Wisconsin State Cranberry Growers' Association. Forty-fifth annual meeting, Wisconsin Rapids, Wis., December 2, 1931. Forty-fifth summer convention, Wisconsin Rapids, Wis., August 18, 1931. 1931

Wisconsin State Cranberry Growers Association
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WISCONSIN STATE CRANBERRY GROWERS' ASSOCIATION

FORTY-FIFTH ANNUAL MEETING

Wisconsin Rapids, Wis.

December 2, 1931

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W. D. HOARD & SONS COMPANY
FORT ATKINSON, WIS.

LETTER OF TRANSMITTAL

To the Honorable Philip La Follette,
Governor of Wisconsin.

Dear Sir: I have the honor to submit to you herewith the Forty-Fifth Annual Report of the Wisconsin State Cranberry Growers' Association.

Very respectfully yours,

Clare S. Smith,
Secretary.

Wisconsin Rapids, Wis., January 1, 1932.

IN MEMORIAM

WHEREAS, Divine Providence has seen fit to remove from our midst Ralph Peterson, our former county agent, co-worker and entertainer, be it therefore

Resolved, That this Association tender to his family our sympathy in their bereavement, and be it further

Resolved, That this resolution be inscribed in the minutes of this meeting.

GUY POTTER,
HERMAN J. GEBHARDT,
VERE JOHNSON.

IN MEMORIAM

WHEREAS, Divine Providence has seen fit to remove from our midst Thomas Nash, son of our friend and fellow-member Guy Nash, be it therefore,

Resolved, That this Association tender to his family our sympathy in their bereavement and be it further,

Resolved, That this resolution be inscribed in the minutes of this meeting.

JOHN S. SCOTT,
ROY M. POTTER,
JOS. BISSIG.

IN MEMORIAM

WHEREAS, There has been removed from among us the loving character of Franklin J. Wood who has been for more than forty years a true and loyal friend to his fellow members in this Association and

WHEREAS, His loss is keenly felt by each of us, and his counsel, generosity and kindness will be greatly missed, therefore be it

Resolved, That we, the Wisconsin State Cranberry Growers' Association here assembled, extend our deepest sympathy to Mrs. Wood and the members of the family and that a copy of this resolution be sent to his family, and also spread upon the minutes of this meeting.

C. L. LEWIS, JR.,
MRS. JACOB SEARLS,
F. R. BARBER.

MINUTES OF THE FORTY-FIFTH SUMMER MEETING OF THE WISCONSIN STATE CRANBERRY GROWERS' ASSOCIATION

Witter Hotel, Rose Room,
Wisconsin Rapids, Wis.,
August 18, 1931.

President A. B. Scott called the meeting to order at 11:15 A. M.

The minutes of the last meeting were read, also the financial report, both being approved.

Moved and seconded that the next meeting be held on the first Wednesday in December, followed by a banquet the same evening.

Those appointed to draft resolutions of regret of the death of members are: Mrs. Jacob Searls, C. L. Lewis, Jr., F. R. Barber for the late F. J. Wood, Joe Bissig, John Scott, Roy M. Potter for Thomas Nash.

Moved and seconded that resolutions of regret be sent to the family of former county agent R. A. Peterson. Herman Gebhardt, Guy N. Potter and Vere Johnson were appointed to draft them.

After some discussion motion was made and seconded that the Association put on an exhibit at the coming state fair similar to and conducted on the same lines as the one last year. Motion made and seconded that the Sales Co. be called on to help if necessary. Motion carried that we exhibit at the coming county fair. The secretary was appointed to take charge of both exhibits.

A. U. Chaney gave a report of crop conditions. A. M. Chaney spoke on market conditions.

Adjourned for lunch until 2 P. M.

A letter from Governor P. La Follette was read on the question of Land Utilization. Moved and seconded that the president appoint two besides himself to go to Madison to confer with the Governor on the matter. President appointed Roy Potter and Phil Bennett.

E. L. Chambers spoke on the new methods of biological control of insect pests. H. F. Bain gave a paper on the keeping quality of cranberries as affected by water and dry raking methods. L. M. Rogers gave a paper on the effect of water cure on vines, worm control, weed control and fertilizers. F. L. Musback gave a talk on the fertilizer experiments carried on by himself and County Agent Lathrope on the Biron Cranberry Co. marsh at Biron. County Agent L. Kuenning reported on his work on the O. O. Potter marsh at Warrens.

Vernon Goldsworthy and Craig Scott told briefly of their work and of the value of an insectary for carrying on experiments.

Motion made and seconded to give a rising vote of thanks to Mr. Daniels for the use of this room and the courtesy extended this afternoon.

Motion carried to adjourn.

C. S. SMITH,
Secretary.

ADDRESS

By PRESIDENT A. B. SCOTT

One of the matters that greatly interests most of the cranberry growers is water conservation. I will refer you to Mr. C. L. Lewis' paper given in 1926, in which he stated the averages of the Weather Bureau records of rainfall from 1871 to 1925. In order to bring this back to you more clearly, I will repeat those figures. They are given in ten year periods in most cases. During the years of 1871 to 1875, the rainfall was 32.7 inches; from 1875 to 1885, it was 32.3 inches; 1886 to 1896, 28.7 inches; 1895 to 1905, 27.26 inches; 1905 to 1915, 27.16 inches; 1915 to 1925, 25.09 inches. We have no record of figures since 1925, but would have ample reason to believe the rainfall annually shows the same percentage of decrease. In constructing a graph to illustrate what this means, I have drawn a curve to show the amount of rainfall. It shows the rainfall during the period of 1871 to 1875 on the left hand side of the graph. The next ten years it rose a little, but continually after that it has been decreasing, until in 1915 to 1925 we have a little over twenty-five inches of rainfall. There is no question but that it has been decreasing at probably about the same rate since then. Adding 1930 and 1931 to it, would show, no doubt, a considerable greater decrease than before.

