FRUIT GROWERS FORM SOCIETY

(Continued from page 1.)

One thing our grower must bear in mind is that the marketing of the Hood River apple crop is a different proposition today from what it was ten years ago. Today we have an article that has a standing with the trade—namely, our Newtowns and Spitzenbergs. It has a certain fixed value on the market, and our system of business should be such that our fruit should be sold merely on its own merits. Its value should be determined only by the law of supply and demand and we should co-operate, so that we will never be at the mercy of the juggling of buyers and commission men.

This is the age of specialism; that being the case, let us concentrate our efforts to three or four of the best varieties of apples that we can raise, and let us co-operate in the marketing of the same, so as to avoid competition among ourselves.

In answer to a question from Leslie Butler why he did not mention Winesaps, Mr. Franz said that this variety of apple in Hood River valley usually grew one-third four tier, one-third four and a half tier and one-third five tier, and for that reason it was difficult to get a good price for them.

In answer to another question as to what he thought was the best soil to produce a high color in Spitzenbergs, Mr. Franz stated that experience had shown that soil where oak trees had grown and a location that had a southern exposure and plenty of sunlight had been found to be best.

"Pruning" was the topic selected for D. H. Sears, and he advised growing a full tree with as many inside limbs as possible, thereby causing the trees to bear full and heavy and keeping out the sunlight. This, he thought, produced a far better commercial tree than any other way.

F. W. Angus talked on "Observations of Our Pack and Suggestions." Mr. Angus told how the present method of packing apples could be improved on, although he said that the Hood River pack was the best that had been put in use. He advocated more care in packing apples in the future.

Appolination was J. T. Porter's theme, and results of experiments he said were to the effect that pollinization was necessary to all fruit trees, although the pomological department of the Government held to the contrary. He told what he thought were the best trees for this purpose for Newtowns and Spitzenbergs, but stated that there was a great deal to be learned on the subject and that he was still experimenting.

C. H. Sprout endorsed the co-operative plan for marketing fruit established here and urged the organization of unions as the best plan to secure this result. That any kind of an organization was better than trying to market the fruit individually.

Ray Brock explained the method of manufacturing pure culture cider as carried on in Germany with the use of yeast taken from the fermentation of grapes used for making wine. Some of the cider thus made was on exhibition and was pronounced very good by those who tasted it.

In his talk about diseases of trees G. R. Castner explained the nature of anthragnose, and said that the most effective remedy that had been found for it was the Bordeaux mixture. Mr. Castner exhibited a piece of a limb affected with anthragnose which he used in demonstrating his talk and showed how the disease manifested itself by finally encircling a limb and destroying it.

J. L. Carter told all about the deadly effect of fungus, saying that it was more dangerous than San Jose Scale or anthragnose and more difficult to contend with. He stated that the Bordeaux mixture was the best preventative of the disease and also the best remedy for it.

The last topic on the program was "Thinning." B. F. Tucker was asked to speak on this subject and made one of the most interesting talks of the meeting. Mr. Tucker gave a description of how he had set out his orchard, saying that it was a small one and that he had planted six rows of strawberries between the trees which had netted him $50 an acre for the first three years, when they had been removed. At the end of that time he cut back the side limbs and main branches and kept cutting them back until the tree had plenty of wood, many of his trees measuring 21 inches in circumference and some of them 24. He believed, he said, in building up a stout tree so that when it came into its full bearing maturity it would be able to support the fruit without the aid of props. That he had never had to use a prop under his trees and didn't expect to. As a result the trees had not borne as many apples as trees in other orchards, but the fruit was large and of the finest quality, and that when they were seven years old they would be paying ten per cent on the investment. Mr. Tucker prophesied that if growers would properly care for their fruit and raise only the finest that in the not very distant future their land would be worth $1,000 an acre.

During the course of the meeting E. H. Shepard read a paper on "The Codlin Moth." We have received many requests to print this article for the future reference of those interested in apple growing. It is as follows:

THE CODLIN MOTH.

Introduction.

I wish to say, gentlemen, that I do not claim this to be an entirely original talk, but on the other hand it is more a collaboration principally from Simpson, Milander, Cordley and Ball. In nearly every instance their words best express the idea. Furthermore, I wish to state that I do not consider myself well enough informed to advise you, nor do I wish to pursuade you to adopt any of these methods. I am simply going to tell you, as I remember them, the opinions, observations and conclusions of intelligent workers on the codlin moth that you may have an opportunity to discuss and consider them. If I have erred in any particular or omitted any important feature, there are many experienced growers present who are better posted than I and with better memories, and I beg of them to correct me lest harm be done.

