequate standard of excellence it kept the speakers at so high a grade of efficiency they had to keep their chin's moving overtime to relieve the tension.

Because the train was well advertised, therefore the people came, and were interested.

Because we met the producers on their own ground, spoke of their own products from their own standpoint, and in their own way.

Because of the personal element we were able to introduce into the work. We could come into direct contact with each of our hearers, show him the subject we were talking about, and allow him the privilege of expressing his views and asking his questions without the embarrassment that always stands in the way at conventions and institutes.

The one thing that accounted for the success of the train perhaps most of all was the complete harmony of all its members. For, represented in the expedition, either all or part of the time, was the Southern Pacific freight, passenger, and advertising departments, University of California and farm at Davis, Stanford University, and University of Nevada, Sacramento Valley Development Association, and the State Commission of Horticulture, two departments. And right here I might as well tell you how the train was made up. First, an engine which developed over 60 miles an hour without an apparent effort, headed by a cowcatcher, which retrieved a turkey, a rooster, and numerous other strays on our right of way. Next the hayseed car, with its load of grains, eucalyptus, and dairy displays. Then the chair car, where we dispensed divers forms of verbal information. The bug car next, with its horde of friends and foes of the agriculturist and horticulturist; and then, ah! then, the Sunset car, with its forward compartments overflowing with delicious goutiness, and the after portions, where all joined in, with his particular key on the song of the weary. And woe to him who awoke, for it was a case of "spoons all roll;" you had to awake the whole car and start all even, the handicap was too heavy.

Will this train continue to be a success? YES, in capital letters. For if the people continue to manifest the same enthusiasm and crowd the cars, loaded with questions, as they did on this first and really experimental trip, there is no doubt of the ultimate effect. It will prove to be an education to the younger element, arouse the enthusiasm of the elder, and cause them all to take more advantage of the means at their disposal for the betterment of their conditions.

The commercial bodies of the State have voiced their unanimous approval of the project, and have been insistent in their invitations to visit practically every fruit or grain producing portion of the State. With so bright a path behind and so brilliant a track ahead, is it any wonder we are looking forward to the next trip with hope of still greater success? This past trip has been an education to the instructors as well as the instructed, and we believe we know *more* now of *what* the people want, and that is just *what* we are going to try and give them.

So we're coming down your way,
Then prepare without delay,
All the questions and conundrums,
Of cheat wheat and raising pumpkins,
For the Demonstration Train.

Don't allow the grass to grow,
On your pathway here below,
Till you've fathomed all the sciences,
Rotating crops and the appliances
Of the Demonstration Train.

Bring the family one and all,
For there's none too big or small
Can afford to miss the time,
When old 1459,
Brings the Demonstration Train.

(Applause.)

PRESIDENT JEFFREY. Professor Ramsey will read a paper on the culture of the walnut in northern California. Professor Ramsey is connected with the Whittier Pathological Station in southern California.

WALNUT CULTURE IN THE NORTH.

BY H. J. RAMSEY.

In treating of a subject so broad it will be impossible to cover in any sense fully or satisfactorily the various phases of walnut culture in northern or central California. I shall not attempt to do so, but in the short time allotted for the discussion of this very interesting and important subject I shall confine myself to some of the more fundamental problems involved in walnut culture as relates to particular conditions in this section.

Of late years there has been manifested a renewed and intelligent interest in this industry in northern and central California, and there is now a constant demand for information as to the best stocks and varieties for use in planting. The general prevalence of blight during the last few years has led to a search for a variety or varieties which would be more or less immune or resistant to blight, and at the same time desirable from standpoints of productiveness and quality. Blight resistance from whatever cause is not in itself or alone sufficient to stamp a variety as being desirable for planting. A variety to be a desirable one commercially can not be lacking in any one fundamental requirement, but must possess all of the most desirable characters to a greater or less degree. For instance, a variety may be blight resistant, it may be a good bearer, but at the same time lacking in size and uniformity or be ill shaped and rough. Such a walnut is not a good commercial walnut, even though it be blight resistant.

It becomes a question, then, in any consideration involving the planting of a walnut orchard, as to which one of the many varieties now on the market comes the nearest to fulfilling the ideal requirements in a walnut. Which one is the all-round most desirable variety for planting? What is wanted is a variety adapted to your own peculiar climatic conditions, grafted on to a root or stock that will give this variety its greatest vigor and maximum productiveness.

Comparatively speaking, there are but few large producing walnut orchards in northern or central California, a large part of the total yield of walnuts being produced on scattered and roadside trees. At first scattered trees of the native black were grafted over or topworked to English walnuts, but later orchards were set out in regular form. The trees were either grafted in the nursery, or else the native blacks were grown in the orchard and grafted over later. Many of these orchards and scattered trees have proven to be good bearers and commercially profitable. These examples of successful walnut culture in the northern sections have largely dispelled the feeling which has been more or less prevalent in the south at least, the feeling that successful walnut culture was limited to certain favored locations in the southland. There is little or no doubt in my mind, at least, that you have certain sections in the north peculiarly adaptable to walnut culture. Your conditions of soil and climate are somewhat different from those in the south, a fact which limits the list of adaptable varieties to some extent.

Your past experience will help you much in the selection both of stock and variety. As with the southern grower, you are chiefly concerned

with questions as to stocks and varieties most suitable for planting in your locality. In the south the growers are beginning to realize more and more the desirability of having good grafted trees in preference to the seedling. They are aware, too, that their future orchards should be grafted orchards, and not seedlings. With them, as a rule, top-working old trees and the general proposition of grafting and budding is a new, untried, and uncertain operation. With you, this phase of the business is no new thing, but one of the everyday ordinary operations concerned in walnut growing. I shall not, therefore, dwell on the different methods of grafting and budding, as your familiarity with the various phases of this subject is fully proven and attested to by the great numbers of grafted and top-worked trees found on nearly every ranch.

Success in walnut culture in nearly every section will depend, as before said, on the adaptability of stock and variety to conditions of soil and climate. If you have not already the variety which in every way answers the requirements, it is very probable that such a variety can be found by selection from existing seedlings or by the crossing of varieties. There is but little doubt that some desirable varieties will be found either by selection or crossing, and there is here a wide and useful field for young men with the time, inclination, and opportunities for such work.

It is evident also that the sections which surround the bay, and are affected more or less by the coast influences as relates to temperature and moisture, are at present somewhat favored. I mean to say that there are at present well known and tried varieties which by experience have been proven to be a success in these regions. These sections can be said to have passed through an experimental stage and to have emerged therefrom with a list of more or less fixed and standard varieties most suitable to their conditions. There are large bearing orchards in these sections producing both a desirable quantity and quality of nuts. While these varieties are known quantities and are desirable, there is, of course, ample room for improvement, and the growers are constantly in search for some variety that will be more desirable as relates to greater productiveness and better quality. In the more interior valleys somewhat unaffected by the coast influence, walnut culture is in a more experimental stage. While there are scattered trees in all of these interior valleys, there are no varieties of which I know that have no serious drawbacks. Some of these are so serious that it is somewhat doubtful whether walnut culture can be made very profitable with the present limited list of varieties to choose from.

There are a few general requirements and conditions as relates to walnut culture in particular localities which it is well that we keep clearly in mind. Early varieties like the Santa Barbara Soft Shell and Placentia Perfection are not suitable for planting here. They bloom and come into foliage too early in the spring, and are thus extremely liable to serious frost injury. You require a variety that will come out comparatively late in the spring, but which will in an ordinary season mature early enough to be harvested before the commencement of the rainy season in the fall. This lateness in coming out in the spring will be of twofold benefit, in that in localities where fogs are not too preva-

lent during late spring, the trees will not be so subject to attack by blight. Many, or most, of our French varieties, which are considered to be more or less free from blight, are so because of their lateness in coming out. They escape in this way a period during the spring when atmospheric moisture conditions are peculiarly favorable for blight development.

A very serious drawback to successful and remunerative walnut growing in the interior valleys is the great and almost universal susceptibility of the walnut to sunburn. I do not mean by this alone the very evident effects of sunburn as evidenced by the blackened hulls where the hulls have actually become sunburned by the direct rays of the sun. I have reference to the meats in the walnuts, which show no external signs of sunburn, but which instead of being white are usually quite brown or dark. In many cases it is not only the skin of the meat which is dark, but the whole meat is somewhat browned. This browning or staining of the meats is undoubtedly due to the extremely dry heat at certain seasons in the more interior valleys. Nearer the coast, or where the coast influence is dominant, the meats are white and clear. It is, of course, admitted that the white meated nut is by far preferable. Actual sunburn can be avoided to some extent by using varieties that have an abundant, thick foliage. At present I know of no variety which will consistently produce white meated nuts in the interior valleys and which is immune to this climatic effect. The procuring of an otherwise desirable variety which would produce white meated nuts in the hotter interior valleys would greatly extend the field of successful walnut culture, and would be a distinct contribution to this branch of California horticulture.

Stocks.—The question of stocks on to which to graft the variety of walnut you wish to grow is certainly a very important one. Upon the stock used depend largely the general vigor of the tree, its productiveness to a large extent, and many other important considerations. In locations where irrigation is not practiced, it is very desirable, in fact essential, to have a stock which is a vigorous grower even in the dryer situations. There have been used for stocks in the past the English walnut, the Eastern black, the native California black, and various hybrids between the two blacks and the English walnut. Experience has taught us that the English root is not a desirable root, being too easily affected by variation in soil moisture and other factors of soil and climate. In fact, it is not worth consideration in any type of soil or locality. It is fully as much influenced by unfavorable conditions of soil and climate as is the ordinary seedling. The genuine Eastern black, or *Juglans nigra,* is too slow a grower, and is not the equal of our native California black in other respects. An interesting fact in connection with the occurrence of the Eastern black in this State is this: that almost invariably second generation seedlings, or Eastern blacks grown from California raised walnuts, do not come true, as far as we know, but produce a tree of quite another type. This type, often called a Kentucky black, is a much more rapid grower, makes a larger tree, holding its leaves longer in the fall, and producing a walnut something like the Royal hybrid. These second generation Easterns, wherever we have found them, are much of this same type. Whether this is due to

hybridization or other causes, I shall not attempt to explain, but coming back to the question of stocks, it is certain that this so-called Kentucky type would be far preferable to the first generation Eastern for use as a root stock. The genuine straight Eastern makes but little growth in height the first season, while the second generation Eastern, from this State, makes a growth the first year of several feet and grows erect, more like the California black.

The straight California black is really of somewhat rare occurrence in the north. In the Moraga Valley, back of Oakland, are found some magnificent specimens of these trees, apparently the genuine California black unaffected by hybridization. There are found trees, some over a hundred feet in height and over five feet through, trees which have been there ever since the earliest settlers can remember, and which were large trees when they first came into the valley. Up in the mountains in the Wooden Valley, near Napa, are some more of these old trees several hundred years old, but now gradually disappearing. The California blacks in the Sacramento and San Joaquin valleys probably all came from either one or the other of these two places. The first plantings in these two valleys produced the straight California type, but the walnuts produced by these were hybridized to a great extent with Eastern, and we have to-day every graduation between California black and Eastern black. In the south the California black is found growing more as a dwarf, spreading tree, growing wild on dry, exposed hillsides, in foothills, and to some extent in the mountains from Santa Barbara southward toward San Diego. It is very rare that any of these ever grow to have a trunk two feet in diameter. The northern form is a much larger, more erect type, preferring usually situations in the valleys, where moisture is more available.

After everything has been taken into consideration it would seem that for all-round stock, the selected straight California black would be preferable. It is a fairly rapid grower, adapted to a wide range of soils, growing well in either dry or wet situations, is very hardy, and usually a good bearer. It combines more nearly than does any other proven stock the most desired qualities required in an ideal stock. Much can be gained also by selection in the seed bed and nursery, and using for grafting only the most vigorous.

The best results can usually be obtained by sprouting the walnuts in sand and planting out into the orchard or nursery only the most vigorous seedlings. In this way we can eliminate a great proportion of weaklings from the start. A further selection is desirable in the nursery, using only for grafting the best and largest trees. Some leave the smaller ones to be grafted a year later, but this would seem unadvisable, as it would certainly seem true that these are not as vigorous as the ones that attained a desirable size during the first year. Some deem it advisable to transplant directly from the sprouting bed to the orchard. Selection is still possible by planting out several in a place where the trees are to stand, and eliminating all but the most vigorous. By allowing these to grow three or four years, or even more, before attempting to graft them over, they would make a growth sufficient to allow of the grafting being done at or above the fork. This method has this advantage, that the trunks will be the same as the root, not liable

to sunburn nor easily injured by tools in cultivation. There is no interference with the tree's growth or vigor by transplanting, and when finally grafted the tree has a strong, well established root system, capable of producing a good top in a short time. Even though this method, everything considered, may not be the most desirable method, it is certainly worthy of consideration. The method now in vogue in the south, and to some extent in the north, is to graft the one year old stock in the nursery and transplant the grafted stock out into the orchard one year later. In this case there is gained some time and there is greater opportunity for selection of vigorous stock.

The use of hybrids as stocks on to which to graft the English walnut has recently come into prominence. There are in general two types of hybrids: the Royal and Paradox. A Royal hybrid is a cross between the Eastern and California black, while the Paradox is a cross between either one of the blacks and the English. There are scattered throughout the State a great number of these hybrids, most of them spontaneous hybrids, resulting from planting either English or blacks. With the exception of a few of Burbank's Royal and Paradox hybrids, which were planted out as such, these hybrids have come from nuts planted either for black or English. Most of these trees have certain common characteristics. They are all extremely rapid growers, are very hardy, and apparently thrive even in the driest situations, and are also usually shy bearers, especially the Paradox hybrids. I know of one Paradox hybrid, about forty years old, with a trunk having a circumference of more than sixteen feet shoulder height, but a poor bearer for such a large tree. Another Paradox in the south is growing in an extremely dry situation, where the English seedlings of the same age have all but died. The tree is thirty-five years old, and is a large, magnificent specimen. It is fully two and one half feet in diameter, has a spread of over ninety-five feet, and is a very heavy bearer, having, according to the owner, produced some thirty orange-picking boxes a year. The walnuts are shaped something like an English walnut, but are otherwise like the black. If these walnuts would germinate at all readily and would, with any degree of uniformity, produce trees equal to the parent tree, they certainly would be desirable for stock. The rapid growth, hardiness, and productiveness of this tree are considerations which would make it extremely valuable for stocks, were one at all certain to obtain these characteristics consistently from the seedlings. We have collected nuts from most of the hybrids that have come under our observation, and will propagate them in the nursery to see if there are any that will produce a uniform stand of a fixed, vigorous type.

Most of the trees which I have seen growing in the nursery, which are second generation trees from hybrids, have been a very mixed lot. The fault seems to be that none of them produce seedlings true to type, and but few equal to the parent. Very satisfactory hybrid seedlings can be obtained by growing first generation hybrids. This is very easily done by planting out black walnuts gathered from trees growing near English, and which have been pollinated from English trees. In the nursery this year we obtained on the average over twenty per cent of such first generation by planting California blacks from near English. Over twenty per cent of the seedlings are distinct hybrids, over half of

these hybrids outgrowing the blacks. Of course, we know nothing as to the productiveness of these trees. I know of but few English grafted on hybrid stock now in bearing, and there is as yet too little data and definite information to be had concerning hybrids as stocks to warrant any very extended use of such stock, except in an experimental way.

If one were to use hybrids for stock, in a commercial way, it is probable that some Royal hybrid would be the most satisfactory. The nuts from Royal hybrids are usually larger even than the large California blacks, and germinate with more certainty than do most Paradox hybrids. One would stand a chance of getting a larger number of desirable seedlings from this hybrid, perhaps, than from the Paradox. There are a few trees of the Royal hybrid producing a fairly fixed type of seedlings.

The question of the best varieties for planting in the north as well as the south is somewhat open to discussion, due largely to a lack of sufficient information in regard to some of the most promising kinds. There is but little question that the best proven variety in the north at present is the Franquette. It is a fine nut, well filled with white meat of good flavor, well shaped, and is a good producer. The one objection to the Franquette is its lateness in maturing in the fall, carrying the period of harvesting well into the rainy season. However, it has considerable blight immunity, because of its lateness in coming out in the spring. The famous Vrooman orchard at Santa Rosa is a fair example of what this variety will do in that section. It certainly is a fine walnut, both in appearance and quality, and commands the highest market price.

The Mayette is another very fine walnut, but, unfortunately, there are but few true Mayettes in the country. It may be that the genuine Mayette will prove to be even a better variety than the Franquette, but it has not been as thoroughly tested. It is generally supposed to be earlier in maturing, being at the same time quite immune to blight. If in other respects its proves to be as good as the Franquette, it should be equally or more desirable than the Franquette. Mr. Hutchinson, of Concord, has a type of Mayette which he much prefers to the Franquette. Of the other standard French varieties, the only one that would be worthy of trial is the Meylan. This needs to be tested further, however. It is a fine, well filled walnut, with considerable blight immunity.

What is called the "San Jose" or "Wiltz Mayette," a walnut supposed to be a seedling from a Mayette, is certainly an extra fine looking walnut, and quite blight immune. However, beyond these facts little is known concerning its desirability as a commercial variety, as it has been propagated and planted only within the last few years.

The Concord walnut, but recently being advertised, is apparently a very good walnut, and it may prove superior to the Franquette, but it has not been very fully tested as yet. The original of this variety growing on Mr. Wescottt's place, at Concord, is said to be quite blight resistant, and is a good producer, and matures earlier than the Franquette. Time will demonstrate whether it is to take rank as one of the leading varieties or not.

Among the varieties which we have had under observation in the

south, the Eureka is by far the most promising. It has but recently been planted in the south, and none of the trees can be said to be in bearing yet. The original tree certainly is a fine specimen, and is a heavy producer of extra fine, heavy, well filled walnuts. It is quite late in coming out in the spring, but matures its nuts earlier than the Franquette. During the four years we have had it under observation we have never seen any blight on it, while the rest of the seedling trees were full of it. It is certainly the most promising of the many new things I know of, and certainly is worth trying out.

The Chase is another variety but recently planted in the south, and is a good producer, quite blight resistant, and is a fine nut. What it would do in the north we do not know. It may be that where a large acreage is to be planted out it would be well to plant out more than one variety, so as to not put all your reliance on one variety. If one would want to wait a few years before selecting his variety, he could gain a good deal by setting out in orchard form the trees to be used as stocks. By the time they are ready to work over there will in all probability be more definite information to be had with reference to varieties, and some of the newer and more promising varieties will have been tested more fully.

I have not here touched on any of the operations of cultivation, irrigation, fertilization, pruning, and many other important considerations. Practical growers here in the north can give this information better than I can. It was not my purpose originally to give you a paper on walnut culture here in the north, but only to discuss it somewhat after being presented by a practical grower. I feel that such an arrangement would have been better, as I feel that some one who has had the experience here in this section would have been better qualified to speak on this subject, and could have given you more valuable information. I have tried only to give a few things as regards stocks and varieties, and a few general considerations in walnut culture. (Applause.)

MR. MARKLEY. Some fifteen years ago I bought a variety of French walnuts at Nevada City. I had the Mayette and Franquette. Both of them bloomed five weeks later than the Santa Barbara soft shell. The Mayette ripened a little earlier than the Franquette. I got them from Mr. Gillett. Mr. Gillett was a Frenchman, and claimed that he had imported the nuts from France. I am inclined to think, from the way they acted, they were the true Mayette.

MR. SPRAGUE. Did they sunburn?

MR. MARKLEY. No, they were in Sonoma County, and don't sunburn much there. I experimented with walnuts there for seventeen years and kept the records. Were I planting to-day I would not plant anything but the two French varieties. All through the Sacramento Valley the walnut sunburns very badly. If it is on very rich deep land, river bottoms, sometimes it does very well.

MR. WILLIAMS. I would like to ask the writer of that paper a question in regard to those second generation Eastern walnuts. I have in mind four trees of the second generation; they do not show any of the characteristics of our common walnuts; they are heavy growers. Whether he would recommend the native California black walnut in preference to those?

MR. RAMSEY. The only trouble that I have found with the hybrids up to the present time is that by planting these hybrid walnuts you can not consistently get strong trees. You don't know just what you are going to get. Still, if I had some very strong growing second generation hybrids I would not be afraid to graft on them, but it is very difficult to get any number of those, that is, that are desirable. I only know of a few trees that have been grafted on these hybrids and we have no data as to what they will do, but it would seem from the rapid growth which these seedlings make that a good many of these would make excellent stocks on which to graft the English.

MR. ANDERSON. I planted some Præpeturians twenty-five years ago and they were unsatisfactory. In our locality at Davis would you recommend this Franquette?

MR. RAMSEY. As I said in my paper, the Franquette is the best proven variety that we have as yet in the north, and the true Mayette may be fully as good. Here is this Eureka walnut; it is quite a large walnut. The tree itself from which these walnuts were grown is a seedling. The nut from which that tree was grown was taken from one of three or four trees which are growing on Mr. Meek's place, the original of those trees having been sent him from Persia, so it is really a third generation tree. As regards this Santa Barbara soft shell in the north, I would not recommend that at all for planting where you are susceptible to late spring frosts, because it is an early bloomer and you would nearly invariably get caught, and besides that, it would blight. The Placentia Perfection is really one of the best walnuts I know of if it were not for the fact that it is so susceptible to blight. It is white-meated and the meat comes out whole. Aside from the fact that it is so susceptible to blight it is one of the best varieties we have in the south. In the north it would not do, because it is early.

MR. SWINGLE. I am informed by a nurseryman in Texas that he takes the wild walnut for a satisfactory stock, and I want to suggest that perhaps it would be worth while to try a few of them in this State. It is somewhat analogous to the California black.

MR. RAMSEY. Just in that line I want to say that we are investigating the question of black walnuts and also have a number of trees of that walnut which is growing in Texas, and are going to graft on to it this coming season. The trees, as I understand it, are much like the type which we have in southern California.

MR. RIXFORD. I have grown the Præpeturians for twenty-five or thirty years. It is a success as a regular and profuse bearer. It is a fine nut, but it has this serious fault, that it is small size.

MR. POWELL. I would like to ask for some information in regard to pruning French walnuts.

MR. RAMSEY. As a rule, pruning has not been done very extensively, except in the south. The practice has been to keep the lower limbs cut away so that you can cultivate underneath the trees. That has been very nearly the whole extent of pruning. I have no doubt but what some good work could be done along that line as to the best methods of pruning.

MR. SWINGLE. I would like to have Professor Ramsey give an expression publicly as to whether the Franquette will come true to seed. I believe there are thousands planting them under this expectation.

MR. RAMSEY. I can answer that in a very few words. No, it will not come true to seed any more than will any other variety of walnut. I don't care what variety of walnut you plant, you will not get them true to seed. If you plant a hundred walnuts from the Franquette you will have one hundred different varieties of walnuts.

MR. RIXFORD. What method is most successful in grafting the walnut?

MR. RAMSEY. There are a number of ways of grafting a walnut which are very successful. I will just give you briefly our experience as to nursery graft. We used a modified tongue graft. In top grafting, where the limbs are larger, we find that a modified cleft graft does a whole lot better than the tongue graft. It is really a modified Whittier graft, something on the old style of apple graft, only instead of cutting across, as in the apple, you just slice off a portion of the side. It is cut straight across and with an incision, making a tongue in the side, and another cut is made downward where that cut has been made before, and the two tongues of the stock and scion are fitted in that way. You have just a little slanting surface on the side and the rest of the stock is cut across square. In the south that method has produced 90 and 95 per cent stand, but in commercial practice I should say about 80 per cent of the grafts take and make good trees. In the top grafting this graft has not been quite as successful as the modified cleft graft, because it does not connect as well, but does in the young stock in the nursery, and they are a little more liable to dry out; so the cleft graft, as far as top grafting is concerned, seems to be more advisable. I have not hardly the time to go into details on that. Here in the north a modified cleft graft seems to be very successful. In fact, it is a universal proposition in some of these valleys. Instead of cutting clear across, an incision is made on the side.

Mr. Mills stating his inability to act as chairman of the Committee on Resolutions, the President appointed in his stead Mr. George H. Hecke.

The members of the convention then proceeded to the State Insectary on the Capitol grounds, where the following proceedings took place:

PRESIDENT JEFFREY. Ladies and gentlemen, I will explain briefly that we have asked you down here to see the setting of the little tablet which we have arranged in the front part of this building. We are here to pay a brief tribute to Ellwood Cooper, to whose efforts is due the fact that we have this building to-day, and to hear a few words about the object of this institution, and, in brief, just a simple, short address. That will fix the dedication of the insectary in the horticultural literature of the State and give you an opportunity to examine everything. I have asked Mr. Mills to address you briefly on this matter.

MR. MILLS. Within the last sixty seconds I have been notified by the Chairman of the Commission that I would be called upon to perform this important duty. I can assure you that I might well have wished to have been given longer time to prepare the remarks that should be made at so opportune a time as this in the dedication of so great an institution—an institution that will mark an epoch in the affairs—has marked an epoch in the fruit affairs of this State.

In being called to, in a measure, express a tribute to so great a man as Ellwood Cooper, a better voice than mine ought to be heard. There are

all too few of the citizens of this State, and of other States, who are like-minded with Ellwood Cooper, who are willing to give of their life-time, of their younger days, of their mature days, when others are seeking rest and leisure—I say there are all too few men like Ellwood Cooper who through many years have given the very ripest of their talents to the service of the fruit-growers and the agricultural people of this great State.

Words are too few, words are too unthoughtful, if I might say it that way, to express the admiration that I have for the noble man who formerly was head of the Horticultural Commission of this State, and who for so many years of his life has given the ripest talent of his mind, of his soul, to the service of his fellow men.

You and I—in the twenty years and odd of my life at least in this State—have observed his actions. I went over twenty-two years ago his great orchards in Santa Barbara County and marveled at what he was accomplishing, studied his life and marveled that he was so generous. I would that we might here to-day draw a lesson from the life of Ellwood Cooper and that we might be willing, ready, yea, glad, to give up our time, our energies, our substance, our wisdom, if we have any, to the service of our fellow men. Let us to-day draw the lesson that service of our fellows is the greatest and grandest thing that man may give of his life here below and that will fit him now here for the better service, the better enjoyment, the better life beyond the grave to which we are all journeying and which we will reach so very soon. I glory in the fact that we have one man like Ellwood Cooper in this State, and I would rejoice, as few men could rejoice, if we could to-day inspire others among us to do as he has done.

Ellwood Cooper made it possible for us to be here to-day at the dedication of this State Insectary, which will do great things for the agricultural and horticultural interests of California. Here we will have those who will study the insects, beneficial and otherwise. You know that Ellwood Cooper was the first one to send abroad men who would seek out in foreign lands the enemies of the scale that devastated our orchards, and he brought to our shores beneficial insects that have done wonders.

Take, for instance, that insect which drove absolutely from our orchards the cottony-cushion scale. It was worth, in that matter alone, millions of dollars to the State. The wisdom of the man who thought out that idea has been worth millions to us. Well may we to-day, upon the tablet at the front door, place his name. Well may we take off our hats to him and rejoice in his wisdom and in the breadth and depth and glory of his soul. I to-day beg of you again that you will emulate the grand and glorious and beautiful efforts of this man Ellwood Cooper, whose name we honor here to-day.

PRESIDENT JEFFREY. Before leaving your places I will appoint voluntarily, without any motion, a committee of five to unveil this tablet, in behalf of all who are here. Then when you pass out you can see the inscription as it reads. I will appoint Mr. Edward K. Carnes as Chairman of that committee to unveil this dedicatory tablet and Mr. C. B. Messenger, Mr. Craig, Mr. Pease and Mr. Maskew. The others of you here will immediately disperse yourselves around through the insectary and let us explain it.

EVENING SESSION.

The Convention was called to order by President Jeffrey at eight o'clock P. M.

MR. KING. Mr. Chairman, I move that we tender to the Chamber of Commerce a vote of thanks for the use of their hall last night.

MR. JUDD. The Committee on President's Address is ready to report.

PRESIDENT JEFFREY. If there is no objection we will have that read now.

Mr. Judd read the report of the Committee on President's Address, as follows:

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS.

To the California Fruit-Growers' Convention:

We, your committee appointed to consider and report on the annual address of the President of this organization, respectfully report as follows:

We find the President to be in hearty accord and with a broad policy, covering all of the interests of the fruit-growing industry of California. We approve his hearty coöperation with the State University, in his favoring their policies, and we note particularly, with the highest commendation, his recommendation for liberal appropriation by our Legislature, to advance the greatest interests of California, by strengthening the quarantine service, as well as to be in sympathy with previously expressed reforms of former conventions, in the matter of reduced freight rates, quicker and better service.

Also we want to call special attention to the specific points in the address of President Jeffrey, touching the insufficient and unfair division of the taxes upon fruit trees and vines in this State, the unfairness consisting in the fruit grower getting no returns, practically speaking, from this great and exorbitant tax for his own benefit in the protection of the great industry that makes California prosperous to-day.

We also indorse his suggestion in asking the State University to take up the economic question of freight rates, market and distribution.

In conclusion, we commend the entire document as timely, progressive, and worthy of the thoughtful consideration of all our people.

We further indorse our worthy President's suggestion advocating amendments to present laws that will strengthen and fully protect us from incoming pests, to the end that adequate protection may be had for all fruit growers of the State.

Respectfully submitted.

A. N. JUDD.
GEO. E. KING.
S. A. PEASE.

Vice-President Cutter in the Chair.

On motion of Mr. Judd, duly seconded, the report of the Committee on President's Address was unanimously adopted.

The Committee on Resolutions, through Mr. Judd, reported the following resolution:

Introduced by Prof. E. J. Wickson:

WHEREAS, Since the last meeting it has fallen to the lot of our old friend and associate, Mr. Alexander Craw, to answer the final summons which removed him from his earthly sphere of activity, we members of the Thirty-fifth Convention of California Fruit-Growers assembled in Sacramento, December 1-4, 1908, desire to place upon record a heartfelt tribute to his memory; therefore,

Resolved, That we look upon the career of Alexander Craw as one of the greatest achievements of California horticultural development, because such development gave opportunity for him to devote his native talent, energy and unselfish spirit to the formation of a noble character, and to successful performance of great public duties, both of which are attributes of the highest manhood and citizenship;

Resolved, That while we regard the production of a man like Alexander Craw as one of the greatest gifts which a great industry can give to mankind, we desire to inscribe upon the records of our Association a tribute of profound thankfulness for his nobility, self-sacrifice, and distinguished service in the hope that such a tribute from us may be accepted as an honor to his memory.

Resolved, That our love for his memory prompts us to express our deep sympathy with those to whom his removal brought deep bereavement, and to assure them that we count as one of our earthly blessings the remembrance that we had the friendship of such a man as Alexander Craw and the privilege of association with him in his life and work.

G. H. HECKE,
Chairman.
A. N. JUDD.
P. D. FOWLER.
JAS. MILLS.
G. H. CHAMBERS.

Mr. Judd moved the adoption of the resolution, which motion was duly seconded.

MR. JEFFREY. I would like in a few words to express the feelings of this convention and my own feelings as a personal friend and associate of Mr. Craw in the work now being considered by this Convention, to indorse the resolution as read. I have known Mr. Craw for many, many years. I have been out with him in the orchard many, many times. I found him always conscientious, where if he had not been conscientious no one would ever have been the wiser. Mr. Craw was the personal friend of most of the delegates to this Convention. In all his goings about the State, instead of loafing like some men who get to be high up in office sometimes do, Mr. Craw's mind was always on his work. He would come to Los Angeles on some mission and instead of going to some hotel and resting and perhaps getting something to eat, he would come first to the horticultural office—"Boys, what is there to-day? How can I help you? Let us go out to such and such a place"—always ready, very industrious, very conscientious, very able, and altogether a man. (Applause.)

President Jeffrey in the chair.

MR. WHEELER. May I say a few words in regard to Mr. Craw? I found him a kind hearted, conscientious man. He loved his fellow man, and that, I think, is the greatest tribute that can be paid to any character, and when I read of his death I felt as if I had lost a friend. We differed on many things, but it was the differences which can exist between man and man and which lead to the progression of the world and lead to better feeling and better acquaintances between men. Mr. Craw was of a genial nature, he was of a kindly nature and he was of a sympathetic nature, and therefore I feel proud to-night, I feel glad that I am able to say a few words of a gentleman that may have differed from me, but that I can always recollect as an honorable, pleasant, genial opponent.

MR. MILLS. I do not desire often to be heard. I can not refrain, however, from adding my word of tribute to the splendid character who has gone hence from our midst. What a tribute is offered to him by this gentleman over there—"He loved his fellow man." The greatest man who ever lived, the one whom we count divine, loved and loved only and loved always and went about doing good. Alexander Craw was an inspiration and will ever be an inspiration to those who knew him—yea, to those who heard of him, to those whom he served. He went about everywhere doing good. God give us a few more of such men as Alexander Craw, who honors his God and his fellows and who adorned his place here, and who surely has on his forehead that crown that shineth unto the everlasting days, with many jewels on it. I do wish to say here

that he has been an inspiration to me, and in his loss I feel that I personally, and all of us together, have lost the truest friend the fruit-grower ever had. I know not where they can get a greater one. All honor to the noble soul who is marching on.

The resolution was adopted unanimously by a rising vote.

Mr. Judd read the following resolutions, which were adopted:

WHEREAS, The principal markets of the products of California are found in the Eastern States, and at a great distance from the place of production, and for the reason that the transportation between California and the Eastern coast of the United States becomes a factor of paramount importance in the economic advancement of our entire State; therefore, be it

Resolved, That this Fruit-Growers' Convention does most earnestly favor the establishment by the National Government of a line of steamships plying between New York and California ports in connection with the Panama Railroad, owned by the United States Government, to the end that the transportation facilities may be increased and freight rates may be regulated in the interests of the productive and commercial interests of California; and be it further

Resolved, That a copy of these resolutions be sent to President Theodore Roosevelt, and a copy to our Representatives in Congress, calling their attention to the fact that these resolutions are in line with the President's policy expressed upon the receipt of Commissioner J. L. Barstow's report exposing the reason of the high freight rates maintained by the allied railroad and steamship interests, and also call their attention to the fact that the immense vote for W. H. Taft in California fully shows a hearty endorsement of the reforms of President Roosevelt so dear to us.

G. H. HECKE,
Chairman.
A. N. JUDD.
P. D. FOWLER,
JAS. MILLS.

WHEREAS, There has appeared a new and insidious enemy of our deciduous orchards, known as the thrips; and

WHEREAS, This pest threatens this industry with heavy injury, and will, if not checked, largely ruin it; and

WHEREAS, In recognition of the seriousness of the injuries inflicted by this insect pest, the Bureau of Entomology of the National Department of Agriculture at Washington has directed one of its most efficient workers, Mr. Dudley Moulton, who has spent many years studying this insect, and an able corps of trained assistants, to enter the field against this foe, and to continue until it has been overcome; therefore, be it

Resolved, That we do heartily commend and endorse the spirit and enterprise directed by Mr. Dudley Moulton and his associates against the thrips; and be it further

Resolved, That we recommend most seriously that our Representatives in Congress direct their efforts toward securing sufficient increase in the appropriation for this purpose, in order that this most necessary work may be continued to final success.

Passed by the Convention without referring to committee.

Offered by Mr. A. R. Sprague:

WHEREAS, The reign of graft, bribery and other forms of corruption in San Francisco so long endured by that city has been overthrown by the courageous and self-sacrificing action of District Attorney Langdon, Francis J. Heney, Rudolph Spreckels and other patriotic citizens of that city; and

WHEREAS, We recognize that the good name of our whole State demands that there be no relaxing of the prosecution of the evident criminals; therefore, be it

Resolved, That this Convention expresses its entire confidence in the graft prosecutors, and congratulates the city of San Francisco that it has such able and self-sacrificing citizens as those who have been and are now devoting themselves to the defense of the vital interests of that municipality, and rejoices that the dastardly attempt to assassinate Francis J. Heney has brought to the support of the prosecution so large a number of the best citizens of the metropolis.

WHEREAS, The Great Northwest is becoming rapidly settled by America's best and most intelligent and enterprising young men; and

WHEREAS, Ere long, with their American instincts and patriotism, they will be clamoring for annexation, devoutly to be wished for by all right-thinking people of both sides of the line; and

WHEREAS, Our sons and daughters over there are clamoring for the rich and abundant fruits of the Golden West, to the end that fond memories of the old home may ever be lasting; therefore, be it

Resolved by the Thirty-fifth State Fruit-Growers' Convention of California assembled, That our Representatives in Congress be requested to have a general provision

placed in the tariff law, which may be enacted at the next session of Congress, authorizing the Executive to make trade agreements with Canada in order to secure the abolition of the duties on green, canned and dried fruit, entering that country; be it further

Resolved, That a copy of these resolutions be sent to Hon. J. C. Needham, and each member of the Ways and Means Committee.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The Woman's Council of Sacramento, with such rare taste and consideration, provided a delightful entertainment for the members of this Convention on the evening of December 3, 1908, thus enabling the members to meet each other socially and to partake of the dainty refreshments and listen to the rare music; therefore, be it

Resolved, That this Convention tender the President, Mrs. J. J. Fitzgerald, and her efficient corps of assistants, and all others that made the evening so enjoyable, a rising vote of thanks, for the courtesies shown us while sojourning among them.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The civic bodies of this State, as well as its inhabitants, are working faithfully and at great expense to advertise the wonderful resources of this State by maintaining exhibits, distributing literature and other efforts to the good of all; therefore, be it

Resolved, That the members of this Convention respectfully request that all hotels and restaurants serve on their tables only such fruits as are calculated to create a favorable impression on their guests, and the stranger within our gates.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

Offered by Mr. Geo. H. Cutter:

WHEREAS, There are vast areas of rich agricultural and horticultural lands in the wide valleys of the State, and more particularly in the middle and northern part of the State, waiting for settlers and capital to properly develop them; and

WHEREAS, No adequate means of advertising these rich lands to the intending settler has so far been adopted or followed; and

WHEREAS, The wonderful possibilities of these lands need only be brought to the notice and knowledge of the intending settlers to secure their coming and staying; and

WHEREAS, Many, many thousands of tourists annually visit the State, but more particularly the sunny south land; and

WHEREAS, Many of these tourists did they know of the rich lands of the middle and northern valleys, and that these lands were available at exceedingly reasonable prices; and

WHEREAS, It will be greatly to the advantage and profit of the present residents in these valleys if more settlers are encouraged to settle among them; and

WHEREAS, A golden opportunity presents itself to the counties of the State to advantageously present their possibilities to tourists and others seeking homes in California at the State Agricultural Park at Los Angeles; now, therefore, be it

Resolved, That we, the horticulturalists of the State in convention assembled, do most heartily endorse the scheme presented here by Mr. Wm. Bowen of Los Angeles, to the end that our lands and products shall be more widely known, and we do commend the same to our legislators and ask their coöperation in making it an immediate and grand success.