As further evidence, lakes are drying up in the northern part of the state. Lakes in the south central part of the state that have never in history been known to be dry have dried up. One that I know of has had people living near it for nearly ninety years, and it has always had water in it. This year it has dried up.

The reason for this decrease in rainfall, as described by weather bureau men and scientists, is that we have been recklessly destroying the cover to all of this land that holds moisture in the northern part of Wisconsin. The forestry work started here quite early—I think in 1890 or in the early nineties. In that year, we saw considerable decrease in the amount of rainfall. The period from 1893 to 1895 was very dry, with fires destroying a large amount of vegetation and timber.

If the cranberry industry is to be preserved for our future generations, it behooves the men in the industry to be vitally interested in some method of bringing back or restoring to this cut over country the former water conditions. That cannot be accomplished in a few years. It will take years of work, but if it is not started it never will be accomplished. I think there is no work of more importance that can be taken up by cranberry growers than to start some plan, or become interested and work with those who are working on the problem, to bring about former water conditions in the cranberry areas, which of course will be over a greater part of Wisconsin.

The chief method of procedure would be to become interested and boost the reforestation program. Conservation of water is best accomplished by damming up the drainage ditches, constructing cross dams on marshes across the flow of the water, holding back water wherever

it can be held back in any amount, large or small. Any water raised to the surface will bring benefits to that area not only in irrigation or sub-irrigation, but evaporation will help to restore the amount of rainfall.

With this idea in mind, we took up with Governor La Follette the matter of restoring, with the aid of the Conservation Commission, the water levels of the marshes. This also includes fire prevention and protection. Fire prevention cannot be carried on successfully without the aid of people who are interested. I have a letter here from Governor La Follette, asking this association to send a committee to Madison with whom he can confer in order to map out a program that will be agreeable to the industry. The Conservation Commission, the zoning committee and the legislature have set out to determine which land shall be used for farming, which shall be used for reforestation, etc. I think this is an opportunity that our Cranberry Growers' Association should not neglect. We have an opportunity to show our interest and have a hand in some work that I feel is very important.

CROP REPORT

A. H. CHANEY, *General Sales Manager*, American Cranberry Exchange, New York City

The crop in the East has not been definitely estimated. The guess at present by Franklin is 400,000 barrels for Massachusetts as against 375,000 last year. Rainfall was heavy; bogs are in good condition, the crop is not so heavy as last year but the size of fruit is making the increase. The New Jersey crop is more difficult to estimate. The bloom was enormous but the weather was very undesirable. During the ten days of bloom there was very little sun, causing a heavy blight especially on native Jerseys, Late Howes and Early Blacks. The size of fruit is large and early but water is very short, several growers being without water entirely. The water shortage is affecting all crops in New Jersey. A fair estimate for New Jersey berries would be about 125,000 barrels.

The Wisconsin crop is fine in the northern part of the state; others show very well. Reports from Cranmoor and Mather districts would make an estimate of about 48,000 barrels for the state.

General fruit crops are equal to 1926 yields but the prices are lower than any year since. Peaches double last year's crop, are heavy in the middle west and selling very cheaply. The grape crop is considered shorter, and better prices are expected, likewise the fresh prune crop in the northwest.

Industrial conditions were bad last year and are worse this year but fruits are being consumed. Food values are the lowest in twenty years. Wheat is the lowest on record—18 cents a bushel in Kansas. Corn is low and there will be no improvement until the surplus is gotten rid of. I feel the cranberry growers are more secure and have a better chance to get fair values, but I doubt if we would get the old high price even if the crop was short.

We have put on a wonderful advertising campaign; cranberry juice as a drink is being featured. We are sending out recipes to hotels, trying to get them to serve cranberry juice cocktail. We are getting out a new recipe book, 85,000 to be printed for one chain store and a million for various retailers.

It will be a day to day, week to week market. I can not say anything more definite.

MARKET CONDITIONS

C. M. CHANEY, *Treasurer*, American Cranberry Exchange, New York City

As to prospective business conditions this fall, many economists, some of whom are connected with the Administration, are telling us that "good times are just around the corner," but they do not tell us how far it is to the corner.

There must be a change in the general sentiment in order to get the confidence necessary to start the wheels of business rolling. In my personal opinion one of the best things that could happen to bring this about, or at least start it, at the present time, is for the railroads to get some kind of an advance in freight rates, even though it may be only half as much as they are asking for. It is my understanding that as of July first, Class I roads alone were more than $160,000,000 behind on current maintenance, i. e. keeping up to normal their road bed rolling stock, etc. If the roads could see in sight an increased revenue, the bringing up to date of their normal maintenance would help to place many men at work who are now unemployed. It is well known that the railroads are among the largest purchasers of raw materials, such as steel, lumber, etc.

So far as the sale of cranberries is concerned, I do not look for any speculative buying this year. No one will buy in quantities, and it is my opinion that our shipments will have to be arranged more in line with actual consumption than for many years.