Again, I wish to preface my remarks by saying I do not propose to give you informaton founded solely on my own experience. I have read everything obtainable on the subject and have been in attendance at all our horticultural meetings for the last three years. In evidence of the value of what I have learned I wish simply to state that of the 2500 trees on my place, but 100 are bearing. In 1903 I had $18.50 worth of good apples; in 1904, $386; in 1905, $800, and of the 400 boxes this year there were only 19 boxes less than four tier and no five tier and only 5½ per cent loss from all causes.

Stages.

The life of the codlin moth is divided into four distinct stages—the egg, the worm, the pupa and the moth. The codlin moth passes the winter in the larvae stage, found in silken cocoons on the bark of trees and in various places. If you have an apple house in which there were wormy apples, do not fail to spray it. In spring hibernation these larvae change to pupae, from which the moth emerges about blossoming time; Simpson says about a week after the apple tree blossoms. The moth with wings extended is about three-fourths of an inch across, of a grayish brown color similar to the bark of the tree.

The moth lays her eggs in about four days after she emerges, and, by the way, she lays 50 of them. The eggs of the first brood are generally conceded by the best authorities to be laid on the leaves, while most of the eggs of the second brood are laid on the apples. The egg is nearly white, about the size of a pin head. In about ten days the egg hatches into the worm, which seeks a place to enter the apple. The worm or larvae is about one-sixteenth to one-twentieth of an inch long when hatched, and this is the fellow we are after. The worm feeds on the apple about twenty days, and when he emerges, usually from the side, he seeks a place to spin the cocoon, frequently the bark of the tree or some dark place. The larvae or worms change into pupae in about six days, and in about twenty days emerge again as moths to lay the eggs for the second brood.

For a more thorough knowledge along this line I refer you to Farmers Bulletin No. 171, which can be secured of the Department of Agriculture at Washington, free of charge; "The Codlin Moth" by C. B. Simpson, Division of Entomology, Department of Agriculture, Washington, D.C., which can be secured for 50 cents, or the Biennial Report of our State Board of Horticulture, of which the Hon. E. L. Smith is president, and of whom a copy can be obtained by asking for it. And, by the way, nearly every subject discussed here today is ably treated in this report, and if you have it not, let me suggest that it is your duty to yourself as well as your neighbor to get it and study it.

The duration of each stage of the codlin moth is as follows:

	Philander. Days, max.	min.	Simpson av.	average
Winter larvae,	240		295	
Spring larvae,	21	36	29	
Moth,	2	10	4	5
Incuba. of egg,	8	18	10	11
Worm in apple,	12	30	20	20
Worm in cocoon until pupation,			7	22
Pupae,			16	
Total life of summer insect,			57	58

A complete metamorphosis, that is from moth back to moth again, is from 50 to 57 days, a great many claiming 50 days average in summer. So about 50 days after the first moths appear watch out for the second and get your spraying done in time for the worms, which will begin to chew in from 10 to 16 days.

Material.

I think all those present who used Swift's arsenate of lead last year feel sufficiently satisfied to be justified in using it again. The fruit growers of Pajaro Valley, under direction of the experiment station of California, spent $35,000 to find a better spray than Paris Green and one that would not turn their foliage. Although they tried every known spray they found that Swift's arsenate of lead gave the best satisfaction. Colorado also had good success. In fact I have yet to hear of a grower who used it that is dissatisfied. If there is any one opposed to it let him speak out and give his objections when I have finished. Hood River used about one-half pound of arsenate of lead for each tree for the season. Swift's directions are for the first spray, two and one-half to three pounds for 50 gallons; for the second, two to two and one-half pounds, for the third one and one-half to two pounds, and the following sprays one to one and one-half pounds for 50 gallons of water.

Now I am up against the real thing, when and how to spray. As Prof. E. D. Ball of the experiment station, Logan, Utah, has spent seven years on this work, I m going to tell what you he said, because he has given the best talk, backed up by statistics, that I have ever heard. First let me tell you he selected the wormiest orchard in Utah, and made his comparisons on the same variety, with about the same number of apples on a tree, because comparisons must be made under similar conditions.

Prof. Ball said substantially as follows:

In Utah unsprayed orchards have averaged a worm to each apple. Many problems remain to be solved before we can say with certainty just what is the best method of controling the codlin moth under the varied conditions in which it is found.

The Utah station concerned itself with three questions:

First, what is the relative value of early and late sprays?

Second, what is the relative of each of these early sprays?

Third, how long does the value of the early sprays last, or in other words, do the early sprays kill any worms in the second brood?