Offered by John A. Livingston of Placer County:

Resolved, That this Convention send a delegation of three (3) members to represent the fruit-growers of the State at the meeting called for December 5th at San Francisco, to discuss the proposed raise in freight and express rates.

A. N. JUDD.
JAS. MILLS.
P. D. FOWLER.

Offered by R. G. Williams:

Resolved by the Thirty-fifth State Fruit-Growers' Convention, That a committee of three be appointed to communicate with our Congressmen and members of the Ways and Means Committee of Congress and the Treasury Department, for the purpose of endeavoring to prevent the reduction of duty on Almeria grapes entering the United States from Spain, or the arrangement of the measuring of the barrels containing said grapes.

WHEREAS, The press of San Francisco deem it advisable to confine itself to the publication of its own peculiar internal affairs, than to disseminate the fact that the

bone and sinew that produces 90,000 cars of fruit annually in this State is being ably represented in convention in Sacramento, by the grower, university and scientific departments of the State and Government; and

WHEREAS, Said journals evidently think the slow process of the distribution of the vast amount of valuable information through the channels of State bulletins and the regular annual reports of the Horticultural Commission is amply sufficient; therefore, be it

Resolved, That this Convention ask the influence of said papers in the interest of a greater publicity to intercede in our behalf with the incoming Legislature for an increase in the appropriation to the end that the many valuable and scientific papers may be put into every man's hand as speedily as possible.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The development and use of water power in California concerns very directly the future prosperity of the fruit-growing interests;

Resolved, That the policy of the Forest Service in its control of the privileges granted to power companies is thoroughly commended;

Resolved, That the Secretary of this Convention be instructed to mail a copy of this resolution to our Senators and Representatives in Congress.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, There are likely to be immense tracts of land in California devoted to cereal culture, and the average production of cereal per acre is extremely low, and the quality of varieties now being commercially grown are so low as to render it necessary for our milling interests to import over 100,000 tons of wheat annually to maintain the quality of our flour; and

WHEREAS, Under an appropriation made by the State, the University of California has established a very complete and systematic line of investigation to introduce and develop more desirable varieties, and has already obtained some promising results; therefore, be it

Resolved, That this Convention do approve of this work and appeal to the members of the coming Legislature to continue this line of investigation, and so extend it that it may include the improvement of other field crops, fruit, and green manure plants.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The Chamber of Commerce of Sacramento have kindly assisted in every way in making the Fruit-Growers' Convention a success; therefore, be it

Resolved, That the Thirty-Fifth Fruit-Growers' Convention take this method of thanking them heartily for said assistance in making our stay pleasant and profitable.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The general publicity well distributed over the State of the proceedings of the Fruit-Growers' Convention adds very materially to its value to the general public; and

WHEREAS, The horticultural and agricultural papers of the State and the daily press of Sacramento have been giving a fair and impartial report of this Thirty-fifth Fruit-Growers' Convention; therefore, be it

Resolved, That the thanks of this Convention is extended to each of them for their many courtesies.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The manifold advantages to the people of the State of California, brought about by the session of the Thirty-fifth Fruit-Growers' Convention, are enhanced materially by the presence of the many professors and scientists from the Department of Agriculture at Washington, College of Agriculture at Berkeley, State Farm at Davis, Polytechnic Institute at San Louis Obispo, and State and County Horticultural Commissioners; therefore, be it

Resolved, That the members of the Fruit-Growers' Convention most heartily thank the various professors and scientists for their valuable assistance in making our meetings the success they are; and be it further

Resolved, That the assembled fruit-growers commend and appreciate the untiring efforts of J. W. Jeffrey, the executive head of the Horticultural Department of California, as well as that indefatigable worker, E. M. Ehrhorn, whose presence at the Golden Gate is a much-needed menace to the ever-threatening pests.

WHEREAS, The expedition of the business of fruit-growers' conventions, parlimentarily and otherwise, devolves upon its officials; and

WHEREAS, The thirty-fifth session of the fruit-growers of California, in convention assembled in Sacramento, December 1 to 4, 1908, have been fortunately situated in having a corps of efficient executives; therefore, be it

Resolved, That the members of this Convention tender our most hearty thanks to Mr. J. W. Jeffrey, our President; to Geo. H. Cutter and A. R. Sprague, our Vice-Presidents; to O. E. Bremner, Secretary of the Convention; to E. K. Carnes, Superintendent of the Insectary, and to the affable official reporter, Chas. H. Adams, for their courteous treatment and kindly consideration.

MR. DARGITZ. I desire to say a few words on the questions that were touched upon in the President's address, emphasizing the necessity of the fruit-growers taking up and considering the economic side of our business, which has been more or less neglected, especially in the conventions and in our praise for the professional side of the work. We have all laid a good deal of stress upon the idea of producing better fruit and more of it. We can go on producing beautiful fruit and swell our professional pride along this line, but, after all, it is dollars and cents that count in the matter of the fruit industry of this State. If it is only professional pride, it is only a question of a little time until our fruits will be grown in our door yards. But if it is a matter of economics, if it is a matter of dollars and cents, then the commercial side will come to the front. I heard some one say—I think standing well up in the front, too—that to invite people to come to this State and help us to grow fruit by increasing the number of orchards and acreages without at the same time taking steps to develop markets for that and increase the commercial value of our products, was doing the State an absolute injury. I believe it is true, and, by way of illustration, I hope you will pardon me for saying that it is sometimes asserted that a preacher is a very poor business man, that he doesn't know much about finances. I want to say that one preacher went into northern San Joaquin County and took charge of 800 acres of orchard which had been the rock that had blasted the financial hopes of at least two corporations and several individuals, and that preacher has made it pay. Now, I have made a success there by working largely along the economic lines. It has been a question of rooting out undesirable varieties, of working over other varieties which might be made to produce better and pay better, of carefully selecting the men that would do the work, and placing them where they would work to the best advantage, and in the marketing of the fruit. You know the labor people of the country are getting pretty well organized. They have seen what was good for themselves. The merchants of the country are organized pretty well. They know what is good for themselves. The manufacturers of the country are organized. They know what is good for themselves. But when it comes to the average farmer, he doesn't know what is good for himself. When things are presented to him that are proper and right and good for him, he is a little bit inclined to turn them down. Even in the last political campaign a problem was presented to us to vote upon that had been submitted to us by our Legislature, which proposed the changing of the tax arrangements, and relieving somewhat the tax burdens of the farmer. It was number one among the amendments that we were to pass upon, and to my intense surprise and disgust the farming community practically turned it down. They didn't know what was good for them. In the matter of the marketing of our fruits,

as at present constituted, we are going at it backwards. Whenever you go to a store to buy anything from a merchant, the merchant fixes his price on what he has to sell, and you can pay his price or you can let it alone, just as you please. When we produce our fruit and have it ready to sell, the fellow that is going to buy comes around and tells us what he will give, and if we don't want to take that, we can keep it. It is all wrong. The man who produces the fruit is the man who should have the say as to what he will sell it for, and if the grower hasn't got common sense enough to place a reasonable price upon his fruit products, so that the people can afford to buy them, then he will have to keep them. Now, take the dried fruit, for instance, and how does it work? Up to the present time the packing houses have served a very good purpose for the people in marketing our fruits. The packing houses will send their agents throughout the East before they buy fruit, and in competition with one another they will try to sell the fruit short to the Eastern consumers, the wholesalers, the jobbers, the dealers, and by competing with one another and cutting prices as low as possible they finally make sales, and come back to the purchaser here, and after taking off the price they have sold for and the matter of transportation and packing and a profit for themselves, they offer the grower what is left, and the grower can take it or he can keep his fruit. The system is entirely wrong, because it tends to reduce the prices instead of elevate them. It is making the packing houses the agents of the Eastern people instead of the agents of the producers here.

PRESIDENT JEFFREY. My attention has been called to the fact that there is a part of our programme that we have omitted.

MR. DARGITZ. I can take this us at some other time.

MR. MILLS. Mr. Chairman, I do wish that the discussion that this gentleman was just leading could be followed up. There is nothing that you gentlemen in the north need more than the doctrine he is giving you. We in the south have learned the lesson. We are the dictators as to what the price should be. You need it here. It is more important than getting your fruit into Canada. (Applause.) Those of us from the south can bring you courage and give you courage, for we have solved our difficulties, and in a year of panic we did what no other industry has done in this State, marketed the fruit in the face of it, and got a better price than before. You need information, direction, instruction, leadership, in the marketing of the fruit you are growing.

PRESIDENT JEFFREY. This subject is provided for in the programme for Friday, and we will take it up then.

The Convention adjourned until to-morrow at 9:30 o'clock A. M.

PROCEEDINGS OF THIRD DAY.

SACRAMENTO, CAL., December 3, 1908.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

PRESIDENT JEFFREY. The first number on the programme this morning is "The Minus Quantity in Soils, Humus," by Professor G. W. Shaw of the University of California.

PROFESSOR SHAW. Mr. Chairman, I feel a little diffidence in speaking at a horticultural meeting, on account of the fact that most of my work has been along the line of general agriculture rather than horticulture, but inasmuch as President Jeffrey has asked me to speak along a certain line, and he has assigned to me "The Minus Quantity in Soils, Humus," I desire to present to you some facts which have appeared during a somewhat careful study of the soils of California during the last seven years; and I may say that this conclusion which I have reached here, and which I shall attempt to present in this paper, has not been hastily drawn, but has been the result of rather a careful study of the situation, brought about particularly through a study of why it was that our soils were giving such low average yields in general field culture; why it was, for instance, that our soils are failing to produce 30 or 40 bushels of wheat per acre, as they did years ago; why it was that our farmers have changed from wheat to barley in recent years; and during the course of this investigation I have been impressed with the fact that the horticultural people are up against a proposition somewhat similar to the grain men, and unless we mend our ways, particularly in the northern portion of this State, we are going to be continually worse up against it than we are at the present time. I am going to speak especially with reference to northern California, because I realize, from having traveled over the southern portion of this State, particularly, that the particular point which I wish to bring up at this time is much better understood in southern California than it is in northern California; and you gentlemen of northern California will have to wake up to the situation; you will have to wake up to the reason of why you have clods as big as your fist and as big as your head and as big as a washtub, and why you do not produce the same crop with the same amount of moisture that you did twenty years ago. It is some of these things that I desire to speak of in this paper.

THE MINUS QUANTITY IN CALIFORNIA SOILS.

BY PROFESSOR G. W. SHAW.

Under the above title the writer proposes to set forth what he believes to be the most vital question confronting the farming and horticultural interests of California to-day. I may perhaps be pardoned for saying that this impression has not been formed hastily, but is the crystalliza-

tion of a somewhat careful study during the past seven years, both in the field and laboratory, of the soil conditions as they obtain, if not in all, still in most parts of the State.

While these investigations have had mainly to do with the underlying causes for the low average production per acre of field crops, particularly grain, yet in the prosecution of this special work I have become impressed with the unmistakable fact that many fruit and vine growers in northern California are facing much the same problem.

In the case of the general farmer, the gradually reduced wheat yield per acre leading to a change from wheat growing to barley growing, and the subsequent gradually diminished yield of this crop has forced him to ask the very pertinent and fundamental question, "Why are soils which in our fathers' hands were so productive now giving so meager returns?" This is still more evident in the case of the fruit grower by his blind rush to the commercial fertilizer market for some sort of a cure-all to remedy a condition that he sees is already upon him or one which he wishes to avoid.

The Popular Explanation.—The general supposition, although erroneous, is that that plant food content if not absolutely gone is reduced to a minimum—that the soil is exhausted. Both the supposition and the usual conception of the term *fertility* are incorrect.

The chemical phase of the subject is overemphasized. The terms plant food and fertility are not synonymous. The latter refers only to the ability of the soil to produce crops, and the plant food of a soil is only one of the attributes, and often not the main one in crop production. Moisture, warmth, and aëration; soil texture, soil fitness; its tillage, drainage, and irrigation, are all quite as important factors in the productiveness or fertility of a soil as are fertilizers. The crop-producing power of a soil constitutes its fertility and not simply the three or four forms of plant food present, and the maintenance of fertility involves such an all around handling as will conduce to maximum effectiveness. Both science and the better practice is laying more and more stress to-day upon the direction of natural forces, the same that built the soil in its pristine vigor of years ago, on the conservation of the inherent richness of the soil, and on the acquirement of plant food supplies from the air and the subsoil, but the popular mind is still fixed on the idea that a fertilizer is a panacea for all soil ailments. The purchase of plant food when needed is an important matter and should not be neglected, but no fertilizer can act as a substitute for proper soil management.

There are, of course, soils and soils; some which, from the outset, are relatively unproductive unless assisted; others which are at first fertile, but which become rapidly depleted; and still others which maintain high productiveness for many, many years. But the best of them show wear if improperly managed; yet, even though they may have been grossly abused, most of them may be renovated.

Neither the cereal nor the horticultural soils of California are exhausted or worn out—*many are depleted,* but there is an immense amount of inherent richness in most soils, even in the poorest. In a certain table which is supposed to show fifteen representative samples of so-called "worn out soils," the nitrogen content in but one sinks below 1,100 pounds in the top eight inches, and but twice below 1,500 pounds; the phosphoric acid content but once falls below 1,000 pounds, and but

three times below 1,500 pounds, while the two lowest potash contents are 1,000 and 1,200 pounds and the next lowest is 4,000 pounds. The average nitrogen content of these soils is above 3,000 pounds, 5,000 pounds phosphoric acid, and 17,000 pounds potash in the top eight inches, and these figures may be ordinarily doubled, for the next eight inches will usually show as much as the top, and is available for most crops. If we compare these figures with those indicating the draughts made by most crops, the supply of plant food would not be exhausted in five hundred years.

The figures express for the most part *latent* rather than potential plant food and are merely given to enforce the thought that soils are seldom if ever denuded of their plant food entirely. The causes of lessened crop production lies partly in a shortage of *soluble* plant food, for only a small amount of the total plant food is potential at any one time; but it is more often the result of a wretchedly bad soil management on the part of the grower himself. We have not given the ounce of prevention, and consequently we must pay for the pound of cure. Nature made the soils of our valley friable and absorptive, but we have sacrificed this condition for the immediate dollar, and now we must pay double the price to restore it. Nature will restore the condition, but she is unrelentingly slow.

This minus quantity of our soils lies not so much on the chemical side of the soil as upon the wretchedly poor physical condition induced through the lack of any attempt to return to the soil that vital attribute which makes for productiveness, *humus,* which, together with rational tillage and the use of manures, constitutes the best keys for the unlocking of the latent plant food mentioned previously.

Failure to realize the importance of this most vital question, the restoration of humus, has led to lessening the retentiveness of our soils for moisture, especially in the upper layers, a very serious matter in our climate of fickle rainfall; a lessening of available plant food; the making of the soil colder, and the increasing of the cementing action in the case of heavy soils and increasing the tendency of light soils to drift.

The maintenance of fertility or productiveness of soils is very largely a matter of the up-keep of its humus content. The "first aid to the injured soil" abused and depleted should invariably be to supply it with a good quality of humus. We shall not attempt at this time to go into a scientific discussion of what humus is, but shall pause only long enough to say in this connection that humus is a variable, indefinite sort of matter, difficult to classify, chemically complex, sometimes highly nitrogenous and sometimes nearly nitrogen-free, composed of mixed animal and vegetable matter—mostly the latter—in its intermediate forms of decomposition, far along in decomposition, but not complete. It is the result of the partial decomposition of the organic matter of soil, leaves, sticks, straw, stubble, roots, sod, green crops turned under, and the like.

During its process toward final destruction, and while being made into mold, this material is useful to the soil. It was that which gave the lightness and tilth to it in the earlier days through its accumulation for countless years, and which when man began to cultivate the soil was rapidly destroyed. During its formation it acts both in a chemical and physical capacity, which may be summarized as follows:

It benefits the soil chemically:

1. By supplying nitrogen directly;

2. By supplying phosphoric acid, potash, and lime indirectly.

It benefits the soil physically:

3. By augmenting its water-holding capacity;
4. By increasing its warmth;
5. By bettering its texture.

It benefits the soil biologically:

6. By affording food materials for micro-organic growth.

Humus as a Supply of Nitrogen.—The nitrogen of the soil other than that captured from the air by means of leguminous plants is of humus origin. It is a raw material from which nitrates are formed. Humus obtained from different sources carries different percentages of nitrogen, that obtained from stable manure and from leguminous crops being of the most value. It is generally stated that the humus content of the soil extends only to a depth of eighteen inches to two feet, but extensive experiments recently conducted in California on soils which have been cultivated to grain for many years show that the humus content extends very much deeper than this, even to the extent of six or eight feet. But the important fact is also developed that in this soil, which has been cultivated for so many years, the top foot carries only about one half as much humus as does the second foot, and is in much poorer tilth than the second foot. This means that from a chemical standpoint so far as nitrogen is concerned, in the case of deep-rooted plants, if we take pains to maintain the humus already there found and restore the content of the top foot, we shall continue to have soils which are well supplied with nitrogen. The top foot of this soil, however, is in extremely bad condition, which becomes evident from its great tendency to dry out rapidly and to become very cloddy and heavy.

Humus as a Supply of Mineral Plant Food.—During the processes of humification acids are formed capable of dissolving more or less mineral matter. The weight of evidence seems to show that potash, lime, and other mineral forms of plant food are combined with the humus, and in this form nourish plant life. It is altogether probable that these plant foods become available to plant life through the agency of the humus compounds.

Humus as a Soil Sponge.—Humus acts as a sponge in the soil in its water absorbing powers. Like all other kinds of organic matter, it holds water very much better than does mineral matter. A soil well supplied with humus may hold nearly twice the water that a medium sand will carry, and one half as much again as a medium sandy loam. When we remember that plants use from 250 to 800 times their dry weight of water during the growing season, and that under the California conditions it is of extreme importance for us to care for all the water which falls, it will be seen how vital the question of maintenance of a good humus supply is. Under the present conditions it requires a greater rainfall to produce the same amount of dry matter than it did twenty years ago on account of the lessened humus content of the soil. Not only does the humus absorb a greater quantity of moisture and hold it against drainage losses, and for the use of the plant, but it assists greatly the capillary rise of water, thus promoting growth in dry season, the moisture being more slowly and evenly conveyed to the plant roots. *The presence of ample humus supplies in the soil means success; its lack*

means disaster. The water-holding capacity of the soil may be lowered a quarter by reducing its humus contents by one half. The original moisture capacity of the soil and its pristine vigor may be largely reëstablished by restocking the soil with humus.

Humus Increases the Warmth of the Soil.—As black clothes are warmer than white ones, so the dark color imparted to the soil through the presence of a liberal quantity of humus will render the soil warmer, consequently the crop is thus made earlier and frequently frost injury warded off, although it is admitted that it might happen that so much humus was in the soil as to actually cool it on account of the slowness with which the water held by it tends to evaporate, so that in cases of soils very rich in humus the cooling effect might overbalance the increment of temperature due to the change of color. This latter condition, however, is seldom found in agricultural soils.

Humus Betters the Soil Texture.—By the incorporation of this organic matter in the soil, the porosity of the latter is increased and soil aëration bettered, and the weight of the soil is lessened and thus the increased pore space and lessened weight tend to promote easier tillage. As contradictory as it may seem, *sandy soils* are *made more compact* and retentive of moisture, *while clay soils are made more mellow and porous* by this vital thing, *humus.* It must always be remembered, however, that this easier tillage leading to a cleaner culture serves rapidly to deplete the soil humus supplies, and special pains must be taken to restore that which is constantly used up, owing to tillage.

How May the Need of Humus Be Diagnosed?—First, by one's general knowledge of the past history of the soil; second, by observing the relative action thereon of farm manures and of commercial fertilizers. By the tendency which the soil has to bake or to dry out rapidly, or in the case of lost soils the drift, will be vastly improved by the addition of humus.

It would require too much time to enter into a discussion of the effects of current agricultural methods upon the humus content of our soils. The condition of many of them is a standing commentary upon such methods. Suffice it to say that clean culture, while conserving moisture culture, tends rapidly to burn out the humus and thus rapidly deplete the soil, and with this loss the humus goes, also a serious loss of phosphoric acid, potash, and lime.

A grower, if he is wise, will keep some sort of track of the plant food outgoes and so adjust his procedure as to maintain the plant food, or at best to minimize the losses. There is much difference as to the effect of the character of farming upon the soil losses. In *grain farming* there has been a very serious loss of nitrogen, phosphoric acid, potash, and lime, especially from the top foot, in addition to rendering the top soil extremely refractory in cultivation. It is neither the time nor place to discuss the methods of restoring these grain lands.

The horticulturist is engaged in special farming, one which constantly withdraws plant food from the soil, and he has no recourse to any great extent to farm manures to assist him in the maintenance of the fertility of his soil. He is forced then to a more natural system, on the one hand, to maintain the humus supply by the use of green manure crops to be turned under, and by the artificial application of plant food on them

through the use of commercial fertilizers. But right here comes a source of danger, for the continued use of commercial fertilizers alone tend to aggravate the trouble by the exhaustion of humus. They supply little or none.

The function of fertilization is to augment crop growth, which means the use of humus. If we are to maintain soil productiveness by the use of commercial fertilizers alone, special measures must be employed to maintain the humus content, else rapid deterioration in this direction occurs. This should not be construed, however, as an argument against the usages of commercial fertilizers, but rather a plea for their proper usage in *connection with* and *not in lieu of* humus material. No one can hope to secure maximum returns from commercial fertilizers unless there is a reasonable amount of humus existing in the soil.

This brings us to the question as to how one may maintain and augment the soil humus. This may be accomplished by these procedures, all practicable, standard and long practiced by the best farmers, viz., (*a*) crop rotation, (*b*) the use of farm manures, (*c*) the practice of green manuring. While the first-named, *crop rotation,* is not available in orchard practice, yet on account of the fact that many fruit-growers are also interested in other farming operations, it is pertinent to say that *crop rotation* retards, where continuous cropping hastens, soil deterioration. The one maintains a higher degree of fertility, assists in the regulation of labor, aids in the combat with weeds, and makes for success; the other lowers fertility, reduces yields below the point of profitable farming, and is a spendthrift of humus. Rotation should be short and include leguminous crops. The fundamentals for this practice are to select three classes of crops, one which will sell well, one which has fertilizing value, and one tending to free the soil from weeds, money, manuring and cleansing crops.

As to the second method of securing humus, viz., the use of farm manures, I assume that no one before me is so foolish as to neglect their use when obtainable at a reasonable cost. Rich in organic vegetable matter, already partly decomposed in condition for and containing agents inducing rapid decay, it is ideal and rich humus of the best sort. No one gets its maximum value; many get but half.

PROFESSOR SHAW. Now, I have come to the end of the place to which I have written. I have not touched upon the other point, the matter of pre-manuring. That is the resource which the horticulturist has. I have occupied, perhaps, more time than I ought, yet I want to speak of this particularly. I am not a pleader for any particular kind of pre-manuring; I am sort of eclectic along this line. Get humus. I don't care whether you use pease, whether you use rape, whether you use various other corps which are valuable, but get it if you can, only get a small crop of it. Don't stop if you can only get three feet of growth. Get one if you can. Some people say, "I can only get pease to grow 8 or 10 inches." That is 8 or 10 inches better than nothing. And don't despise the burr clover as a green fertilizer. I am not particular as to whether you turn that crop under green or whether you allow it to grow dry during the season and turn it under, except that you will probably pay for the crop a little bit if you turn it under dry, but it will improve the crop the second or third or fourth year. I

would prefer, from my own experience, to turn it under green; I think I can get better results from it.

Now, as to green manuring. There are certain crops which are valuable to the grower in California for the improvement, by the addition of this humus, of the soil. I would say first of all, in northern California, and perhaps in southern California; in fact, I don't need to say much about that section, because they use it all the time down there. They would almost think as much of not picking their oranges. We must have a winter crop primarily. The Canadian field pea is quite the best success on our experiment station.

MR. ADAMS. May I interrupt you? There are about sixty varieties of field peas, and I was wondering whether you would name that variety.

PROFESSOR SHAW. Any of them. I realize that you horticulturists, in many cases, are in a very much better situation to handle these things than a common farmer, where he does not irrigate, but in most cases you can irrigate. These can best be seeded in October. You will get a satisfactory growth by the first or middle of February to turn under and vastly improve the soil by reason of these legumes, which reach out into the air to take the nitrogen. Rape makes a most excellent fertilizing material. *Vicia sativa* makes a satisfactory growth. All these plants are understood in the south, but in the north we have not understood the importance of these things. In the cereal industry we have got to do that, and I am constrained to think that in the horticultural industry we will have to do the same thing.

PRESIDENT JEFFREY. The Secretary of the Convention has made arrangements with Mr. Geraldson to present his views on this matter, as they are somewhat different from the ordinary views.

MR. GERALDSON. It is a pity that circumstances were not such that we could devote a whole day to this question. It is really the most vital question that can come before a convention. The foundation of all agriculture and horticulture is soil, soil, soil. If we have no soil we do not care about pests, we do not care about tariff. We might just as well get down to this question of soil and consider it seriously. You all really know, if you stop to think, how soil was made, yet probably not thought of. Originally this earth was one great big rock, and there was a lot of water on it. Then there came ice and snow at the poles and rain and wind in warm places, and the sun and wind broke the rock into sand, and then the rain fell and carried these rocks down the watercourse, and the rock broke into smaller pieces and became pebbles and sand, and then bars formed, and the lower forms of vegetation grew, and the seed dropped down and formed humus, and the next year it went through the same process, and formed more humus, and the humus and the sand formed soil. That process has gone on from the beginning until now, and now anywhere in the world—I don't care where you may be—the soil consists of pulverized rock and decayed vegetable matter. The Professor has stated plainly the importance of humus, and he has also shown you the absolute ruination following its departure from the soil. He has done it better than I possibly could. The whole question resolves itself right down to the best way to retain humus in the soil or get it back into the exhausted soils. The trouble with our orchards is due to the loss of humus, and absolutely the falling off in

our grain crops and all our crops is due to the loss of humus. Soil does does not lose humus; it is built up from year to year as long as we don't interfere with nature. As long as there is grass or a covering the humus increases. The policy of cultivating the soil is precisely on the same footing as the absurd policy of insane deforesting our mountains; the same policy of excessively overgrazing our hillsides. The three all come exactly under the same head, and lead to bankruptcy, ruin, and desert. Right now, all over California, up and down for hundreds of miles, the hillsides are as bare as this floor, and the cattle are licking the roots out of the ground. When the grass is all taken off the rains run down the hillside, and the green grass does not start. Keep your soil covered, keep your mountains covered, and new trees will grow up and keep us in lumber forever. Keep your hillside stocked with grass, and when it rains the new grass will come up quickly. Keep your orchards covered. Let nature's process of making humus go right on. The matter of stable manure and the matter of chemical manuring are makeshifts. Chemical manuring will lead us to bankruptcy first; stable manuring will lead us to bankruptcy second, and green manuring, where there is clean cultivation of the orchard, will lead us to bankruptcy, anyhow. They don't see what is coming after it. Nature did not make humus out of green grass or green leaves; it always took the dry, matured article. Green grass is all water. It is nothing, nothing. You bury it in the ground and you have nothing left. You turn under grass up to your knees and go under that ground in a couple of weeks and turn it over and put your nose to it and it is bad; there is a stink there.

I have a better plan to offer, a plan that lines up with nature's methods, gets natural, normal, sane, unlimited results, and is subject to none of these criticisms. You don't have to spend hundreds of dollars plowing and seeding and cultivating in the fall, and then plow it under in the spring. Cultivate alternate tracts in alternate years, and let the land that you don't cultivate this year go. Don't pasture it. Let the native grasses grow. You don't have to employ vicias. Nature will soon supply on this soil the grass that this soil needs, and on the other the grass that that soil needs. I believe the whole thing is automatic, and that nature is amply able to handle the thing. When soil reaches a certain point one sort of grass disappears and another comes up. That must be due to natural chemical conditions, making that grass necessary for the time and later on unnecessary. This applies to any kind of cultivation you can take up in California. It applies to orchard culture much better than grain. I come from Newcastle, up here in the hills, where the ground is sloping. We have something like 30 inches of water; it is all simply a matter of rainfall. Your humus is cultivated out of the ground, but a large percentage is washed out of the ground.

We call the space between two rows of trees the middle. One year we plow middles numbers one, three, five, and seven, and leave the others in grass. The next year we plow, two, four, six, and eight, and leave the others to grass. We started that six years ago. The first time we irrigated we ran trenches along to irrigate the trees. The first time we irrigated our water would soak probably two or three feet. The second

time it would soak a foot, and the third time it would go right straight through the bottom of a ditch, and the tree would show distress all the time. If you put humus in Portland cement it won't stick together. When we started this process, after a long lot of worry and consideration of the matter, we could grow perhaps two inches all over the soil. At the end of two years, instead of having two inches of scattering vegetation, we had grass as high as my head.

MR. MILLS. You mean between two rows of trees?

MR. GERALDSON. Yes; between the trees, the strips, we call them middles. At first we didn't see much difference in the ground we had plowed up, but as soon as we began to get a little grass growing on the ground—and the grass re-seeded itself. Nature re-seeds itself. She knows what seed she needs, and she puts a seed in that ground that has nitrogen in it. That is the way nature got nitrogen into the ground originally. As this process repeated itself it built itself up, just like an electric generator; the more you have, the more you get. When we get a little grass, conditions are better, and we get a little more. The hillsides around us are now bare, and in our orchard, where last year we had a good crop of grass, we have now 6, 8, or 10 inches coming up. That process will go on indefinitely, and will build up your soil indefinitely, and at the same time you can take off better and better crops, just as the German forest service is constantly taking off more lumber and having more and more on hand. As the professor says, it betters the soil in every way. We once irrigated every week. Now, if we do not irrigate for three weeks our trees don't show distress. Formerly our soil baked like rock; now it is perfectly crumbled. Formerly you could not put enough fertilizer on; we would put on chemical fertilizer and the trees would jump, and the next year they stood stock still. Now we don't use any chemical fertilizer. We use manure to get the grass started. We had worn 18 inches of top soil off trying to get good results. Now we have an unlimited supply of green grass. We have a fine big supply of dry grass to put in the soil to make the real humus. During the past summer our trees made the finest growth they ever made; our crop was the best. While much of our crop is on ground forty years old, it is at least equal to any ground up there. You all know the old story of diligent cultivation; you all know the defects. As long as you can get good results through diligent cultivation it is simply because there is enough old original humus in the soil. By adopting this plan nature does it all, and you go on from better to better, I believe to infinity. I can see no point where we are not better off than we were yesterday. (Applause.)

MR. MILLS. Do you say that you could not get barnyard manure enough on your ground to keep it in humus?

MR. GERALDSON. In the first place, there isn't enough barnyard manure to go around for all of us.

MR. MILLS. You gave the impression a moment ago that all the barnyard manure you could haul on to your ground would not reclaim the ground. You don't want that impression to get out?

MR. GERALDSON. I do. I make that now, that our ground will go to ruin with all the barnyard manure I can afford to put on it.

MR. MILLS. Do you say you are using no chemical fertilizers?

MR. GERALDSON. Not for seven years.

MR. MILLS. What are the grasses growing on your soil?

MR. GERALDSON. A bountiful collection. Burr clover is a very important part, and broncho grass.

MR. MILLS. Burr clover is the standby?

MR. GERALDSON. Yes; it seeds itself all over.

MRS. YATES. I can support this gentleman's theory perfectly. I abandoned plowing eight years ago, and have not had one bit of manure except what the cows made, and I think I have as find a stand of grass as the State can show on a hillside, and the trees are all irrigated in a basin shape. I have never sowed one ounce of seed. The soil is decomposed sandstone, and had but very little humus in it at the beginning, but it seems to be taking care of itself. I abandoned plowing for the reason that the plowing was done so very poorly. The people would plow up hill and down, and I had no teams of my own, so I abandoned the plowing system entirely. I like the system very much. Now I have a beautiful field of green grass and my neighbors have none. They have harrowed their land to death and washed their lemon trees out of the ground. (Applause.)

MR. PEASE. I want to ask Mr. Geraldson if he irrigates in the section where he lives?

MR. GERALDSON. Our plowing is done across the rainfall; across the water flow. We irrigate right across a plowed strip and then across an unplowed strip. It prevents wash, both by rainfall and ditch water.

PROFESSOR SHAW. I am very glad to hear that Mr. Geraldson is getting humus. I very much doubt, however, if he knows how he is getting humus. I don't care whether he plows it under dry or green, but I do want you gentlemen to understand this, and I don't believe Mr. Geraldson really wants to go on record as saying that stable manure is not a good humus forming material; and furthermore, I don't believe he wants to go on record as saying that green stuff plowed under is not a humus forming material. That is a pretty broad statement, and it is positively untrue.

MR. MILLS. As Mr. Geraldson said, this is vital, more vital than anything else for the north. I have talked with gentlemen in this house who have made a failure, and that is their failure. Mr. Geraldson has made some statements dogmatically, that if followed will be ruinous to Mr. Geraldson. The fact that he is not using any phosphates in soil will land him or his descendants in ruin. This thing ought to be discussed. If there is a place on earth that needs it, it is right here around Sacramento.

PRESIDENT JEFFREY. We can hardly give any more time to the discussion now.

MR. KING. Mr. Chairman, I move that this be given discussion on Friday afternoon.

The motion was duly seconded and carried.

PRESIDENT JEFFREY. The next number is "Local Value Forestry Work," by Mr. F. E. Olmstead.

LOCAL VALUE FORESTRY WORK.

By F. E. OLMSTEAD.

MR. OLMSTEAD. I should much prefer to let this discussion go on and defer my own talk. I want to speak very briefly about the mountain regions of California and their influence on agricultural interests below. It may seem like a pretty far cry from fruit-growing in the Sacramento Valley, for instance, to the care of the trees and the protection of the timber in the high Sierras, but, as a matter of fact, I think the relation is pretty close, and, at any rate, it will be very much closer in the future.

The national forests in California, as well as elsewhere, and the work of the Federal Forest Service is designed first of all to benefit the agricultural interests of the immediate vicinity, and as fruit-growing in California is, of course, the dominant agricultural interest, the work of the forest service should benefit you above all others. If it does not, in the future at least, something is wrong.

The history of all mountain regions the world over shows that the resources of the high ranges have always been neglected until they have had to be taken care of through necessity. Settlement, of course, in the first place has always been in the valleys when the country is opened up, and in many cases timber and the various resources of the high ranges have been impediments rather than anything else. California in a way is unique, because a great deal of the first settlements, of course, were made in the foothills and the mountains. But that was merely a scratch and the real settlement came afterwards through the building up of argicultural interests in the great valleys. In this State, as well as in most parts of the West, the need for some kind of systematic care of Government forests was first felt about 1890. From then on, what were then called forest reserves were created in California. They now include practically all the great mountain ranges of the State. They begin at the Oregon line and run south along the entire crest of the Sierras and on the other side along the entire crest of the Coast Range, with some few exceptions, so that the agricultural lands in the Sacramento and San Joaquin valleys are wholly surrounded by forest reserves almost without a break. In the first place, the forest reserves were created and nothing was done at all for their administration and use, and that naturally brought out opposition, and a great deal of it. It was like taking the resources and locking them up absolutely. That opposition brought about a very good thing, which was a law providing for the use of all the resources of the forest reserves, and a short time ago the very name was changed to get away from that idea of reserve. They are not reserves any longer; they are national forests, and the timber, the range and the water, and everything in the way of resources, is for use and is used.

Now, let us take up the resources, very briefly. First is the timber. There are about a hundred billion feet of merchantable timber in the national forests of California. Most of it, of course, is in the northern part of the State, some of it in the south, but not much. If these timber lands had remained in the public domain and had not been thrown into national forests, what would have happened? They would have passed

very quickly from Government ownership to private ownership, and, as many of you know, the tendency has been, and probably still would be, for private owners to gradually form large holdings and monopolies. That has already happened in some parts of the State. In other words, the interests of the people, so far as the timber resources go, would be in danger of not being properly guarded. As it is now, the Government owns, of course, only a small proportion of the merchantable timber in California, but it owns enough, at the same time, to have a very strong influence on market conditions. For example, there is no question whatever but what it could control local market conditions in the great valleys of Sacramento and San Joaquin, because the Secretary of Agriculture is empowered to sell timber at whatever price he thinks best and whenever he thinks best, if it is found that through monopoly of any kind the price of timber in any particular region is being held up at an exorbitant price; that monopoly can be broken, or at least very much modified, by the Government selling its own timber if any such necessity should ever arise. The first thing to do, of course, is to protect the timber we have, and the main thing is to keep out fire. It is pretty hard, but we are doing it better and better all the time. It is simply a matter of keeping enough men employed and keeping those men traveling the mountains in the fire season and jumping every fire at its start. As soon as a forest fire gets a good start it is almost hopeless to control it before immense damage has been done. The main thing is to stop the little fires at the start. A great part of the work had been to create a good public sentiment in regard to the fire question, and that has already been done, and California in that respect is away ahead of the rest of the country; they are very much more careful here than in any other part of the West.

Forestry is a sort of agriculture, and we treat it as you would treat an agricultural crop. The object is to make that land produce that crop of timber which is most valuable and which that land can best support, and to keep that timber growing continuously. For instance, we are selling timber all the time, but the trees are cut in such a way that instead of the lands becoming barren, burning up and becoming waste, a certain proportion of the stand is left, trees of all ages, and fires kept out, so that those trees that are left set up the land again and you have new trees coming all the time, and thus you are always assured a continuous supply of timber. That is the object in the timber business. Not only do we want to keep timber growing on the land, but we want to improve its kind and its quality and its quantity, and we can do this by very careful cutting, which we always insist upon. That applies, of course, particularly to the Government, because the private holder must get certain returns upon his capital and he must get them in the immediate present. With the Government it is quite otherwise. The Government can be satisfied with very low returns at the present time, and it can wait years and years for second crops, so that conservative forestry is very much more easily handled by the Government than by private owners, although it is possible for private owners to do very much more than they are doing at present.

Now, as to this timber matter in its relation to fruit-growers. You need, and always will need, lumber and timber for your houses, fence posts, stakes, shakes, wood for all kinds of uses. The agricultural pos-

sibilities in the great valleys of California are in their infancy. They are nothing at present compared to what they will be. There will be two or three times as many homes. The demand for lumber will always be increasing. It is pretty important in that connection that you be assured an accessible supply of wood at reasonable rates. Wood is a necessity; we will always need it, and that is the cardinal principle in the management of the national forests of California, to always keep enough timber on hand for local use. If there is only enough timber in a certain national forest to supply the future needs in that given locality, we do not sell a stick of it for export. We keep it right in that locality for present and future use by the ranches. We try to work to the end that local interests will never have to go outside and import timber which, of course, would be very expensive and inconvenient, so we are keeping the timber right in the country for continuous use in the future, and it will never be shipped out unless there is a surplus which can not be used locally, and then, of course, it will be sold and not allowed to go to waste.