About 60% of our sales from the 1930 crop were sold in quarter-barrel box; 68% of our sales from the Cape Cod district were in the quarter-barrel box; and 98% of our total sales in New York were in the quarter-barrel box. It is my opinion that we will see considerable increase in the demand for quarter-barrel boxes the coming season. There are only a few territories left that seem to have a preference for the half-barrel box, one of which is the Pacific Coast. It is my opinion that if the premium were taken off the quarters we would eventually get down to the one package, and that the 25-pound package, known as the quarter-barrel box, is the best package that we have ever had for cranberries, and I am in hopes that this will very soon be the standard package, and it will not be necessary for us to pack in smaller units.

HOW NATURE MAINTAINS HER BALANCE

By E. L. CHAMBERS, *State Entomologist*

When insect pests and plant diseases are as prevalent throughout the state as they have been this season, and our shade trees are being killed by Cottony Maple Scale insects, and our alfalfa and small grain is being destroyed by army worms and other cut worms, we are frequently asked, "What can be expected in another year?"

These outbreaks of serious insect pests are a result of the breaking down of one or more of the restraining bonds which Nature uses in keeping such pests under control. Some of the factors which tend to restrict the population of insects are climate, bird population, and the presence or absence of insect parasites and predators. Outbreaks of this kind are not confined to species of the insect world alone and neither are they confined to the animal kingdom. The standard dictionary defines an outbreak as "a sudden and violent breaking forth of something that has been pent up or restrained." This definition seems particularly apt for describing the biological meaning of the word, because it implies that all Nature is in a condition of restraint and that an outbreak is something abnormal, due to the breaking of one or more restraining factors. Usually, an insect will become very abundant, and if it is a native insect, it will suddenly disappear the year following a serious outbreak. The reason for this may be attributed to any one of a number of factors, including the prevalence of parasites and predators, unfavorable weather conditions, or an unusual abundance of birds, mammals, reptiles and other forms of animal life which feed upon these insects. No stage in the development of an insect is free from the attack of these predators and parasites. Even though the eggs of the insect are generally very small objects, they nevertheless have both their predacious and parasitic enemies. No matter how carefully they are hidden away, some of them are almost certain to be found and destroyed. The larvae of defoliating insects and other insects on the surface of plants, because of their comparatively exposed position, are attacked by a host of enemies too numerous to mention. When the larvae drop to the ground, either accidentally or, as many do, to prepare for the pupal stage, they expose themselves to attack of such predators as mice and skunks, which are very fond of insect food and feed ravenously upon any larvae they find. Ants also frequently feed on smaller larvae. While the insects usually seek secluded spots for pupation, many spin cocoons to protect themselves during this quiescent period, but careful as they may be to hide or protect themselves, many of them will be found and killed. Were it not for the fact that numerous species of insects and higher animals destroy large numbers of both the adult and the young larvae of the Colorado Potato Beetle, this pest would be much more abundant than it already is. In addition to this destruction by other insects, of which between 30 and 40 species have been observed to actually prey upon the pest, the bobwhite or quail, robin, crow and several other birds either pick the beetles from the vines or dig

them from the earth, and skunks, snakes, and toads frequently gorge on them. Domestic fowls, especially ducks and guinea fowl, also are of assistance in suppressing this particular pest. A small red beetle with black spots belonging to the Ladybird beetle family is very abundant in potato fields this year and is doing a great deal in the way of assisting the farmer by destroying the eggs of the Colorado Potato Beetle, and in some sections, it is so abundant that spraying has not been necessary.

The Army Worm and certain other cut worms which are usually associated with this pest have been reported doing injury throughout the entire state where alfalfa, sweet clover, and grain crops are grown extensively; and whereas the army worms appear only for a few days and then disappear as quickly as they made their appearance, the other species of cut worms have lingered, and it has been necessary to resort to the spreading of poison bran bait to protect the crops from destruction by them. The reason for the disappearance of the army worms is due to the fact that certain small flies, known as the Tachinid flies, which are grayish in color and slightly smaller than the common house fly, have been responsible for their destruction. They lay their eggs on the outside of the caterpillar just back of the head, and when these eggs hatch, the maggots bore through the skin and live within the body of their host, killing the worm in a few days. The Tachinid flies lay many eggs and develop very rapidly, and when they are unable to find a sufficient number of caterpillars to lay their eggs upon, some species deposit their eggs on the leaves of plants infested with caterpillars, and in this situation the eggs are swallowed by the caterpillar as it devours the leaf. Once inside the host, the eggs hatch, and the maggots live within the body of the caterpillar which it finally destroys.

The pea aphis, which has been responsible for doing unusual injury to the pea crop in Wisconsin this summer, is likewise kept under control by the larvae of certain syrphid flies and the young of various species of the Ladybird beetles. Unfortunately, these insects did not make their appearance in time to save the early crop of peas this year, and the late crop was seriously damaged before they became established in sufficient numbers to save the crop. The problem of the entomologist is to determine some method of securing a supply of these natural parasites and distributing them in the fields about the crop infested in time to check the aphis before they have had an opportunity to do their damage. It is interesting to note, in this connection, that in California, they are making it a practice to collect in the mountains the hibernating Ladybird beetles where they are to be found in large numbers huddled together, and these are kept in cold storage and distributed in the citrus orchards just at the time when they are needed to bring certain of the more serious citrous pests under control. Another example of the utilization of this information is the practice of distributing eggs infested with a certain chalcid parasite, known as the Trichogramma minutum, which feeds upon the eggs of a large number of moths, including the codling moth, the European Corn Borer, and other equally destructive pests.