In order to get these exact results every apple that set on a tree was counted and examined. In this experiment this was done on 64 trees averaging 3500 apples each. For this work it was also necessary to separate the damage of the first brood of worms from the second, which was done by counting every wormy apple on the trees just before the second brood began its work. Three early sprays were tested by varying the order of the sprays in six different ways as the following remarks will show. The first spray was applied just before the blossoms had fallen, and the second ten days later and the third fifteen days after that.

Results of the First Brood.

Trees that had only the third spray were as wormy as the unsprayed trees.

Trees that had only the second spray had 15 wormy apples, or 79 per cent worms killed. Trees that had only the first spray had 8 wormy apples, or 89 per cent of worms killed. Trees that had the first two sprays had 4 wormy apples, or 94 per cent of worms killed. Trees with three sprays had only 3 wormy apples, or 96 per cent of worms killed. These results are better shown in the following table:

Times sprayed.	Wormy apples.	Worms killed.	Per cent.
000	72	0	0
001	—	—	—
010	15	57	79
100	8	64	89
110	4	68	94
111	3	69	96

From these results we see that the third spray alone was of little value. The second spray alone killed almost 4-5 of the worms. The first spray alone killed 1-9 of the worms. Both are valuable, the first is double the value of the second when applied alone, but the first and second when both are applied killed 17-18 of the worms, or 9 per cent of the first brood. When three sprays were applied a slightly better result was obtained.

Where the Worms Were Killed.

Examination showed where the second spray was applied, of 15 wormy apples only 5 were wormy in the calyx; where the first spray was applied, of the eight wormy apples only one was wormy in the calyx; where the first and second sprays were applied, of the wormy apples only 3-5 of and apple was wormy in the calyx. Consequently it is seen that by these early sprays the calyx worms are practically exterminated and that but few worms escape, and these go into the side.

Results in Second Brood.

Times sprayed.	Wormy apples.	Worms killed.	Per cent
000	216	0	0
001	—	0	0
010	120	96	44
100	78	138	64
110	48	168	78
111	8	168	78

From these results we see that the third early spray was of no value in the second brood; the second one alone killed nearly half the worms; the first one alone killed one-third more than the second alone, and the first two together killed 3-4 of the worms in the second brood.

Hard to Believe.

It is hard to believe that a spray properly put on at the right time in May, in Utah, could kill over half the worms entering the apples in August and September, or that the two early sprays applied properly at the right time before June 10th, in Utah, could kill over 3-4 of those same worms. The results were so uniform for two consecutive years that there could be no question about their accuracy. My further investigation and explanation makes the matter clear.

The poision put in the calyx cup in the early sprays remain there. You can see this and convince yourself by examination with a microscope and this is responsible for the greater part of the results.

Taking the actual figures there was an average of 101 calyx wormy apples on the unsprayed trees from the second brood; 41 where the second spray only was applied; 8 where the first spray only was applied, and only 3 where the first two sprays were applied. From these figures you see that the poison in the calyx cup, where the first and second early sprays were applied, killed 98 of the 101 worms of the second brood entering the calyx from August 1st in Utah until picking time. Besides killing 97 per cent of all the worms of the second brood entering the calyx, the early sprays killed 700 out of 1115 worms that went in on the sides, or 61 per cent of the worms of the second brood entering the side. These statements have all been given in actual number of worms found, which is the only true way to compare results. Translating them into per cent means that the second year these two early sprays gave 98 per cent of sound apples.

Method Used.

The essential feature of the work was forcing the small drops of poisoned liquid between the stamens way down into the bottom of the calyx cup. To do this it is necessary to have 85 to 100 pounds pressure and the spray must be thrown in fine drops that do not break into a mist within six feet of the nozzle. Then by using a platform, so the operator is on a level with the top of the tree, an extension pole with a nozzle set at an angle of 30 degrees, each part of the tree can be sprayed so the liquid will be forced straight into the calyx cup.

In conclusion Prof. Ball said he was not offering a method for spraying in humid regions, as he was not familiar with them; that he was not advocating Paris green as better than any other poison and that it is not better, but he used it because he could see it better and in an arid region it is safe. Neither did he advocate two sprayings or any other number; but what he did advocate was that the early sprays be applied according to the method he gave, and if it was done he believed he would be able to get on with a less number of late sprays and under favorable conditions possibly without any late sprays for the second brood.

In Conclusion—First Brood.