Then about the water; that is another thing you need. You will find more and more water, and you want a steady supply. The national forest will accomplish that, simply in this way. Forests do not make any more rain—at least, nobody has ever proved that they do. What they do is to hold the rainfall when it comes and regulate its flow down the mountain slopes. That is the main influence they have. If the whole Sierra range were smooth and barren the rains would rush off quickly in flood waters, and a great deal of it would be waste. With a forest cover, with a brush cover, with a good grass cover even, when the rain comes it forms a reservoir and lets the water run off slowly, and especially holds it for the latter part of the season when, as I understand it, it is needed very badly indeed.

There is another thing connected with the water supply of the national forests, and that is the power question. The power resources of California are as but yet very little developed. They are likely to be enormous in the future. It is simply impossible to figure to-day what they might be. The policy of the Federal Forest Service in regard to the power question is simply this. We believe that electric power generated from a flow of water is so very important now, and will be so very much more important in the future, that the power companies should be under some kind of control by the Federal Government. The water, of course, is appropriated wholly under State laws, but the land belongs to the Federal Government; the reservoir sites belong to the Federal Government. The rights of way for ditches, conduits, power lines, belong to the Federal Government, and the sites for power-houses, also; and further than this, the fall of water, which is due to the configuration of the land, belongs to the Federal Government. It is not one thing alone which makes power, it is a combination of all those things; it is not the water alone, not the land alone, not the protection which we give the land, not the fall alone, but it is a combination of all those things; and our opinion is that it is only fair to keep the title to the land with the Government; give the power companies long leases, 30 or 40 or 50 years, for their power-house sites, their reservoir sites and their rights of way and to charge them a reasonable rate on the total amount of power developed. Of course, there has been a great deal of opposition

to this. There was an attempt last year to pass a bill in Congress granting patent and fee simple to the power companies of the necessary land, and there will probably be another attempt at this session. But the power question is likely to be very important also to the agricultural interests in the valleys below. You will use it more and more for light and heat and pumping and mechanical power of all descriptions, and what we are working for in that respect is to see not only that we keep a general control of the whole situation, but that whatever power is taken out of the mountains is utilized completely and to the best advantage, and there is another local question. We want to look out that power is not taken from one locality completely out of it, to the detriment of local interests, and we expect to see very carefully to that.

Now, the range. The range, of course, does not affect you directly. It is only a small fruit-grower in the foothills that is concerned, so far as the agricultural interests go. He has an apple orchard and a few head of cattle usually, and the range in the immediate vicinity of his ranch is kept for him against outside cattle or sheep—at least, that is the intent. It is the man with a small holding who is making a home who is always favored in all these things, so far as we are able to do it. Of course, the prosperity of your fruit-growing industry depends directly on the prosperity of the stock-growers, because if one thing is prosperous everything is prosperous, and if the stock business goes to pieces you are bound to feel it more or less. The intent of the national forests is not to overstock the ranges, but to keep just that number of cattle and sheep on them which the range will support, and to gradually improve the various kinds of grasses and other forage. So far as the use of the land goes, the forest reserves do not shut out homestead entries at all, which is often misunderstood. There is a law now, which applies the homestead act inside of national forests, and if there are little patches of agricultural lands lying around in the meadows and valleys inside of the national forests they can be settled up and homes established.

You have a State Forest Service here which is a mighty good one, and we are coöperating with it in every way we can. The California fire law is the best in the whole country. It is very much better than the Federal fire law, much easier to work with and very much more effective, and we use it a great deal. Our officers are deputy state firewardens. The State of California could do a little more along that line, however. We ought to have State forests and State parks, a good many of them. Of course, it is a great shame that the school lands and State lands have slipped away in the manner in which they have. If the State still had possession of those it would have hundreds of thousands of acres of State forests and State parks, but it is not too late to begin.

Then it is also a question which seems to me a very important one as to whether there can not be some slight State control of lumbering on private lands. You have a State control of placer mining; that is controlled by private interests. The effect of logging and lumbering on private timber lands is just as important, if not more important, than the effect of placer mining on the lands below, and is there any more reason why State control should not be extended to private timber lands as well as to private mineral lands? It is bound some day to be of very great importance, and it seems to me it is a question which is surely coming up for your solution.

Now, just a word about the organization of the service. There is a new organization just gone into effect. Of course, the ranger is still the man who does the work. The forest rangers are sprinkled all over the mountains with little cabins and meadows and pastures of their own. They get the brunt of the fight. They patrol for fires, they make small sales of lumber, they look after the stock, they keep two or three horses and get very little in the way of salary. Most of them are in it because they like the life. There is a supervisor on each of the ranges and he does the business in his office, locally. Just recently there has been an office established in San Francisco, of which I have charge, which has direct control of all the national forests in California. That is an advantage. Formerly the control was in Washington, D. C. Now it has been moved West. The whole national forest business in California will hereafter be done from the San Francisco office; that is, the control of the thing. That, it seems to me, is a mighty good idea, because you get a certain man in that San Francisco office who will stay there. They become familiar with California conditions; they will make their homes in California; they will be California citizens, and their work will be permeated with the California atmosphere, which is absolutely essential to success.

It is not an easy matter to show clearly in a brief talk like this just how the national forests affect fruit-growing, but I have tried to show you that it affects it, at least indirectly, in a great many ways. The big holdings in the valley will be divided up as time goes on; the farms will become smaller and smaller, and the cultivation more intensive all the time. That means more people and more homes, and I know you will not forget that in that connection at least a part of your future prosperity will depend upon an accessible supply of timber and wood ready at hand always at reasonable cost, an ample flow of water and a regular flow of water for irrigation and domestic use, and a wise and fair use of that same water for purposes of generating electric power. I thank you very much. (Applause.)

PRESIDENT JEFFREY. The next number of the program will be by State Forester Lull, who will present a paper on the local aspects.

STATE WORK IN FOREST PROTECTION.

By G. B. LULL.

Mr. Olmstead has covered this field so thoroughly that I do not feel it is necessary for me to take much more of your time, particularly as when I came in I noticed you were very much engrossed in an interesting discussion which you propose to continue later. I shall take but a very few minutes. Mr. Olmstead has told you that the national forests in California, situated on the steep mountain slopes, cover an area of approximately 23,000,000 acres. He has told you about the policy of the forest service; why those reserves are being maintained; why the timber and grazing interests are being protected, and so forth, and has mentioned, incidentally, the State forest laws of California. It is the operation of the State forest law that I want to talk particularly about. In the first place, this law applies to the State, whether the land

is included in national forests or not, and, as Mr. Olmstead has said, the law is more workable and more effective than the Federal forest law, and for that reason is used more widely by the Federal men themselves than is the Federal law. In the national forests the rangers and employees of the Federal service, in the first place, are made firewardens; and this is for the purpose of giving them control not only of the public lands which they would have control of anyway under their ranger appointments, but in order to give them control of the private lands, for on these 23,000,000 acres there are a great many large private holdings which the rangers would have very little control of except through their appointments as firewardens, which give them power to handle them promptly.

This law provides numerous things, but most important among them is the power of a firewarden to arrest for any violation of forest law and the violations that fall under these headings. First of all, for use of fire in the dry season without a permit. It may seem rather hard, at first glance, to require a man to get a permit before he burns brush on a little ranch next to the foothills, but the idea is not to work a hardship on that man, but to protect his neighbor, because he might use poor judgment, start that fire on a hot day or when a strong wind was blowing, and it would escape from him, and it does damage to his neighbors and to the watershed. The idea is protection and not persecution. The burning permit, then, is required. In addition, the firewarden is vested with authority to compel assistance in putting out fires. The State requires its citizens to act in case the public safety is jeopardized by hostile forces or anything of that kind, and the same principle is followed out in exacting help from the citizens in time of fire. The idea is, the firewarden should have the means of getting help quickly in case of fire in order to stop what might turn into a very serious conflagration. These firewardens, then, are appointed on the forest reserves and they cover this 23,000,000 acres. But outside of that we have in California an area of about 77,000,000 acres that have no Federal men patrolling and watching for fires. Of course, a large part of this area is not subject to fires, but a considerable area, covering the great grazing areas and the foothills, brush lands and timber lands in private holdings, are subject to very serious fires, and the only way we have at present of controlling fires on those large areas is through these firewardens. At the present time we have about 725 firewardens in the State. They are distributed everywhere from San Diego to the Oregon line, and are working in most cases without pay, because the State has made no appropriation from which these men may be paid for their services. The appointment is conferred upon them; they are given a badge to show their authority; they are given fire warning notices to post about their district to show what the forest provisions are; they are furnished with the law printed in separate circulars, so it can be distributed well, and with blank books containing burn permits, in order to enable them to conduct from their home places an educational campaign to advise the people of the State what the law prohibits, what measures must be taken to prevent fires. From every one of those 725 firewardens there radiate these educational notices to advise what may and may not be done. We have been at this work now a little less than four years, and in that time these firewardens have been appointed and the educational work has been extended to the

point that I doubt if there are very many well-read people in the State who do not know practically what may and may not be done without the risk of punishment. Through these firewardens we have brought a great many careless and malicious fire setting cases to trial, and in the majority of cases we have secured convictions and fines. This is not done in the way of persecution in any case, but as a warning; to get a more livable condition in the State. We have had in the past year something like 900 fires, and the average size of the fire is something over 350 acres. You can see how necessary it is to have men thickly scattered over the State who are interested in suppressing fires, and who will get there quickly. In a great many cases I have gone through the country and found fires smoldering after they had been burning a week, and no one paying attention to them, and when I asked the reason it was said they were doing no damage. Look at the damage done by the Humboldt fire last summer, when not only were millions of dollars worth of property destroyed, but two or three lives. It is those things that we must expect from every fire, and means should be taken at once when a fire starts to put it out. We are then dovetailing this work in with the great work being done by the Federal service, in order to protect the forest areas of the State, and Mr. Olmstead has outlined to you how necessary those forest areas are to you from the standpoint of timber and water.

Another point which may be of interest to you is the use of windbreaks as a protection to your orchards. Going through California, and particularly southern California, where the horticultural activities have become highly intensified, I have noticed that there is probably no orchard which does not have it windbreak of eucalyptus and spruce trees. We are prepared to give what information is available on the methods of best propagating those trees, and will be very glad, indeed, to aid you in whatever way we can in that direction. The State makes a very small appropriation for our work, and we have no seeds to distribute—I say this because we receive frequent requests for them—but in the way of advisory aid we are always glad to give whatever time we can to it.

I think that practically covers the ways in which we are now striving to bring about better conditions. I mentioned a few moments ago that our firewardens are unpaid. I think this is a serious mistake the State is making. You can not expect effective work from an unpaid man, whether he is a firewarden or a governor, and we want some means devised by which the firewardens can be reimbursed at least for the expenses which they personally incur in putting out fires. We can not expect their enthusiasm to last long enough to give permanent protection to the State unless they are encouraged in some way. Last year the Federal Forest Service offered to contribute toward the support of firewardens that they would put on in counties that have foothill forests adjoining the national forests, if the county in which that forest was located would in turn appropriate an equal amount. That offer held good during the latter part of the summer, and I personally went to San Diego, Kern, Tulare, Fresno, and Madera counties and secured from those counties appropriations sufficient to pay two firewardens during the dry season. The Federal Government put on two men in each case. The work that has been accomplished in those counties has proven that the system is a good one to follow, and we want more of the same kind of work.

But why is not the State prepared to go in and take the place of the Federal Government in this case, or why don't the State, the county, and the Federal Government go in together? So far, the State has stood back, and the only money ever paid for fire protective work in this State has either been done by the county units or by the county and Federal Government together, except in the case of the institution at Riverside; but we want some recognition on the part of the State of our interest in these things, and we want some appropriation from which these firewardens may be paid for their services. It won't be expended, probably, to pay 720 firewardens, but it will be expended to pay 70 of them. Let these be the ones detailed to do the work. Let one man in each county who is at the head of these firewardens, and whose duty it is to go about the county throughout the dry season and educate the people in the forest law, take charge of fires and do that sort of work. I see no reason in the world why the State should not put up an appropriation that would enable the forest officers to say to any county: "If you will appropriate $250 for fire work this summer the State will meet you with an equal appropriation. I see here an Assemblyman, and I hope that he will lean kindly toward that idea when it is presented later. I thank you. (Applause.)

MR. LIVINGSTON. I was very much pleased with Mr. Olmstead's address. I have noticed our new power lines coming down through the valley and several other places, and I have been somewhat worried, thinking it would be but a short time before all our power sites and water power had been gobbled up by private corporations, and I am much gratified indeed to understand that the Government holds the key to the situation, and I hope that the office having been moved to San Francisco will not be permeated by any of that atmosphere down there, and they will stay straight. (Applause.)

MR. KING. Here is an opportunity for this Convention to act; here is one of the principles presented to you that is important. Private enterprise is a menace to some of these public utilities. If the General Government in years gone by, in 1843 and 1845, had said, "We will not give rights of way for the railroad companies, but if there is a necessity for that kind of transportation the Government will furnish it," you would not face the problem which you are against to-day in the matter of transportation. Now, gentlemen, public utilities are still on sale. They are in the market to be auctioned off, and if the horticulturists and the agriculturists of the State of California want to do a good work here, here is an opportunity to memorialize Congress that they do not become a party to giving up these public utilities. Now here is your opportunity to have your Committee on Resolutions formulate a resolution which might properly go to Congress, asking Congress that they give up no more rights of water for power or anything else. (Applause.) I agree with what the last gentleman has said, that it would be proper for you gentlemen in the conservation of your own interests to go before the Legislature of the State of California with a resolution that the forests should be protected by paid employees. You can not get any man to work for nothing. I have been an employee all my life; I have been on salary; but I never would consent to work for any man or any corporation without remuneration, and you can't get protection in your forest

reserves unless you come to that point. Of course, that means taxation for you and me; but we want to look into the future and see what it contains. America is growing by leaps and bounds, and there is a population to come into California one day that will surprise the world. Here is the empire State; here is the biggest and most important State, and I think there is no area in the world that has so many possibilities as the State of California; and it remains for you and me, having that in view, to conserve all its interests and not give them up to private enterprise. (Applause.)

MR. SWINGLE. I only want to take one minute of your time to call attention to a fact which perhaps as an outsider I can see more plainly than some of the later residents, and that is, that the great interior valley of California is only imperfectly settled; that it will some day become the seat of an intensely wealthy population, and also in my opinion the foothill region of this State is destined to become one of the best fruit-growing regions of the world. To vote away the Federal control of the power of franchises would be a grave danger to the future of this State, because it is in the foothill region that Federal control is apt to be of importance to the fruit-growing region.

MR. SPRAGUE. To emphasize the necessity for being able to command assistance in forest fires in expediency, I want to give just a moment of experience in a forest fire myself this summer at Lake Tahoe. We do not know how the fire started, and all the force that was available in the immediate vicinity was at once called out, and I took a shovel with the others—a shovel is the way we fight fires mainly—and we worked as I had never worked before. I would drop down, and after resting a moment get up again and go after it, and we gained the best of the fire; thought we would be able to stop it in about half an hour, and all at once it jumped in three places immediately. Then, of course, we had to go and fight those before they got started very much, and we were just on the point of failing and the fire getting into a great forest that would sweep away hundreds of acres when two men unexpectedly came to us and they took shovels and with their aid we stopped the fire then and there; but had not those two men arrived there would have been a tremendous loss. The necessity of being able to command any assistance at critical times, it seems to me, can not be questioned. We ought to have this aid given by the State.

MR. DARGITZ. Just a word additional to stow away, by which we can give practical aid to the matter of compensation to firewardens. Every one of us is more or less acquainted with the Assemblymen from our districts. We can give them a word of suggestion that will probably bear hard. In our district the Assemblyman elected this year is a fruit-grower. I am sure that the horticulturists will be able to get a hearing with him.

MR. LIVINGSTON. I would like to ask if Professor Shaw will be here to-morrow afternoon.

PROFESSOR SHAW. I will not be able to be here.

MR. LIVINGSTON. I want to ask what you consider the relative value of a cover crop plowed under green and that same crop left to dry and plowed under. What is the relative value as a humus producing food?

PROFESSOR SHAW. The ultimate result will probably be the same. There will be a more immediate result on account of the more

rapid action from the plowing under of that crop green. The action would be slower and you would probably get less results from the first year or second of that plowed under dry.

MR. LIVINGSTON. Would we get the same percentage of humus from the green as from the dry crop?

PROFESSOR SHAW. Probably not in one year.

MR. SPRAGUE. Mr. Chairman, I think it seems to many of us that Mr. Geraldson has introduced something of fundamental importance. How much of cultivation the method needs for particular places and crops is a matter to be determined, but it is very important that it should not be misunderstood, and lest there be some here now who will not be here when it is discussed to-morrow I would like to ask one or two questions. I would like to ask if it is not true that he uses all the water he can get the ground to absorb during the entire growing season, both on the middle space which he tills and that which he does not till.

MR. GERALDSON. I know I am going right straight against popular opinion and popular ideas. We buy water by the miners' inch; we do not buy it by the cubic yard. We take a certain stream all summer. Formerly, we turned the water in and it would soak out through the bottom to the ravine. The first year we started the new plan we had to buy 20 per cent more water. Now we don't buy any more than we formerly did. Where formerly we had to irrigate the trees every three or four days or a week and they showed distress, now we irrigate them every two or three weeks and they show no distress.

MR. SPRAGUE. The question was, Does he not use all the water he can get his land to absorb, both the plowed and unplowed space, during the season?

MR. GERALDSON. No. For instance, we use eight inches of water on seventy acres of orchard. We could run that eight inches on five acres all the time if we wanted to, so we are only using it on 1-35 of our land.

MR. SPRAGUE. You aim to irrigate the unplowed space?

MR. GERALDSON. We plow across. The grass on the unplowed strips prevents wash, and also we have got enough humus now in the ground so that it won't wash much. Formerly we did not dare run it down, because it would cut a deep ditch. Now we have so much of last year's grass, and it is all caught in the next middle.

A MEMBER. What is your object in plowing at all?

MR. GERALDSON. To prevent fires, mainly. We have got so much grass there that if it was not plowed it would all go up.

MR. LIVINGSTON. Then you irrigate in ditches across both the plowed strip and the unplowed strip?

MR. GERALDSON. Yes.

MR. LIVINGSTON. You irrigate opposite the way you plow?

MR. GERALDSON. Yes, at right angles.

MR. MILLS. Do you cultivate the plowed portion of the orchard after each irrigation?

MR. GERALDSON. No, we do not cultivate in the summer.

MR. MILLS. Leave your furrows open after irrigation?

MR. GERALDSON. Yes.

MR. MILLS. And you irrigate seventy acres with eight miners' inches?

MR. GERALDSON. Yes.
MR. ADAMS. You have a pretty heavy rainfall?
MR. LIVINGSTON. About thirty inches.
MR. MILLS. That is deciduous crops?
MR. GERALDSON. Yes.

PROFESSOR SHAW. I want to point out, if I may, just this fact, that I don't think this gentleman and myself are in very great contradiction. He believes first in getting humus in the soil. I believe in getting humus in the soil, but there are some vital things which I believe are wrong, practically and scientifically, in certain statements which were made. He is following a practice which will get humus in the soil undoubtedly, but there are other things which have to be taken into consideration.

MR. MILLS. I hope next year, Mr. Chairman, that there shall be given to this very important question a whole day, if necessary, to get into the minds of the people a knowledge of the soil that they have not got, because they have not studied it. Those of us who have been put up against disaster and have had to study it for our bread and butter can bring you something. You are in a like condition now and you must begin to study. Every farmer ought to be like a lawyer; he ought to have his library, to which he would go when difficulties confront him, and dig it up. You are not doing that.

A recess was taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

The Convention was called to order by President Jeffrey at 1:30 o'clock P. M.

PRESIDENT JEFFREY. The first paper this afternoon is "The Invasion of Noxious Weeds," by Professor Elmore Chase.

THE INVASION OF NOXIOUS WEEDS.

BY PROFESSOR ELMORE CHASE.

During the past two years, dating from the flood period of 1906, we have had in this valley the greatest invasion of noxious weeds known to horticulture. There are also many kinds of weeds that may be called standard weeds, always on hand and ready to do the service they are so well qualified to perform. These, also, seem to have received reinforcements, so that to-day we have an army of weeds marching triumphantly into fields of our most valuable land.

But in considering noxious weeds we should not overlook the fact that they have a valuable mission. Some one has said, "It would have been a sorry time for agriculture if there had been no weeds. They have made us stir the soil, and this stirring of the soil is the foundation of good farming. Good farming and judicious tillage should always keep the weeds down."

A weed is a plant that is not wanted. There is, therefore, no species of weeds; for a plant that is a weed in one place may not be a weed in another place. A plant that is a weed in an orchard may be a useful plant to the stock-raiser. There are, of course, species that are habitual weeds, but in their wild state they can not be called weeds.

The following are some of the most troublesome weeds, each of which will be so treated that they may furnish a topic for discussion on the floor rather than an exhaustive treatment.

Bermuda grass (*Capriola dactylon*), when it grows on pasture land, is not a weed, but a nutritious food, especially for horses, but in cultivated lands with abundant moisture it is very difficult to destroy; but by clean cultivation and frequent use of the spade it will give but little trouble. The most effective method is to turn the soil upside down by means of plow or any tool, leaving the roots exposed to the sunshine, especially during the dry season. One such treatment will completely destroy the plant.

Cockle-bur. There are two species of this weed, *Xanthium strumarium* and *Xanthium spinosum*. The strumarium has green on both sides of the leaves, which are rough and irregularly toothed. The burs are three fourths of an inch long, with two stout beaks. The spinosum, however, has branching stems, very spiny, with long, triple spines by the sides of the leaves. The former has ovate-cordate shaped leaves, and the latter lanceolate and white on the under side. These weeds appear later in the season and do not attract the attention of the weed killer till the season of orchard cultivation has passed. Both are annual plants and are easily destroyed by good cultivation, but they grow by the wayside and in neglected places in the fields; hence, in order to exterminate these weeds, every nook and wayside place should be examined, and by skillful use of the hoe before the plant has reached the blooming age, one season is certain to exterminate both species of this very troublesome weed.

Horehound (*Marrubium vulgare*) is so well known that it needs no description. It is grown in some places for its bitter aromatic juice, which is used in candy and in medicine for coughs and colds. This is a perennial herb and is making great strides in meadows, pastures, and byways all along the coast, especially in Oregon and Washington. In sheep pastures it has become the most troublesome weed in the field. Sheep feed upon this plant, especially upon the seed vessels, and the bracts of the seed vessels cling to the wool and the seed is scattered wherever the sheep wander. The seeds are also disseminated by the water, hence all overflowed land is badly infested with this weed. It is easily destroyed by cutting down the plant before it blooms. Well cultivated fields are not much infested with this weed.

Crab grass (*Syntherism sanguinalis*) is an annual, the seeds of which are disseminated through the water for irrigation purposes, but it is not difficult to keep down, especially where the irrigation is moderate and cultivation frequent.

Star thistle (*Centaurea solstitialias*). This pest is quite troublesome in Butte County. It is an annual, branching widely, covering much space in pastures. It belongs to the same family as the bachelor button. There are many species of this plant cultivated in flower gardens. This *solstitialias* is not so common as many others of this class and less ornamental. It has conspicuous yellow flowers tipped with from three to

five prickles palmately spreading, the middle bracts also having stout spines. No one seems to know how to eradicate this, but being an annual, if it can be prevented from going to seed, it will soon disappear. It does orchards but little harm, but it is troublesome in all grainfields, and there are several thousand acres along the river.

Wild morning-glory has given a great deal of trouble and expense in this valley, but its destruction can be accomplished by careful cultivation and judicious tillage. If a good weed cutter is used, cutting a plant a few inches below the surface as often as the plant shows itself above the ground, it will be destroyed in one season. It is distributed in wheat and barley, which often contain many seeds of this weed.

All these weeds have been introduced from other states. It may be added in regard to Bermuda grass and crab grass that their presence in alfalfa is due largely to excessive irrigation.

The limits of this paper will not permit even a brief discussion of any more noxious weeds, and these have been mentioned for the purpose, as was said above, of calling forth discussion from the floor. There remains one which is said to be the most troublesome weed in the United States. It was introduced into North Carolina from India some sixty years ago. From North Carolina it was introduced into Alabama by a man named Johnson, and from this introduction it has found its way into more than half of the territory of the United States. It is known in botany by the not very euphonious name of *Androphogan halepense,* but in our statutes as *Sorghum halepense,* otherwise Johnson grass and wild millet This plant is a stout perennial with smooth erect culms, and in its native state in northern Europe grows 3 to 6 feet high, but in this State it reaches 10 feet in height. It has a strong creeping root-stock which penetrates into the soil from a few inches to even five feet, according to the mellow condition of the soil. The flowers are on a variable panicle somewhat resembling the head of oats, but more branching, much longer and somewhat drooping. Its blossoms have a showy purple appearance, ripening into a hardy seed resembling millet, so much so that in some localities it is known as wild millet. It is abundantly grown in the Southern States for hay, where it makes a very rapid growth, but when it has once been established it becomes a very serious pest. In Europe it is much admired as an ornamental grass, and in the north it is cultivated for that purpose. During the high water period of 1906, along with several other weeds, it has made an invasion into the rich soil along the banks of our rivers.

Recent investigations concerning the extent of territory now more or less occupied by this weed which immediately concerns the farmers in the Sacramento Valley reveals the fact that it has a vigorous growth in the orchards and fields in Yuba, Placer, and Sacramento counties. To such an extent has it taken possession of the soil that in many cases fruit-growers have abandoned their orchards. Placer County supplies the seeds for distribution through the irrigation ditches and the North Fork of the American River. During the flood periods of the latter, large quantities of seed, not only of Johnson grass, but of nearly all the other weeds mentioned above, are left upon the overflowed ground, both on cultivated fields and uncultivated banks.

From the statements of the owners, many interesting accounts of its origin are given. In Placer County it is stated that a great spoonful of

Johnson grass seed, some fifteen years ago, was sent to the subscribers of some San Francisco paper as a premium. Several purchased twenty-five cents worth and planted it both for hay and nursery stock. One nurseryman did a large business in shipping the root-stocks to New Mexico and Arizona. In Sacramento County, beginning a short distance above Folsom and extending as far as Perkins, which covers the territory recently inspected, there are not less than one thousand acres which have been more or less infested. A larger portion of this territory was planted with seeds by means of the American River through the irrigation waters and the overflow. Some three or four fields were stocked with it for the purpose of furnishing food for cattle and hogs. From reliable sources, information has been received that this weed pest is found in increasing abundance on the rich lands of the Sacramento River bottom subject to overflow. It is growing with great vigor in Yuba County, in and about Biggs, Marysville and on the fertile lands on the banks of the Feather River. It is alleged that on these rich lands the stalks grows to the height of ten feet and the root-stocks are larger than a man's thumb and reach from a few inches to ten feet in length. To such an extent has Johnson grass become a serious menace to cultivated fields that the Agricultural Department at Washington, through the Bureau of Plant Industry, began investigations and experiments in 1902 for a method of eradicating it. In 1907 the results of these experiments, conducted by J. S. Cates and W. J. Spillman, were published in a Farmers' Bulletin, No. 279. These bulletins can be obtained from the Department of Agriculture by asking for them.

In order to exterminate all noxious weeds, there should be a distinction between annuals and perennials. But a more important distinction should be between roots and root-stocks. The want of a clear distinction between these two has rendered the task of eradication difficult and expensive. The function of the simple root is to hold the plant in place and supply it with food. The function of a root-stock is entirely different from that of a root. The root-stock is an underground stem for storing up starch and sugar for the nourishment of the future plant. It has none of the offices of the root. The common Irish potato is a condensed root-stock or underground stem. The eyes of the potato are simply leaf buds, so also are the joints in the root stocks of Johnson grass. If you cut a potato into as many pieces as there are eyes, each eye will send forth a stalk. Plant a potato whole, only the more vigorous eyes will send forth stalks. Plow up and cut up by cultivation the root-stocks of the Johnson grass and every piece thus cut will send up a stalk of grass. It has been found that these root-stocks do not live over from one year to another; that these root-stocks are dependent for their growth in a year upon the amount of top which the plant is allowed to produce. If you were to keep the potato plant cropped close, you would not expect it to form very many potatoes, so if you keep Johnson grass cropped close to the ground, it will not form a very extensive root-stock system. It has been found if the land be pastured closely for a whole season, that the root-stocks, instead of being many feet deep and as large as your thumb, are confined to the upper few inches of the soil, and very small. If the land then be broken shallow and given careful, clean cultivation for a few times, the Johnson grass will be killed out. If the pasturing fits in with the cropping system, the grass can be killed out

with practically no additional expense. If lands are put to meadow, the same result will follow, provided the hay is cut sufficiently often during the season. Potatoes begin to form about the time the vines begin to bloom, so the root-stocks begin to form about the time the plant begins to bloom. It is therefore important that the grass be cut before it comes out in full bloom. This kept up for one season, the root-stock system will be very small. If the grass is not cut, however, until it gets out in full bloom, the plant will form large root-stocks, and you will have accomplished but little. If it is not practical to pasture orchard lands, the grass can be killed out in one season by careful, clean cultivation, if pains be taken not to let it get more than one foot high at any time and simply keep persistently at the job. This can generally be done at the cost of from $5 to $10 an acre. For making meadow of Johnson grass alfalfa is the best thing to plant, for it must be cut so frequently that the root-stocks can get no start.

One means of eradicating is by plowing a field in the fall and sowing barley, and after the barley is 8 or 10 inches high, pasture it for a season, then remove the stock and allow the barley to mature. After the harvest of the barley, turn in the stock for pasturage.

Lands liable to be infested by irrigation or the overflow of the river can be kept clean by prompt cultivation as soon as the soil is dry enough. Though this weed is one of the most difficult to eradicate when once established, the young plant is one of the easiest to destroy if taken before the root-stock has begun to develop.

It will be seen that all weeds can be destroyed by good tillage and clean cultivation persistently followed. But every man must take care of his own weeds just as faithfully as he must take care of his own cattle. No one has any moral or legal right to permit his weeds to invade his neighbor's fields, whether the neighbor lives just over the fence of in Yuba or Placer or Sacramento County. Nine tenths of this weed invasion is due to neglect on the part of the cultivator, and to the extent of that neglect he is robbing his neighbor of the products of his own labor. So serious has the matter of noxious weed invasion become that some vigorous action is demanded. (Applause.)

MR. RIXFORD. I rise to make what might be called a personal explanation. If the Bulletin distributed Johnson grass, I am responsible for it. I was business manager of the Bulletin at the time, and I wish to say that the Bulletin never distributed Johnson grass. If this man says it came from that office, there is some mistake about it. I presume all of you may have bought alfalfa seed that contained something else. Every seedsman doesn't always furnish pure seed.

PRESIDENT JEFFREY. When we went out on the demonstration train the other day up as far as Anderson, every farmer who came in that car was interested more in the display of noxious weeds we had than in any other thing, and they told us it was an enormous peril.

MR. PEASE. Mr. Chairman, while the gentleman has dealt with the Johnson grass, he has almost entirely left out the morning-glory, which is taking the lower part of California. The morning-glory is our worst pest. In fact, there are a great many orchards in Santa Barbara County and in Ventura County that are entirely given up on account of the morning-glory. It is the hardest thing we have to contend with. We have tried all sorts of experiments to get rid of the enemy, but it is still

growing and gaining on us every day. There is one gentleman in Carpenteria, Santa Barbara County, who has started in there experimenting and made a success of it, by losing the use of his ground for one year and cutting four inches under the ground twice a week during the summer season. He was so afraid that he would forget to cut it that he put a notice over his door as he went into the dining-room, and it said: "Cut your morning-glory," and he cut it every Tuesday and Friday, and the morning-glory never showed up the next year. I know another gentleman that lives close to me that three years ago only had a small piece of about thirty feet square. He said, "I can get rid of the morning-glory; I will smother it out." He put on six or eight feet of mustard straw over this morning-glory. He left it all through the summer and in the fall he set fire to it. The next year he had a beautiful crop of morning-glories, not only in that spot, but it had run out six or eight feet. Then he plowed it and harrowed it, but he harrowed it right across his forty acres. The land was worth $300 an acre, and I don't think it can be sold for $50. The farmers are afraid to lose a dollar; they want everything they can get hold of, and instead of setting aside five or ten acres each year and working that out and killing it, they are farming it all and cultivating the morning-glory at the same time.

MR. RUDDER. Fifty-one years ago I moved out to Florin. I had a good many flowers, and among them was tame morning-glory. I have been troubled with the morning-glory ever since I have been there, but the tame morning-glory rivals the wild. It climbs the vines and it is a perfect nuisance, and the wild morning-glory is a nuisance, but not so much so as the tame morning-glory.

PROFESSOR CHASE. Cut the morning-glory before it comes up.

PRESIDENT JEFFREY. I am pleased now to introduce a paper by a gentleman from San Francisco, Mr. Wetmore, who will discuss the market question from his standpoint.

BAY CITIES MARKETS, DEALERS' VIEW.

BY JOHN G. WETMORE.

Mr. Chairman and Gentlemen of the State Fruit-Growers' Convention.

I have been asked by your Mr. O. E. Bremner, Deputy, State Commissioner of Horticulture, to present to your Convention my views as a commission merchant on the retail fruit market of San Francisco. This I will endeavor to do from a practical standpoint, and as briefly as possible. I might say, to commence with, that in dealing with the retail fruit market of San Francisco I am obliged to consider the whole trade, from the largest wholesale dealers to the smallest fruit venders, for the reason that it is very difficult to distinguish where the wholesaling stops and where the retailing commences. In this connection I shall endeavor, as far as possible, to classify my replies to the several questions upon which I have been asked to present my views.

First, the expediency of an organization to regulate fruit shipments to commission men to be distributed in a particular section or market, and its probable effect. It would certainly be a desirable thing if such an arrangement could be made, and whenever you can get a very large proportion of growers in any section to agree to have their products dis-

tributed in this way, the effect would be most beneficial to the growers and of great advantage to all markets. This, however, is something which can not be forced upon the growers, either collectively or individually, and would not be practical, excepting with a product such as oranges or raisins, the great bulk of which is produced within comparatively small sections of the country. Experience has proven that even in these commodities where it would seem that the total output could be controlled by combination of all the growers, that there are always a certain percentage who want the movement to hold the umbrella for them and protect them in a general way, while they sell their own product to suit themselves. To my mind the question of regulating the shipment of deciduous fruits as suggested would be practically impossible, as the production extends over so great and diversified a territory.

The question has been asked, "How can San Francisco secure a better grade of local fruit for the retail fruit market?"

San Francisco is the greatest distributing point on the Pacific coast for deciduous fruits. Fruits are not sold alone to retailers and canners, but large quantities are shipped from this point to all sections of the country, as well as Mexico, Hawaii, Australia and the Orient. That the reputation and standing of our fruits in foreign markets should be maintained is vitally necessary to the growers as well as the wholesale merchants. And it is equally important that the quality of the fruit should be maintained in the distribution to the retail trade. There is only one way that I can see where uniformly good grades of fruit can be placed on this market, and that is by the members of this Convention using their influence to repeal the law which prevents a county from having an inspector of the State Commission of Horticulture, excepting where petitioned for by a certain number of fruit-growers from within the borders of the county asking for the same. You probably all know that San Francisco has no orchards or farms and consequently is not entitled, according to the law, as it now stands, to a deputy fruit inspector. The result is that her market is made the dumping place for all the fruit and produce that can not be sent any place else, and there is no limit to the amount of inferior fruit which can be sent into San Francisco under the law as it now stands, and I would like to say right here that if the very large proportion of very inferior, scaly, wormy, undergrown, and overripe fruit were eliminated from the San Francisco market shippers would get better net returns for a tremendous lot of their fruit than they will get in any other market they may ship to. Taking the expense of packing, freight, etc., and the cost of boxes and commission from the very inferior fruit sent in, leaves very small returns to the shipper. It will always be so as long as this market is made the dumping ground for all that can not be disposed of elsewhere. Eliminate the trash, ship to San Francisco reasonably good products, and shippers will have their very best market at their very door, for there will not be only as much fruit sold as there is now, but there will be a great deal more sold, and with much better results to the growers. If every grower who ships to San Francisco would dump his inferior fruit at home and ship the balance, he would realize better net returns than though he shipped the entire crop, regardless of quality. This proposition can not be made too strong. It is an absolute fact, and if there is any way that the members of this Convention can control the shipments

into San Francisco, whereby inferior stock will be destroyed before being shipped, the shippers will have a greater lump sum of money for their net returns for their season's shipments.

The question has been asked me, "Would there be any advantage in having the retail market centered as in Los Angeles, where they have a market as an incorporated company, composed of retail dealers and commission men, all located in one large building?"

In answer to this I would say, most emphatically, no. The topographical feature of San Francisco is such, being composed of hills and very little level ground, that it is impractical to center so large a business in the manner suggested in the query. The fact is that it is absolutely necessary for the successful marketing of fruit that there be fruit stores in every section of the city. There are at the present time, I believe, between four and five hundred retail fruit stores situated all over the city, in some cases several to the block; in hardly any section of the city more than two blocks apart. Just imagine attempting to do the retail marketing of a city like San Francisco, covering the area she does, in a few blocks. It would be a physical impossibility. In Los Angeles there are many commission houses, in addition to any that may be in the market referred to, and all the commission houses send solicitors all over the city and outlying districts to take orders for fruit, afterward delivering the fruit by wagon. In San Francisco the four or five hundred retail fruit dealers come to the wholesale district and purchase their fruit each morning anywhere from 4 to 7 o'clock, and have the fresh berries and fruits on display at their stores in time to deliver to the good citizens of San Francisco for their breakfast. In addition to the retail storekeepers there are perhaps a hundred retailers who sell altogether from their wagons, called vegetable peddlers. These men take an assortment of vegetables and fruit of all kinds, have regular customers whom they call on daily. After the retail fruit stores and vegetable wagons come the fruit peddlers, from two to three hundred of them. They buy loads of fruit, whatever they can buy cheap, and hawk this fruit all over the city, generally among the poorer class of people. They take a large load, and usually dispose of a full load in a day, selling it at small profit over the cost of each article.

In order that the products of the growers may reach every consumer, the eight hundred retailers and peddlers are an important factor in the distribution of these products among the people. In addition to the general retail dealers and the peddlers there are at present several so-called free markets, one built by the State on East and Pacific streets; one called the Sacramento Valley Farmers' Free Market, situated on Mission street, in the Mission district; another called the Bay Counties Free Market, situated on Market and Gough streets; and one on Clement street, called the Richmond Branch of the Sonoma County Free Market. The first named was built and is supervised by the State; the second and the third were built and are run by private parties; the fourth has just been opened, and I do not know who the proprietors are, but all are welcome. They all help distribute the fruit, and generally are heavy purchasers from the commission merchants, and when overstocked consign their surplus to the commission houses for sale. This latter applies particularly to the State free market, and without doubt this will always be the case with markets of this sort. Oakland has had a free market

for many years, and although Alameda is an agricultural county, I believe fully ninety per cent of the fruit and produce sold at this free market is bought from the Oakland and San Francisco commission merchants.