Recently, we have been undertaking some experiments with the possible control of the cranberry fruit worm (Mineola vaccinii) and the black head fire worm (Rhopobota vacciniana), and to this end, we have been securing a supply of these tiny parasites from California, where they are being bred and distributed by commercial entomologists, the methods of procedure being to parasitize large numbers of the eggs of a very familiar grain pest, the Angoumois Grain Moth, and distributing these for use in the field, where they are released at the critical time when the number of eggs laid by these particular pests are most numerous. These moths are caged in large cages, and the eggs are collected and carefully washed in water and mounted on sheets of cardboard, 150,000 eggs being shellacked on a strip of cardboard with the eggs distributed 6 to the square millimeter. These sheets of cardboard with the eggs glued upon them are then exposed to other sheets which have been parasitized by these tiny flies and from which the adult flies are beginning to emerge. After being exposed for a period of twenty-four hours, practically all of the eggs on the new sheets will be parasitized by having eggs of the tiny parasite fly laid in them. These are either kept in a cool temperature by refrigeration until needed, or are immediately distributed to the field and released when they can be of most value for the control of the eggs of the particular pest to be dealt with. These tiny parasitic flies occur naturally here in northern Wisconsin and are to be found in every cranberry bog, but since they do not occur in sufficient numbers to be of any economical value, they offer no very promising means of control. If it were possible to increase their number at the time when the undesirable insect pest was laying its eggs, it would be possible to completely check it through natural means. On cranberry bogs where it is very difficult to handle insect control problems by spraying, we are hoping that some such method as this may offer some relief to the serious losses sometimes taken by such pests as the fire worm and the fruit worm.

Another, possibly in the way of control of weeds on the cranberry bogs by insects, is also worthy of mention, since many plants are kept in check by their insect enemies and plant diseases. A very desirable ornamental shrub in some countries may prove to be a very undesirable noxious weed in countries where the environment is ideal for its rapid development and spread, and where its natural insect pests and plant disease enemies are not present. Most of you are acquainted with the thistle butterfly, the black woolly larva of which completely strips the foliage of the Canadian thistle and sometimes occurs in such large numbers that it is responsible for defoliating several acres of thistles; and our farmers are frequently writing in to inquire how they can increase the good derived from these insects by artificial methods, and we are unable to furnish them with any helpful information on this point other than to advise them that it would not be possible to do any great injury to a patch of Canadian thistles by a single defoliation; and, since this worm has only one generation of larvae a year, it would not make very much progress

against a weed such as the Canadian thistle which will mature several crops of seed under favorable growing conditions. We have, however, records of excellent results in the control of undesirable weeds in various parts of the country through insects pests, one of the first examples of which was the control of the Lantana shrub in the Hawaiian Islands which spreads very rapidly and threatened to crowd out the other vegetation until a number of its insect pests were introduced from Mexico, and then it was completely brought under control and no longer offers any serious menace.

The prickly pear in Australia has been another example of a serious pest which has been brought under control by means of insects, and it should be remembered that some 60,000,000 acres in Queensland and New South Wales were completely over-run with this plant, and it was not found practicable to control it chemically or by mechanical methods; and as a last resort, insects were experimented with and satisfactory pests have been discovered that are completely bringing this noxious weed under control.

Only recently, a visitor from New Zealand was in the office inquiring about the insect pests we have in Wisconsin attacking blackberries, and he advised us that he was being sent out by that country for the purpose of making a tour of America in an attempt to locate some of the serious pests of the blackberries which are useful in keeping it under check. He advises us that the blackberry is overrunning New Zealand in much the same way as the Canadian thistle over-runs certain counties in Wisconsin. These plants, it was explained, were introduced into New Zealand from Europe, and they have developed so rapidly that it has been impossible to cope with their spread. Large orders of insects which are injurious to blackberries are being put up in Europe and America and shipped into New Zealand after determining that they will not do any serious injury to any other crop in that country.

Probably one of the best examples of parasite control which has come to the attention of the most of us is the work of the small Hemispherical Black Ladybird Beetle, with a red spot on each wing cover, which is very prevalent on soft maple trees infested with the Cottony Maple Scale as well as Evergreen trees attacked by the Scotch Pine Scale. These small beetles lay their eggs upon the infested trees, and the young white woolly larvae, upon hatching, feed upon the eggs and the young scale insects crawling about on the tree.

Last summer, an outbreak of the Scotch Pine Scale appeared on Jack Pine throughout the entire state, and it seemed as if, with some of the trees already being killed outright, large numbers of them would succumb, but the pests were brought under control by Nature, much to our surprise, and most of the areas heavily infested last summer have been completely rid of this pest by this beetle, and every indication points to its ability to bring the infestation under control throughout the state.