The first two sprays are the most important, and if applied properly at the right time kill by far the greater number of worms. Ball applies the first spray just after the blossoms have fallen, but in Hood River we applied last year just before all the blossoms had fallen. It remains to be determined which time is preferable. It is possible that by applying just before may necessitate a third early spray, which was customary here last year, but which Ball stated was of little value in the arid region when the first spray was applied just after the blossoms had fallen. While we are not sure that two early sprays are sufficient with us, actual work has proven that three early sprays get results. The second early spray should follow the first within ten days, and the third, if applied within thirteen days after the second. These early sprays are applied in advance of the first brood of worms, because they have to be applied when the calyx is open.

Second Brood.

The proper time to spray for the second brood, which by the way is large in Hood River, would naturally be in about 50 days after the entrance of the first worms, but it is not best to figure by days, as the temperature varies the cycle periods. The better way is to determine by brooding cages or counting the worms under the bands. If you use the brooding cage take a fruit jar, put in some cocoons, cover the top with mosquito netting and place out of doors. When the moth appears in the jar, your spraying should be done in about a week, and surely within 13 days. Let me caution you to be sure you get early cocoons. If you determine by counting the worms under the bands, spray in 43 days after you observe the greatest number. The second spray for the second brood should follow in 13 days, and Ball says in Utah the third spray for the second brood should follow in 13 days again. I am rather of the opinion that two sprays would be sufficient for the second brood, for the reason that the maximum period of the life of the moth and incubation of the egg combined is 28 days, which exceeds the minimum period of 10 days by 18 days; therefore, if we get the first spray for the second brood on at the proper time and follow with another in 13 days we have kept the apples continually coated for 26 days, which will kill maximum stragglers, as they are but 18 days behind the first worms of the second brood. Let us look into this by actual dates.

Full blossoming time is about May 10th. In about 10 days, just before all the blossoms have fallen or about May 20th, we apply the first spray. The majority of worms enter in about 15 days after blossoms have fallen, which would be about June 5th. The first spray for the second brood, which by this plan would be your fourth spray, probably would be in advance of 50 days from June 5th, which means with us about July 25th, followed with another spray in 13 days, which would go on about August 8th and keep the apples covered until about August 22nd.

I want to tell you about actual work by Chris Dethman and compare it with the above. He sprayed last year just before all the blossoms fell; the second time 10 days later and the third time two weeks after that. Then he waited 40 days and sprayed the fourth time and in two weeks sprayed again, and he had a fine, clean crop of apples. Now, assuming that spraying just before blossoms fell with him was the same date as we assume in our calculations—May 20th. His second spray would be June 1st; his third June 14th, and 40 days later for the fourth spray would be July 24th, and his 5th spray August 8th. You see they both agree.

Now if there is a third brood the time to spray for it would be determined by jars or bands, or calculating approximately by dates, would be about 50 days from the first spraying for the second brood, which we put about July 25th; this would mean about September 10th to 15th, which would be your 6th spraying. I am inclined to believe it advisable, because we all remember great damage in the early part of September.

In spraying for the first brood do not use a mist nozzle, but one that throws a fine stream, as the object is to force the poison way down into the calyx, and a fine stream and force is necessary to put it there. In spraying for later broods use a mist nozzle, as the object is to coat the apple. A Y nozzle is best at all times.

Be careful in spraying not to get too much drip in spraying for second brood, as drops in forming are apt to pull the poison together, leaving the surface of the apple bare in spots, but be sure your apples are coated.

Don't neglect to band your trees and examine the bands each week and kill the worms, and the nearer the color of the bark the band is the better. Every moth killed means the saving of 25 apples from being wormy or stung and that means a quarter of a box more clean apples at $2 per box, worth 50 cents. At a cost of $3 I killed under the bands an average of 4 worms on 100 trees, which meant the destruction of 10,000 eggs, the saving of 10,000 apples from being wormy or stung, or 100 boxes at $2 per box, and that meant to me $200 in coin.

Lastly, it is not the number of times you spray that does the work, but HOW and WHEN.

In another column will be found an article supplementary to this paper entitled "Thinning," which will also be found interesting.

A LETTER

I wish to say to all our old friends and customers who for so many years came to our shop for their meats, that it is useless for me to introduce Wood Bros., our successors, as their 18 years in the butcher business in Wasco county has made them so widely known that an introduction is unnecessary. Being honest, capable business men, they have the means and ability to own a business as it should be run, and in a way that will be a credit to our city.

I expect to stay with the new firm for awhile, and will be glad to see you all at the old stand. I will guarantee that you will get just as much meat for your money, just as courteous treatment and just as prompt service as can be had in the city.

We will have a full line of everything good to eat for the Spring trade.

Respectfully yours,

E. S. MAYES.