Much has been said about the large percentage of profits imposed by the retail fruit dealers. Assuming that in some cases the percentage of profit imposed by the retailer is large, conditions must be considered. Without doubt, in some sections of the city the percentage of profit of the retailer would seem to be very large, especially if you take the low selling price for the poorest fruit in the market and figure it up with the highest selling price of the retailer for a fancy article delivered to the purchaser's residence, it would seem to be very high; but any one who will take the trouble to honestly investigate the selling profit of the retailers of San Francisco will find that the average profit is not great, excepting in some sections where customers demand only the very best there is, and where they order small quantities delivered at their houses, but through the greater sections of the city the profits are reasonable. This is best demonstrated by the fact that a very large proportion of the retail fruit dealers of San Francisco occupy premises, with the store in front, one, two, or three rooms in the rear, where they live in the most economical manner, a large proportion of them being run by a man whose wife assists him in selling at the store, and their only help being a man or boy to drive the wagons. Notwithstanding the economical manner in which these people live, they do not accumulate, as a rule, and very few of them are able, after years in this line of business, to build a place of their own, as almost all of the corner grocerymen do. We never hear any complaint about the corner groceryman who accumulates enough to buy a lot and erect a building, but there is a constant and everlasting cry against the fruit dealer, which I think is not justified by the facts.

The San Francisco Board of Health during the past few years has done good work in the supervision of the conditions covering the places where fruit is handled, and in the condemnation of fruit when in unfit condition for consumption, but they have no power to regulate the entrance of wormy, scaly, or other undesirable fruit into the city of San Francisco, and were they to be asked to do this work they would of necessity have to have a force for that special purpose. The only protection, so far as I can see, to prevent the dissemination of insect pests and diseases through the medium of just such a market as San Francisco must of necessity be through proper legislative enactments. The members of this Convention could arrange a law, if they saw proper, so that a deputy or deputies could be appointed in San Francisco with full power to prevent the entrance into this market of scaly citrus fruits, scabby and wormy apples, pears, apricots, and other fruit in undesirable condition.

At the present time we have shipments of lemons coming into the city which are absolutely covered with scale. We have apples coming into the city which at their point of shipment are lovingly called "our wormies." Every apple in the box will contain a worm, but the shippers are so anxious to gain something for their "wormies" that they deluge our market with them. This should be stopped, and the man who sends in good fruit will get good prices.

In answer to the query whether there would be any advantage in having an all free market, have to say that San Francisco, at the present time, is one great big free market. It is too free. There is too much freedom of access for the undesirable, good-for-nothing fruit which is now poured in there. Eliminate that freedom, and you will have the best market in San Francisco that you have anywhere for her proportion of your good stock.

There is not a man, woman, or child in San Francisco who, if they want to buy a box of fruit, can not buy it from any dealer.

The so-called wholesale houses will not break boxes, but they will sell a box of fruit to any one who wants it and is willing to pay for it and who will take it away from their premises.

About the only people who could take advantage profitably of a free market are the Colma and San Mateo Italian vegetable-growers, and they now have a market of their own, between Davis and Front, Pacific and Oregon streets, which they open at 2 or 3 o'clock A. M. and close at 11 A. M. There they sell to any and everybody who wants anything in the way of vegetables. They will sell 10 cents worth or as much more as any purchaser wants. Just imagine such a way of supplying a market like San Francisco. Even if we were situated in the center of an agricultural district, the population could not be so supplied. Steamships and railroads have to bring the products which are handled in this market, and the producer of to-day is too much of a business man to think that he can individually sell his goods in a market in which he is only an occasional visitor as well as the business man who is on the ground every day of the year.

San Francisco is the largest market in the State, centrally located, and the natural market for growers whose output is not large enough to ship East or to contract to canners or dryers. Every grower watching the markets can take advantage of the best offering at all times. Get in touch with dealers in every market, keep posted, and if too small a shipper, combine with his neighbors to keep posted and take advantage of the best market.

If the shippers who use the San Francisco market would get in touch with one or more of the many reliable commission houses there and keep themselves posted regarding conditions and prices, they will find it very much to their advantage. Shippers should get close to the man who is selling his goods. Don't treat him as a last resort, where you can dump your refuse, and then condemn him for not getting you good prices for poor goods, but remember your interests are his care, and he is usually working from 4 o'clock A. M. to 5 o'clock P. M. trying to place your goods to the best possible advantage for you.

Being so centrally situated, San Francisco is a very large distributor of products. Thousands of packages of fruit are reshipped from this city almost daily in addition to sales to the local trade. The commission houses thus become the clearinghouse for the fruit shippers, and in order to make this great distribution of products it is necessary that the markets in other sections be closely followed. The commission merchant is necessarily forced to keep in touch, not only with the productions at home, but with all points where it is possible to distribute such products as may be placed in his hands. This involves a great deal of work and requires the employment of many people. Although but a small por-

tion of the goods are sold for cash, the bulk being sold on credit, ranging from fifteen to sixty days' time, the commission merchant assumes all responsibility of sales, and makes returns promptly upon the sale of the growers' productions, and returns payment therewith, thus insuring the shipper against uncertain collections and bad debts. (Applause.)

PRESIDENT JEFFREY. Now we will hear a paper from Mr. Edward F. Adams, editor of the San Francisco Chronicle, on the market situation in San Francisco.

MARKETING PERISHABLE PRODUCTS IN SAN FRANCISCO.

BY EDWARD F. ADAMS.

In requesting me to prepare an address for this occasion Commissioner Jeffery wrote me that he desired that at this time "the subject of the San Francisco fruit markets may be discussed from all standpoints calculated to conserve the interests of the fruit-growers and consumers." As it is a matter of common knowledge that some other topics are to be considered at this Convention, I fear that I must confine myself to a rather less ambitious programme. There will not be time to fairly consider even the interests of the producer with which those present are most directly concerned, but producers and consumers are alike interested in having the promptest and most economical distribution of perishable products, and to that extent both interests will be considered in what I shall have to say. And what I have to say will deal mostly with what can be done to promote that end by public authority under the legal and physical conditions actually existing in San Francisco. More than that, I shall for the most part consider only the transfer of perishable products, from or for account of first hands, in unbroken packages to those who will retail them to consumers. So far as public authority is invoked to facilitate retail trade in these commodities of daily consumption, I apprehend it to be a matter between the municipality and its citizens, with which neither the State or the producers are directly concerned. And I say this, although I assume that my invitation came by reason of the general interest in the alleged "free market" established last summer by our present vigorous and effective State Harbor Commissioners, on State property in San Francisco, in a belated effort to comply with the so-called free market law enacted in 1907 and reënacted with amendments in 1903. There is no reason why there should not be one or more retail markets on the State property in San Francisco, if they can do business to justify it, but no retail produce market on State property, no matter where located, can do any business worth doing under the law as it now stands.

I conceive that I shall be most likely to interest this Convention by reciting the history of the so-called free market movement. It covers twelve years, and the recital will be hard to condense into the limit of the very longest paper admissible at this meeting. It will necessarily, however, bring out the most important problems connected with marketing perishable products in large cities, and especially in San Francisco. And it will bring out a lot of other things, quite as useful to be known and quite as interesting. Incidentally some parts of the story

may afford amusement. I have come to think that I am the only living person who understands that "free market" subject, and in taking this course I am influenced by the selfish motive of having, in due time, a printed record to which I can refer anxious inquirers, who from time to time torment me with requests for enlightenment, and with whom I have spent hours upon hours of precious time in which I might have been enjoying myself.

THE STATE WATER FRONT PROPERTY.

The submerged and tidal lands of the seacoast and harbors of this country between high-water mark and deep water, or in case of harbors, the pier head line fixed by Federal authority, is public property. It can be alienated only by authority of the State. In most of our harbors this property long ago passed into private ownership. There was originally a large area of these State tide and submerged lands in San Francisco, most of which was sold for a nominal price, filled in by the purchasers, and some of it is now very valuable. Nearly the entire water front itself, however, belongs to the State, which builds the seawall, piers, and bulkheads, and collects tolls on merchandise passing over them and berthing charges for ships making use of them. When specially authorized by law, the Harbor Commissioners may lease the docks for fixed periods, but otherwise the occupants are tenants only from month to month, and may be evicted or moved at any time by the Harbor Commissioners if the space occupied is required for some use more advantageous to the public. Immediately back of the seawall and bulkheads there is a wide street, which at all points with which this paper is concerned is called East street, and which for the entire distance is the property of the State, and in some places there are still on the west or landward side of East street certain blocks or fractional blocks of made land belonging to the State and subject to the jurisdiction of the Harbor Commissioners under the same conditions as the wharves. The blocks or parts of blocks, forming a triangular tract bounded by Pacific, Davis, and East streets, were the object of the controversy, whose history I propose to relate, in which the farmers were completely beaten by strong corporations, although nothing could have prevented them from winning had they used even ordinary diligence and energy in trying to get what they said they wanted. The lessons of the contest ought to be quite as valuable as the information which can be gained about marketing fruit in San Francisco. Upon the smallest of these fractional blocks is located the alleged retail free market which has been operated the past season by the State Harbor Commissioners.

THE BELT RAILROAD.

It is contemplated that the State shall own and operate on East street and its extensions north and south what is called a belt railroad for the purpose of connecting all the railroad terminals of the city with each other and the wharves, and also, by spur tracks, with the warehouses and industries in the vicinity of the water front. A portion of this road, with some spur tracks, has for years been operated on East street from about Pacific street to a considerable distance north. Another portion

will soon be constructed south of Market street. The problem of getting across Market street in front of the ferry building is left for the future. At present, as in 1896, cars destined for points north of market street are landed at the Lombard street slip, about half a mile north of the present alleged free market, where the State belt railroad receives them. I may assume that most present are familiar in a general way with the geography of this portion of San Francisco lying a short distance north of the ferry building and carry these details in their minds.

THE TONNAGE OF PERISHABLES.

Perishable products include fruit, vegetables, poultry, and other commodities, including fish. The tonnages of fruit and vegetables are not segregated in the records, and are considered together in this paper. The work of collecting the data of the tonnage of perishables reaching San Francisco is considerable, and for the purposes of this paper it will be sufficient to use those very carefully assembled more than twelve years ago by the late C. F. Smurr, then freight traffic manager of the Southern Pacific Company, for a period extending from May 1, 1895, to April 30, 1896. The relative quantities delivered at the different terminals are doubtless about the same now, although the actual tonnage is probably 50 per cent greater, and may be doubled. These data formed the basis of the main argument made twelve years ago for the establishment of the free market. They are as follows:

Deliveries.

	Tons.
Fourth and King streets, for ten months, actual	30,324
Market street, by rail	10,917
Market street, by steamer	4,649
Lombard street	13,531
Total for ten months	59,421
Estimate for March and April, 100 tons per day	5,200
Total for year, Southern Pacific Company	64,621
Arriving by river steamer, estimated	150,000
	214,621

The data of the arrivals by steamer were formulated by Major P. J. Harney, a well-known river man and then a member of the Board of State Harbor Commissioners. Of the river tonnage 90,000 tons were the ascertained deliveries of the largest river company and 60,000 tons by careful estimate of the deliveries of other companies, segregated as clearly as possible from the total deliveries of all merchandise as shown by the books of the Commission which collects tonnage.

THE CARTAGE PROBLEM.

Virtually all perishables reaching the city by rail and a very large share of those arriving by water are subject to cartage from the terminals at the expense of producers. All shippers to San Francisco are familiar with drayage charges on their accounts of sales. Keep an account some year and see what it costs you. At the rate per package

in force in 1896 the drayage charge as charged by commission men to producers figured out, per ton, as follows:

Drayage.

	Per Ton.
Oranges	$0 75
Apples	1 11
Grapes, plums, peaches, etc.	1 60
Strawberries	2 00
Cantaloupes	2 00
Vegetables	90

The low rate for vegetables was because the traffic would not bear a higher rate. The still lower rate for oranges capable of carying about the highest rate of all was obtained because the orange growers of southern California were smart enough to organize and stay organized, and the exchanges made a contract with a single draying firm to do all their hauling at the rate which figures out as specified. Unorganized orange-growers profited because those who hauled the outside oranges could not charge a higher rate than the organized growers received.

As nearly as could be calculated the average drayage paid on all perishables hauled from terminals was about $1.25 per ton, which for the drayage of 214,000 tons a year would be an annual payment of $266,000 and regularly increasing with the growth of the city, paid by producers for hauling their products from terminals of the carriers to the stores of commission men. Not all those perishables paid drayage. Carload lots consigned to canneries were carted at the expense of canneries unless delivered on their spur tracks. A great deal of produce was sold on the Jackson and Washington street wharves—about 600 feet south of the block sought to be obtained for the so-called free market, and upon which the State always has and does still maintain an unregulated free wholesale market. Whether river growers shipping to the city usually got accounts of sales with no cartage charged, they know—I don't. It was alleged in 1896 that much cartage was charged that was never paid on fruit sold on the wharves or from the platforms of the North Pacific and South Pacific Coast railroads, whose freight cars were received at the Lombard street slip and delivered by the belt railroad to the terminals adjacent to the blocks desired for the free wholesale market, with the exception of what was shipped in carload lots to canneries and sold on the Jackson and Washington street wharves, the fruit was hauled from the terminals of the carriers to the stores of the commission merchants and there sold. I suppose the actual cash paid by producers in 1896 for drayage on perishable products was not less than $200,000 a year, and yearly increasing. With higher prices now, and necessarily, prevailing and the vastly increased volume of trade, the amount now annually paid for this service must be between $300,000 and $400,000. The actual amount could be closely approximated if one had several days to devote to it, which I have not. And it would be of no use except to determine the value of a lost opportunity. It used to be said that commission merchants got a commission on cartage, and I had reason to suppose they did.

WHAT THE PROPONENTS OF THE FREE MARKET WERE AND WERE NOT AFTER.

We are now in a position to understand the precise object sought by the Producers' Committee, of which I was chairman and the most active member. It was:

1. To save the greater part of this drayage by providing one central spot, in close proximity to the existing commission produce district and conveniently accessible to all puchasers, where all perishable produce entering the city by rail or steamer could be delivered by carriers without drayage charge and there sold in original packages.

2. To save the damage to tender fruits from hauling over rough streets from half a mile to a mile and a half.

3. To secure the supervision by public authority of the commission sales of perishable commodities—an occupation which requires public supervision quite as much as banking or insurance—and to do it as thoroughly as it is done in the municipal markets, say, of Paris, where any producer can send any commodity dealt in there and have it sold for his account, either by a public salesman, or at the same rate, by any broker whom he may select, in either case being perfectly sure of an accurate accounting. In most American cities this would be very difficult to accomplish by reason of the lack of the non-political and very effective administrative systems which exist in continental Europe. In San Francisco, however, in the State Board of Harbor Commissioners, we have the one thoroughly effective administrative body in the State. Its powers are ample for the administration of the State property for any legitimate commercial purpose, and it can enforce its authority because nearly all occupants of State property are its tenants at will. If they do not comply with its rules they can be bounced. It is not, however, non-political. It is strictly political. No member of the party not in power need ever apply for a job. That, however, the people can change whenever they choose, and the present Board is demonstrating, so far as the powers above it will permit, that honest and effective work can be done through employees chosen wholly from one party.

4. To render possible the collection and daily publication of receipts and sales of all perishables sold in the market.

WHAT WAS NOT THE OBJECT.

5. Emphatically it was not the intent or expectation that producers would come to the market and sell their own products, although they would have the privilege. At least, it was not supposed that any individual producer would try it more than once. Nor was it expected that they would combine in associations and do so. The Producers' Committee knew the farmers too well. Nor, as a matter of fact, would it be profitable for them to do so. It was supposed that the sales would be made through commission merchants as now, because under proper regulation that is the cheapest and best way to sell perishable products.

WHY PRODUCERS NEED MIDDLEMEN'S SERVICES.

As, unfortunately, the theory that producers and consumers would meet in the "free market," where the honest farmer would personally meet the guileless consumer and the two dicker together for truck, was the one picturesque feature which caught the public imagination and served the purposes of the public press, it was the only idea that the general public ever got into its head. The city press and people were possessed of the notion that the farmer was yearning for the chance to sell his products at the lowest rate which he could induce consumers to pay—a notion whose unsoundness need not be demonstrated to this assembly

—while the country press, on the contrary, seemed equally firm in the conviction that all city consumers desired was the chance to pay the horny-handed farmer the very highest prices which he could be induced to accept—an hypothesis whose accuracy would be promptly attacked by any producer or producer's agent who sold produce in the State retail "free market" last summer.

I fear that it is not safe to assume, even with this audience, that all understand the unwisdom of fruit-growers of the State undertaking to sell their own produce in the San Francisco market, and I may briefly explain.

First. So far as meeting actual customers, that can only occur in a retail market. There was no available State property large enough for a retail market, and the water front is as far as possible from the residential parts of the city. The retailing of fruit is a trade of itself. It involves the ability to get regular customers and keep them. It requires a delivery wagon and driver. There must always be full assortment of fruit and vegetables in season, or you can get only transcient trade. It involves giving credit and collections. There is a large wastage, which takes off profits. It is a business for a farmer to let alone.

Second. As for producers of fruit and vegetables undertaking to sell even in unbroken packages and to retailers, it is to be said that almost none of this business is done for cash, and a stranger would promptly get all the bad debtors in the city on his books. A trade of this kind is like any other trade—customers are gradually accumulated by tact and fair dealing, readiness to extend credit when deserved, good salesmanship, and large and varied assortments of the most desirable commodities always in stock at all times of the year. Very few fruit-growers have any great variety of produce at any one time, or produce of any kind for sale for more than a few months in a year, or sufficient output to assure daily shipments, even during the season, in quantities large enough to pay, if they could always be sold, the salaries and expenses of a salesman and bookkeeper out of 10 per cent of the gross proceeds, which he would pay the commission men. As to the fruit-grower himself, he is needed at home. As to farmers joining together to sell, they could not more than individuals get and hold trade without a variety of seasonable products the year round, which no association in a single district could supply. Besides, you all know that if such an association were formed, half of them would fly the coop the first time they heard of any outsider some day getting 5 cents a box more for peaches than they got. Such propositions are trivial. There is but one way to handle produce in the quantities which reach large cities, and that is to dispose of them at wholesale in unbroken packages to retailers who will take them to their stores or to retail markets where consumers can get to them, and where there is room to display them and help to sell them and deliver them. The wholesale and retail middlemen perform functions which are absolutely necessary and must be paid for. The producer, or an association of producers, may, if they choose, undertake these functions themselves; but unless they are keen salesmen and alert collectors, if they try it they will wish they hadn't. Incidentally, the bulk of this produce is delivered by the carrier, beginning about 5 o'clock in the morning, and the farmer who undertakes the function of a commission man would discover that the hours he must keep are shocking. The late D. E. Allison, a

commission merchant well known in his lifetime to all our older growers, once told me that for years he got out of bed regularly at 3 o'clock in the morning. I believe they have a "combine" now, which enables them to sleep longer. They all agree not to get up so early—an agreement which I imagine is better kept than most others.

The Producers' Committee which endeavored to secure the establishment of a great wholesale market had not in mind, as they declared and reiterated time and again through the press and in all other possible ways, the puttering of fruit-growers with trying to sell their own products, but, on the contrary, a great business enterprise involving a certain saving to producers of hundreds of thousands of dollars a year and of vast and yearly increasing benefit to all connected with the trade in perishable products, whether as producers, consumers, or honest middlemen. It also necessarily involves the dedication, on fair terms, to the producing interests of the State, three blocks of very valuable State property, which certain corporations also desired for their own purposes. In the end the corporations got the blocks, because they attended to their business, and the farmers lost them because they didn't, and could not be prodded into doing it.

Bearing in mind what the Producers' Committee was really after, and remembering that the Harbor Commissioners understood it from the first as well as we did, the recital which follows may not only enlighten you about marketing fruit in San Francisco, but as to political pull, the methods of applying it, and what it will do for the fellow who has it.

THE COMMISSION MERCHANTS.

But before beginning the story, I may refer briefly to the attitude of the commission merchants. In private conversation with some whom I knew well, they heartily wished us success, and incidentally told me many things which I was not authorized to repeat, which showed very clearly the necessity of publicity in the commission trade. As a body they were sullenly hostile. They refused to form any committee to confer with the committee of producers, and privately used whatever influence they had to defeat us. Their most effective work against us, doubtless, was through draying firms, who did not wish to lose business, and the landlords owning their stores, who feared loss of rentals. Both those classes privately lobbied against us. They were not, however, the influences which defeated us.

And I wish to add this about the commission men. For a quarter of a century I have sold fruit in a small way in San Francisco, and I never had reason to believe, and do not believe, that I was ever robbed of a cent by any commission man. There are as honest men in that trade as in any other. But it is also true that any business which affords such opportunities for cheating as the commission trade offers will attract a certain number who will lose no chance of profiting by these opportunities. And it is the competition of the tricky which gives honest commission merchants most trouble, as any good man among them will requires publicity, regulation, and supervision—which it is not likely to get.

And now for the story.

THE GENESIS OF THE FREE MARKET.

The genesis of the San Francisco free market agitation was a lurid newspaper story some time in the autumn of 1894, in which the navigation of the bay was almost claimed to be impeded by an alleged Saragossa Island of watermelons dumped therein by extortionate and conscienceless "commission men" for the alleged wicked purpose of keeping up the price of that toothsome commodity, while the entire colored population and all the small boys of San Francisco were hopelessly hungering and thirsting for the red and juicy product of which they were thus ruthlessly deprived, in order that sordid and unrighteous commission men might roll in ill-gotten wealth. What foundation there was for the story I do not know. I suppose there were some watermelons dumped, but they did not belong to the "commission men," but to some unfortunate farmers of somewhere—probably Lodi. It is an experience familiar to most of us. But from reading the stories in the press one would have got the impression that he could have walked on watermelons from San Francisco to Oakland.

"GOOD STUFF" FOR THE PRESS.

From the standpoint of journalism the story was "good stuff," and the enterprising reporter who struck the trail made the most of it. Various official and other persons were "interviewed," and the then president of the Board of State Harbor Commissioners declared that rather than have such horrible conditions exist he would favor the establishment of a "free market" on the State water front, which the Commissioners had—and still have—the power to establish whenever they choose without any legislation whatever. The watermelon story, therefore, turned out to be not only good stuff, but good politics. The late Commissioner Colnon was not only a good newspaper man, but a good politician, and the term "free market," which he struck off in a moment of inspiration, has stuck, although there never was, and ought not to have been, any intent to create a real market, with proper equipment and supervision, without in some form collecting revenue from it to pay expenses.

A CASE OF FALSE RETURNS.

About a year later it was proved that a commission house had, in at least one instance, sold some packages of fruit to a householder for 40 cents a box, and accounted for them as sold at 25 cents. That was published, with the name of the firm, and at once renewed the talk about a "free market." The transaction could not be denied, but the firm defended it by saying that this fruit was sold at "retail" at 40 cents, and was properly accounted for at the "wholesale" price of the day, which was 25 cents, and offered to prove that it was the "custom of the trade," which perhaps it was, although a misdemeanor or felony under the laws of California, according to the amount involved.

HIGHLAND GRANGE TO THE RESCUE.

Highland Grange—now defunct—one of whose members was the injured party in the fruit trade above mentioned, addressed, under date of December 22, 1895, a letter to the State Board of Harbor Commis-

sioners asking whether the Board had power to establish a free market on the State property, and was inclined to do so. The Commissioners replied on December 26th in the affirmative to both questions, and a little later officially requested Highland Grange to send a representative to confer with them. I, being a member of the Grange, was appointed such delegate, and that is how I came to get into the mess. I attended a meeting of the Commissioners, and stated to them that what producers needed was a central market to which all carriers could deliver perishable products direct from the cars, without drayage, and where the products could be sold under public regulation and supervision. At that time I did not know anything about the location of the State property, other than the wharves. The Harbor Commissioners knew that, but had not the slightest conception of the problems of fruit marketing. Their idea seemed to be to set aside a little corner of some dock, to which fruit-growers could personally conduct their stuff and try their luck at coaxing customers to come and buy it. Their notions were trivial and silly. Their talk had been and continued to be political rot. Finally, after long talks, and many of them, producers were offered space on section 4 of the seawall, which was a grainshed about 500 feet long, about one half mile north of any wharf where perishables were landed, three fourths of a mile from any street car line, and a mile north of the commission district through which nearly all the produce arriving by rail must be hauled to reach the free market. We—for by this time I was consulting with others, I can not now say whom—of course positively refused to even consider the tomfool proposal. So there was nothing doing.

But Highland Grange was a rustler while it lasted, and by that time—for this talk had lasted for some weeks—had begun to get its back up. By that time we had found the State property we wanted. It was a triangular piece bounded by Davis, Pacific, and East streets, adjacent to the terminals of the North Pacific and South Pacific Coast roads, connected with the belt railroad, and a short distance north of the Washington and Jackson street wharves, where the river produce was landed.

THE PETITION OF HIGHLAND GRANGE.

Highland Grange therefore decided to press things. It prepared a petition to the Harbor Commissioners, from which I quote the essential features of the market desired:

First—It must be the usual and ordinary terminus for perishable products of all transportation companies, at which all such products will be delivered unless otherwise ordered by the shipper.

Second—The sale must be conducted under such regulations as shall insure to all shippers the opportunity to know, without expense to themselves, whenever they so desire, the particulars of the disposal of their products.

Third—To accomplish this purpose there must be competent inspection under the control either of the Harbor Commissioners or a State organization of producers.

Fourth—There must be the authority to levy upon all produce delivered to the market whatever additional tolls to those now paid which may be required to defray the expenses of proper supervision.

The first requirement was fundamental. Neither Highland Grange nor the Producers' Committee, subsequently formed, would consider any market which was not the common terminal of all important carriers to which all perishable products were delivered, and from which, if they were to be sold elsewhere, they must be carted away by pro-

ducer or buyer. It was perfectly understood, and frequently stated in public, that the only way to change the existing methods of selling perishables from first hands was to create a new center from which they could be sold more promptly and economically than from any other place in the city, and that if that were done no power on earth could prevent the trade from going there. The fourth stipulation proves that we were not after anything "free"—that word was more political rot—but that we expected that the market would be made to pay expenses. This petition was signed by sixty-nine producers of products whose names I have recorded, dozens more of which I have no record, and the largest river steamer company. The entire press of the State was enthusiastic, but unfortunately, foolishly enthusiastic over the absurd notion that the producers were at last to get rid of those awful middlemen. The Harbor Commissioners stood pat. Under date of March 26, 1896, they replied to Highland Grange that they "have already offered section 4 of the seawall, which is provided with a shed 500 feet long, for a free fruit and produce market. The only remaining matter to be determined is the management of the market, which must be by the fruit-growers."

HIGHLAND GRANGE NOT SATISFIED.

Highland Grange did not think that was all the matter to be determined. By that time the Harbor Commissioners knew exactly what property we wanted and were determined we should not get it. We were determined that we would get it. The Commissioners won out. The fight, however, had just begun. The next step was to ask the State Horticultural Commission to call a State Convention, which it did. It met at San Francisco, April 16, 1896. Mark L. McDonald of Santa Rosa presided, and the late B. M. Lelong was secretary. It was a very large convention, with many delegates representing grangers, fruit-growers' exchanges, farmers' clubs, and other organizations of farmers from all parts of the State. The matter was presented precisely as I have presented it here, and after a day's discussion resolutions were adopted in language virtually the same as that of the petition of Highland Grange, especially in asking for a market "which must be the usual and ordinary terminal for perishable products delivered by all transportation companies in San Francisco." In due time the petition was presented to the Harbor Board. The Harbor Board again stood pat. Its only reply was that section 4 of the seawall had been offered. The petition was that of many thousands of fruit-growers scattered over the State. It had the backing of the entire press and of public sentiment. The Harbor Commissioners would not seriously consider it. Surely there must have been powerful, if unseen, influences opposing it. There were. What they were you will hear later, if you stay to listen. It is hard to compress the story of a ten-year fight into a paper for an occasion like this.

THE CALIFORNIA FRUIT EXCHANGE.

It was evident that the fight had got too strenuous for one little Grange to carry on, and Highland Grange, of brief but glorious memory, now disappears from the scene. There was at that time an active farmers' organization, called the California Fruit Exchange—now

defunct—which had some good men for directors, and the State Convention requested that board of directors to take charge of the fight. Most of them were in attendance on the Convention, and with a special committee appointed for the purpose, went out to section 4 of the seawall, saw that a gold brick had been offered to the farmers—as usual—and so reported. The directors, however, scattered over the State, found that each meeting would cost them about $10 each, which the Convention—as usual with farmers' conventions—had provided no means of paying. Consequently, they promptly jumped the job.

THE FIRST COMMITTEE.

Before fading away, however, they appointed a committee, consisting of B. F. Walton of Yuba City, W. L. Overhieser of Stockton, and I. H. Begeir of San Leandro, with whom I, as representing Highland Grange, the originator of the trouble, was requested to act. The committee never met, presumably because nobody would provide for their expenses, but the members "consulted" as they happened to be in town, and I acted. I was much of the time in the city and could not get away. Nor, to tell the truth, did I wish to. I was enjoying the fight. The conclusion we reached was that of the farmer in the fable with a bad boy in his apple tree hooking fruit. Since neither words nor grass would make him come down, he decided to try what virtue there was in stones. We determined to get the Legislature to give us the blocks which we were after, but which the Harbor Commissioners refused us. A bill was drawn in such terms that if passed the Harbor Commissioners would be compelled to set aside the Washington and Jackson street wharves for a free market, and also the blocks bounded by Pacific, Davis, and East streets which, of course, was precisely what we wanted.

WHAT THE FARMERS WOULD NOT DO.

The only reason why that bill did not become a law as we drew it was the miserable stinginess of the fruit-growers and other producers in refusing, in spite of earnest appeals, to put up a dollar to pay a competent man to look after their interests at Sacramento. I suppose they thought the committee wanted the money for junketing. As a matter of fact, no member of the committee could or would have undertaken it, but if the fruit-growers had given us the money, we would have employed a representative as bright as any employed by the corporations, and in the state of public feeling at the time no adverse lobby on earth could have prevented the passage of the law as we drew it. There is not, never was, and never will be, corporation influence which can prevail against real outspoken public opinion, and public opinion was solidly with us at that time.

MURDERED BY AMENDMENT.

Such measures are not killed by open opposition, but by amendments made in committee or in the house. For that reason whoever desires such a bill to pass must keep some one in Sacramento, until it has passed both houses and been signed by the Governor. That is what the corporations do, and until the farmers do the same they need not expect to win. W. L. Overhieser of the committee went to Sacramento once or

twice at the expense of the San Joaquin Pomona Grange, but Brother Overhieser was too good a man to cope on equal terms with the powers of darkness. He did not understand the game. Besides, he was there but little, and otherwise the bill had no promotion. It was amended by striking out the paragraphs making it obligatory to give us the blocks we needed, and leaving the location right where it was before—with the Harbor Commissioners, which meant—nothing doing.

THE PACIFIC COAST STEAMSHIP COMPANY.

The trouble with the bill was that the greater part of the blocks we wanted were occupied for a coal yard, laundry, small repair shops and similar purposes by the Pacific Coast Steamship Company, represented by Goodall, Perkins & Co., who desired to keep them. And Goodall, Perkins & Co. had more influence with the Harbor Commissioners than all the farmers in California. But they, also, lost out to still more powerful forces, as we shall see a little later.

On the day before the Legislature adjourned I happened to be in Sacramento and naturally dropped into the Legislature. One of the members in charge of the bill—I have no idea who—saw me and came to me with the amended bill, which had just come from the Printer. At the same time there happened to come up the legislative representative of Goodall, Perkins & Co.—Milton S. Green, if I remember correctly—to whom I was introduced and who told me that he had suggested to the committee "a slight amendment" which he thought would make the bill "better"—as, indeed, it did for Goodall, Perkins & Co. The member then took me aside and told me the bill had been amended by the committee and could not then be changed. It could be passed in the form it stood—for it had passed one house and there was no chance of any change at that stage of the session—or be dropped, and he would do as I said. I read the amended bill, saw that its only value to the farmers was that it established the principle of the free market and cleared the way for the fight in the next Legislature on the single issue of location. That, however, I thought worth while and told the gentleman to run it through the mill. He did so, and as reënacted with amendments as approved March 2, 1903, it is the law still. If I ever knew how it came to be amended with no material change in 1903 I have forgotten. That, however, merely ended one stage of the fight.

NO FAULT WITH THE STEAMSHIP COMPANY.

It should be said right here that I never had any complaint to make of the attitude and action of the Pacific Coast Steamship Company for their part in the performance. They were using the property which was nearly opposite their wharf for the legitimate purposes of a steamship company engaged in commerce in a large way, and they did not want to move to accommodate the farmers or anybody else. They did precisely what I would have done, or any of you would have done, in their place, and won out as they deserved to because they attended to business, while the farmers did not. To this day Senator Perkins and I occasionally joke about it when we meet, and he evidently thinks he had the laugh on me, while I maintain that if I, or any other alert person who understood the machinery of lobbying, had chosen to spend our time and money in staying at Sacramento and watching the bill, in

the existing state of public opinion, all the corporations in the State could not have prevented its passage. The laugh was on the farmers who refused to provide means for their own defense. It was a fair fight, and the weaker political guns won because they were kept on the battlefield, were loaded and brought into action precisely at the right time and place. I had no malice towards any one. Of course, I had contempt for public servants who, while pretending for political purposes the utmost anxiety to benefit the farmers, never for one moment intended to give them anything of value which was desired by any important corporation. As a matter of fact—and it was clearly shown at the time—the time had come in the history of the city when the property in question could no longer properly be devoted to the uses to which it was then devoted. It was needed for more important purposes, and has since been devoted to them.

THE LAW OF EIGHTEEN HUNDRED AND NINETY-SEVEN.

The law as enacted required, and still requires, the Harbor Commission to set aside a "sufficient number of docks and piers, which must be contiguous to each other for the reception of all perishable products arriving by rail, boat or other conveyance * * * and shall permit the sale of such products therein by or for account of producers only under such regulations as may be prescribed by the Harbor Commissioners." It does not require that any blocks of land whatever shall be so set apart. The paragraph requiring that was stricken out, as we have seen, in committee at the request of the Pacific Coast Steamship Company. The Commission had authority to assign such blocks, but we knew it would never voluntarily do so. The law, however, required that they should provide space for "all" the perishables, which, although it was provided that the docks should be "connected with the belt railroad" was impracticable as to produce arriving by rail, without either assigning State land for a terminal, or unreasonably obstructing other commerce. After passage of the law the Harbor Commissioners voted to set apart the Pacific street wharf for a free market. That was at the time the best wharf in the city, easily accessible for river craft, and immediately opposite the block we were after. There was no way of getting produce arriving by rail there except by team. The railroads had no object in delivering there, and would not have done so. Besides, there was no room for it. Regardless of the repeated declaration that no sane person expected produce to be sold there in any quantity, except through commission men, the Commissioners insisted on pretending to think that producers were eager to come to the market and sell their own produce, and sent out 1,000 circulars to producers, inviting them to apply for space. To these but twelve replies were received, only eight asking for space. Instead of accepting this as evidence that producers were not crazy, they called it evidence that they did not desire to save drayage and have their produce sold in a regulated market. They still refused to give us the land for a terminal. There was nothing doing except talk. At a later date the Harbor Commissioners formally adopted a set of "regulations" for the "free market," which were printed. The first section reads as follows:

The free public market consists of Market street, Clay street, Washington street and Jackson street wharves with their bulkheads, and such other blocks and wharves as may be hereafter added thereto by resolution of this Board.

The action has never been repealed that I know of. But the Harbor Commissioners have never done either of the following things required by the act of 1897, still on the statute books:

"Construct car tracks to connect the docks and piers so set apart with the belt railroad."

"Construct suitable tramways and tracks and other devices for the rapid conveyance of perishable products to the stalls in the free market and operate the same."

"Adjust the tolls to provide the necessary revenue" for such operation and the superintendence.

Appoint the "Superintendent and Assistant Superintendent" required by the Act.

And except on the general principle that all laws should be obeyed by those sworn to execute them, there is no reason why they should. But the law is there.

A funny feature of the passage of the law of 1897 was that the legislators went home and claimed credit—and generally got it—for magnificent work in providing a free market in San Francisco, where the unfortunate, oppressed, and downtrodden farmers could go and peddle their own fruit and "garden truck."

THE SAN FRANCISCO FARMERS' CLUB.

At this juncture Highland Grange butted in once more by requesting the San Francisco Farmers' Club to take charge of the movement. At that time—I had entirely forgotten it until I overhauled my old papers for this address—a rather active Farmers' Club, now defunct, all the good seem to die young—was in existence in San Francisco. It had, I see by its first annual report before me as I write, sixty-three members, including many well-known men. How it came to be born, what it did, or of what disease it died I forget, although I see that I was chairman of its executive committee. There is every reason why there should be a farmers' club in San Francisco. There are more farmers there than in any other county in the State; they doubtless operate more land than the farmers of any other county—and at far greater expense to themselves. In 1898 this club, at the request of Highland Grange, jumped into the breach. It appointed a Free Market Committee consisting of Edward F. Adams, E. A. Denicke, I. J. Truman, and T. L. O'Brien—two bankers, one lawyer and mining man, with a real farmer as chairman. The committee had full power to act, and at once began to again stir up the animals. Probably the prodding of this committee led the Harbor Commissioners to appoint January 18, 1898, as a date at which representatives of farmers, carriers, and commission men were invited to appear and discuss the subject. I have no doubt that our committee was there, although I have no record of it. My only record is that neither carriers nor commission men appeared. The Commissioners, however, continued to be bombarded with "resolutions" by the State Grange, State Farmers' Alliance—now defunct—the State Fruit-Growers' Convention, and numerous less important bodies. Still nothing doing.

THE SECOND STATE CONVENTION.

Under authority, therefore, of the San Francisco Farmers' Club, a second delegate convention was called and met in the hall of the San Francisco Chamber of Commerce on February 23, 1898. It was attended by delegates from granges, fruit exchanges, and other farm-

ers' organizations, and boards of supervisors from all parts of the State. Edward F. Adams was chosen president, and Victor L. O'Brien, secretary.

AN INCIDENT OF THE CONTEST.

How I came to be president of that convention is rather interesting as showing some of the methods of warfare practiced by commission men of the day who did not wish to be "regulated" and supervised. It had been planned to ask one of the representatives from the Tulare County board of supervisors present to take the chair, but when the assembly convened they found in every chair a copy of the Bulletin of Commerce, a trade paper then, and perhaps still—published in San Francisco, of date of February 17, 1898, containing on the front page a three-column article of which the following were the scare-heads:

THE FREE MARKET. ITS TRUE MEANING.

ONE OF THE MOST BAREFACED POLITICAL JOBS EVER ATTEMPTED TO BE FASTENED ON THE PEQPLE.

ADDITIONAL TAXES ON FARMERS.

The Leading Agriculturalists and Horticulturalists of the State Oppose It. We Have a Free Market Already.

A VERY ADROITLY HIDDEN SCHEME.