While it is claimed by many that if Nature were left alone, she would take care of her insect problems without any assistance on the

part of man, we must remember that Nature works in centuries, while man works in years, and if he is to survive, he must protect his food supply; and while, if Nature is given sufficient time, his enemies will all be brought under control, in the meantime, man must eat and be able to grow his crop economically, and this can only be done by assisting Nature in speeding up her control work by encouraging the presence of birds and certain of the other animals which are friends of the farmer, and by assisting the work of these parasites and predators as well as by the application of arsenical sprays and contact sprays which are bringing about speedy control at times when there are not sufficient natural enemies to do the work. It is true that with the development of science, we are finding it possible to utilize more and more the methods of Nature in bringing about the solution of certain of our problems; and it is quite likely that the very near future will see the development of the science of rearing and distributing insect parasites and predators rather than relying so much upon arsenical sprays which have certain objectionable features besides being expensive. In this connection, it should be stated that already the United States government has found it necessary to depend almost entirely upon the importation of natural enemies of those host insect pests such as the Japanese Beetle, the European Corn Borer, the Gypsy Moth, the Oriental Fruit Worm, and others which were accidentally introduced into this country, and, unfortunately, were brought in unaccompanied by their natural enemies. These major pests prove to be very serious in this country in the absence of their natural enemies, whereas in their native countries, they do not do any very serious damage. Consequently, it has been necessary to study the pests in their home environment and determine and collect their natural enemies, introducing them into this country after making sure that they would not become serious pests to other beneficial insects, and rear them and distribute them in the area infested with the pest in question.

To illustrate what a pest may do in a foreign country in the absence of its natural enemies, we need only to remind you of the results of the accidental introduction of the Colorado Potato Beetle recently in France and Germany. Where it was content to feed upon the potato in this country, it proved to be a general feeder in its new environment, and the entomologists in those countries found it impossible to bring the insect under control with the measures recommended in this country, and they have been compelled to make a study of the natural enemies in this country with the idea of introducing such of those as proved most satisfactory in their control with the hope that they will be able to permanently establish these parasites and thus prevent the Colorado Potato Beetle from becoming a permanent serious menace in those countries. While the introduction of these parasites has not to date made it possible to approach eradication of any host insect, it has been found that the injury can be reduced to a point where no great economic damage will result; and, therefore, this type of control will continue to meet with favor un-

til the injuries are sufficiently reduced to make the pests no more difficult to control than our native forms.

In 1870, when the Mormons were settling in the vicinity of Utah, a plague of grasshoppers appeared and almost completely devastated the country, coming in such swarms that they appeared as clouds, and just when it looked as though every green leaf and grass blade was to be destroyed, a flock of birds appeared in swarms, almost obscuring the sun, and in a single day completely wiped out the outbreak. Here in Wisconsin, we find flocks of birds following an outbreak of such pests which play an important part in checking serious outbreaks before they attain much headway.

As an example of what a heavy rain will do toward checking an outbreak of a serious pest, we might cite an instance that took place several years ago in Marinette County. We were preparing to spread poison bran for the control of grasshoppers, and just as we were ready to issue the word to the farmer that they were about all hatched out of the egg beds and were ready to migrate, a storm was threatening and so it was thought advisable to wait until after the storm, and two days later, after a heavy storm had subsided, there were not enough of these hoppers left to warrant the spreading of the bran. In another county adjoining they decided to apply their bait, and the farmers there still believe that the enormous reduction in numbers of these insects was due to the treatment, whereas, had they waited, they would very likely have found it unnecessary to apply the poison at all.

SPRAYING AND WATER RAKING EXPERIMENTS

By HENRY F. BAIN, *Senior Pathologist*

Many of you will be interested in the results of our experiments with spraying and water raking cranberries. We were first approached on this question three years ago by a company which had been experiencing considerable difficulty with berries spoiling on the markets. The company proposed to try spraying with a fungicide to overcome the trouble, a remedy of proven value in other cranberry sections, and offered to cooperate with our office in making a study of the value of spraying under Wisconsin conditions. Since the practice of spraying had not to our knowledge been used in connection with water raking, and since the use of this method of harvesting is increasing yearly in the state, we felt that the question was of sufficient importance to justify an extended study.

Bordeaux mixture of the 4-4-50 formula has been used in all spraying experiments, and two and three applications per season have been tried. The first application has invariably been made in the "hook stage", the second immediately after blossom, and a third some two weeks later in certain tests. The results have been measured by determining the amount of rot which developed in berries from the respective plots after holding for about 3½ months.

The results of spraying on two successive crops have not been promising. The percentage of rot in the 12 unsprayed lots held during the two years has averaged exactly the same as in the 12 sprayed lots—21%.

Strikingly different results were obtained when comparing dry raked and water raked berries. The average rot in 12 lots of dry raked berries was 14%, while in 7 water raked lots it was 27%. The discrepancy between numbers of lots held is explained by the fact that time-of-harvesting tests were run also, and it was not feasible to flood an entire section merely to harvest the early and late picked samples.

When it began to appear that water raking was followed by twice as much storage rot as dry raking on this particular marsh, it was decided to see if the condition was general over the state. Accordingly, last year we ran as many water raked-dry tests as time would permit. One sample was raked dry either before or after the section was flooded, and another from near the same spot raked on the flood by the regular harvesting crew. In every case an attempt was made to dry the berries in the manner used by the grower, though frequently the test samples dried in shorter time than the average for the crop. Water raked berries were thoroughly dried before being placed in storage, and all samples were boxed and shipped to Chicago about the middle of October. Counts for rot were made December 15—18. The total number of tests was 13 with the Searls variety, 6 with the McFarlin, and 3 with odd varieties. The results are given in Tables 1 to 3, together with detailed notes on the handling of each lot.

These tests clearly indicate that the keeping quality of the Searls variety is decidedly impaired by water raking, as has been the invariable experience in similar experiments conducted by other workers. On the other varieties used the results were surprising as well as perplexing.