The scare-heads sufficiently indicate the nature of the article, but you would enjoy hearing the whole of it read if there were time. The free market plan was described as a deep and dark plot, contrived to entice the honest farmers to forsake their faithful commission men, come to San Francisco to sell their own produce to their utter disgrace and ruin in order that a "so-called farmer" named Adams might roll in the luxury of a $1,500 job on the water front, surrounded by an army of satellites also drawing "fat salaries" at the expense of their misguided and wretched dupes. The only effect of the document was to induce some one, I don't remember who, to upset the programme by nominating me for president of the Convention, and I was unanimously chosen, with great applause.

THE PERMANENT COMMITTEE.

The convention discussed the subject of the free market during the morning and afternoon sessions and appointed a "Permanent Committee," consisting of Edward F. Adams of Wrights, John Sweet of Martinez, W. L. Overhieser of Stockton, S. S. Peck of Petaluma, W. P. Cragin of San Jose, J. M. Moore of Alameda and R. D. Stevens of Sacramento. Mr. Stevens did not accept. The committee received definite written instructions as to the kind of market to work for, which were identical with the plan originally outlined by Highland Grange, and were directed to accept "no moral responsibility" for anything less or different. Subject to those instructions, we were to exercise our own judgment and to serve until displaced by some convention or "equal

authority'' with that of the convention which appointed us. As no such convention has ever met and acted on the subject, I suppose we are in office to this day. In accepting the appointment, the committee promised the convention that it would never meet after the meeting to be held that evening, except when there was money in the treasury to pay their traveling expenses—a promise, as I recollect, which was pretty faithfully kept. That it might have money in its purse—for each member declared he would never solicit a dollar—a finance committee was appointed, consisting of I. J. Truman of San Francisco, H. Meacham of Petaluma, and A. N. Judd of Watsonville. These gentlemen accepted, with the statement that as Finance Committee, they would estimate and report to the organizations represented at the convention what money was required. If they sent it, it would be used and accounted for. If it was not sent the Permanent Committee would have to go without it. Mr. Truman, then president of a bank, was made treasurer, and promised never to let the committee overdraw its account. All these financial engagements were faithfully kept. It was known that any further effort would mean another legislative campaign, and the convention was told that not less than $1,000, and probably more, would be required for expenses, including printing, probable traveling expenses, and the per diem and expenses of an experienced representative at Sacramento through the entire session or until we got a bill passed and signed by the Governor. And I may as well say here that of twenty organizations which sent delegates to the convention, fifteen sent nothing whatever in response to the appeal of the Finance Committee, two sent $5 each, and three sent $10. The boards of supervisors of San Francisco, San Joaquin and Contra Costa counties each sent $20, and the farmers' organizations and individuals not represented at the convention contributed from $2.50 to $5 each, the total amount sent being $147.50. Of this there was expended, up to July 14, 1898, for traveling expenses of Permanent Committee—I was traveling on a pass in those days and got none of it—$23.75; for compensation of a very industrious secretary, $35; for printing and official history from which I have taken this record, $58.25 (3,000 copies), and for postage and minor expenses sums which bring the total to $138.75, leaving a balance in the treasury of $8.85, which, for all I know, Treasurer Truman may have yet. I guess we got it, although I have no record of it. The Permanent Committee was active enough. It presented a memorial to the Harbor Commission in which we went over the whole matter de novo, making it plain that we wanted those blocks of land in addition to the piers which the law provided for, and that we did not expect the farmers to sell their own products. John Swett and S. S. Peck, as a subcommittee, sought to reach an agreement with the commission merchants who, as an organized body, would have nothing to do with us. W. P. Cragin and W. T. Overhieser, as a subcommittee, called upon the carriers and found the California Transportation Company and the Southern Pacific Company willing to coöperate. Goodall, Perkins & Co. sidetracked the proposition that they should move, and suggested as an alternative that San Francisco should be made a free port by abolishing all harbor dues, which was interesting but hardly germane. Meanwhile, the Harbor Commission stood pat and did nothing. As a last resort the committee called twice on Governor Budd, who

received us cordially and agreed to "look into it further." On June 27th the committee addressed a formal request to the Governor requesting him, as our last resort, "to enforce the law." To this a reply was received, dated June 29th, that the communication had been referred to the Harbor Commissioners "with the request that they attend to this at once." The Commission apparently understood the Governor's request in the Pickwickian sense, for it continued to do nothing.

THE RECORD ENDS HERE.

At this point, or rather at July 14, 1898, my record ceases, all subsequent records having been lost in the San Francisco fire. For the particulars of the closing episode I must rely on my memory, and can only vouch that in substance my statement will be correct. As the Permanent Committee did not meet for lack of funds I acted from this on alone, but with the approval of individual members of the committee, whom I consulted as occasion required. Although my home at that time was at Wrights, I was in the city two days in the week, and what I did, which was a good deal, took very little time and gave me much amusement. Beyond a fairly reasonable amount of time, and a very little money, it was impossible for me to go and I never did go, or intended to go.

AN EPISODE OF A LATER DAY.

I may digress for a moment at this point to state that in 1902 the fruit and vegetable dealers in San Francisco got very haughty. Combinations of all kinds were rampant and aggressive. There was a retail vegetable dealers' union, which decreed that no new fruit and vegetable stores should be opened within a "block," I think it was, of any established store. If an interloper should be so impudent as to start opposition within the prohibited limits no commission man should sell him a dollar's worth, under penalty of a boycott by every retailer. Nor should any commission man, under the same penalty, sell any produce whatever to any person not a member of the retailers' association. And this was enforced in the most drastic manner. The retailers had all the machinery, including the walking delegates, and any one who violated the rule could not stay in business. On the part of the commission men, they had an equally effective organization. No one was permitted to sell produce except to a member of the association or to a retailer. If he did he was boycotted, both by commission men and retailers. The two organizations were in cahoot. An association of Sacramento River growers came to the city and opened a store, but they could not buy from commission men to fill out their assortment, and if any retailer bought of them no other wholesaler would sell to him. It was a cinch. The newspapers roared with indignation, but the cinch held. When the Legislature met on the January following I drew up a bill providing that no one could sell produce on any State property in San Francisco without a permit from the Harbor Commissioners. No one could get such a permit except by application in writing on a form in which he expressly promises not to be a member of any association in restraint of trade, and that he will sell impartially to all persons wishing to buy in unbroken packages, whether in or out of the fruit trade. The precise form of the obligation is written in the

law and is as binding a cinch as the produce trust had. I gave the bill to some member of the Legislature—I think it was Senator Woodward, but am not sure—and it went through with a whoop. It was "agin trusts" and needed no "promotion." It was approved March 2, 1903. It was sustained by the courts and broke up the San Francisco vegetable trust. It is very stringent in its requirements that the State Harbor Commission shall enforce its provisions, and when there is a public uproar about the abuses in that trade it does enforce them. Unless there is, I doubt whether the Commissioners bother much about it. Perhaps they do, I don't know. A funny incident in connection with this episode was the coming to San Francisco of that organization of a few Sacramento farmers, who had determined to get rid of the commission men and sell their own truck. They opened a store in the commission district and butted in. They had lots of stuff, but their variety was very limited and no commission man would sell them a dollar's worth to make up a variety. If a retailer bought a box of tomatoes of them he might go hang before any one else on the street would sell him anything. The honest river farmers made an awful roar, but it did no good. They were tabooed. Of course, they did get rid of some stuff when some retailer, attracted by price or quality could sneak it away, but they could only supply a few things. It made no great difference, for this particular bunch had plenty of money and could afford to run their store whether they made or lost. They got no end of free advertising as the fellows who were trying to "buck the trust," and the upshot was that so much outcry was made that the bars were let down for them and they were let into the combine, where they lived happy ever after. Farmers are queer.

AN ALLIANCE WITH A "MONOPOLY."

We, of course, knew from the beginning of the agitation for a "free market" that anything of importance was impracticable unless the Southern Pacific Company would agree to make the blocks bounded by Pacific, Davis and East streets their regular terminal for all perishable products which it brought into the city. There was no way of compelling it to do so, and while for many years I had found the traffic officials of the company very obliging—they gave me free transportation for years while I was trying to get the farmers to coöperate—but they could not control the operating department, which always desires to keep down expenses, and the additional cost of the proposed delivery would be considerable. The first thing I did when appointed by Highland Grange was to call on the Freight Traffic Manager of the Southern Pacific Company to ascertain whether it would deliver all perishables, without extra charge, at the proposed free market site. If they would not, I knew I need go no further. In due time I received verbal assurances that this would be done if the free market was established at the proposed site, and later the late C. F. Smurr, then Freight Traffic Manager, so stated to the Board of State Harbor Commissioners at a public meeting. They never told me their reasons, except a desire to relieve their congested freight terminal at Second and King streets, but the stronger reason was plain enough, although it never came up in our discussions. The Southern Pacific officials had had their eye on the blocks we wanted ever since that company purchased the South Pacific Coast road running to Santa Cruz, whose freight terminal adjoined those

blocks of State property. In this desire they were backed up by the wholesale merchants then established on and near lower Market street, who very much desired to ship and receive merchandise from that terminal, which saved much drayage as compared with that to and from the more distant and crowded terminal at King and Townsend streets. They were able to get a few deliveries on the small trackage of the South Pacific Coast road, and the little they had made them anxious for more. They wanted to save drayage on merchandise just as we wanted to save the farmers drayage on fruit. On October 20, 1891, twenty-eight of the largest wholesale firms in the city had signed a communication to the Chamber of Commerce, asking that body to request the Southern Pacific Company to deliver unbroken carload shipments by the Lombard street slip to its tracks in that vicinity. The request was approved by the Chamber of Commerce and promptly forwarded to the Southern Pacific Company, where it slumbered until March 5, 1896, when it was filed with the Harbor Commission in aid of our request that the blocks bounded by Pacific, Davis and East streets should be assigned for the free market. During the height of the fruit season the Southern Pacific Company might bring into the city as many as twenty-five or thirty cars a day, while for months in the winter two or three cars might be the maximum. It was evident, therefore, that if those blocks could be assigned for the free market during much of the year, the tracks could be used for the receipt and shipment of ordinary merchandise. The Santa Fe railroad was by that time in active competition, and to the extent that these nearby tracks could be used for merchandise, it would provide for the Southern Pacific a more attractive terminal than it was possible for the Santa Fe to get anywhere. That was the real reason why the Southern Pacific Company would agree to make that proposed free market site the terminal for perishables. That was the reason why our project got the hearty support of the wholesale merchants and the San Francisco board of supervisors—not love for the farmers. The merchants really wanted the entire benefit of that small terminal, and the railroad company would have much preferred to use it to attract competitive business than to use any of it to give better deliveries for local business, which they would get anyhow. But half a loaf was better than no bread. We farmers were making an awful racket and might win out. Hence it looked good to the railroad men to help us for what there might be in it for them. I assumed at the time that they doubted whether our plans ever materialized, and that if they once got their tracks on to that property the future would be their own. I, on my part, counted on being smart enough to so draw the law that in any case all the Southern Pacific Company perishables would be forever delivered at that terminal. That, however, is more imagining. They were square people, and most of them my personal friends. We kept perfect faith with each other from first to last.

A CONCLAVE OF CONSPIRATORS.

I shall never forget the time when, early in the campaign, I first let my comrades into this secret. It must be remembered that this was in the middle nineties, when the farmers were at the bottom of the heap and the name of the "espee" was anathema maranatha. Brother Walton and Brother Overheiser and I were at dinner in a little half-lighted restaurant, whose gloom well comported with the concoction of some

dark conspiracy. It was an awesome moment. There were we three horny-handed grangers considering what was almost a secret alliance with the arch enemy. Should we—could we—for sake of saving the farmers hundreds of thousands of dollars a year uselessly spent for drayage consent that that dreadful Southern Pacific Company should get anything on earth that it wanted? Would it not be doing evil that good might come? Was it not a sin? Was it not a mortal sin? Could we ever again look an honest farmer in the face without blushing or lift our voices in the grange without fainting from the sting of our own consciences? At the very best, did it not have the appearance of evil from which we are commanded to abstain? How long we pondered or how we reasoned and wrestled I forget, but our unanimous conclusion I remember. We would obey the command against the appearance of evil by keeping perfectly still. Having thus satisfied our consciences in that respect, we settled the main question much as Samuel Butler said the good deacons of evangelical churches in New York settled it for themselves and their daughters when invited to the great ball in honor of the young Prince of Wales when he visited that city in 1860. They would foot it that time anyhow and take their chances with the Recording Angel. And so our first campaign was conducted with the knowledge that we had the hearty good will of what was alleged to be a powerful factor in lawmaking in California, although from prudential reasons, not entirely connected with our own consciences, we refrained from asking active assistance. The conscientiousness of our constituents might be more robust than our own. So far as I knew, we got no help from the Southern Pacific Company during the first campaign. I never heard that the word was passed to fall in.

THE SECOND LEGISLATIVE CAMPAIGN.

In the second campaign it was different. It had become evident that the mass of the farmers in conventions assembled could be relied on to pass any "resolutions" which we might draw up and send to them; but not one dollar would they give to pay the necessary expense of fighting their battle. Personally, I was fully occupied and could not under any circumstances do much of anything which could not be done in San Francisco. No other available farmer was familiar with the art of lobbying, which is merely, when nothing improper is intended, going to the Legislature and never leaving until your bill is signed by the Governor. You employ your time in making personal friends among the legislators, and especially members of the committees, watching your bill through each legislative stage, getting your committee together—if you feel sure of a majority—quick and getting your bill reported back favorably before your opponents hear of it—the committee stage is the danger point—and getting it called up out of order, if necessary, the first time you see a good majority of your friends in the house, and the friends of your hated rival not present. In every Legislature from 1,500 to 2,000 bills are introduced. Each legislator is interested in his own bills. Some of them—probably most of them—do not even read one bill in ten, and know almost nothing about the merits of most of them. In all legislatures there is a majority of sensible and honest men. The art of honest lobbying consists in getting hold and keeping hold of the honest majority, inducing them to take time to understand your

bill, and convince them that it is right. It is perfectly simple for a person competent to secure attention and respect, but demands constant attention, alertness, and tact. We could have employed an effective person, probably, for $500 or $600, and expenses, but we might as well ask the farmers for a million. It was of no use bothering any more in that line, and I agreed with the Southern Pacific traffic men that they should try to get some help for us. They seemed to think that somewhere in the bowels of that institution there was some one who could probably be of service. Who it might be I did not ask, and was not told. But the event proved that they were correct.

THE LEGISLATURE ASKS FOR THE CONGESTED BLOCKS.

I drew up a bill of one brief section providing in explicit language that the blocks of State property in San Francisco bounded by Davis, Pacific and East streets should be part of the free market and operated as much by the Harbor Commission in accordance with the act of 1897. I presume that I took it to Sacramento, but I do not remember. If I did it cost me nothing but my lunch, for I doubtless went and came back on a pass. It was introduced in the Assembly by Assemblyman Radcliff of my then home county of Santa Cruz, who had promised me to do it when he was in our precinct electioneering. It passed the Assembly, if I am not mistaken, without amendment. The "boys" stood in. In the Senate it was introduced by the late Senator Langford of San Joaquin County, who everybody liked, but who had lost his youthful alertness. W. L. Overheiser spent more or less time there again, if I am not mistaken, at the expense of the San Joaquin County Pomona Grange. Otherwise, the bill had no promotion other than whatever was given by the friend of the Traffic Department of the Southern Pacific Company, whoever that was. It was not enough. The Pacific Coast Steamship Company also had friends in the Senate and probably attended more strictly to business, for they amended the bill in committee by striking out the blocks bounded by Davis, Pacific and East streets, and substituting "Section 4 of the seawall," which made the bill nonsense and was an amendment intended to kill. The Senate adopted that amendment by a vote of 21 to 11. I have the roll call on that vote as sent me by Senator Langford. It is interesting. I am not sure of the details of the legislative history of the bill, but as I remember it, the bill passed the Senate in its amended form and then went to conference, and at the request of the members in charge of the bill I, with others whose names I can not recall, went to Sacramento and made an argument before what I supposed was a conference committee at which a considerable number of members of both houses were present. I stated my case as well as I could and handed the committee a letter from Julius Kruttschnitt, at that time General Manager of the Southern Pacific Company, stating that if the free market was established on the blocks we asked for all perishables reaching San Francisco by their lines should be delivered there as the regular terminal on condition that so far as there might be room the trackage should be available for the delivery of other merchandise, for which use of the trackage the company would pay. Our main opponent before the committee was the president of the Harbor Commission, who finally came out in the open and declared that it would be an "out-

rage" to make the Pacific Coast Steamship Company move its coal yard and laundry, and William H. Metson, an attorney of San Francisco, who being asked, as I remember it, intimated but did not squarely aver, that he appeared for his "aunt" or somebody who owned a ranch on the Sacramento River and objected to any loss of the advantage which river produce had over produce arriving by rail by reason of the saving in drayage which this bill would give to shippers from interior points. But I always doubted whether Mr. Metson's aunt was the person who really paid his expenses—and Mr. Metson is not a cut-rate lawyer.

THE STEAMSHIP COMPANY WINS OUT.

I have no exact record of further proceedings, and the legislative history of that session is not available. The conference committee seems to have reported back our bill as we desired it, for on March 18th the Senate rejected by a vote of 19 to 14 the report of the conference committee, which finally killed the bill. By that time, of course, it was known that the Southern Pacific Company favored the bill and our opponents on the floor treated it as a Southern Pacific "job." The then Senator C. M. Shortridge, in particular, is reported in a press clipping which I find among my papers as saying that "it was a question of taking the property away from Goodall, Perkins & Co. and giving it to the Southern Pacific Company. Therefore, being opposed to the Southern Pacific, he wanted the market to stay where the Senate had put it—at "section 4 of the seawall." So far as I can see when it came down to any matter of real value, none of the real "politicians" in the Legislature thought it worth while even to pretend to consider the interest of the farmers. From their standpoint I do not see why they should. Farmers will do nothing in any effective way to help themselves, exert almost no influence in determining nominations to office, and can usually be depended upon to vote their party ticket straight. Why should any politician bother about them! They will not, except just before election time, nor will they ever do so after election until they have learned by experience that their votes are watched by their constituents; that their misbehavior is remembered; that farmers recognize no allegiance to any party which nominates untrustworthy men to office; and that therefore square dealing in office is the best political policy. Farmers will continue to be fooled with until they learn to resent fooling at the polls.

WHY FARMERS LOST THEIR FIGHT.

Had the fruit and other produce growers of the State made half an effort to influence their own representatives in the Legislature; had they studied the literature which was so abundantly supplied to them so as to understand that the so-called free market was a legitimate business proposition and not a tomfool notion of getting rid of middlemen and peddling their own fruit; had they ever trusted the committees whom they chose to represent them and sent them the money to pay the necessary expenses, nothing could have prevented the passage of their bill either in 1897 or in 1899. They would to-day have been dividing $300,000 to $400,000 saved in drayage which they still pay, and would have had a regulated central wholesale produce market where every sale would have been a public record and where with no expense but a postage stamp any farmer could at any time have learned just what any

lot of his produce was actually sold for. They lost because they deserved to lose, and the wholesale merchants of San Francisco are now enjoying the saving in drayage which the producers might have saved and which it was in accord with public policy that they should have saved rather than the merchants.

THE POWER OF CORPORATIONS EXAGGERATED.

The contest of 1899 showed, as is shown whenever such a contest occurs, that the popular imagination grossly exaggerates the power of corporations with legislators. Their greatest source of power comes from the continuous denunciations of the press, which the corporations could well afford to pay for. By making the public believe that the corporations are all powerful the press brings to the corporation back doors all the instruments needed for their purposes and whose services, for the most part, cost very little indeed. Their wide advertising as the dispensers of favors gives them easy control of conventions through county and state committees, thereby enabling them to get about whatever they desire and which can be got without attracting attention. The Southern Pacific Company is the largest corporation in the State, and, through its control of county and other political committees, controls a large amount of public patronage. It gets small jobs for heelers whom under no circumstances it would employ in its own business, and by their help controls nominations for more important positions. How much cash, if any, it disburses for such control no outsider knows—certainly as little as possible. It has a great amount of legal business to distribute among active attorneys, and its distribution of passes—now only within the State—pays wonderfully. But in face of public sentiment strongly expressed it can not hold its men—except the lowest class—in the Legislature a minute, and when opposed, as in this case, by any other important corporation whose agents skillfully make use of the prejudice against the bigger concern its chances of success are small. So far as I can see—or rather hear, for I only visited the Legislature to make one argument— the Southern Pacific people did all that they could be expected to do to help pass our bill, but they could control nobody except their ordinary roustabouts, who cared nothing for public opinion. The bill failed because not one legislator in ten understood its real object, and they did not understand it because the farmers had no alert and competent representative on the ground to inform them and interest them. That being the case, it was easy for the steamship people to defeat a bill which the Southern Pacific push was known to favor.

ANOTHER STRING TO THE SOUTHERN PACIFIC BOW.

It is possible that the political department of the Southern Pacific Company took less interest than they might by reason of another more promising plan. The press dispatch from Sacramento, before me as I write, which announced that the Senate had killed the free market bill, went on to state that the blocks in question were to be leased to the Southern Pacific Company. How the correspondent knew I do not know and probably could not find out. But he stated that fact, and from that day it was so understood. The farmers made no further effort to secure the property, and the next Legislature, by an act

approved March 23, 1901, authorized their lease for terminal purposes for twenty-five years, and on July 18th of the same year the lease was signed at a rental of $980 a month, and the Southern Pacific Company is now in full possession, regardless of the statement made two years before by a Harbor Commissioner to the legislative committee that it would be an "outrage" to disturb the steamship company. The producers of perishable products could have well afforded to pay twice that rental.

With the signing of that lease all possibility ended of making the blocks of State property bounded by Pacific, Davis and East streets the common terminal for perishable products arriving in San Francisco by rail and established there, in connection with nearby wharves, a wholesale market for perishable products under public supervision. The property is more valuable to the company for other purposes, and as it pays rent for the land it will use it as it desires. The law remains on the statute books, and if I were a Harbor Commissioner I should deem myself bound to enforce its provisions in respect to produce arriving by steamer. I do not know that river producers desire it. I do not know that anybody desires it. But the law is there and should be enforced or repealed. But the city is growing, and the time will come when Washington and Jackson street wharves will be demanded for other purposes than the delivery and sale of perishable products. In my opinion that condition will be reached when San Francisco has 100,000 more inhabitants. The center of population, also, is drifting south. If the fruit-growers of the State were united; if they knew what they wanted and why they wanted it; if they were "scopy," as the late Mr. Huntington used to say, and could foresee the inevitable in the future and provide for it, they could cause to be set apart, possibly in the vicinity of Islais Creek, an ample tract of State land yet to be filled in, where a magnificent wholesale market can be established under public regulation and supervision, which shall be a common terminal nearer to the center of population than the blocks which we fought for and did not get, for all perishable products arriving by rail or water, without the expense of one dollar for drayage. The united farmers can get from any Legislature almost anything in reason if they spunk up and get it before it is known that some corporation wants it for the benefit of some more effective class. I have endeavored in this paper to make clear what seems to me essential for the satisfactory disposal by producers of their perishable products and to illustrate by the long story of the struggle for the terminal on East street what is necessary for farmers in order some time in the future to attain it.

THE EXODUS OF THE "FREE MARKET."

There is a finale to this history which must not be omitted. From time to time something occurs in the San Francisco produce market to cause the press of the city to jab the Harbor Commission for not executing the free market law. One of those jabs about something or other first called the attention of the present very effective, very honest, and strictly political Board of Harbor Commissioners, then newly appointed, to the existence of such a law. Reading the law, they proposed to execute it. Nothing on earth, however, could convince them that there was ever any intent or any desire other than that the farmers

should come to San Francisco, or send a hired man, to peddle their own truck. A small triangle of the State lands which we fought over which was too small to be occupied by railroad tracks remains in the control of the Commission. There they determined to establish a free market in alleged compliance with the law. It was not a terminal. Everything brought there must be hauled in wagons. Its total area is but 2,747 square feet, about the area of a store of one of the smaller commission firms. It was quite out of the way of family trade. Nevertheless, the Commission erected a one-story building, divided it into seventeen little pens, and offered the building for a "free" retail market to the producers of California. No "rentals" were charged, for the law forbids it, but "tolls" at the rate of 2 cents a cubic foot were charged for all produce delivered for sale. The press of the State was wildly enthusiastic over the final delivery of the producers from the devouring jaws of the remorseless commission men, and the commission men laughed. Personally, I was glad to see it done, for the city is contemplating the establishment of a chain of municipal markets, and it was of great importance to determine by trial whether householders would go to market in the old-fashioned way, and this State experiment did demonstrate it. They will go, and go in great numbers. The State market was for a time crowded with those who came some distance until they discovered that it was wholly uncertain what they would find there and then most of them stopped. One producer of olive oil was there and stayed there, and told me he did well. One producer of lemons from San Diego told me he was taking in about $20 a day, and it was just like finding so much money, for most of the lemons he sold were those he would have had to dump behind the barn if he had relied on the ordinary channels of trade. And they looked it. Two or three producers' associations were formed with agents, either on salary or commission, and occupied stalls. Seven "stalls" out of the seventeen contained in the building were occupied on November 5th. One association was formed in the neighborhood of my little fruit farm at Wrights, and I sent a little fruit there. I am a small shipper, but my shipment on any one day when I shipped at all would have swamped the man with that particular variety of fruit. And my neighbors all ship about the same fruits at the same time. The crates and boxes, for the most part, were opened, and sold as at any other retail store in quantities as desired, and at about the same rate per box that the commission men were selling to retailers. When I—or my foreman, for I was in the city and knew nothing about it—shipped 5 or 10 boxes of plums, they competed at cutthroat prices with the 30 or 40 boxes which I probably sold the same day to some son of Italy through a commission man. If the son of Italy had known it he would probably have boycotted my fruit and served me right. I usually got about the same returns from those sent to the free market and those sent the same day to the commission man. Both got all they could, poor fellows. It was a hard market all summer.

"FOR ACCOUNT OF PRODUCERS ONLY."

One of the funniest things about this free market was the working out of that provision of the law which says that produce shall be sold "for account of producers only." That was a very proper provision in the law for the wholesale market, partly by reason of the limited

space requiring the prompt removal of produce when sold and also to prevent the commission men from selling at what they called "retail" price, accounting for it at what they called "wholesale" price and pocketing the difference. It will be remembered that it was an instance of that kind which started the trouble. Under that provision produce would be accounted for at whatever it brought, and if the commission man wished to do business on his own account he must charge the produce on the market books to himself and haul it off somewhere and sell it. As applied to the retail market, where it was rigidly enforced, it merely prevented the poor fellows from attracting trade by buying what they needed to make out a variety of fruits in season. They could only sell what happened to be sent to them.

The Harbor Commissioners appointed a "Superintendent" at $125 a month, and as the State law would not permit him to hang around there more than eight hours a day—commission men work twelve and thirteen hours a day—a "janitor" was appointed at $75 a month. Between the two of them they kept the market in a pretty bad muss a good deal of the time. On the 5th of November, when I went to count the stalls, seven of them were occupied and ten were vacant—that is to say, filled with empties and other material. The cost of the building was $5,476. There was paid from the state harbor fund to November 1st for salaries to November 1st $975. There was paid into the state harbor fund from "tolls" on fruit offered for sale there $251.09 to same date. The building can be rented easily enough for other purposes. The market has been worth all it cost. It proved that householders would patronize a public market; that the seawall district is not a good place for a retail market; that no producers worth mentioning have any intention or desire to go to San Francisco to peddle their own fruit; that those who have that desire are easily cured by a little experience; and that it does not pay the producers of any commodity to sell to retailers who must make a profit if they continue to buy, and then go into the same market and compete with those retailers by selling at retail to consumers at the same price that the retailers, who must pay rent and stand a lot of waste, paid at wholesale. Possibly the most desirable thing about that retail market was what Mr. Dooley said was the greatest benefit to a city which had an international exposition—"you don't have to have another."

I do not wish to do the free market injustice. Some of those who sold there doubtless made a fair living, and one of them told me that he had established connections which would make an outlet in a wholesale way for the products of himself and his neighbors. He was evidently a good salesman and the chances are that he developed into a commission merchant. There seemed to be quite a trade in poultry and eggs, at what price or profits I do not know. The whole business was small. The market was never kept orderly and attractive. Rubbish and empties were allowed to accumulate in the unoccupied stalls in a way which would not be permitted in any private market in the city.

One thing not be to forgotten is that all fruit which is merchantable at all, but is not fit for canners' use or Eastern shipment finds its way to San Francisco. There are a great many very small growers who will not cull closely, and do not know how to pack, whose fruit reaches that market. The quantity of such fruit is sufficient to greatly lower the

average quality and the average price of the fruit sold there. But there is never a time when good fruit well packed can not be had, as may be seen by calling at any good retail market. For a quarter of a century I have sold fruit there and been in the city to see it sold. Invariably when good fruit sold at unremunerative rates, if I have walked through the commission districts, I have seen the stores and sidewalks piled high with the stuff, far beyond the requirements of the market, and which commission men were doing their best to get rid of in the only possible way to get rid of it—by temptingly low prices. There is doubtless some dishonesty by some men.

I think I have made it clear that in my judgment the way to sell produce in San Francisco is the way approved by the experience of generations. The farmer who can succeed in selling his own fruit at a profit in a city market is an exceptional man. No ordinary farmers' association is likely to succeed or to hold together. Such an organization as the southern orange growers have could, of course, sell its own produce if it thought it paid to antagonize the trade. I should not think it would pay to do so. In my opinion, producers should sell their products at wholesale to retailers who will sell it again, and when they have sold it they should leave consumers, retailers and municipal authorities to deal with the final distribution. As a resident of San Francisco I favor the establishment of municipal retail markets, but as a country producer I should not care whether there are any such markets or not if I did not think the aggregate of sales would be increased. But I do think so. The ideal plan would be that proposed twelve years ago of concentrating all deliveries at one terminal and making that terminal the wholesale market, managed and supervised by non-political public authority—that to be supplemented by a chain of large municipal markets into which the fruit should be delivered by freight cars on street railroads operated for that purpose during the night. That, however, is a matter for the municipality and its citizens to settle. The concentration and the wholesale market might be arranged some time in the future on State property in San Francisco if the growers should take it up with the Harbor Commissioners. It would succeed if the place selected and the arrangements with the carriers combined to make it the place where sales from first hands could be most economically conducted. Otherwise, it wouldn't.

This completes my story of the great struggle for a "free market" in San Francisco. It reminds me of the story about southern roads which was current in the civil war among the soldiers who marched over them. A southern road of those days, so the story ran, started out as a noble highway, well drained, well metalled, delightful to travel on; from that you turned into an ordinary country road, ungraded, unmetalled and either muddy or dusty; from that into a plantation road, thence into a cart path, thence into a trail, thence into a squirrel track, and thence up a tree. (Applause.)

The Convention then adjourned to meet at the Crocker Art Gallery at eight o'clock P. M.

EVENING SESSION.

On Thursday evening the Woman's Council of Sacramento tendered to the delegates to the Convention a reception at the Crocker Art Gallery. After some time spent in examining the art treasures, listening to music, partaking of refreshments and in social converse, President Jeffrey called the meeting to order.

PRESIDENT JEFFREY. Ladies and gentlemen: In opening this meeting to-night, and before introducing the speaker of the evening, I wish to say a few words of appreciation—it would require a great many words of appreciation—of the kindness of the Woman's Council, the ladies who have met the delegates to this Convention and greeted them at the door, and I wish to express thanks to these ladies for their kindness. Most of the members of the Thirty-fifth Fruit-Growers' Convention have been upstairs seeing the beautiful pictures, and now we are assembled here to listen to a short programme.

We have been nicely treated in Sacramento. Why shouldn't we be? Sacramento is the center of the largest deciduous fruit section in the State. As a matter both of courtesy and business, Sacramento people have treated us well, and we appreciate it. I will say that it seems to be the voice of the delegates that this Convention has been a great success. You are more or less concerned in the interests that have been discussed at these meetings for the last three days, not so directly interested as the delegates who were discussing their troubles, their aspirations, their inspirations, and their business generally, but nevertheless you are interested. If all the fruit orchards that are tributary to this town were wiped out of existence there are many people of this town who would have a fit of blues; so I am glad you have encouraged us in meeting us in a social way on the streets, in the hotel lobbies, and in your homes, and in the kindness in which you have tendered us this reception this evening in this institution. Now, as we do not care to detain you any length of time, I simply close my remarks with a reiteration and expression again of the sincere thanks of this Convention to the people of this town, where this Convention was organized twenty-seven years ago with a very few pioneer fruit-growers, where this Convention was born almost a complete generation ago. Now, I will introduce Mr. A. R. Sprague, who will speak about as long as I have talked and choose his own subject. (Applause.)

MR. SPRAGUE. Friends, Mr. Jeffrey, I am sure, has quite overrated the amount of inspiration which I can command on a moment's notice for an extemporaneous speech. However, I do not like ever to refuse when any important task must be done, and so when he requested me to say just a few words concerning the Crocker Art Gallery, I am very glad to respond.

This gallery, as most of you know, is a result of the liberality of Mrs. Crocker, who formerly lived in the city of Sacramento. As you have seen, it is filled with the art treasures of all lands. Doubtless nowhere west of Chicago can be found a gallery more replete with rare gems of art than is the Crocker Art Gallery. I do not think the fame of this gallery has spread at all in proportion to its merits. I think there are

comparatively few in this great Sacramento Valley know what a treasure we have here in reach. If it were generally known, there would be more pilgrimages from the various parts of the valley to see these treasures of art. It is maintained, as doubtless you know, by the city of Sacramento, which is proud that it possesses so magnificent a gallery; and although it is not quite so accessible as many of us wish, we can always get to it if we start.

We are very glad also to call your attention to the magnificent statuary at the door, which is the gift of our distinguished citizen, Colonel Weinstock, who is now journeying in foreign lands. (Applause.) Doubtless nowhere can be found at the present time on the coast a group of higher merit than that. This is the gathering place, as you see to-night, of the citizens of Sacramento whenever they wish to do especial honor to visiting citizens; and in these beautiful halls, adorned as they are with such rare treasures of art, we all feel free to enjoy each other's society and to catch something of the inspiration that comes from non-utilitarian things. To be sure, we are agriculturists; we are doers of things, the most of us, and we spend much of our lives with minds intent on that feature of it, and yet there is in us all something which demands something higher, and we doubtless will respond to-night, our souls will rise from the inspiration of these noble works of art. (Applause.)

PRESIDENT JEFFREY. I now have the very great pleasure of introducing one of your foremost citizens, Judge Peter J. Shields of Sacramento County, one of your honored men. (Applause).

JUDGE PETER J. SHIELDS. Life in the open country, under the clear sky and in the midst of green fields, has never failed to excite the praise and move the fancy of the world. There industry does not hum, but is full and abundant; life is peaceful, but of a measureless range; and the silent forces of nature stir only man's best impulses. Such a life requires no praise or appreciation.

Nor shall we here attempt any praise or defense of farm life, nor of the men who live it. With outdoor conditions have ever gone a type of manhood that was clean in its morals, sturdy in its courage, useful in its industry, and loyal in its patriotism. Country life has given to America its ideals, and our institutions are peculiarly its product. Its freedom and independence and repose are everywhere expressed in our Nation's aim and purpose. It has all of its strength and reserve and courage. While we remain a Republic, dedicated to justice and equality, we must remember from whence our strength and power came; and we must foster our country life that it may supply the influences which will keep our Nation ever vigorous and young.

But mindful of these conditions, we are mindful, too, that this life has its weaknesses as well as its strength, and our purpose to-day is not to rhapsodize or appreciate its better side, but to study its conditions as they are, to endeavor to determine its value, and to indicate, if we can, how its condition, good as it is, can be made better, and how its usefulness, great as it is, may be enlarged. On its weaker side it may be said of farm life that it lacks social advantages and educational opportunities. The life is too often solitary and isolated, and the range of its activities narrow and circumscribed. Too much of its labor is mere drudgery, and it lacks the alluring prospect of easy profits or large wealth; its earnings are often too small; its work hard, and its hours of labor long and monotonous, lacking stimulation or enthusiasm. Many

elements of the home life are meager; the farm women lack companionship, their work is hard, routine, and uninteresting. A combination of these influences tends towards a general atmosphere of repression. Over wide areas these conditions happily do not prevail, and everywhere they are becoming outgrown. When we were going through that phase of our country life in which these conditions were most prevalent, our cities began to grow, and our youth in a steady stream left the, to them, unattractive farms for the pleasures and opportunity of the apparently larger life. Under the influence of this desertion rural conditions further degenerated, farm life languished, and cities grew apace. This disproportion, this condition of social and industrial unbalance, excited first interest and then alarm. Our people began to study the consequences to the individual and the State of rural decay. We began to see country life with a better understanding and consequently a new appreciation. We began to see that the country produced a different, although not necessarily a better, man than the cities, a kind of man indispensable to our social soundness. The full industry of the country, its beauty and its sweetness, its dignity and its peace, were reflected in the character and personality of the man who grew up there, and gave him a depth and earnestness and sincerity which make him big and effective.

We saw that the country was free from those temptations which beset the path of the city youth, and that a simple honesty was characteristic of it. Its industries were moral and creative; its wealth was cleanly realized from the very elements by the application of honest toil. With a new force we saw that its products fed the industries of the cities and created the commerce of the Nation. With the continued growth of our cities their social problems began to develop. Crime increased, and the overcrowded tenement districts and large numbers of helpless poor began to appear. The question of what to do with our great mass of dependent children began to press for solution, and divorces so multiplied as to become a national scandal. And we then observed that these conditions did not arise in rural communities, that their whosesome industrial conditions forbade them, that they were the sole product of the cities, and that the country's only part in their existence was to pay the price of their correction and support. We came early, too, to realize the political value of a country citizenship. It early appeared that it cast a steady and conservative vote; without passion or hysteria, having peculiarly high patriotic and moral ideals, it moves to the solution of governmental problems slowly but sternly. We saw that it was of the nation's hostages against the forces of revolution and unrest.

These considerations newly realized, or newly learned, gave to country life an enlarged appreciation and a new eminence, and lay at the base of a revived national desire and purpose to foster it as the very foundation of the Nation. As a result of these considerations the question is constantly, though crudely, asked as to the relative advantages of the two types of life, as to which produced the better man. This admits of endless discussion, but one without profit. It is readily apparent that both conditions are indispensable to a large national existence and symmetrical social growth. That a man should follow that life in which he can find the most happiness and do the best work is self-evident, and if that be a city life or a country life, that is for him the one to follow. There is enough in each to furnish the materials of a useful and happy

existence, one of distinction and greatness. The one undisputed fact in their comparison is that success in either is a question of interpretation, of seeing large. Our great cities are rich in stimulation for those who can feel it. If the city boy once knows the thrill of the high life about him, he may pursue its best purposes to distinction. If the country boy once catches the inspiration of his noble surroundings; if he once sees the size of the factors with which he is dealing, the big thought makes him a big man, and masterfully and with an enthusiasm which ennobles his labors, his life tends naturally to fine achievement.

Manifestly the thing to do is to cease comparing the two and go about so controlling the forces back of each that the youth of both shall hear the right call and that their progression be directed towards the high places. Each at its best is good enough, and the Nation is more concerned in knowing that each is lived to its best than that either is the more meritorious. The general welfare is served when governmental and social forces are so formed that city and country life, each in its own field, shall be perfected, and that both working together shall round out a sound and useful society.

Growing out of this new national purpose to strengthen agricultural life, many influences conspired to effect its betterment. The city man regarded his country brother with a new respect; the country man felt a new pride in his calling. Having more friends, in its prosperity many strong influences combined to aid it. Commerce ramified and extended and the farmer learned business from the city merchant. Transportation facilities multiplied, and gave the farmer new and better markets and enlarged the range of his life. Agriculture was given a place in the President's Cabinet, and the Department in recent years has been doing a great good to the industry which it was created to serve. Agricultural newspapers have everywhere increased in number and improved in quality until they have become an invaluable aid in improving farming conditions. And then the improvement and multiplication of agricultural schools and colleges has come to do all that can be done to prepare the country man to live a country life.

The latest agency which has offered itself to the out-of-door man, the latest evidence of the Nation's concern for the farmer, was the appointment by the President of the Country Life Commission, which has so recently visited us. The purpose of its appointment was that it might study and observe all of the conditions applicable to, or operating upon, out-of-door life, and to recommend such direct remedies, or the pursuit of such general policies as in the judgment of the Commission promises to improve or correct them. The forces behind this commission include the nation itself, and whatever views we may hold as to the conditions, or how they may be improved, we must not undervalue its possibilities. That it can aid in the great work of improving rural conditions, the most superficial observer can easily see; that it must do so should be the determined purpose of every farmer in America. But we must carefully study the way in which it can be made useful, that it may not waste its powers, and we our opportunity in fruitless and ineffective activities; that it does not waste its energies in recommending legislation which can not reach the evils aimed at; that it does not concern itself with effects, rather than with causes.

To determine how this commission can be of help to country life, we have only to recall the unfavorable features of that life and inquire how

they may be remedied. These disadvantages are pretty generally set forth in the letter of the President and the correspondence of the Commission. Happily they have little reference to California conditions. Among them is the isolation and lonesomeness of farm life. This the commission may point out, as it has been pointed out countless times before, but it can not recommend legislation for its correction. Nor can it favor laws abolishing unintelligent methods, long hours and heavy, unprofitable and uninteresting work. These are personal and industrial conditions, beyond the reach of legislation. Health regulations may be legally and practically enacted to improve city conditions, but if the rural sanitation is bad, laws promise little more remedy than their suggestion. The President suggests a study of the condition of the rural schools. They are now good and substantially meet the demands made upon them. Of what avail to improve a course of study if the school is open too short a time, or if the children, at work on the farm, do not attend it? Of what use to recommend a more capable teacher if the people can not afford to pay the price of his employment.

Our people are now building better roads as fast as they feel the need of them, appreciate the loss they sustain through the use of poor ones, and as fast as they can afford to pay for them. Laws in relation to good roads under present conditions would be largely temporizing, while the conditions which resulted in bad roads continued. We must change the condition. Our present mail facilities reasonably meet the demands of our farm people. In the main they are satisfactorily served with such mail as they have the judgment or taste to select, the means to pay for, and the time to read. It is suggested that the rural people should meet more frequently and coöperate more fully to effect the welfare of their industries. This, if only the repetition of an old saying, is as surely a wise recommendation. But if so, the farmer has to travel a long distance over a poor road, at the end of a long day's toil and on the eve of another; it is an obstacle which neither argument nor law will remove. He has been misled and injured by such means until he has grown suspicious; he has not been trained in such activities, and he does not make them interesting or profitable. And, so afraid, bored and without hope of advantage, he maintains his seclusion. It would be futile to point out the advantages of such meetings while these conditions continue. And the scarcity and unreliability and unintelligence of farm labor is beyond the reach of law to remedy; it is an evolution which can only be remedied by a correction of the forces which produce it.

I think it clear that rural conditions can not be corrected or even improved by laws directed immediately at its defects; we must go deeper and correct the causes, and this remedy can not be applied by some one else for the farmer; paternal law in his behalf would not only fail of beneficial results, but would work an injury and be resented by a man who is able to stand alone. The country man needs no legislation peculiar to himself; his wants are met in that respect when the people generally are wisely and justly governed. His interests are best served by those measures which are of general application and best serve the interests of the whole people. Given good general criminal, financial, and economic laws, and his condition demands no more, it does not permit of any other. To a greater degree than any other man he can work out his own progress. Firmly fixed upon the soil, controlling the very

forces of nature, and bending them to his service, he is his own master, and is able to mould his own destiny.

But this does not acknowledge the existence of numerous grave limitations to rural life and despair of their correction. For there is a remedy, and it is easy of application and entirely adequate. It is as broad as the evils sought to be corrected, applicable to all conditions, and capable of accompanying agricultural life through all of its developments, and keeping it sound and making it supreme. And that remedy is education! Not general education, although that would be most helpful. Not educating the farmer, the outdoor man, to be a merchant, a journalist, or a physician; but teaching him to be a farmer; training him for the work he is to do, for the life he is to lead.

This will help the country in the only substantial and permanent way in which it can be helped, and start it on the road to an endless development. Agricultural education will not only refine and cultivate the country man, it will stimulate and energize his mind. Trained to know his soil, his seed, and his animals, he will use only the best, and those to best advantage. Growing only the best and the most of it, combined with business methods, he will make more money, and consequently have to work less hours. Leisure and wealth will give him time for new ideas and the means to realize them. He will add beauties to his farm and refinements to his home. He will farm more on fewer acres. His labor, to what is now regarded as its humblest detail, will become intelligent and enthusiastic. Cultivation will become intensive, farms will be subdivided and population will increase. Upon these conditions the farm meetings and farm organizations will follow naturally and be made to realize their fullest measure of social betterment and business advantage. The intelligent and prosperous farmer will see the advantages of good roads and will build them. He will demand better schools, which his children will have time to attend, and he will provide and develop them for himself. He will read more and better publications; he will have an increased correspondence; he will need better mail service, and he will have the power and intelligence to get it. To this well settled and prosperous country transportation facilities will come, and the whole life will go up. Country life will become attractive, and its labor problem will be settled. Better men will be drawn to it; they will be trained by it, and its discipline will make them efficient and dependable. There is no phase of country life to which education of this character does not apply, and which it does not improve. We should, therefore, urge upon every moral reformer, upon every humanitarian, upon every statesman and political idealist, that they advise and demand that immediate steps be taken to give to this country an enlarged and adequate system of agricultural education. We should earnestly recommend to the Country Life Commission that it bend its every energy in furtherance of such a national policy, and should point out to it that action in any other direction will be indirect and ineffective.

The Department of Agriculture should utilize all of its vast forces to the same end. The Davis bill, now before Congress, or some such similar legislation, should be enacted. Every state should be urged to do its utmost in this direction. Let us in California strengthen our College of Agriculture and make it fit our necessities. With particular

emphasis let us go about the work of building up and supporting the School of Agriculture at Davis, and making its management practical and vigorous. Knowing the value of a strong rural population, of its necessity as a source of happiness, of wealth and strength, blind to consequences, we have been training our city man for all of his activities, and the country man for none of his. We have been teaching men to practice law, to conduct banks, to lay bricks; but we have asked this country man to grope amidst nature's mysteries without a ray of light. If our cities grew great under this treatment, while the country fell away, let us not be blind to the cause, nor hesitate now at its correction. This will require work and will take time, but it will be worth while.

Looking into the future, and seeing country life as it will develop under training, I see a field into which science has gathered all that is good, and from which progress has banished all that was ill. I see farm homes filled with the fruits of wealth and culture and moral purpose, set amidst the dignity and sweetness of nature; the kind of homes which shelter strong, clean, and effective men, and which nurture a youth fit for all the trials of life, equipped for effective industry and the kind of citizenship which this great democracy demands. (Applause.)

PRESIDENT JEFFREY. I very much appreciate, in behalf of the California Fruit-Growers' Convention, the remarks that Judge Shields has made. I again thank you, ladies, for the kind reception to-night, and extend the appreciation of the Convention to the city of Sacramento and to the magnificent donation that has made possible the holding of our reception to-night in this beautiful place. (Applause.)

PROCEEDINGS OF FOURTH DAY.

SACRAMENTO, December 4, 1908.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

The President appointed as the committee to attend the meeting on increase of freight rates in San Francisco, December 5th, the following: J. P. Dargitz, Chairman, and Messrs. A. Brinck, B. F. Watson, and J. W. Anderson.

PRESIDENT JEFFREY. I have a telephone message from Judge Norton stating that he will be here at 11 o'clock, at which time he will present his paper. In the mean time we might dispose of any business which suggests itself to the members of the Convention.

MR. DARGITZ. I have been requested by a person interested in the matter to call the attention of the Convention to the subject of dried fruit contracts. You are all doubtless aware of the dispute which has been going on between the shippers from California and the Growers' Association and the jobbers of the East in regard to the matter of the dried fruit contract; that is, what sort of a contract for sale should be accepted by both parties, and it would seem as if it were a matter in which the members of this Convention are particularly interested, and I therefore move the appointment of a committee to consider the matter of dried fruit contract and make recommendations.

The motion was duly seconded and carried.

MR. WALKER. There is a matter that has been brought to my attention in the last few days that I think might interest the grape-growers, and that is the duty on Spanish grapes. There is quite a serious attempt on the part of the Spanish importers to have the basis of measurement rearranged so as to let the cork dust in free. If that is permitted it will mean about a 20 per cent reduction on the duty, and we all know that if the Spanish grape can come in with an additional reduction in duty it is going to hurt us very seriously with our early grapes, especially on the Atlantic seaboard. This matter has gained considerable headway—in fact, the importers, I believe, have it up with the Treasury Department at the present time, and inasmuch as it affects interests, especially at Florin and other early districts, I think it would be well for this Convention to consider the matter very seriously.

PRESIDENT JEFFREY. Mr. George Hecke is on the programme for an address to the Convention, and we will hear him now.

THE PROTECTION OF VINEYARDS BY QUARANTINE.

BY GEORGE HECKE.

When the viticultural industry of our State was in its infancy, it found almost perfect conditions for rapid development. The supply of its finished products was insufficient to meet the demand, the climate was ideal, and serious insect and fungous pests had not then appeared on the scene. Few rules and regulations were needed to control the produc-

tions, and the marketing of the crop and the healthy conditions of the existing vineyards caused a feeling of security, so that no measures whatever were taken to guard against the introduction of insect pests.

This feeling of security was rudely shaken by the discovery of the dreaded phylloxera in the State about the year 1874 near the old town of Sonoma. Unfortunately no proper quarantine laws were in existence, and by 1880 the insect had spread through viticultural districts of the coast counties. It is estimated that approximately fifty thousand acres of vineyards, representing investments of many millions of dollars, have been lost through its ravages.

The only parts of the State that are now supposed to be free from the insect are some counties of the interior valleys and southern California. While southern California has so far escaped serious infection by the phylloxera, she had lost very heavily through the devastation of her great grape-growing districts by the Anaheim disease. In 1884 and 1885 the loss is estimated to have been about twenty-five thousand acres; if we add to this the acreage destroyed by this disease in 1889 and 1890 in the upper Sacramento Valley, amounting to five thousand acres, and the loss of approximately ten thousand acres in 1898 and 1899 in the Santa Clara Valley, we find that the great viticultural industry of California has during the last thirty-five years lost over fifty thousand acres by the phylloxera, and forty thousand acres by the Anaheim disease—a grand total of ninety thousand acres, which means a direct and indirect financial loss to the State and country from these causes of probably not less than seventy-five million dollars.

The figures are appalling and should demand the careful attention of every one interested, so that the industry may be better protected in the future.

Phylloxera and Anaheim have been so far the most serious pests that we have had to fight against, but by studying the Eastern and European records we find that there is much danger of introducing other enemies, only secondary in importance. The French grape-berry moth is causing considerable damage in the important viticultural districts of Europe, and if introduced here might develop into a very serious problem. In addition to the French berry moth, Mr. Ehrhorn, our Deputy State Commissioner, tells us of the grape-berry moth and grape curculio attacking berries, and of the grape-bud gnat attacking buds and blossoms. To guard against the danger of importing these dangerous insects into our vineyards, the introduction of all Eastern and foreign grapevines should be absolutely prohibited, unless the consignee should first obtain from the State Commissioner of Horticulture of the State of California, or his deputy, a written certificate indicating that the stock has been properly inspected.

The low prices at which Eastern and foreign grapevines are offered in California are calculated to appeal to the California grape-grower, who very often leaves out of consideration the fact and the danger that sufficient guarantee is not given him as to the clean condition of the stock he is importing. In the vineyards of our coast counties hundreds of thousands of these foreign grapevines have been planted, and in many instances complaints have been made that varieties received have not been the ones that had been ordered, and that in some cases phylloxera had been found on the roots. There is no redress against the foreign dealers after the vines have been accepted.

In counties of California where Anaheim and phylloxera are known *not* to exist, stringent measures should be adopted to provide for the prevention of the introduction of these pests. The importation of rooted vines and cuttings from other counties or districts should be absolutely forbidden, unless accompanied by a written certificate from the State Commissioner of Horticulture, or his deputy, stating that phylloxera or Anaheim is not known to exist in the county in which such grape-vines are grown. This is an absolutely necessary ordinance in order to protect a county that is not infested. A measure like this, consistently carried out, may keep out the pests for many years.

If, however, the insects have obtained a foothold in a county that had previously escaped, the first step necessary will be to determine, as much as possible, the extent of the attacked area, and if it is found to be confined to a small vineyard, an effort should be made to completely eradicate the pest by destroying this vineyard. (Bulletin 192, U. C. Cal.) The vines should be grubbed out and burned upon the ground and the ground should be kept clean of all growth for at least one year; this must be done, so that any suckers that may come up from the root may be destroyed immediately. If the affected spot is not too large, it is advisable to disinfect the soil with bisulfid of carbon. Apply this by boring holes two feet apart over the land to be treated. These holes should be about one foot deep, and can be made with a small crowbar. After pouring in the liquid the holes should be closed by pressing the earth into them with the foot.

If, however, the pest has obtained a foothold in several vineyards of the districts, it is practically hopeless to attempt to eradicate it. In this case, all we can reasonably hope to do is to delay the spread of the pest as much as possible, and in the mean time to place all new vineyards on a permanent phylloxera resistant basis. The infested spots in the districts should be diligently hunted out and treated. The treatment consists in digging up and burning every vine, in each spot, which shows symptoms of attack, together with at least three rows of apparently healthy vines surrounding them. Disinfection of the soil of these spots by flooding or with bisulfid of carbon is then advisable, but in any case these spots should be strictly isolated in all farming operations. In cultivating the healthy parts of the vineyard, to pass through the infested spots with the plows and harrows is the most effective method of spreading the insects.

The search for the infested spots is most easily and thoroughly done in July and August, as at that time the shortness of growth is most readily detected and the insects are easily found, as they are in large numbers on the surface roots, and generally also on the trunk of the vines just below the surface of the soil. If this searching and destruction of infested spots is commenced in the early stages of infestation and prosecuted with sufficient thoroughness in every vineyard throughout the county, the life of the bulk of the vines will be effectively prolonged for many years. As soon as the actual presence of the phylloxera in a district is known, and all hope of permanently eradicating it is abandoned, the embargo could be modified to the extent of admitting all vine-cuttings, unless it were known that these vine-cuttings came from a district that is suspected to be infected by the Anaheim disease. The Anaheim disease will be invariably reproduced in cuttings taken

from sick vines. Rooted vines should still be kept out, as they can not be disinfected with any degree of certainty.

But no matter how carefully and completely those measures are enforced, a time will arrive sooner or later when the cost of inspection and eradication will be greater than any benefit to be derived from them. We must accept the phylloxera as a permanent inhabitant of the district, and simply consider the best method of growing vines in spite of its presence. By this time all quarantine regulations are useless, and should be repealed.

The County Horticultural Commissioners will experience great difficulties, indeed, to determine how to proceed in the case of Anaheim disease. In spite of much investigation by Federal and State authorities, the cause and remedy have not been discovered. The first record was obtained at Anaheim in 1885. The malady became less virulent in 1890, and it is a matter of doubt whether the extensive destruction of vineyards in the Santa Clara Valley during the last decade may be attributed entirely to this disease, or to the combination of peculiar conditions, such as loss of vitality caused by overbearing ending fatally during the extreme dry weather of 1897-98. The earmarks of the Anaheim disease are found over all the vineyard districts of California, but they are so uncertain that I doubt whether even an expert can tell you with any degree of certainty that such or such a vineyard is harboring the Anaheim. The characteristics are uncertain. The leaves show a lack of coloring matter (chlorophyll) between the veins, turning vivid red in the colored and yellow in the white varieties. The growth is limited, commencing at the top, and the internodes become shortened. The body of the canes show irregular patches of unripened tissues, and the end canes, being last to ripen, remain immature and soon after the leaves fall these unripened parts turn black, and become dry so they can be snapped off between thumb and finger. Another peculiarity is the remaining of the leaf-stem, the petiole, on the cane, with the premature dropping of the diseased leaf. A healthy leaf unaffected by the Anaheim will always drop from the ripening canes with the stem. These to my knowledge are the outward characteristics of the disease. As I mentioned before, comparatively little is known and no remedy has been discovered. The course of the disease so far, however, leads me to believe that it is not likely to prove destructive to an alarming extent where vineyards are planted in good, rich soil with sufficient water supply, and where care is taken to keep the soil in good culture and to prevent the vines from overbearing.

The Anaheim disease is suspected to infest southern California, the Santa Clara and the upper Sacramento valleys. It is hard to determine, and I do not think there is an expert in California who can tell it with certainty. This is one of the weak points in guarding against the disease; the other is a fact that many nurserymen are also dealers, and do not raise all the stock that is needed for filling their orders. They buy and in so doing may unwittingly become the agent for the spread of diseases and pests. If this practice on the part of the nurserymen continues the time may come when the law will prevent all intercountry business in nursery products. This would be a long step in the direction of securing clean stock.

Clean nursery stock would practically guarantee immunity from

spreading pests, and the security thus obtained would be of the greatest economical value to the viticultural and horticultural interests of California. (Applause.)

MR. ANDERSON. I would like to ask Mr. Hecke if he has found any Anaheim disease in Yolo County.

MR. HECKE. No, I have not found any in Yolo County.

MR. ANDERSON. In what county nearest Yolo?

MR. HECKE. I explained in my paper that it was rather uncertain whether the disease is in any of the northern counties, for this reason. The disease may be there and yet the conditions and circumstances may not be such as to make it dangerous. Some years ago, in the Vina vineyard, in Tehama County, the disease was very destructive, and we also know that the disease is suspected to be in Marysville, and yet at the same time it did not prove as destructive as it did in Santa Clara and southern California. It is pretty likely that the disease is all over California, but it may take a combination of circumstances, a dry year, overbearing, or something of that kind to make it destructive. I thought that I had found the earmarks of it near Woodland; the peculiar discoloration was there, and for awhile I was actually afraid that I would have a dead vineyard in two or three years' time. But it recovered. I lost about six or seven vines out of 9,000, and the symptoms passed away. I have always thought it was an attack of Anaheim.

MR. ANDERSON. In my inspection northeast of Woodland I saw something like the Anaheim disease, but I was not sure; I was not well posted.

PRESIDENT JEFFREY. Nobody in the world is well posted on the Anaheim disease. Mr. Hecke has taken the best position possible. It may be a condition altogether, not a disease. It may be it is not infectious, but that it is a condition, like the sour sap of the peach tree. In southern California where in 1884 the vines all died absolutely for whole sections of the country there, to-day there are the finest vineyards in the south, growing on the identical land where these vines were all killed. You will remember, in connection with this kind of disease, a few years ago the orange gum disease, as they called it, was supposed to be infectious. Now, all the scientists of the university tell us—and they have gone into this thoroughly—that they are unable to find any bacterial culture from what was known as gummosis, and now they tell the farmers down there not to pay any attention to a sick tree as far as infection is concerned; it is simply a condition that has come over that tree, the same as sour sap on a peach tree, which will cause it to absolutely fail to put out any leaves until August, and finally in two years that tree will be as well as it ever was in the world. I have seen thousands of acres of peach trees in the south affected with what they call the sour sap that up to the first day of August were apparently dead. Eighteen months or two years from that time that orchard would be as well as it was before it was affected in that way. So I don't wonder Mr. Hecke can't find the Anaheim disease.

MR. WHEELER. I would state that about 1888 Professor Gustav Eisen and myself were requested to investigate the Anaheim disease in the county of Fresno, and we were there about four or five months. While there we were taught how to detect the Anaheim disease. Pick

up a leaf and hold it to the sun and see if the cells have a little yellow spot. Some years ago when the disease was affecting Santa Clara County I came to the conclusion that it was something similar to the Anaheim disease, from the appearance of the leaves.

MR. HECKE. I believe in Santa Clara County, Mr. Wheeler, it was the phylloxera in conjunction with this Anaheim disease.

MR. WHEELER. I saw a vineyard die at Orange. Professor Pierce, Professor Eisen, and myself went through that vineyard the early part of June, and we found no trace of this Anaheim disease. We figured upon 2,000 tons of good raisins, calculating it would dry 2½ to 1. I think about the first or middle of July we saw the first indications. By the middle of August that vineyard was dry and yellow, like a wheat field, and they only got about one carload of grapes.

MR. WILLIAMS. Mr. Chairman, I was reminded at one point that on the first day of the session I brought up the question of those French vines; that I contended that they ought to be kept out of the country entirely. Of course, that might hurt some commercial project, but it is good for the growers. You can't be certain, even from the most rigid inspection, that you are not bringing in the disease. The horticultural commissioners, some of them, pass them. It seems to me it ought to be definitely decided whether they should be brought in or not.

MR. BREMNER. I saw about a million French vines come in last year, and I know about what those French vines have passed through before they come into the United States. They are not first-class vines from a nurseryman's standpoint, but they are first-class as far as disease is concerned. The French Government and its colonies have the strongest quarantine of any nation on the face of the globe. You can't get a flower into Algiers; a lady can't even wear a carnation into Algiers as a bouquet, and every vine that comes out of France has to come with a certificate signed by the Minister of Agriculture. They are pretty strict. I would not condemn these vines without being pretty sure that they were affected.

MR. HECKE. The main objection to the importation of French vines is this. You order maybe 10,000 vines from France. When you receive your vines you have no assurance that you have what you have ordered. As Mr. Bremner said, the condition of the cuttings can not possibly be as good as those that you buy from some good California nurseries that have the reputation of furnishing you the proper varieties.

PRESIDENT JEFFREY. Mr. Hecke, will you tell the growers what they are going to do about the sprouting of resistant stock?

MR. HECKE. I am not in favor at all of field grafting. A few years ago it was recommended to set out your resistant stock in the fall and field graft in the following year. My observations over practically the whole viticultural districts of California have convinced me that that is wrong. Purchase from a reliable nurseryman the young vines that you want. If you want field graft, however, with such varieties as already mentioned, you are liable to have trouble with suckers all during the life of the vineyard.

PRESIDENT JEFFREY. I know of one vineyard of 160 acres where the sprouts were cut and windrowed up like hay. It was almost filling the road.

PRESIDENT JEFFREY. Mr. Hecke, would it be a good thing for

you to advise the grape-growers here to-day to put in a good deal more time to the resistant stock?

MR. HECKE. I should certainly do so. Of course, you might read a paper here on the grafting, and yet at the same time it is a delicate operation and can not very well be performed by an actual grower. He has to break in his men, and if you set them out in a nursery part of them do not grow. I believe that the bench grafting is work for experts, and I should certainly advise the grower to get in communication with a good reliable nursery and get his stock from there with a guarantee, or, if he possibly can, order his vines a year ahead of time. Now, there is another point that I would like to speak about. You have all noticed how quickly the phylloxera has spread through the coast counties; you know how it has acted in Napa and Sonoma. Sometimes they have planted two or three times with the same results. In the Sacramento Valley the phylloxera is not spreading nearly so rapidly. The phylloxera does not live in water, and therefore our vineyards are partly resistant, you might call it.

MR. NEWCOMB. I also think that one reason the phylloxera does not spread any more than it does in the Sacramento Valley is because the phylloxera travels through the winged form, and for some reason the winged form is developed very little in this locality. I think the different counties are perfectly right in establishing quarantine laws.

MR. HECKE. I have never heard of a winged form in California but once, and I think Mr. Bremner was reported to have found it in Sonoma.

MR. WHEELER. The Japanese at Fountain Grove, Kanai Nagasawi.

MR. BREMNER. I have found the winged form in Sonoma County in very many sections. When a vine is nearly dead, the small roots deep down being killed, the phylloxera comes to the surface. It does that anyway in the fall, but when the vine is nearly dead in certain sections, especially in sandy soil where there is much moisture, small roots are put out near the surface and on those the winged phylloxera form appears. It will only be found where those rootlets form. You will find it around the Fountain Grove vineyard and up through that section.

PRESIDENT JEFFREY. I think Mr. Newcomb is right, that every county ought to quarantine against every other county. Sutter County, for example, has no phylloxera, and they are trying to keep it out. I believe that one district in the same county ought to have quarantine against another district. What little trouble it makes to the nurserymen won't amount to much. They don't make much on the grapevines, anyhow. Mr. Roeding and I have fought this out over and over. He is always opposed to the quarantine regulations on the grapevine, and yet he goes right along and does all he can to support those regulations and obeys them; but it is a fact that quarantine ought to be stricter than it is. If the nurseryman tells any commissioner in this room or in this State that we will keep on until we have everything quarantined you tell him no, that the phylloxera is about the only insect pest we have that the best inspector in the world might overlook; and you can tell the nurserymen who are objecting to our grape quarantine that so far as you know there will never be any effort made to quarantine peach trees and apple trees and orange trees.

PRESIDENT JEFFREY. I will name the following as the committee on the Form of Dried Fruit Contracts: A. R. Sprague, chairman; E. F. Adams, and Arthur R. Briggs. I would like to say I just have a letter from Mr. Smith of the Whittier Pathological Station, expressing his regret at not being able to be here. Our Celery Growers' Association of Southern California have just reported at their last annual meeting that the work of the Pathological Station at Whittier has saved their celery crop. They shipped 2,000 carloads of celery—a little section there not much bigger than you can see from the top of the State House here, and two years ago they thought they were going to lose their entire crop; the blight got in there very badly, but the problem has been solved and they are no longer afraid of the disease. This is some of the work that your scientific men are doing.

Mr. Williams then produced a new style of crate, filled with grapes, and explained to the Convention the experiments he had been making in that line.

PRESIDENT JEFFREY. Judge Norton is now here, and I take pleasure in introducing him to this Convention.

MARKETING OF TABLE GRAPES.

By C. W. NORTON.

The marketing of table grapes is made up of two factors, which may be tersely expressed in two words, "quality" and "quantity."

I have mentioned quality first, because of the two, quality is perhaps the more vitally essential to the remunerative disposal of this fruit. But "quantity"—the number of tons of marketable table grapes produced in the State, is a close second in importance. Quality is a condition directly within the control of the individual grower, but quantity, in the general sense in which I use the term, is a matter entirely beyond the control of any individual or set of individuals, every man being entirely free to plant as much land to any product as he pleases, and to dispose of his crop in such way as to him shall seem best.

Under these two heads of quality and quantity the entire subject of the marketing of table grapes can be appropriately discussed. While the two subjects are distinct, there is yet such an interdependence between them that it is most convenient and logical to discuss the two together.

The paramount importance of producing a first-class grape for table use can hardly be overestimated. Many of you are no doubt familiar with this saying of one of the leading handlers of table grapes in New York City: "There are just three things necessary to the successful disposal of table grapes in New York, and those three things are quality, *quality,* QUALITY." Within the last few days one of the leading shippers of table grapes in California said to me that quantity had nothing to do with the price of grapes in the East. That quality is the sole thing. But while these statements are in a great measure true, they are not entirely true. They only serve to show, and were probably meant by their authors only to serve to show, the extreme importance of "quality" in the disposal of California fruits in the East.

If proof were needed to show that quantity also cuts a figure in the

price of fruit in the East, it should be found in the fact that during the present fall, when the New York market was overburdened, from 25 to 30 carloads of Tokays selling per day, strictly first-class Tokays were materially lower than when the quantity of this grape upon the market dropped down to 10 and 12 cars per day.

Yet there is no doubt that the successful marketing of table grapes rests fundamentally on the quality of the grapes produced. Human nature is much alike the world over, and every one of us knows that if we pass a fruit-stand upon which are displayed fine, fresh, splendid looking fruit, no matter what the variety may be, the temptation to purchase is strong, while if on the same stand there had been displayed small, inferior looking, upripe, or overripe fruit, we could not be induced to purchase at any price.

There is no way of arriving with any degree of accuracy at the increased amount of fruit which might be successfully marketed in the East, if strictly first-class fruit only were sent forward; but the writer ventures the assertion that the quantity might be increased at least several fold. If this be true, this one thing would go far to relieve the present unsatisfactory condition of the table grape industry.

Therefore, the first great object of our growers must be to produce strictly choice fruit. Not only to grow it, but to see that nothing but a strictly choice article is packed and shipped to the consumer.

There are many elements which enter into the production of a choice Tokay, or other table grape, among which may be mentioned soil, cultivation, proper pruning, fertilization, sufficient moisture, and many other things. But when all this is successfully accomplished, there still remains the delicate and absolutely essential task of properly picking, packing, and forwarding the product, so as to put it in the best possible condition into the hands of the consumer.

All this requires great and constant care on the part of the successful vineyardist, combined with a constant search for further knowledge of the history and nature of the vine, its wants and habits, as well as the nature and habits of the numerous enemies with which it must contend. It has been said, and truthfully, that the successful growing of table grapes is a profession and a difficult profession. But nothing pays like work, and the man who bends the best energies of his hands and brain to the task before him will achieve the highest degree of success in this line, as in any other. But it is not the purpose of the writer to discuss in this paper the best method of successfully growing a choice grape nor to enter in any degree into the details of picking, packing, and loading the fruit. It is his purpose to take the grape after it has been grown and matured, properly treated, packed, and crated, ready for its journey in the refrigerator to its final destination. To do this the writer intends to review briefly the history of the table grape business from its infancy down to the present time, basing his statements and conclusions both on his own experience as a grower and shipper, and on statistics showing the growth of the business.

The question of the proper style of package, and the present system of packing, have provoked much discussion during the present season.

The United States Government has this year conducted a systematic series of experiments, designed to demonstrate the best method of preparing this fruit for shipment, and these experiments have shown some

surprising results. This question, however, is to be treated at this Convention by a representative of the Government thoroughly qualified to present this subject. The writer will, therefore, do no more than to remark in passing that the grape-growers of California owe a debt of gratitude to the National Government and its able corps of agents for the campaign of intelligent investigation which they are waging for the benefit of this very important industry.

For the purpose of showing the bearing which the quantity of table grapes shipped has upon the market let us now for a short time review the history of the table grape business in California.

The writer's experience in the growing of this fruit dates back to about the year 1893, and has been confined to San Joaquin County, and applies, of course, to conditions there, though it is believed that analogous conditions have existed all over the State. At that time the business was in its infancy, and its condition was far from satisfactory. In San Joaquin County there was then no medium by which the grower could ship his product into the great auction markets of the East. Indeed, at that time, I think, outside of New York, Chicago, and possibly Boston, there were no open auctions. The growers were forced to depend on the local buyers, who loaded an occasional car for the East. Most of these buyers were irresponsible, and whether or not the grower got his money depended on whether or not the buyer had a successful season. At that time, too, the price of a crate of table grapes f. o. b. was much less than it is at present. At that time fancy Tokays in the East brought possibly as much, but certainly not more, than they do now. In fact, strictly fancy Tokays bring as much money in the market to-day as they have ever done in the history of the business. In those early days second or third grade Tokays did not command any better prices than they do now. There was a period, however, a few years later, when there were better facilities for shipping, and new markets had been opened up, that second grade Tokays could be sold at fairly remunerative prices. This was the period which induced the great rush to plant Tokays which has taken place in the last few years.

In the year 1894 the Earl Fruit Company first took a hand in the grape business in San Joaquin County, establishing headquarters at Lodi. It was followed rapidly by other strong companies, and from that time on the reign of wildcat shippers was ended, and there has been no further trouble about the collection of amounts due for fruit.

Let us now examine the increasing output of table grapes in the past. In the year 1895 there were 1,010 cars of table grapes shipped out of California. This amount was not again equaled until 1902, except in one year, 1897, when the shipment reached 1,100 carloads.

In 1903 the total shipments reached 1,786 carloads, dropped back a little in 1904 and 1905, reached 2,052 carloads in 1906, 3,460 carloads in 1907, and up to November 15th were 3,790 carloads in 1908.

If we reckon the total shipments for this year at 4,000 carloads, which they will approximate, we will see that the shipments of table grapes in the last thirteen years have practically quadrupled.

But as we are examining the past and present of this industry so that we may prepare for the future, we must remember the immense plantings of the past few years, which will be rapidly coming into bearing as the years go by.

I have been unable to obtain accurate statistics as to the acreage of table grapes in counties outside of my own, but if San Joaquin affords any criterion we can draw comparatively correct conclusions.

The figures I am about to quote are accurate, and are furnished me by the best authority in San Joaquin County on the grape question.

In that county there are 14,773 acres planted to Tokays. Of this 7,792 acres, or a trifle over one half, have been planted subsequent to 1905, and are therefore not in bearing at all. Of the other one half by far the larger portion has been planted within the three or four years prior to 1906, and are therefore not in full bearing. On this basis we believe it safe to estimate that within the next ten years our output of Tokays, without any more planting, will be again quadrupled, and that within that time, instead of being called upon to market 4,000 carloads, we shall have 16,000 carloads to find a market for.

These figures are truly startling. Not so much the growth which has been made in the last thirteen years, but the prospect for the increase in the next ten. Certainly not a very encouraging outlook for prospective planters. Indeed, the man who would plant Tokays in the face of this showing would, to use a popular expression, "have to have his nerve with him." Now, how are we to handle and successfully market this vast quantity of perishable fruit? The answer is, *by improving the methods of marketing the fruit.* First, reduce the quantity to be shipped by eliminating everything from Eastern shipments except strictly first-class grapes. We must educate our growers to raise the highest possible percentage of choice stuff, and to the fact that one half of their product, properly culled and packed, will bring them more money than all of it put up in any old way. Let them bear in mind that there is more clear profit in one crate of $2 than there is in eight crates at $1. Secondly, we must widen the markets and reach more people with our fruit. Thirdly, extend the period of marketing by improved methods of packing.

Along the line of reducing the output by relentless culling too much can hardly be said. I have said that we must educate our people along this line, and so we must; but it is probable that experience, that stern but impartial teacher, is doing more to teach this important point to our growers than any amount of friendly counsel can do. It seems as if our growers must learn this hard lesson by having their grapes sold a few times at a price at which they not only give their grapes away, but pay something for the privilege.

Now, as to the second point—the widening of our markets so as to reach more people with our fruit. And this brings me up to the very meat of the question indicated by my subject.

A casual inspection of the fruit shipping business will show that there are but three methods of distribution and sale in practical use, viz.: The open auction, the f. o. b. sale, and consignments upon commissions other than to open auction. As to the last method, it has never proven, and, it is safe to say, never will prove satisfactory. The reasons are many and cogent, and I say this with the kindest of feelings towards any and all commission men. One single reason is sufficient to mention, and that is that this method puts the prices which we shall receive for our grapes entirely in the hands of the other man. Why should we do this with this valuable product, when it is not necessary for us to do so?

With this commission business eliminated, there remains but two methods of marketing our grapes, to wit: Sales in open auction, and f. o. b., which includes private sale at this end, subject to confirmation on inspection at the other end. As to the first, it is the fairest and best method, in the opinion of the writer, which can be devised. But unfortunately only a portion of our grapes can be marketed in that way. Only the very largest cities in the country—those capable of consuming at least several carloads per day—can be served with the fruit by the auction plan.

There are hundreds of cities varying in population from a few thousands into the hundreds of thousands, with their contiguous territory, which, in the aggregate, could consume hundreds of carloads of our grapes per day which never see a California grape, simply for the reason that our system of distribution has not yet been developed to a point where our product has been brought to them. This portion of our people the auction market never has and never will reach. Yet it is among this portion of the population of the East that we must look for the market that will consume the immense quantities we will produce in future years. This population must be supplied by the f. o. b. method of distribution. It is the only method, in the opinion of the writer, that can reach this portion of our people, and at the same time bring any returns at all to the grower.

And yet this very method of disposing of the product of our vineyards is in danger of meeting a violent and untimely death at the hands of the very people whose salvation it would be if it were given a fair opportunity. Unfortunately a considerable portion of our growers will, if opportunity offers, put up for f. o. b. sale a pack which should never go anywhere except to the winery or the hogpen. If ever the old adage of "Honesty is the best policy" held good, it is in the preparation for market of table grapes. While working off on the shipper, and perhaps his customer, of a lot of inferior trash may seem to these shortsighted growers to afford them a temporary profit, it is, as surely as the sun shines, driving nails into the coffin of the table-grape business. If persisted in the result will soon be that practically there will be left to the grape-growers the open auction only. There only the strictly fancy article will find a sale at profitable prices, and the grower will not be able to get cost for anything else.

The result of this practice is to demoralize the f. o. b. method of sale. Some of our chief shippers have sought to remedy the difficulty by requiring the grower to divide his pack, buying one half at a stated price and forwarding the remainder on consignment, the grower not knowing in advance what was to be sold outright, and what was to be consigned. But the fact remains that every season a great amount of fruit is worked into the market that ought to be relegated to the cull box. The result is that the f. o. b. shipper is afraid to guarantee the contents of his car. Carloads are continually being rejected, and the shipper 2,000 or 3,000 miles from his customer, knowing the uncertainty of the pack which he has been forced to send for lack of something better, is unable to determine whether his car has been turned down honestly on account of inherent defects in the cargo, whether it has been turned down by reason of a falling market, or because a sharp dealer thinks there is a chance to work him for a reduction.

As a consequence of these abuses our shippers are becoming discouraged, and are gradually quitting the f. o. b. field. The responsibility for this state of affairs rests, as I have attempted to show, with the growers themselves. If this practice of putting up inferior fruit for market would be abandoned, the difficulty of marketing our grapes would be almost overcome.

I have not thus discussed the difficulties and abuses of shipping our grapes for the sake of finding fault, but in the sincere hope that some means may be found of overcoming the difficulties and correcting the abuses. However, I have no remedy to offer which I conceive to be a panacea for all the ills we suffer. The best I can do is to offer a few suggestions, which may be of some value in the premises, and may not.