The present tests are in no sense an investigation into the causes of water raking injury. However, records were kept of such contributing factors as degree of ripeness and time and method of drying. These notes apparently do not help in interpreting the results. For example, water raking under exceptionally favorable conditions were not detrimental. The only obvious difference between Searls and McFarlin as a class is that the latter were harvested late in the season, when both water and air temperatures were lower.

While so far it appears that water raking nullifies the effect of spraying, we are continuing the experiments for at least one more season before feeling fully convinced of it. The water raking tests emphasize how little is really known about this common Wisconsin practice, but it is clear that certain disadvantages are associated with it. Realizing this, it is important to take all possible precautions in the handling of water raked berries.

TABLE 1. WATER RAKING TESTS IN 1930 SEARLS VARIETY

Lot No.	Locality	Date Raked		Notes	% Rot Dec. 15	
		Dry	Water		Dry Raked	Water Raked
1	Phillips	September 3	----------	Sprayed lot. Raked early in season.	5	----------
2	Phillips	September 3	----------	Unsprayed lot. Raked early in season.	5	----------
3	Beaver Brook	September 4	September 6	Young bog. Berries immature. Wet berries through grass-picking machine, dried in open shed. Wet by rain at night, and dried in a day or two.	14	42
4	Biron	September 11	September 11	Fairly colored. Considerable leaves and trash. Boxes halved and dried in open. Dry in 24 hours.	13	33
5	Phillips	September 12	September 13	Sprayed lot. Mid-season. Wet berries dried in 3 hours	5	22
6	Phillips	September 12	September 13	Unsprayed lot. Mid-season. Wet berries dried in 3 hours.	5	16
7	Phillips	----------	September 12	Crop run sample from a section under water over one day. Dried in 24 hours	----------	17
8	Beaver Brook	----------	September 12	From low bed partly under water at each frost flood. Some drowned berries. Taken from warehouse, drying period not known	----------	32
9	Beaver Brook	----------	September 17	Mid-season. Check for lot 13. Commercially raked and dried. drying period not known	----------	14
10	Beaver Brook	September 20	September 20	Water raised Sept. 19 for frost, section raked in A. M. Dry Sample raked 4 hours after water was drawn. Wet berries dried in 6 hours	9	19
11	Phillips	September 21	----------	Sprayed lot. Late season. Berries very dark	7	----------
12	Phillips	September 21	----------	Unsprayed lot. Late season	9	----------
13	Beaver Brook	October 11	October 13	Late season. See Lot 9 for mid-season check. Few frozen berries Water not high enough for proper water raking, but berries came out wet. The boxes were further wet down with tap water at night. Dried 48 hrs. after raking.	17	17
				AVERAGE OF ALL LOTS	8.9	23.5

TABLE 2. WATER RAKING TESTS IN 1930 McFARLIN VARIETY

Lot No.	Locality	Date Raked		Notes	% Rot Dec. 15	
		Dry	Water		Dry Raked	Water Raked
1	Cranmoor	September 22	September 25	Berries well colored. Water very shallow. Dried in place in warehouse, spread thinly in large crates. Time of drying not known	11	7
2	Warrens	September 30	September 30	Berries well colored. Frost flood night of Sept. 29. Dry sample raked after wet sample. Dried in stacked crates in 6 hours	10	11
3	Warrens	September 30	October 1	Wet berries dried in stacked crates near warehouse. Took 4 days or more to dry	4	8
5	Tomah	September 11	September 9	Berries green. Wet berries dried in open in hot sun, drying period not known	22	21
6	Warrens	September 25	September 25	Commercially water raked sample taken because of slow drying. Dried in 3 days		
				AVERAGE OF ALL LOTS	11.7	11.0

TABLE 3. WATER RAKING TESTS IN 1930 ODD VARIETIES

Lot No.	Locality	Date Raked		Notes	% Rot Dec. 15	
		Dry	Water		Dry Raked	Water Raked
1	Beaver Brook	September 4		Howes variety, immature. Young vines	19	
2	Wyeville	September 8	September 9	Metallic Bell variety. Light colored. Wet berries dried in 24 hours in crates stacked on dam	25	28
3	Warrens	September 10	September 10	Native Wisconsin vines. Rather light colored. Wet berries dried in crates outside of warehouse. Dry in 18 or 20 hours. Berries badly hail-scarred	43	50

CRANBERRY CULTURE IN WISCONSIN IN 1931

By L. M. ROGERS, *State Cranberry Specialist*

We closed last season with a large budding throughout the state, and it was my hope to see a bumper crop in 1931, but as you know the winter-kill has reduced the bearing area considerably, and the hot dry weather may have done extensive injury. I believe the growers are bringing their marshes into better shape to bear heavy crops and will increase their average yields when we get some less frosty years with more water in the reservoirs.

It is obvious that an old marsh with vines so tall that the terminal buds are 1½ to 2 feet from the root system needs something done to it. Various methods are used in Wisconsin to cause new growth to appear near the base of the plant. One way is to go over the marsh with a heavy roll. This has the desired effect to some extent, and also crushes the crowns of certain grasses and retards their growth. Where the vines are very long they are sometimes rolled with a heavy tractor equipped with lugs and used when the marsh is very soft. This punches the vines into the bottom, where they take root and send up a new growth of short and vigorous uprights.