After much thought upon the subject it is my opinion that we will never be able to exploit the markets of the East so as to make them absorb the immense crops of the future without coöperation of some kind. But how to effect coöperation, or how to make coöperation effective, is a problem which will require the best thought of the best minds in the business. The California Fruit-Growers' Exchange, which manages the marketing of the citrus fruits of southern California, affords us a valuable object lesson. But our problem is a more difficult one than theirs. We have a much more perishable product, rendering the handlings of it more much exacting in every way. Besides, the nature of our product is such that it can not be graded in any such simple and effective way as oranges and lemons can be.

It has been suggested that the growers submit their packs to the inspection of competent and impartial persons, selected for the purpose, who should determine what should be shipped and what should be rejected. This plan is open to many objections, not the least of which is the difficulty of properly examining a pack after it has once been finished for shipping. This system could only be put into operation by the free coöperation and consent of the growers, and I incline to the opinion that if an angel were appointed inspector he would last only one day.

Another suggestion which seems to me to have more merit than the one just spoken of is that the shippers might coöperate in a plan to improve the quality of the pack. There are only ten or a dozen shippers who do any purchasing of fruit. It would seem that they might be brought into an agreement by which they would require all fruit purchased by them to be prepared, if not in their own shed, at least by packers employed and directed by them, working under their supervision, with the absolute right of culling and rejection in their hands. Of course, this would require coöperation on the part of the growers also, at least to the extent of agreeing to the plan. To make this plan effective it would have to be carried to the extent of controlling the output of the State, except such as went to the auction market. In other words, everything would be either auction or f. o. b., with all the latter under the direction of one central organization. If this were done and the shipper was thus able to guarantee the excellence of his pack without fear, we would soon have the dealers of the East coming to our very doors to buy grapes for cash.

Let us now turn for a moment to the third and last means that may be of assistance in the disposal of our grapes, viz.: extending the marketing period. Along this line the experiments made by our Government experts this season, to which reference has already been made, offer sur-

prising possibilities. They have shown the possibility of keeping perfect grapes for long periods without ice.

The way in which the Almeria grapes imported from Spain are kept affords another object lesson. These grapes come in small barrels packed in cork dust. It is said that large quantities are placed in cold storage and marketed in the Eastern cities long after the beginning of the new year. If our Spanish neighbors can do these things successfully and profitably, why can not we?

It requires no argument to show that if we can by some means preserve a portion of our grape crop, either here, before shipment, which would be preferable, or in the East, near the place where they are to find a market, that this would be equivalent to opening a new market for the amount of our fruit thus held back. I respectfully offer this suggestion as one well worthy the earnest consideration of our growers.

There is one other point in connection of the importation of Almeria grapes which I desire to mention, and through which it seems to me that our growers might find material relief. Almeria grapes now come into this country in immense quantities, and subject only to a very light duty amounting to less than one cent per pound. They are imported just in time to sell alongside of our Tokays. I will not say to compete with our Tokays, for I will not admit that any grape that grows can fairly be called a competitor of our Tokay. But the placing of several hundred thousand barrels of these grapes on the market certainly helps to glut it with fruit, and lessens the demand for our grapes. Why should not the protecting arm of the tariff be extended to us as American producers to relieve us from unprofitable competition with Spain? If we seek to cross the Canadian border with our fruit, we are met at once with a duty of about fifty cents per crate, which almost prohibits the introduction of our grapes into that country. It would seem that tariff legislation ought to be enacted which would secure to us at least our home markets. The American market for the American producer first is supposed to be the principle of tariff legislation.

This question of the duty upon Almeria grapes, and upon bananas, an imported fruit which also helps to glut the market of the East at the same time that our grapes are being sold there, has been taken in hand by the efficient General Committee on Tariff Revision, whose very comprehensive and instructive report has been presented to this Convention and its recommendations approved. I take this opportunity to urge all who are directly or indirectly interested in this business to use their utmost endeavors with our Congressmen and Senators to secure relief in this direction.

Much interest has also been aroused over the question of a mutual trade agreement with Canada, looking to the removal or reduction of the Canadian tariff on our grapes in return for the removal or reduction of our tariff on lumber. This question presents very interesting possibilities. But the writer is not sufficiently conversant with the production of grapes in Canada nor with the lumber interests of this country to discuss it intelligently at this time. It can do no harm, however, to say that every trade agreement which can be made which will serve to reduce the foreign tariff on our grapes will serve to enlarge the market for them, which is the grand objective point to which all our efforts should be bent. I would therefore urge all to exert their influence to

secure trade arrangements with Canada, as favorable as possible to the admission of our grapes.

And now, in closing, I summarize the facts and conditions which I have endeavored to set forth in the foregoing paper, into these conclusions: That the present production of table grapes under existing conditions is already in excess of market requirements except for fancy grapes. That the present output of Tokays will be multiplied several fold in the next ten years.

That the remedies which must be applied to overcome the difficulties are:

1. Improvement of the quality of grapes produced by better cultivation and care.
2. Improvement of the quality of grapes shipped, by better selection, severer culling and improved methods of packing.
3. Extending and widening our markets so as to reach all the people.
4. Coöperation of growers and shippers for the improvement of the quality of the pack put up, to the end that we may make our fruit so excellent that instead of its being a drug on the market it may be eagerly sought after in all quarters of the country.

PRESIDENT JEFFREY. I now have the pleasure of introducing Mr. R. D. Stephens.

MR. STEPHENS. Mr. Chairman, ladies and gentlemen: It is evident that Judge Norton has given great consideration to this subject and to the arguments and facts presented by him. His paper is a very important one, probably one of the most valuable ever presented to a fruit-growers' convention, but I differ with Judge Norton in regard to some things. Some of the suggestions he has made are very good, but they are wholly impracticable, simply because you can not organize the producers to bring about such a condition. The Judge prognosticates that in a few years we will have 16,000 cars of Tokays. What is to become of those shipments unless some relief comes to the producer? You can all understand that if you are following a certain course, doing certain things which in the judgment of others are not right and nobody says anything, you are not the wiser, and therefore you will continue to do those things. But if your attention is called to any errors you may remedy them yourself, and therefore publicity is the greatest remedy for any evil that exists. In other words, if you have a bad law and you think it is a pernicious law, and that it is wrong, the only way to succeed in getting that law off the statute books is by enforcing it. I wish to state that, taken as a whole, in the table grape shipments from this State there is a loss to the producer; that this year's shipments have not been disposed of at a profit to the producer. While a few producers have received splendid returns, splendid profits from their shipments, it is because of the fact suggested by Judge Norton, that their pack has been superior to other packs. But you must understand that if all packs were equal, if there were no difference in all the packs, one as good as another, then there would be no opportunity for one grower or one shipper to receive better prices for his products than the other. A very important admission and statement was made by Judge Norton that during the glutted condition of the Eastern markets the superior packs were materially impaired in price to what they were when fewer ship-

ments were going forward. Some of the packs that sold for $2.00 and $2.25 were brought down to $1.40, and while $1.40 is a good price and will bring to the grower a reasonable profit, yet you will see there was a dollar less for that pack than when the market was not flooded. Distribution, of course, cuts a very important figure. Just how that is to be brought about I do not know, and I wish to ask now, Mr. Chairman, whether the California distributors have made a report or not?

PRESIDENT JEFFREY. Not here.

MR. STEPHENS. And you don't know the number of cars shipped, so far as any report of theirs?

MR. WALKER. Close on to 13,000 cars this year, all varieties.

MR. STEPHENS. You see there have been about 5,000 added in one year to the deciduous fruit shipments to the East. New York alone has sold as many as fifty odd cars per day of California fruit, Chicago thirty-eight to forty, Boston fifteen, and so on down, which concentrates our business in a few cities. I believe there are about 150 cities now, Mr. Walker, that receive carload lots?

MR. WALKER. About that many.

MR. STEPHENS. A few years ago there were about 120. If this distribution can be broadened, of course, great good will come to the producer; but, as a matter of fact, some relief must come to the producer if he is to continue to exist as a producer. Let that come in any manner, shape, or form that it may, it will be a good thing and the only thing that can perpetuate the interest. It seems to me that this section of the State, the Sacramento and San Joaquin valleys, is somewhat handicapped. I am only throwing these out as suggestions that good may come from them, possibly. From the south there is a freight tariff of 1 1-15 cent on oranges and 1 on lemons to any place in the United States. It may be just, it may be right, to handicap this section of the State with an additional freight tariff, but while there may be a reason, I can't understand it, and it seems to me that ought to be a question to be investigated by the fruit-growers of the State. If we have to pay $1.45 freight rate to New York, which is 30 cents a hundred more than they pay on oranges and 45 cents more than they pay on lemons, but a five-hundred mile farther haul, I can't say whether that is just or not, because I have not given it the consideration that it ought to have. You can not say whether it is just or not, because you have not had the opportunity and do not possess the facilities and facts bearing upon this question for you to properly and intelligently pass upon it, but it does seem to me that this is an injustice to this section of the State. It certainly must cost something to haul a carload of oranges and lemons 500 or 600 miles. Anyway, the transportation companies assume that it costs something. If you want to ship a carload from here to Los Angeles or Redlands you have got to pay for it, and a considerable little sum, too. I believe that if this question was taken up and properly presented to the transportation companies good might come from it. While I was not here personally yesterday, I was here in spirit, because I had the opportunity, and I improved it, of going to the Southern Pacific officials and presenting this question to them. I asked them if they had ever given it serious consideration, and they admitted they had not. I asked them if there were any good reasons why such a condition should exist. I asked if there were any reasons why we in the Sacramento and San Joaquin valleys should be handicapped in that manner. The citrus fruit interests

in southern California have prospered and grown rapidly because of the advantages. They have three roads there; they get better service and lower rates. Now the time is coming that we will get better service. And I wish here now to thank the Southern Pacific Company for the improved service given us this year. We have had better service, better time, and better care has been given to the icing of our fruit shipments. I think that was brought about to a great degree by interviews that I had with the officials last fall. It is possible they might entertain erroneous ideas in regard to the necessary care and attention, in regard to time as well and icing, as the days grew shorter and the nights longer and the temperature lower; that they might assume that it was not necessary to give the same time and give the same attention to the icing that it would be in June and July. I called their attention to the fact that it was necessary to give more careful attention to the late shipments than the early shipments, for the reason that the fruit was on the turn, it was on the down grade, it was at its full maturity, and therefore that it took more care and attention to keep it in good condition than it did before it reached that point of maturity. They admitted that it was a new idea, and they would give it consideration. They evidently have, and we have had better service from the railroad companies this year than we ever had; we have had better time, more regular time. One of the most essential and important things to make California fruit-growing a success is to have a regular schedule time for the fruit trains. The f. o. b. buyer or the shipper must have this protection in order to act intelligent. To illustrate. A car is shipped here to-day by Judge Norton, another one to-morrow and another the next day. He consigns these three cars to a certain place. He knows that if it arrives there at the proper time it can be disposed of within the twenty-four hours, but it is a day late, so he has two cars there. Maybe they are both a day late, so he has three cars for the same market. As a matter of course that market is going to be glutted, and he can not dispose of his shipments at a profit. If he attempts to divert he is going to divert to some market and glut that. If he does not divert he is going to lose, and if he does he is going to lose, because he is going to oversupply the market he diverts to. Therefore, the transportation and the handling of the shipments by the transportation companies is one of the most vital and important questions to be passed upon. I simply asked those gentlemen if the Fruit-Growers' Convention would present the matter to them in a proper way, do it in an intelligent way, not go to them with a club but go to them with arguments and reasoning, give them an opportunity to investigate to see whether relief could be given to the producers and to the shippers along these lines, whether they would take it into consideration or not, and they said that they would do so with pleasure, that they would be willing to discuss this question with the fruit-growers of the State. At that time they admitted that they were not prepared to pass upon it, because they knew nothing about it. What we want is regular schedule time, so that when you ship a car to a certain locality you know, barring accidents of any kind, that that car will arrive upon a certain day and it will be sold upon a certain day, not waiting for another car and putting twice or three times the quantity of fruit into that market that it will take.

As I stated, you take as a whole the table grape shipments from this State and they will foot up a loss to the growers. I have some state-

ments here that I can produce. A car that brings $600 brings a heavy loss to the grower. A car that brings $700 is still a loss, and $800 is another; $900 will bring him no remuneration, and it will take over a thousand dollars a car for him to make both ends meet, including cost of production, purchase of land, the interest upon the capital invested and the taxes. Those are matters that have been figured out, and you can not get away from them. I have presented them for years, and nobody has attempted to deny their correctness. Lodi, Judge Norton's district, has suffered heavily this year. I presume Judge Norton will be ready to admit that. While some growers have prospered and made money, many of them have met with heavy losses. I believe that Judge Norton is right. You should be careful with your pack, very careful.

Now, before I forget it, I want to show you another condition the grower is up against, different from what it has been in the last few years. Last season the culls or the grapes rejected and those left upon the vines —Tokay grapes, I am speaking of—were sold to the wineries at the rate of $10 a ton. There was an incentive for a man to reject, and very heavy rejections were made. This year they first offered $4 a ton, delivered, which meant nothing. Then they came to $5, and I believe that was about the maximum. In some instances, however, they agreed to pay the freight rate, f. o. b. $5. There is nothing in that. You had better do the proper kind of culling and haul those culls out on your vineyard and use them as a fertilizer than to sell at that price. You take the profit you may make in marketing a ton of Tokay grapes at $5 and it will not bring you as much profit and benefit as it will to dump it in your vineyard, return the properties to the soil which have been taken out; and when you come to pay $30 or $40 a ton for fertilizer you will find it will take about twenty tons of grapes to buy one ton of fertilizer; therefore, it is much better to dump your culls on the ground than it is to sell them for that small price. There is a condition that the grower is against this season and likely to be against for some years to come, different from what he has experienced in the past.

Here is a suggestion I am going to make. I will make it as a motion and not endeavor to discuss these questions any further. I believe it would be wise for this Convention to appoint a committee to wait on the different railroads and transportation companies and present these matters to them. Do it in a friendly, intelligent way. Don't go to them with a club, but go to them and discuss in an intelligent way these questions and see if some relief can not be gained for the producer. One of the important ones is a regular schedule time; another is the careful icing of the cars. If this can be secured from a transportation company they can then with safety ship a car to Galesburg, Burlington, or any market outside of the auction market and feel sure that two or three of their cars will not arrive there on the same day on a market that can not take such a quantity. I move that a committee of five be appointed by the Chair to take this matter up with the transportation companies and see what,if any, relief can be brought to the growers.

The motion was duly seconded and carried.

PRESIDENT JEFFREY. I will announce that committee this afternoon.

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

The Convention was called to order by President Jeffrey at 1:30 o'clock P. M.

PRESIDENT JEFFREY. The discussion of the humus question was postponed the other day until this afternoon; if there is no objection, we will have that discussion now, and then turn the meeting over to the grape-growers.

MR. GERALDSON. Somebody thought I said the other day that stable manure was not good or desirable. I did not mean to let that impression go out at all. I meant to say that we can not get enough stable manure to accomplish anything in the face of extensive, clean cultivation of the soil; that the humus we put on in that case would be almost nothing. If we up there could get all the manure from one town and could afford to bring it there, it would be enough for one piece of ground, but there is not enough there to go around.

(Mr. Geraldson then, for the benefit of those who were not present Thursday morning, repeated practically what he then said, describing the manner in which he cultivates his orchard.)

MR. DARGITZ. I would like to ask Mr. Geraldson if he thinks his plan would work on comparatively level ground and without irrigation, where we ordinarily grow crops of fruit without irrigation, but by intensive cultivation.

MR. GERALDSON. Unless I have got an entirely wrong view of the matter, when we cultivate land in California without irrigating it and get crops off of it, we are running on our capital; that is, the humus in that soil. The moment we commence to cultivate the ground annually we stop making any more humus. Nature makes humus out of twigs and dry grass. When we cultivate there is no last year's dried grass. Every year we cultivate the ground we use up a little humus. We wear it out by cultivating; we stop the new supply, therefore the old supply must disappear; and we are going to come to a point absolutely in cultivating without irrigating, as in other ways, where we will be put out of business. Our soil will cease to have humus enough in it to produce crops. Therefore, a person is, in my mind, forced to choose between the plan I propose or some similar remedy, and face the ultimate fact of going out of business when the humus is out of his soil. I think it is absolutely imperative that that system be adopted.

MR. CRAIG. I think it very unfortunate that Mr. Mills and Professor Shaw are not here, because they could very easily answer all those questions, and Mr. Geraldson has the rest of us rather at a disadvantage. I think Professor Shaw could tell him how the humus could be gotten in the soil. Mr. Mills told us in talking the other day, out there before the door, that he used both winter and summer crops in his own orange orchards, and in that way he furnished, probably, a great deal more humus than Mr. Geraldson can get by his method. Mr. Geraldson has just told us that he has a large crop of burr clover. I think that is very likely the cause of all the benefits he thinks he gets from his system. Mother Nature does not, like some mothers, overlook every fault of the

offspring and treat it just the same as if it were good all the time. Rather, she is like a pretty hard stepmother, infinitely capable and infinitely heartless. She rewards liberally those who are intelligent and industrious, but to those who are lazy or ignorant she is cruel as the grave.

About the time I was born there was a book written called "Two Years Before the Mast." I think Richard Dana was the author. He was ordered to take a long sea voyage for his health, and, being poor, went before the mast, and came to California around the Horn. The book is very interesting, giving a vivid description of all the horrors of a trip around the Horn in those days. They came to trade in California. They came to the bay of San Francisco, but there was no city there then, although he predicted there one day would be. What did they find to trade? A few hides, that was all. This country had been in the occupation of white men for two or three generations. They had done the best they could with it. They had not the courage of Anglo-Saxon white men to cope with nature, but they had done their best, and that was all California produced, a few hides. Mother Nature only produced a little grass to keep a few animals alive. We have got not only to follow nature, but to feed her. We must do it energetically.

It seems to me that when we watch the course of an orchard that has been neglected we see to what end Mr. Geraldson's system would come if it were allowed to pursue its own course. Just north of my place, in Fair Oaks, are one or two small orange orchards whose owners have been discouraged and they abandoned them some years ago. Of course, Mother Nature takes care of it. The trees died. You find, however, a dozen olive trees where there were hundreds. Even the growth of grass is a very scanty affair. It might be said that the difference is a matter of irrigation, but I can tell you that in my orchard the first seven years I could not get water, some years none at all, in any year very little indeed, but we cultivated carefully; we did the best we could without water. We conserved the water in the soil to the best of our ability, and the result is you could not find one dozen dead trees out of a thousand. What is the difference between that orchard and those to the north? Simply that mine was cultivated. We have got to fight Mother Nature and work against her to some extent. If we allow her to have her own way we will succumb, but if by intelligent methods we do what science points out as the thing necessary to produce the best results in fruit, then we will be liberally rewarded.

MR. CUTTER. Mr. Dargitz asked the question of Mr. Geraldson, Would it do on level ground? I think Mr. Geraldson's land subirrigates. He runs his ditches diagonally across the orchard and all the trees get some irrigation across the rows, where it is possible they would not on flat ground.

MR. SPRAGUE. Water is a necessity to your plan, is it?

MR. GERALDSON. No, no—water from some source—rain water. You have got to keep humus in by irrigation if there is no rain water. I can see no difference whether it is dry cultivation or irrigated cultivation. You must have moisture to retain the humus in the soil.

MR. SPRAGUE. We all will grant that humus may be had, but I think many of us will take issue with the statement that humus can be had on such land as Mr. Dargitz refers to without water. Your middles

not cultivated would soon dry out so that you would not get the amount of humus gathered during the summer that you would under the circumstances which you mention, and consequently that would not be as good a means as some other.

MR. GERALDSON. There are more ways of getting wrong conceptions of this plan than there are of pronouncing some words. The grass we get our humus out of grows through the winter and spring and is dry in the latter part of the summer. It is last winter and spring's grass. It grows up to maturity. You can not plow it under in the usual time in the spring, because then it has not matured, has not gone to seed and does not make one-tenth as much humus as after it has matured; and the only way to get the matured grass and leaves and twigs is to let it stay through the summer and plow under next year. It reseeds itself that way. The seed is of value first, to propagate itself, and second, for the chemical properties it contains. That system applies absolutely just the same, whether you irrigate or whether you do not irrigate.

MR. SPRAGUE. I am sure I speak for all when I say that Mr. Geraldson has performed an exceedingly interesting experiment, has made a very valuable demonstration for a hill country with water, but I show no disrespect to Mr. Geraldson when I say that in the problem presented by Mr. Dargitz, Mr. Geraldson's opinion is worth no more than yours or mine, because he has made no experiments there and he can only guess what the result would be. For myself, I feel very sure indeed that the crop you would get from an orchard treated in that way every year, plowing each alternate land in the summer, would be a very poor crop indeed, and that your orchard would run down instead of going up, being just the reverse of the results which Mr. Geraldson gets in his experiments.

MR. GERALDSON. This soil where Mr. Dargitz is, doesn't that grow native grasses of some kind during the year?

MR. DARGITZ. Yes. We plow that under every spring. I want to take issue with Mr. Geraldson just at this point. While it is all right if you plow that growth of grasses under, making thereby a green manure, we hold the moisture; our soil is from five to twelve feet deep; we hold the moisture and get crops, but if we let that grass grow and mature it is too dry to plow and it takes the moisture out of the ground and our trees would all be wilted. In orchards getting to be eighteen or twenty years old, we find it necessary to irrigate. Irrigation is rather expensive with us; we have to pump our water. It does not rise closer than thirty feet, and to pump water to irrigate a crop of weeds does not appeal to us very much. But I believe we have got a plan developed there by which we can afford to irrigate and still accomplish all that has been stated in the different lines; that is, to put alfalfa in our orchards among our trees. I do not believe that the alfalfa injures the trees or the crops, provided we put water enough on to give us the hay crops. If we let it dry out then it suffers, but by watering the alfalfa sufficiently to get our crops of hay we keep the trees green and growing, and I am satisfied that the alfalfa gathers fertilizers from the atmosphere and carries them into the ground. My attention was called to this from getting reports of the Washington State Convention some two years ago. A gentleman spoke about having an apple orchard; said

that he planted an orchard of six acres, I think in the Yakima Valley. It was sagebrush, sandy land, and he said for four years he did not do much but go around with a hoe and shovel and scrape the sand back around his trees that the wind had blown out. Finally he said he was going to sow clover in there to stop the sand drifting, and when the clover got to growing he was horrified to find that half of it was alfalfa. His neighbors said, "Cut it out; it will ruin your orchard," but he said he was going to try it, and it grew there for seven years—it is nine years now—and he says that he took no hay off; he irrigates sufficiently to keep it growing, and each year he went through and mowed the grass and let it lay right on the ground; and from that six acres in 1906 he marketed 4,300 boxes of fancy export apples, and he said as long as it did as well as that he would let the alfalfa grow. I am inclined to think that a large part of our orchard will be seeded to alfalfa in the future; that we will plant it and cut it once a year and let it lie on the ground.

PRESIDENT JEFFREY. I would like to ask Mr. Geraldson if he has taken into consideration in his plan the physiological principle that a perfectly healthy working orchard must have every section of its root system acting and operating uniformly to produce the best results, and if the plowing of one half the root system one year, leaving the other half go without plowing, will not interfere with the perfect action of the entre root system of that tree?

MR. GERALDSON. After thirty years of diligent cultivation of our hillsides up there we worked out all the humus. We prevented nature putting any more back in except the little bit she put in from green grass, ten per cent of what she put in by dry grass. We got the ground like Portland cement. That is simply rock ground up very fine. You put a little water on it and it bakes. Things were going from bad to worse, and we had to do something. We simply considered the objection of Mr. Jeffrey and decided that we would choose between the two horns of the dilemma; we were between the devil and the deep sea, and we took the deep sea and trusted that by giving a little more water to the trees they would get through. It was rather a severe strain on them, but they got along better than I expected they would do. We increased our water perhaps twenty per cent, not more than that. That year, on account of the ground being in such bad condition, there was only a little grass, but the next year when we plowed that ground it looked different. There is some effect produced on soil from standing still a year. I don't know what that is and no professor in California can tell you. The very best authorities on green manuring are only beginners, as you will see in ten or fifteen years. I am, too. You turn soil over and it looks like new soil. You let it stay a year and then turn it over and it looks a little more like new soil. After six or seven years it looks almost identically like new soil, and it produces in every way identically like new soil. In ten years I think you will have it back to the ideal condition it was in the beginning. Mr. Dargitz says that after eighteen or twenty years of dry cultivation they were forced to irrigate. Wasn't that what I told you awhile ago? That is only a temporary expedient, and after another eighteen or twenty years irrigation won't do it; then you will have to abandon it. That is why it is abandoned back East, why they are growing hay and grain on rich fertile land

in California and turning sheep on it; sheep which should be confined to twenty acres they turn on two or three acres, and call that resting the land! What Mr. Dargitz said about planting alfalfa is only a variation of the system. Alfalfa plants nitrogen in the ground and is valuable. I think every native grass has its mission and its place. If a ground needs a certain chemical a certain grass will grow on the ground. I can not prove it, but I believe it. If the ground needs some other chemical you will find another grass. I believe there are chemical reactions in the soil that that soil needs and that nature goes on interminably putting things in.

A MEMBER. The canners up our way have a peculiar standard. When we send down our fruit maybe they accept it and maybe they don't. I would like to ask Mr. Geraldson if he has any of this byplay with the canners and if they take it or send it back.

MR. GERALDSON. Of course, the bulk of our fruit goes over the mountains East. Seven years ago, with plenty of water and liberal doses of fertilizers and stable manure, we had trouble in making our fruit clean or reaching any size. This past year, after abandoning fertilizers, we had the heaviest crop in our orchard, and the canners took their share of it without any question; and the dealers in Newcastle will say that our fruit stood as well as any near Newcastle.

A MEMBER. I think the gentleman has an advantage in being on the hillside, but how about adobe land?

MR. GERALDSON. Adobe is like Johnson grass; it is rather a difficult problem, and I don't envy a man the working out of that problem; but adobe is largely humus now, and it is so rich that you don't have to bother much about it. It is fertility condensed, almost, but I do believe that if you keep on cultivating it it becomes more and more stiff, more and more clayey, and that if you can get it aërated and light it will be better. Our soil will bake and crack like brick, but after three or four years of grass being plowed into it it got better.

MR SPRAGUE. Mr. Chairman, I want to call attention to one thing in criticism of certain things Mr. Geraldson has said. I think we did not exaggerate the other day the importance of soil humus. Professor Shaw confessed that nobody knew what humus was, but it was a peculiar compound manufactured by nature somehow in the soil, and that it was of inestimable value. Mr. Geraldson has certainly given the impression that unless you get your green stuff dry and allow it to remain one season dry you do not get very much benefit from the humus in it. In that I think he is wrong. I think he is exceedingly right in the manner of cultivation which he has adopted in such situation as he is in, but we must not go wrong on main principles. There is nothing better established in the agricultural world than that rotation of crops will maintain the fertility of the soil. That would be impossible were it not that you obtain very large benefits from the plowing under of the material at the surface of the ground and the roots, of course. I recognize that there is undoubtedly something in Mr. Geraldson's claim that the chemistry of nature is facilitated by allowing this vegetation to remain undisturbed for a season at the surface of the ground, because we all of us know that that peculiar mold in which the humus very considerably consists is promoted by that sort of treatment, and hence it is fortunate for us that we have conditions such that

we can use the method which Mr. Geraldson proposes, but in the absence of that I think no one would hesitate to use the method suggested by Mr. Dargitz, that is, put alfalfa in every other middle, plowing alternately, and in that way secure an increase of humus that will give you the fertility of the soil and the other values without running the great risks you would run in using the system as Mr. Geraldson uses it at Newcastle. It is very clear that your orchard must have sufficient water to enable it to perform the fruit function. Then the next thing is to protect the surface of the ground as much as you possibly can, for the protection of the humus during the hot summer months. It is a well established fact that the burning heat of the sun actually burns out the humus in the first three or four inches of the soil, and that is a very serious situation, and the more your soil packs and bakes the worse that result is. If you have humus enough to enable you to keep your soil mellow and friable you do not lose humus so fast; but once let it burn down, and you lose as much in two weeks as you would in two years, perhaps, under a more favorable treatment of the soil.

MR. GERALDSON. I have been plowing under green grass all my life, and I am nearly 40 years old, and the soil kept going down hill. Whenever we get in a quandary we turn to nature in one way or another. Sometimes we go down on our knees and do all sorts of things, but we go to nature anyhow. We have tried this out. We have gone right to the brink of destruction and we turned back to nature, and we found that nature never made humus out of green grass. Now, that is all there is to it.

MR. CHASE. Mr. Chairman, I have got a new idea. In explaining the method of destroying Johnson grass, a gentleman said, "This is what I would do to introduce humus into sandy desert soil. I would plant it with Johnson grass and cultivate it two years, and then I would turn my sheep on and let them eat it up, and then I would have my sand pile full of humus."

At this point several members of the Convention expressed their desire to resume the discussion on grapes.

PRESIDENT JEFFREY. We left off without having concluded the grape discussion. The marketing of your fruit is the coming question for the deciduous fruit districts of California. It is no use to produce the fruit unless you can market it, and I predict that unless your marketing agencies are remodeled and improved it won't be more than a year or two until that will be the great cry of the State. Now, you are here to try to throw out some ideas that will lead to a deeper investigation of the difficulties such as the grape men have met this year, such as the Bartlett pear men have met this year, and all other men that are in the deciduous fruit districts of the State, excepting where you have special advantages in some way. Bartlett pears have gone to rot in this valley—the grandest fruit in the world. It seems almost a crime that Bartlett pears should rot and be fed to the hogs, and we have got to find a way to put this fruit where it belongs. I made a statement to the Commission the other day that a whole train load of fruit-growers went to Kansas City the other day to discuss one single problem, the distribution of fruit. They said: "If you spread

out the fruit, if New York wants 25 carloads of oranges to-day and you only give them 20 you are going to have a better price for oranges than if you give them 25." That is the keynote of one great marketing organization. If you will get that to be the keynote of your marketing organizations in this valley and the San Joaquin Valley, I think the overproduction of Tokay grapes and other fruits may be set away off in the future; if you do not do it I believe it is right before you know. Now we will continue the discussion in the line of Judge Norton's paper.

MR. CHASE. Judge Norton said there were three conditions which affected the marketing of all grapes—quality, quality, quality. If you turn a flock of sheep into your vineyard the quantity and quality will both deteriorate. If your sheep get into your neighbor's orchard you will have to pay the damages. Now, for the past three months I have found a flock of sheep in almost every vineyard, in the shape of noxious weeds. They are eating the humus out of the soil; they are destroying the quality and quantity of your grapes. My idea is to increase the quantity of humus in the soil and have every man to take care of his own sheep and corral them where they can not feed and destroy his crops. Here is a man who gets the highest price, the largest quantity, superior quality, and he has the cleanest vineyard I have ever seen; he does not even keep a cosset lamb there. The remedy is this. All of our noxious weeds can be reduced 90 per cent of their present injury if our Legislature will appropriate one half as much fund to the State Horticultural Commission as it does to horse racing, and this Commission will do the work, and you will have the best grapes to market. (Applause.)

MR. DARGITZ. Mr. Chairman, I think the question of economics in connection with commercial fruit-growing enters largely into the problem at this time. If we eliminate the commercial feature, money making, from our deciduous fruit-growing in California, the project is doomed. It resolves itself, then, into a question after all, how can we produce fruit so as to make the most money out of it? I am in very hearty accord with the paper Judge Norton presented. I am in very hearty accord with what Mr. Stephens said. I am heartily in accord with pretty nearly everything that has been said, but I believe we want to go a little bit further. No matter what system of marketing we have, if we have not got quality we need not expect to make any money. It is equally true that we have got to have a certain quantity before we can make very much money. The only opportunity to make money commercially out of our fruits going East is to grow them in such way that we can load our cars. By grouping together, small growers can do this. When I came here and took up the fruit business a few years ago it appealed to me wonderfully to think that a man who was growing a dozen or fifteen acres of grapes could put them in a car and have them go East and be sold without any bother on his part and get the benefit of railroad rates and transportation. Now that is coöperation. Coöperation has brought it about and made it possible, and without coöperation the man with a small amount of fruit might just as well go out of business, as far as money-making is concerned. After you get a certain quantity then we reach another stage, where an increased quantity beyond that presents another problem. Too much is just about as bad as not enough. And here arises another question. From what

I can gather from the records of the matter in this State, a few years ago the fruit-growers were getting red ink and getting it pretty liberally, and they were very much discouraged; then the idea of coöperation to change this condition came up in a fruit-growers' convention. If I am correctly informed, in the convention of 1900 a committee was appointed to take this in hand, and Theodore Kearney was the first chairman of that committee, and the work of that committee resulted in the organization of the California Fruit Exchange in May, 1901. The California Fruit Exchange, through some vicissitudes, did a great deal of experimental work along this line. It was found necessary to change it from a strictly coöperative to a stock basis, still retaining coöperative features, and while reference has been made to the fact that that organization had died, it was reorganized for the purpose of bettering it, putting it on a safer basis, a sounder basis, a money-making basis, and that is what we are all in the business for. You may find some of the professors in the Berkeley institute or at the Davis farm who are in it because of the love of the professional part of it, but we fruit-growers as a mass are in it for the money that is in it, and if there is no money in it we might just as well get out of it. The matter of coöperation in the handling of this fruit is of tremendous importance. Admitting all that has been said about quality and cultivation and preparing our soils, now comes the marketing. I said the other evening that we were lobsters, because we were going at the marketing of our fruit products backwards, and that is the way a lobster travels. Instead of allowing the fruit-buyers to fix the price on fruit, it should remain in the hands of the fruit-grower to say what his product should bring. The orange-growers are organized in the southern part of the State so they do that very thing. They fix the price at which they will sell their oranges, and if the people in New York or Chicago or Boston or Baltimore do not want to pay that price they will make the shipment there a little bit smaller until they do pay it. I have been surprised to see in the past six weeks reference and comment in several publications in the State to the effect that the deciduous fruit interests in northern California must get together on somewhat the same plan the citrus interests in the southern part of the State are, and I have been somewhat amused because the people did not seem to understand that there was that very kind of an organization already in existence. That organization is the outcome of a committee appointed in one of these conventions to start that very thing at work.

In regard to the developing of new markets. There are wonderful possibilities before us in that way. Last summer there was a retail dealer from the Dakotas in our packing shed and we were bringing the dried prunes in. He looked at them and said, "What do you get for such prunes?" I said, "This year we are getting 4 cents a pound." He said, "We have to pay the wholesalers in Dakota 10 cents a pound for prunes very far inferior to that." Now, look at it. We have to grow the prune and cure the prune and finally get 4 cents for it. The man who buys it at an expense of ⅝ of a cent a pound pays one cent a pound to ship it back there and then he gets 10 cents or more. Somewhere there is a great leak between the producer and the consumer. It is consuming three fourths of the profit of the business and it ought not to be. I believe it is possible for deciduous growers of grapes, of prunes,

of peaches, of pears, and even of dried fruits, to get together in small associations where, in the matter of green fruit, you can together conveniently load cars. Or, in the matter of dried fruits, you can load cars, make up carload lots. Let the association have its own brand and pack its fruit under that brand, and if there is no general marketing agency to help you out, enough get together that you can afford to put a commercial salesman on the road in those states where they consume dried fruit and sell to the retail dealers, and you can double your clear money in all dried fruits. In the matter of the green fruits you may have to handle it a little differently, because you have to handle it quickly. If associations can be gathered together for the purpose of loading cars of green fruit and then turn them over to some central organization for the marketing of the same, that is well and good. You will all agree with me that if you could have the distribution, the placing of all deciduous fruit from this State, under the control of one single organization or head, you could avoid the glutting of any single market at one time. Some one will say, "There are two or three such organizations in the field now." Two or three won't answer; it must be one, and that one, no matter what its name may be, no matter what the detail of organization may be, must be under the absolute control of the bona fide fruit-grower. He is the man, after all, that must set the prices and control the whole matter eventually. It won't do for commercial packers and shippers to get in and control that matter; it must be the bona fide grower. He can work through employees, but it must be so that eventually when any question arises it comes back to the bona fide fruit-grower for settlement.

Let me illustrate why this is necessary. Early last summer we started out shipping fruit East. We began by getting very good prices. We were selling at something like a dollar a crate, f. o. b. California. All at once, without any warning whatever, within twenty-four hours, shippers in California began to quote in these same markets fruit at half that price, which meant a loss to the grower. Everything was panicky all at once, and the grower was placed in the position where he had to foot the bills. Now, you might suggest that the men who are responsible for the cutting of that price were not the men who were buying in the East at all, but were gambling on some one else's fruit. They had some purpose to accomplish, and the fruit-grower had to stand the loss. I do not want the fruit handled in such a way that somebody can take my fruit and cut out somebody's prunes that he does not like. I want it handled so that if the man who handles it does not handle it right he has got to answer to me for it. It sifts back to where the grower must have the final word in the matter.

Now, just one word of experience. The little colony which I represent have some large prunes to ship. Previous to three years ago about 18 or 19 cents on the tree was the greatest price that could be had for this fruit. I took hold of the matter and began to pack myself, took my own brand, and the prices began to increase, and in three years we pushed that price up until it netted us 55 cents a crate on the tree instead of 19; and whereas the people before did not want to buy the fruit and said there was not much demand for it, it got to the point where they would send their representatives a mile out of town, watching for our teams, trying to buy it from us. Oh, no. I placed my fruit

to be handled by the men who were in my employ as a grower—coöperation. It is the way to do it—it is the only way to do it.

MR. STEPHENS. I would like to ask the gentleman what colony he represents?

MR. DARGITZ. It is the Christian Colony, near Acampo.

MR. STEPHENS. I would like to ask if you have sold your prunes this year?

MR. DARGITZ. Yes, sir.

MR. STEPHENS. Have any trouble in delivery?

MR. DARGITZ. No trouble at all.

MR. STEPHENS. If it is a fair question, how much did you get?

MR. DARGITZ. I sold very early. I sold on a 2½ basis this year. I could have had 3½ if I had waited later.

MR. WALKER. Mr. Chairman, the matter of marketing table grapes, I believe, is the matter under discussion, and as it covers such a very broad field and yet only a portion of the field which this Convention represents, I believe some of the study that we have been forced to undertake as a growers' organization might be helpful, as far as the marketing of the grapes is concerned. We have had, you might say, two branches to the marketing of the fruit; first, the gathering of the fruit, and secondly, the distribution of it. Judge Norton raised the question this morning as regards getting uniform packs, and I might say that we solved that, to a very large extent, in Fresno, in marketing our Malaga grapes, the Emperors and some Muscats, by establishing small loading stations for packing houses, costing $400 to $600—some, $300—merely shelters so the employees could be protected from the sun, and the grapes are brought there in lug baskets and there they are packed. Since that time we have had very little trouble with decay. Certain brands have become quite famous, and the buyers insist upon certain brands. Another thing that we have tried to develop among our growers is the use of two brands. In the citrus industry there are two grades. The citrus-grower tries to market all his fruit under one name, with the result that if he gets a lot of bad fruit and does not clear it that will give him a black eye in the market, whereas if he had two brands and kept the first one absolutely up to standard we would not have the trouble in the f. o. b. markets.

As to Tokay grapes, I really believe the market is practically unexplored beyond the large markets. We distributed our fruit this year into 81 markets, the grapes into some 19 different districts and they were split up into smaller amounts, all the way from Corpus Christi to British Columbia and Toronto. The market is very large, but the great trouble we had this year was the matter of decay, and especially from the Lodi district, where a good deal of the discussion seems to have developed to-day. We had the same difficulty last year, and I would like to illustrate how the decay in your grapes is interfering to a large extent with the distribution of the grapes. We sold a car in a small city in Iowa and the buyer received the car and accepted it, and after he got into the car found a good deal of decay. By the time he got through he lost $200 or $300. The result was we could not sell him any more Tokays this fall. He did buy Malagas and Emperors. I won't say that it was necessarily poorly put up, but I will say there is a very large problem there that will have to be solved, and I am very glad the Federal Government is undertaking that question.

Another point that interferes with their distribution is the matter of assorting crates. As you know, a small city can scarcely handle a straight carload of grapes, whereas if we could have some other varieties coming along about that time so we could put in 700 crates of Tokays and fill the balance up with other varieties they could be handled. We overcame that to some extent with the Tokays from Lodi by having different varieties of grapes put in, although I must confess that the greatest acreage in Lodi is running to Tokays, and some day I think that is going to make trouble, because the orders come in from small cities that they want so many Tokays and so many of other varieties.

In connection with the glut at auction markets. It was said that a schedule would completely correct that. A schedule will assist very materially, but when you understand there is no sale in an auction market on Saturday, and should a car arrive in any auction market on Friday it has to remain there all day Friday, Saturday and Sunday and is not sold until Monday, you have three days' arrivals on Monday. That is one of the great objections to the auction system.

In regard to the improved service by the railroad companies, I must confess that the improvement this year has been most wonderful, as far as we are concerned. The railroads were willing to listen to us, and when we had any kicks coming they would send some one there instead of our having to hunt all over town to get some one to listen to our story.

We are closely allied with the Fruit-Growers' Association of Southern California by contract. We are endeavoring to follow these, not only as industrial organizations, but as owners, feeling that each one of us was interested in his own product.

As to railroad claims, especially on Lodi cars. Last year the refrigeration was not always good. A number of times we had to ship the cars out dry. We were able to collect a great many claims as the result of that, and we in turn distributed that among the shippers. We collected some $3,000 or $4,000 in 1907, and we were able to collect nearly $12,000 this year.

There is another point in connection with the distribution since 1901. In 1901 about 51 per cent of the total shipments were distributed into three markets, namely, New York, Boston and Chicago; the next year 49 per cent; the next 49 per cent; the next 49 per cent; the next 48 per cent; the next 52 per cent. I do not call that very good distribution, with an increasing crop, and that is a feature that we as growers will have to get down and study, and if the type of organization that the Exchange has is not the proper kind, let us have a committee get busy and find out what is proper, because it is really a serious question and one that in three or four years, as far as the grape industry is concerned, will be overwhelming if we do not anticipate it.

The matter of freight rates. It was said that we possibly had been asleep up north there. I might say that that has been an ever-present topic with us. We received on the same day as the orange people the same reduction in fruit rates that they did. Their reduction was from $1.25 to $1.15 and ours from $1.25 to $1.15 as far east as Chicago, but on deciduous fruit the rates have always increased from Chicago eastward and there was not the same proportion of reduction east of Chicago, so when the committee goes to visit the railroads in San Francisco it would be well to state the matter east of Chicago and endeavor to get

a blanket rate, because if we had a blanket rate we would cut out a good deal of trouble in the Michigan markets and Ohio markets and develop a much larger market.

PRESIDENT JEFFREY. If you can ship to Portland, Maine, as cheap as to Kansas City, would not the postage stamp rate be a greater advantage to the deciduous fruit men than to the citrus fruit men?

MR. WALKER. Yes, sir. That would help us very materially, but we have not got it.

MR. SPRAGUE. I just wish to make a correction in the interest of history. Mr. Dargitz was not quite correctly informed with regard to the history of the California Fruit Exchange. The organization known by that name first was the one of which E. F. Adams spoke yesterday and which never did any business. When the California Exchange, which is now known, as Mr. Dargitz says, as the stock company, but formerly purely coöperative, was organized, we were allowed by the Secretary of State to take the name which had formerly been taken by Mr. Adams' organization. The California Fruit Exchange of which Mr. Walker is the able manager now never went out of business and never lost any ground.

PRESIDENT JEFFREY. I will at this time appoint as the committee to interview the railroads, R. D. Stephens, chairman; C. M. Hartley and W. M. Angier.

In 1902 all of the commission men, orange brokers, orange speculators and orange buyers were as anxious to all get together in the one body as any set of men you ever saw. They formed an organization which included 100 per cent of the orange growers of California and did business that year under the name of the Fruit Agency. I want to ask Mr. Stephens if it is not just as necessary for the fruit shippers, the well established fruit firms of California, to have some organization?

MR. STEPHENS. They have it.

PRESIDENT JEFFREY. A coöperative organization?

MR. STEPHENS. Yes, sir.

PRESIDENT JEFFREY. The shippers?

MR. STEPHENS. Yes, sir.

PRESIDENT JEFFREY. Coöperative for themselves?

MR. STEPHENS. Yes, sir. Now, Mr. Walker, I want to put you on the stand as a witness. I would like to have an explanation from you why such large quantities were put in auction markets this season, particularly in New York, Chicago, and Boston.

MR. WALKER. Through lack of proper organization.

MR. STEPHENS. But the responsibility must rest somewhere. Does it rest with you or somewhere else? I am speaking of deciduous fruits, grapes particularly.

MR. WALKER. Certain varieties can be marketed in New York or any market east of Chicago and certain varieties can not be successfully marketed east of there. For instance, cherries can be marketed in almost any section of the United States; apricots can be marketed in almost any. When it comes to peaches, it is almost unsafe to go east of Chicago. Having that in view, we only put 43 boxes in New York, but we did put a very large percentage in Omaha—

MR. STEPHENS. I am not speaking about your organization.

MR. WALKER. Why the others put fruit in New York I don't know. There was no market there for early fruit.

MR. STEPHENS. Was there any good reason why it should be done?

MR. WALKER. Well, one can't fathom another man's mind.

MR. STEPHENS. What I am trying to get at is, there has been a great deal said about coöperation. I think it is the only solution of the difficulty, a grower receiving a fair proportion of his profits. I do not wish to assume to be knocking anybody. I have been accused of that for a long time. I made a pretty strenuous fight on the car line, and I think that was one of the most important fights, because it was utterly impossible for anybody outside of the owners of the car line to do anything except by and with the consent of the car line. Mr. Armour was absolutely master of the situation. It seems to me the great obstacle in the way of forming great coöperative communities and then having a central one has been removed. It seems to me utterly impossible for you, Mr. Walker, or myself or anybody else to completely divorce this from selfish interests. I can not understand how a commission man can accept consignments and at the same time be an f. o. b. buyer and do justice to the consignors. It seems to me that if I buy 500 boxes of fruit and I receive 500 boxes of fruit on commission, if there is anybody to suffer it will be the ones from whom I receive on commission.

MR. WALKER. That point has been one of our most vital issues. We do not buy at all.

MR. STEPHENS. Inasmuch as the way has been paved for coöperative organizations, so the individual grower can combine with his neighbors; I think there is an opportunity of building up such organizations that will greatly advance and promote the interests of the fruit-growers of the State, particularly the deciduous fruit-growers. We will go back to a little ancient history. Mr. Earl, when he first started in in the f. o. b. business, would go to Mr. Walker and buy 25 crates of plums. After those plums had been marketed and returns came back he would send to Mr. Walker a statement showing expense of marketing and freight and loading and extra icing charges, and you could see that Mr. Earl was losing 25 or 30 per cent on every box he bought, and still Mr. Earl kept buying and retired a millionaire. Take the Porter Brothers and those connected with them, and they are millionaires also, while the fruit-growers, most of them, I fear, are mortgaged. Now, if you will form those coöperative organizations, not as a menace to the commission men, but to act in harmony with them and to hold them, in a sense, kind of level, they will have to recognize your power and you will get a great deal better treatment from them. I wanted to find out from you, Mr. Walker, why those auction markets were so glutted this year. Here are 150 or 160 markets, cities and towns, that will consume carloads. I ask you again if you have got any solution of the question, if you can answer why there were 40 or 50 cars a day sold in New York and 28 or 30 in Chicago and 15 in Boston and considerable in Philadelphia and Pittsburg, why there was not better distribution.

MR. WALKER. Ask the organization that had the majority of the fruit to handle. Mr. Stephens said there was an organization in northern California based upon the same plan as the California Fruit Agency. This organization was organized in 1903. The theory is splendid, but the practice is not worked out quite as well. I am not saying this with any idea of criticism. Instead of selecting one agent of

each market they have three or four, and that is the fault of the system. The individual firms deal with their broker and work upon his information, and your experience must have told you that the average broker makes his market look pretty good. If there was one agent for each market and the distribution was from one office, the glutting would not have been so marked. The solution of the problem is to have an organization in the saddle to distribute the fruit. This was a very peculiar year. It was a bad financial year, there was an immensely large crop in the East, there were many adverse conditions; but I have always been a profound believer in the private sale market as against the auction system, because we can increase the distribution of our fruits.

MR. STEPHENS. The auction market is the only protection the grower has. Up to their establishment the grower was wholly at the mercy of the commission man. I realize that in a small place you can not do that, because combinations would be very easy to prevent a satisfactory price. The point I was trying to make through you is this, that the f. o. b. buyer does not sell his fruit, even in an auction market, unless he has a bidder to buy it in.

MR. WALKER. In Illinois it is against the law to buy at auction.

MR. STEPHENS. There are a great many things against the law, and it is very hard to establish that those things are violations of the law.

MR. WALKER. The competition there alone between the buyers would keep the market about where it belongs.

MR. STEPHENS. The purchases f. o. b. here do not go to the auction market.

MR. WALKER. They put most of their purchases on at private market.

MR. STEPHENS. If they can not find private purchasers then they put them in the auction market, don't they?

MR. WALKER. I suppose that would be the natural consequence.

MR. STEPHENS. Then the result is that the prices go down and your frame of mind is altogether different from what it is when I first offered you an amount. You are ready to sell for any price. Now, what we want is an organization formed along the lines similar to your organization, to distribute the fruit, to put it into these outside markets, markets that are not known to California growers. You send to Chicago as a distributing point, which it is, but it is much better to ship a car direct to Galesburg, saving the local freight, than it is to ship it to Chicago, take it out of the car and send 25 or 50 packages back to Galesburg, because of the local expressage, with the longer time added. There are a thousand towns in the United States that might be reached in that way through an organization such as has been suggested here. The only question is, can you organize the growers.

MR. WALKER. I think I am safe in saying that we are working in the right direction, and we are getting the points organized as fast as it is safe. We have grown this year about a hundred per cent. We are gradually organizing the growers in different localities, and I think in time, after the growers in northern California grasp the situation as have the growers in southern California, you will have such an organization. We have been working for about six years, and we are now beginning to reap the reward. One of the oldest organizations in the State is the one down here at Florin. There is an association at New-

castle and at Loomis and Penryn, at Winters, on the Sacramento River, and in Fresno, and these local associations are purely coöperative. At other points you put out agents so as to educate the growers in those localities to organize. I think in time we will get it, but it will be slow progress.

MR. STEPHENS. One great difficulty to overcome is that so many growers are impecunious and they have to borrow money. There has been no such thing as a fruit-grower going to a bank and borrowing money. The security was not regarded as good. The only relief would be from some of the large shipping organizations, of course, on the condition that the grower had to ship to the organization. I think, however, I must admit that those conditions have materially changed since the elimination of the private car line, and there seems to be a disposition on the part of the shipper to treat the grower better than in the past. Take Placer County. There was a penalty attached to any f. o. b. buyer who would exceed a certain price. Now I think that is done away with. Instead of making enemies I want to make friends of all interests. I am not here to criticise; I am here to draw out facts to show what may be accomplished if proper action is taken by the fruit-growers themselves.

MR. MILLER. Mr. Stephens, I was at the other end of the fruit line six years ago, and I knew a little more of the market in that way. Speaking of Galesburg, Burlington, Springfield and Rockford, if they put in fruit at that time they would have to have an agent at each place. It would be risky at that sized market to put in a car without having it personally conducted. I know, with the coöperative proposition with the New York growers of Concord grapes, they used to ship them in seven and eight pound handle baskets. Before the growers organized we bought them for from 7 to 9 cents a basket, which meant a loss to them. After they organized we bought nothing less than 14 cents a basket. Another thing Judge Norton spoke of this morning, the Almeria grapes from Spain. They were packed in kegs of 40 to 46 pounds. I don't remember ever buying them at less than $4.50 a barrel and as high as $9 a barrel. They were kept until the first of April. They are no better grapes, and if we could get them out of the way and then improve the pack and the keeping, it would make a great difference in the California grapes.

PRESIDENT JEFFREY. The California Fruit Growers' Exchange, which is the citrus exchange, has no more fear of the box trust of California than they have of their home groceryman. You have been up against that box trust or will be. That concern is not a trust with them; it is on an equality. Instead of trying to put its price on, it says "What can you afford to pay this year? Can you stand a raise of six cents?" The directors say: "We had better get up a box factory of our own." So they levy a tax of 5 cents a box and sent their agent up to Siskiyou and Oregon to get options on mill sites and timber, and when he came back to Los Angeles the box trust was there ready to ask them if they would give one cent more for the next five years. So the orange growers met and said: "That is about as good as we could do with our own box factories." So they make a contract for another five years at 15 cents a box. Mr. Stephens has come nearer to me on this matter than he ever has since I have been in the State. I think it will

be found just as necessary to have coöperation here as it is in the south; 20 or 25 per cent of the fruit in southern California is handled by speculators and buyers and commission men. They would rather see anything in the world happen than see the California Fruit Growers' Exchange disband. They would have the nightmare. Why? Because those speculators and commission men find it easier and more profitable for them to handle 20 per cent of the oranges now than a larger per cent under the old conditions. Overproduction will not stare you in the face if you organize. You will protect your own men. There are men here who have bought your fruit for many years; they must be protected.

MR. DARGITZ. Mr. Stephens suggested the situation was sometimes critical because the grower needed to borrow money. I borrowed the money out of a bank, about 25 per cent, on the stock that I took in this California Fruit Exchange. The Exchange carried me on the other 75 per cent until the crop paid me out, and now the bank I first borrowed from says my stock in the California Fruit Exchange is gilt edge collateral for its full face value at any time I want to borrow.

JUDGE NORTON. I have refrained from saying anything up to the present time because in the first place I had my say in the paper that provoked the discussion, and then I desired to hear from the different gentlemen in order that I might be informed as to their ideas. I confess that I am very much pleased and have been very much interested in the discussion that has taken place here. I have been surprised at one thing, and that is the practical unanimity among us all as to what the necessities are. The only difference I can see is the means by which we can accomplish the thing we want. The only difference I can detect is a little difference in the detail of how we will go about to cooperate. Perhaps the most feasible way to coöperate would be through the shippers; that they organize in such a way that they can act for us. I say that because they are fewer in number. There are only 10 or 12 parties that buy grapes that would be interested in marketing these grapes, while the growers number thousands. I realize that there are very serious difficulties in organizing the growers at all. We are going to have trouble and it is going to take a long time. That is only my suggestion; I am not wedded to anything. If we can form little groups and then unite the groups into one large organization, I say that is all right. I do not take kindly to the proposition that the fruit distributors and the growers are going to fight each other. I think that we are all united to accomplish the same thing. Now just look at it. It has been said that these men are in it for what there is in it for them. And so we all are. The more the grapes sell for in the East the more the man that handles them for you gets out of it. So far as I know, all these houses do business on commission. The more they get the more they have. Whether we begin at the bottom and organize the growers into groups and then organize a large central organization, or whether we can get the shippers to form the organization, it does not make any difference. Possibly the shippers, only being 10 or 12 in number, might agree that they would make no grape shipments to the East except those which they saw packed. If we could get enough growers to agree to that plan that could be done and no grapes would go out except in that way. I know that these companies are very jealous of each other. One company will tell you the other company is not responsible and they wont keep their agreement.

Now, there is one thing suggested by the gentleman from Florin. He objects seriously to any arrangement by which he would have to haul his grapes to some central place to have them packed, and I can see that that would be very objectionable to him because he has always done his own work. He has saved labor, and I have no doubt he gets a better pack than people who have more grapes to put up. But here is an answer to that. Undoubtedly, doing the work himself, having a fine quality of grapes, he puts up a pack of grapes which he would not be afraid to put in the auction market. He does not need to come in and it does not make any difference.

PRESIDENT JEFFREY. Suppose he puts up the very pack that you describe and goes into New York with 24 other cars of exactly the same quality and New York that day only wants 20 cars, what will he get for his fruit?

JUDGE NORTON. He won't get so good a price as he ought.

MR. FRENCH. I wish to speak, not as an individual grower and shipper, but as representing quite a class; that there are very many in my position and consequently it was not an individual thing. I represent a large number in Florin.

JUDGE NORTON. I was simply speaking of you as a type. It does seem to me that we might get 75 or 80 or 90 per cent who would agree to some plan.

A MEMBER. May I answer one portion of Judge Norton's remarks? He spoke of the fact that we are all in the business for the profit that is in it, and he seems to indicate that the California Fruit Exchange is in the business in the same way that the Earl Fruit Company is. Perhaps he is ignorant of the fact that the California Fruit Exchange divided among its growers last year 24 per cent of its earnings. The California Fruit Growers' Exchange is a growers' organization, and any earnings over and above the actual running expenses are divided out among the growers again. There is your ideal proposition. We accumulate the fruit at the shipping points. They handle that business locally by a small group of shippers getting together and shipping fruit. Then they are turned over to the central exchange here. If the exchange controlled 50 per cent of the fruit the distribution would be better than it is now.

JUDGE NORTON. That arrangement would suit me if we could get 90 per cent into it. I don't want the gentleman to understand that I made any reflection upon the Exchange or any organization. I think the interests of the shippers and growers are identical. I can't see that there would be any object for any of them to want to beat down the price of fruit.

MR. STEPHENS. You say it is to the interest of the commission men to get large prices instead of low prices. That may be the condition existing now, but it was not the condition before the elimination of the private car lines.

JUDGE NORTON. If the motion will be entertained, I desire to say that I have in my hands an invitation from the Chamber of Commerce of the city of Lodi, inviting the next Fruit-Growers' Convention to be held there.

I take pleasure in moving that such place be selected as the next assembly place.

The motion was duly seconded.

MR. STEPHENS. I wish to say this, that while it is a proper thing and I have no objections to Lodi, yet it is a matter that rests entirely with the Horticultural Commissioner. It would not be improper to have an expression in favor of Lodi, but it should be understood that the authority and power rests with the Commissioner to put it where he desires.

JUDGE NORTON. I understood that was the case.

PRESIDENT JEFFREY. Six months ago Watsonville came to Riverside with the request to have the Convention there. After having told the Watsonville people two or three months later that we would hold it there, I wrote to Mr. Judd and Mr. Rogers and asked them if they would release us from this promise. They consulted, and released the Commissioner from the arrangement he had made to go there. Then immediately several towns tried to get it. Now, Watsonville has the first call on the Convention for next year. If Watsonville does not want it, Lodi will be second in line. Watsonville will probably not want the Convention. Mr. Rogers said to-day that he did not think the town was large enough to accommodate us. In case the Watsonville people do not want the Convention we will consider Lodi, and meet there one year from to-day.

MR. STEPHENS. I move that a vote of thanks be tendered the officers of this Convention for the impartial manner in which they have discharged their duties.

The motion was duly seconded, put by Mr. Stephens, and unanimously carried.

On motion, duly seconded, the Convention adjourned *sine die*.

THE TARIFF QUESTION.

By A. G. KENDALL.

I am asked to present some views on the question of the tariff as affecting California interests.

I assume that the promised revision of the present Dingley tariff law, so-called, by two of the great political parties prompted the request, and that I am expected to treat of those subjects of peculiar interest to California.

Deciduous fruits, generally speaking, are grown commercially in over forty states and territories in this country, and will be represented in Congress by over 360 members of Congress, while citrus fruit, the production of which under the present law has received a great impetus, may be said to be confined to but six Congressional districts, three of which are in California, and which produce more than 75 per cent of all citrus fruit grown in this country.

If the tariff is a local issue, as some would have us believe, it will take the superhuman efforts of our representatives in Congress and the individual effort of every citizen and person interested in California to retain for us the proud position we now occupy as growers of fruit.

This effort of our citizens can be best directed by supporting those who have these matters in charge at home and by individual efforts with Congressmen, Senators, and prominent people from other states, with whom they are acquainted or who may be reached through mutual acquaintance, by soliciting their efforts for the maintenance of such tariff duties as will permit us to lay our California fruits down in Eastern markets in fair competition with the imports of other semitropical countries, who have half-paid and half-clothed labor, and cheap ocean freights. Make the organization at home efficient and then let every person consider himself a committee of one on the state of the country as applied to the necessities of the Pacific coast.

It would seem to me that there was but one side to the question of tariff from a California point of view, and that little could be gained by discussing among ourselves a one-sided question—but of this last I am not sure—if discussion leads to action.

Tariffs are laid for revenue and for protection, and the two great political parties, who have promised a revision of the present law, may be said to fairly represent a tariff for revenue and a tariff for protection.

California has spoken; her voice could not have been otherwise so long as it costs $393 to lay a carload of oranges from California down in New York and only $93 to lay the same sized car from Italy down in New York; the orange grower will ask for a tariff that will equalize the cost of labor and transportation between the two countries.

The same principle should apply to every other product that can be produced in this country.

The writer of this article was reared in New England, where fifty years ago it was the custom to grow and produce as nearly as possible

every necessity of life in each family. I distinctly remember that we raised the sheep that grew the wool that made the cloth that made the clothes we wore; I have peeled the bark that tanned the leather that made the boots we wore; we bought nothing from abroad which we could produce at home. From the treasure chests of New England has the great West been builded, and the spirit of the New Englander has imbued her sons that have helped to build it.

Tariffs seldom raise the price paid by consumers for products of the soil; they do preserve the home market for the home producer, and the output not being restricted, competition by producers regulates the price.

As a matter of fact, the prices during the past year (which is acknowledged to have been a remarkably successful one for the California grower) have been lower to the consumer than were ever known under the lower tariffs on citrus fruit. The reason is apparent. Oranges grown in this country or imported at the time of lower tariffs sought only the larger markets. The commission men and the railroads, by local freights, did the distributing, the quantity was limited, and prices were fixed accordingly.

Home production has been so increased by the Dingley bill that now growers, through coöperative exchange organizations, are compelled to place our oranges in every city in the United States in carload lots, where they go direct to the consumer, and the commissions and long local freight hauls necessary to distribute from the larger markets are avoided. The consumers have been increased many fold and have been benefited in price. Retail dealers in Maryland, Minnesota, New York, Nebraska, Oklahoma, Iowa, and many other states have, during the past season, advertised for sale fancy California navel oranges at from 10 cents to 30 cents per dozen, and lemons from 8 cents to 15 cents per dozen—not on single occasions, but successively through the season, from February to September—prices never before known in the history of the industry in this country.

Perishable products are amenable to the length of time they can be preserved and presented to market. All imported, and over 40 per cent of American-grown citrus fruits, are sold under the hammer at public auction for what they will bring.

Before a California jury an advocate of high protective tariff on fruits would win his case without the necessity of their leaving the jury box—why?

They say you can't talk on the tariff question because it's a dry subject. Let me tell you—without a protective tariff on California fruits, the subject would prove a hungry one for the attempting grower—again—why?

Let me speak to the last question, then you will see there is no occasion for doubting the confidence expressed as to winning the jury case.

In the first place, California is a semiarid State, to grow semitropical fruits you must produce semitropical conditions; we have the temperature, but we lack the moisture. With moisture supplied to the ground only by irrigation, we produce a fruit with our warm days and cool nights with texture, quality, general appearance, keeping and carrying qualities that can not be duplicated outside of like conditions in the known world.

Millions and millions of dollars have gone into irrigation problems in California for developing, conserving, and pumping water from deep levels, nine tenths of which has been in the name of the California orange and lemon.

These millions of money have converted a portion of the great American Desert to what is now acknowledged to be the finest garden spot under the sun. They have invited other millions to investment within the radius of the orange perfume, that have been spent in the employment of labor in developing enterprises, undreamed of a single generation ago, so that, in fact, the golden fruit has become a lively incident in the great growth, wealth, and prosperity of our Golden State.

If California oranges were grown in a Cuban or Jamaica climate they could not be shipped across the continent without great loss, much less be exported to England, Germany, and Russia, where our oranges are now going in safety.

We pay higher wages in the California orchard and about our packing houses than is paid elsewhere in the world for similar service—it requires intelligence, and we pay for it.

The prices paid for American labor in the citrus industry have had a stimulating effect upon labor prices elsewhere, and it is needless to say good prices could not be so paid, except for the protection afforded by the tariff on citrus products.

California grown fruits must go to market over mountains and across deserts, by steam railroad for a distance of from 2,000 to 3,300 miles, and from March to September each year under refrigeration.

It costs 84 cents for lemons and 83 cents for oranges in freight to lay the box down in the Eastern market without ice, and 20 cents a box additional when refrigerated; in 1907, 58 per cent of the citrus crop of California was shiped under ice.

These are some of the conditions under which has been built up a great industry—what are the results?

When the Dingley law went into effect in 1897 we were producing 7,350 carloads of citrus fruit in California, which brought us a revenue of $3,839,000. Eleven years after—1908—we produced 32,500 carloads that brought a revenue of $21,210,000, f. o. b., California. We now have 120,000 acres in bearing citrus trees, owned by between 9,000 and 10,000 growers. During the time of the present tariff law we have produced in California 100,000,000 boxes of citrus fruit; during this time we have paid for transportation on citrus fruit alone $97,500,000, besides $42,000,000 packing and selling charges. We are to-day supplying every demand of consumption for oranges in this country and exporting our surplus. In the eleven years mentioned the imports of oranges have decreased 400 per cent and the exports of American oranges have increased 400 per cent.

Not so with the lemon.

The history of lemon production is interesting, but not so favorable as to results; California produces practically all the lemons grown in America; their growing, handling and marketing may be said to be past the experimental stage.

In 1900 we produced 1,447 carloads, or 18 per cent of consumption, and imported 6,618 carloads, or 82 per cent of consumption.

In 1908 we produced 5,000 carloads, or 41 per cent of consumption, and imported 7,119 carloads, or 59 per cent of consumption.

In the nine years mentioned the consumption of lemons in this country increased 154 per cent and the California production increased 345 per cent.

Will we overtake the importer of Italy? We think not, under present conditions. In California we make lemon-growing a commercial proposition; the vast sums invested in necessary irrigation problems, the distance from our markets, the cost of labor, transportation and refrigeration require large capital and great care.

Lemons in Italy are principally grown in gardens and terraces with family labor and little expense; when orchard labor is needed, 30 cents per day is a fair wage.

The Italian lemon is shipped green, cured in transit and laid down in New York at a cost of 24 cents per box, freight. The finer grades go to England and Germany under cheaper freight rates, and America, the great consuming nation, is made the dumping ground for what is left.

Those who have made a study of the problem believe that with a duty of 1½ cents per pound on lemons we would produce in California within the next ten years every lemon demanded for consumption and drive the foreign lemon from our market, as we have the foreign orange.

Who are our competitors and what are their advantages?

As has already been said, Italy is yet able, under present import duty, to furnish 59 per cent of the lemons consumed in this country.

You have a right to infer that having once gained our orange market we ought to be able to hold it against all comers, and this might be a correct inference if conditions were not changed.

The Spanish war and Cuban occupation by the United States have made it possible to do business in Cuba, and such has been the inrush of American and Canadian capital to that island that confidence is sustained, and the promoters in Cuba are declaring "the Americans will never leave the island. Large corporations financed by the Americans from Dakota, Michigan and other states have secured large tracts of citrus lands in Cuba, subdividing them into small tracts and are selling them to thrifty Americans, who are now planting out orange groves.

Other corporations financed by Canadian capital are taking advantage of the peaceful condition of the island and have secured thousands of acres of suitable citrus fruit land and are selling it in small tracts to thrifty Canadian farmers, under a prospectus of future wealth and happiness that would make a California "boomer" blush.

The same is true as to Mexico—American capital, and in some instances California capital, is now exploiting the citrus belt of Mexico. Hundreds of acres have been planted to oranges in the last few years; labor and lands are cheap, and labor dependable. In both instances, 30 cents to 50 cents per day; with no irrigation in Cuba and free water in Mexico.

We wrested the market from the Cuban, the West Indian and the Mexican because of their methods, or rather lack of method. Can we keep it when the American becomes the controlling influence in citrus fruit culture in Cuba and Mexico, surrounded and supported by con-

ditions as to cost of land and labor that can never obtain in this country? The British West Indies have been visibly improved by the conditions in Cuba. Jamaica oranges are laid down in New York City for 25 cents a box; the Cuban orange for 30 cents, and the Mexican orange for 35 cents per box, freight.

We have a right to expect, and do expect, that within the next few years the struggle for supremacy to retain our own market will be sharp —a protective tariff only can make it decisive for us.

What is said herein as to citrus fruits applies equally to the walnut, the almond, the raisin and the prune and olive. I have not gone into that feature of the tariff as applied to them for I have not the information at hand to permit me to do so, but I think enough has been said in these few words to give me the verdict in the jury case, for it must be evident to every person present that whatever his political opinion or wishes may be, as to the supremacy of either of the two great political parties in this nation, California with its well-paid labor and long distance from market must always be a protective tariff State. If any one hearing this opinion is inclined to raise objections to that theory of the case by reason of a fear of increased cost to the consumer, or for other cause, let him not fret or worry over the moral issue; it were better to grow more fruit or nuts and insure a competition among ourselves, if he is not satisfied with what he now has, remembering always there can be no restriction of soil products in this country so long as there is a profit in their production sufficient to sustain the labor necessary to produce them.

There may be production without a profit, for the soil producer's capital is largely labor; and the hope that springs eternal to the hearts of men for better future conditions will keep labor employed in the support of human life, while the man of means will easily change his vocation.

SOME HIGHER IDEALS OF HORTICULTURE.

By FRANK FEMMONS.

From the earliest dawn of the world's history, our people have been pioneers, with their eyes and footsteps towards the unknown West. Often have I gone back in imagination over their ever onward pathway and stood beside our great ancestor as he beheld for the first time the going down of the sun. The first day of earthly existence had charmed his soul with the beauty of his surroundings. He had wandered among the sunshine and shades of his garden home; the flowers had bloomed about his footsteps; and the songs of birds and rippling brooks had filled the day with music; but the sun was slowly sinking down behind the western hills. What strange sensations must have swept through his mind as he watched its fading light as it seemed to rest for a while among the tree and hill tops of his earthly home! His eye long lingers where he had seen its departing rays, as they painted in purple and gold on the clouds of the evening sky the reflected beauties of, to him, some western world. Darkness is stealing over the scenes that had so charmed his first day, and while he bows in wonder and adoration, weary and alone, he sinks to rest, and the angel of Sleep wraps her mantle around his weary form. The grandeur and beauty of that sunset scene, and the solemnity of the oncoming darkness still filled his heart, and his thoughts and imagination awoke in his dreams. "The evening and the morning were the first day," and the night, like a new creation, had its "evening and its morning stars."

Awaking from that first night of earthly dreams, the "Star of Empire," like the emblem of a prophetic vision, has ever beckoned onward to the west. At times it has seemed to halt and its cheering rays dwindle amidst the darkness of doubt, but with returning faith and new hope the ages of life and light are again marching on with a courage that meets and surmounts every obstacle, developing new strength with every effort, finding or creating new powers to conquer, and new inspirations for the struggle to come.

Some of us who from our boyhood can remember our frontier, as it then reached almost beyond the confines of civilization along the banks of the Mississippi, stand here to-day, amazed, on the shores of the Pacific. We look back over the rushing tide of development where,

> Like waves upon an ocean shore,
> Each coming wave drives on the wave before,

and in the light of the past that comes to us in shimmering brightness across the crests of the rolling tide of the ages, try to solve the problem of future. Shall we turn away from that great solution because it seems beyond our individual powers and few short years of life?

The mind of man is ever striving for advancement. We look back over the ages and compare its first noble efforts with the grand achievements of the present, and as we sweep aside the curtain from the future, and see something of its vastness that reaches in sublime beauty beyond,

we may feel sure that the past, the present, and the future is but an unbroken chain, binding all time into *one eternal now*. The mind of man is ever ready to attempt the most rugged steeps. Throw the light of hope on its pathway and wake up its enthusiasm, and no matter how difficult and rough its footsteps may prove, his cheering watchword is ever *onward*.

"The Star of Empire"—the dream of an ever new western world—has nearly completed its cycle. We look out through our Golden Gate across the peaceful waves of the Pacific, and waving the Starry Banner—the emblem of the accumulated triumphs of the ages—shout our returning cheers to the garden home of our infant race.

Meeting you here to-day, the fruit-growers of our great State, and in the spirit of brotherly friendship looking into your faces, one need not mistake the soul developing influences at work in your high vocation. From the rich soil of the Earth and the bright sunshine of Heaven, and like the developing beauty of our ripening fruits, the high and noble qualities of the heart are stamped upon the brow. Your lives and labors so close to the soul of created things, must stamp their influence upon the development of every activity of the commonwealth; not only in producing the highest types of orchard fruits, but the last, the best, the highest ideal of God-created man.

"Ye are workers together with God." I am not here to preach the gospel. You have that in your churches (some of them), but I wish to suggest some of the laws, principles, and their source, upon which has, and must always, depend the development of humanity in all ages. Of this one thing we may be assured, that if our individual ideals and efforts are in harmony with the great design of created nature, the collective power of that influence will lead onward, and, like the "pathway of the righteous, grow brighter and brighter to the perfect day," but if through our careless doubts and fears, and losing sight of those higher ideals, we drift off into channels that lead out and away from

"that divine event,
Toward which all creation moves,"

again, as in the past, will our civilization be wrapped in the clouds of "dark ages," through which, with faltering footsteps, we must regain the onward way.

Among all the vast and almost bewildering developments in all lines of human activity in every part of the world, I know of none that better illustrates the rapidly moving progress of our age than the growth we have seen here in California, and that means, in a large measure, the orchard interests of our State. We can not think of California without her oranges and lemons, her grapes, peaches, and pears, and a hundred other fruits of her valleys and hills that have been a new wonder and revelation to the markets of the world. At times we hear some feeble voice of warning about overproduction, but soon a little adjustment of methods, a little more care in selection and packing, or better facilities for reaching the distant markets, and we find the demand still growing greater than our orchards can supply; and to-day more new ones are being planted than ever before, and new railroads are building in every direction.

With her almost boundless natural resources and her vast bodies of still unoccupied land, extending for eight hundred miles along the shores of the Pacific, and from the sea to her mountain heights, embracing all the soils and climates that have enriched the world; with the thousands of new homeseekers who are yearly coming with their high hopes of a new home surrounded with their orchard trees and perpetual garden flowers, we wonder what can be the great destiny of our productive State. We stand upon some high Sierra peak, and, looking out over her valleys and plains, her flowing rivers and the restless waves on her shore, her cities, towns, churches, schools, colleges, and universities, her prosperous homes, and bending orchards, all suffused with the golden sunshine of a genial clime, and exclaim,

> All hail to our State! We greet thee anew
> With all that is loyal, from hearts that are true;
> Thy sons and thy daughters, and sisters afar,
> Are watching the rays of the brightening star,
> That rests on the shore of this New Western World,
> Where the flag of her greatness was proudly unfurled.

When we remember that all these high hopes and accomplishments have come to us within our own memories of fifty or sixty years, we stand amazed with wonder as we see in it all the prophetic morning sunlight of a grander development to come.

Nearly all our horticultural literature has been directed toward the practical and commercial growth of our distinctive industry. Nowhere and at no time in the world's history has there been such an advance in horticultural knowledge and its application. Many of our California investigators, authors, and practical orchard men stand at the head in their high calling. To their farsighted wisdom and successful labors we all owe a debt of love and gratitude. We are proud of them to-day, and to future generations we bequeath their honored names. While we have no right to think the less of our vast productive resources, nor their far-reaching commercial value and influences that must ever go hand in hand with all our varied industries, they bring with them equally vast responsibilities.

We think of our Christian civilization as that divine system that must eventually bind together, under the Fatherhood of God, all the nations of the world. What other agency could carry the educating influences the world so much needs as our vast productive and commercial activities that are building railroads in every land and filling oceans with steamship lines? And what commodity, of all the rich productions of the world, could carry with it a higher refining influence and arouse a brighter hope for better living than our own California fruits when grown at their best? But we are sometimes in danger of losing sight of the higher ideals and responsibilities that our opportunities place before us, and to think of the commercial value of our orchards as their highest end and consummation. Their influence upon ourselves, our homes, our children, and the present and future welfare of our State and the world gives them a still higher value; and the wealth of that influence in making life and its conditions more beautiful; in building up heart and soul, the *character* of ourselves and our people, should be the greater high object of all our thought and labor, and *it all rests with our individual selves,* working together in that spirit of coöperation and neighborly

helpfulness that is ever ready to share, and, if need be, "bear each other's burdens."

With these higher ideals before us, we can never be content with anything short of the best we and the ever ready hand of Nature can produce. In all lines of our horticultural efforts the production of the most beautiful and best should always be our highest aim; not because they have a greater present money value, but because from them we gain the greater satisfaction. They help make our homes more beautiful; they fulfill our hopes and add the greater blessing to the world. It is ours to work in harmony with that great design that looks onward through the ages, that age by age should grow better and brighter. We dare not lose sight of those higher ends of creative wisdom. If we are true to our highest ideals, continually striving to make our lives and our homes reflect the beauty of our higher hopes, and stamping the spirit of our faith in God and ourselves upon every package of fruit we send to the world, we need fear no end to our onward development. The better days will come as the sunlight of the morning, and with them that hour of brighter hope for which we were taught to pray, "Thy Kingdom Come."

But few of our fathers, the horticultural pioneers of our western world, are with us to-day. Soon the sunset rays of their day of life will rest upon their last but honored resting place. To you, the younger men of to-day, their high ideals and heroic struggles have left a noble heritage. As yet it is rough and unfinished. The foundation, under the directing hand of the great Architect of Time, has been wisely and truly laid. It is for you to go on building the grand structure, which, in your hands and of the generations to come, must rise here on this eastern shore of the Pacific until its beauties and grandeurs in archways and architraves, its domes and spires reflecting the sunlight of our highest Christian civilization, cast their cheering influence of life, hope, and happiness, with new inspirations, to the peoples of the world.