Another method is the water-cure. This gives very interesting results if properly done. The following seems to be a very good way. Let off the winter flood and allow the grass to start, putting the water on again before the vines make new growth. Keep the weeds mowed as far as possible below the surface of the water. This will exhaust the vitality of the wide leaf and some minor weeds, and partly kill bunch grass and slough grass. The flood should be drawn by July 10 to July 15 to insure any considerable budding the same year. The grass is not killed if the water is removed much earlier than the dates mentioned. As soon as the marsh is dry enough to work on, the half dead weeds can easily be pulled. After the new growth starts it is very tender and should not be disturbed by further weeding. Weeding may be resumed in October. Water cured vines, especially if rolled, will send out numerous shoots near the roots and almost invariably throw heavy crops for several years.

Still another method, one very little practiced here, but which I believe to be very good, is to mow the vines with an ordinary grass mowing machine. In places where it is not practical to drive on the marsh with a team, good work can be done with a small power machine of the lawn-mower type equipped with a sickle, such as is used at present by a few growers in the Mather district. Vines will throw out side shoots and bear a fair crop the next season if not mowed too short, and should bear large crops for several seasons to follow. A marsh so handled, especially if it have a light coat of sand the next winter after mowing, will stand a lot of cold weather both in the form of spring frost and winter exposure. A good time to mow is just before the winter flood is put on, but early spring is all right except that the marsh is likely to be too soft for horses or power machines of any kind.

Burning over the marshes to renew the vines is very good if conditions are just right. Otherwise injury to the roots may follow. Late in the fall when the ground has been frozen should be an excellent time for burning. I have burned in December in Massachusetts many times with the best of results.

Destructive insects do not appear to be particularly abundant in the marshes this year. The black-head fireworm as usual is present in many localities, but its habits are pretty well understood by the growers and a good control is generally maintained. I think where the first crop is not heavy enough to brown the vines, good work can be done without risk of injuring the hooks by waiting until the worms are about full grown and making a short flood of twelve hours. Where the water can be put on quickly it would be well to start early in the morning and have the vines all under as soon after daylight as possible. This should be done in cloudless weather. If flooding is done this late in the season it will also serve as a leaf-hopper control, and if intended as such, after the vines are covered a film of oil should be spread over the water, where it will float to leeward among the hoppers on the dikes. Otherwise a spray should be put on the dikes and shores.

An insect that I think has attracted little notice as a cranberry pest in any state has been called to my attention by northern growers. It is the leaf miner. For some time I gave it scant attention, thinking it would do little harm as it worked only in the old leaves and then only in the springtime. But this season it was so numerous in some marshes that it took all the leaves in places, and the affected plants were obviously weakened by the attack. I have seen little of it in the south or central part of the state. I will give a rough description of it that growers may know if it gets plentiful on their marshes.

The insect overwinters in the egg stage. The eggs hatch in May, and the larva feeds entirely within the leaf, mining between the upper and lower leaf surfaces. The larva matures early in June. It then cuts a clean oval disk about 3/32nds of an inch long from the leaf, sewing the upper and lower leaf surfaces together to form a case in which to pupate. The case drops to the ground or may lodge among the vines, where it is firmly attached by one end to stand at right angles to the stem. The moth emerges soon after July 1. It is a tiny, shiny creature, most active among the vines about sundown. The moths fly for at least ten days and probably longer. They insert their eggs inside the leaf, seldom more than one but occasionally two hatching in one leaf. The eggs are not injured by the winter flood. Soon after the larva cuts off its case the leaf dies and falls off.

Apparently the only stage in the insect's life where we may hope to secure control is with the millers. These are flying in mid bloom, which practically eliminates flooding as a control. Mr. Goldsworthy is trying some sprays which we hope may give good results.

As most of you know, in the past two seasons I have been trying to kill weeds with some preparation that will not harm the vines. The only compounds used to which the vines are resistant are copper

sulphate, iron sulphate and kerosene. Star grass, which is recognized as one of our bad weeds, is susceptible to both the copper and iron sulphates. In 1929 I sprayed a plat of star grass with one part iron sulphate and four parts of water, repeating whenever green shoots appeared. In 1930 a few shoots came up and were treated as before. This year the grass failed to come up. In 1930 I sprayed another plat with one part iron sulphate in two parts of water, which is about all the sulphate the water will take up, applying the spray June 30, July 18, July 30, and August 15. On the same dates I sprayed still another plat of the grass with one pound of copper sulphate to eight gallons of water. Both treatments gave a very good kill with little injury to the vines. I find that mixtures of that strength will injure the tips on quickly growing vines before August. It would be better to use one part sulphate of iron to four parts of water or one pound copper sulphate to ten gallons of water for the first two applications. Star grass may also be killed by pulling and pouring kerosene in the holes where the stems come out, but this is a tedious and costly operation.

Wood moss may be retarded by spraying once with one pound copper sulphate to ten gallons of water. After August 1st, one pound to eight gallons may be used. Another formula for killing wood moss is one quart sulphate of iron, one-half pint salt and one gallon of water. This may be applied freely after August, but will cause some vine injury in June and July.

I have found no really practical way to kill slough grass. It can be eventually killed by repeated applications of dry sulphate of iron, but as many as four treatments are required. On October 8, 1930, I treated slough grass with three quarts kerosene to one quart of used cylinder oil, wetting the crown thoroughly and trying not to wet the vines. This killed a large part of the grass but would have to be repeated the following year.

Considerable work has been done this season with furnace oil on bunch grass. When carefully applied, it gives good results where the bunches are of good size and not too numerous. Cranberry vines are killed readily by the oil. In doing this work, the shut-off to the sprayer should be near the outlet in order to prevent dripping in passing from one bunch to another.

It might be practical to treat small areas that have become worthless from weeds with sodium chlorate scattered on dry as you use sulphate of iron. This will kill everything and by next spring the ground will be in condition to replant.

Most growers when planting vines take great care to have them cut before the stored plant food is depleted by new growth, and also take great care not to allow the vines to dry out. I wish to emphasize the necessity of these precautions. It is better to have the marsh ready for planting before the time for new growth and then cut the vines and plant at once. If this cannot be done the vines should be cut early in the season and kept in a cool place, loosely packed and covered from the light, or placed in cool water not too closely packed.

After one has been to the great expense to get fields and reservoirs laid out it seems poor policy to be the least careless in planting. Plenty of vines should be used, but of most importance is the even distribution and careful stamping in.

Vines as a rule make a very slow growth the first year in Wisconsin, probably due to lack of available plant food. If quickly available nitrogen could be supplied as soon as the stored plant food is exhausted, a great difference in growth should result. How best to supply that need is a problem to all of us. I am pleased to learn that Mr. Musbach is starting some extensive experiments this summer to work out this matter of fertilizing cranberry marshes.

We have little knowledge at present as to what fertilizers to use or how, when, and where to apply them. It does not appear that fertilizer can be safely applied to a field that is covered with grass, but possibly the use of the clipper will serve to hold the increased grass growth in check. Undoubtedly some growers will need a formula that will increase the vine growth while others will need to be very careful not to increase it. We know that marshes having an abnormally heavy vine growth do not consistently throw heavy crops. What is known as bud absorption occurs, the vine setting little fruit but running to vine growth. However, I believe there is a field for fertilizer in Wisconsin cranberry culture and I hope by the aid of the work now started we shall be able to know something more about it.

Through the courtesy of Weiss & Hamre, we have started a small nursery at their marsh. One use for this trial marsh is for the propagation of some of the varieties now grown and for the introduction of selections from wild marshes with the idea of getting many types for possible future cross pollenization. Another thing which seemed much needed was to straighten out the McFarlin variety; as you know, the McFarlin is generally mixed with several other types of berries. Last fall before harvest we selected vines with berries attached, taking care to have the same type of berry on each vine selected. These have been planted and we propose later to distribute cuttings from these plants to growers wishing to try them.

A few other experiments are being tried. I will describe one that may interest you. I took soil from seven marshes in various parts of the state, where vines grew most rank, and also where they grew very slowly. One sample in particular was from a marsh where vines planted three or four years before had scarcely grown at all. I made three small fields from each selection of soil, taking considerable care to give each of the twenty-one fields equal drainage. Cranberry vines planted in these soils grew almost equally well. This test seems to show that there is plant food enough in any marsh soil, and where vines fail to grow conditions are not favorable to its liberation.

In conclusion, I would suggest that cranberry growers keep their marshes submerged during winter as short a time as possible consistent with protection from winterkill and should not flood deeper than will freeze into the bottom early in the winter. Every season in

Wisconsin there is a great deal of fruit bud injury and frequently there is a considerable amount of leaf fall. Both types are evidently caused during the winter submergence. It is distinctly noticeable that these injuries are greater in deeper flooded portions of the marsh and are most severe where the vines themselves are not frozen in.

ADDRESS

By Professor F. L. Musbach

I am glad your chairman said you would not expect much from my talk, so that now perhaps you will not be disappointed. I could not help but be interested in the problems you cranberry growers have. You are in the same class as any other crop raisers—you have all kinds of problems. I do not know why you invited more trouble by asking us to work on fertilizers. You have yourselves to blame now if you encounter more trouble in this connection.

As your chairman says, we haven't much to report so far as results are concerned. We started last spring, through the cooperation of growers in the different parts of the state. We have one set-up of fertilizer plots on the Lewis marsh in Beaver brook, one on the Biron marsh, and another on the Potter marsh at Warrens. In all cases, fertilizer was applied on bearing bogs. You might be interested in seeing just what we are doing. I have a little chart here on which I have put down the mixtures we are using.

I might say in this connection that we are starting out on the basis that we do not know much about cranberry fertilization. We have studied the literature by Franklin at Cape Cod and Beckwith at New Jersey, and the results they got are quite conflicting, and I am not sure whether their results have very much application under Wisconsin conditions. The New Jersey work is on what are called Savannah marshes—hard bottoms—far different climatic and soil conditions than we have. We have read their reports carefully, and in a measure based our treatments on some of their findings. For example, the Eastern investigators seem to be agreed that rock phosphate is a better carrier of phosphorous than superphosphate; so in our plots we have used largely rock phosphate, but we are also including 20 per cent superphosphate. There is quite a little disagreement as to whether nitrogen shall be used, and if so, how much, because we do not want to stimulate vine growth too much; it is the berries we are after. In this first series we are using rock phosphate as a source of phosphorous. There are seven plots on which we used rock phosphate at the rate of 600 pounds to the acre with varying amounts of nitrogen and potash applied broadcast this spring after the last reflow.

When we came to nitrogen we were confronted with the problem of what carriers to use, because we know some forms will go into solution very rapidly. In the set-up we have here, we depend on nitrate of soda as the soluble carrier. Then we use a by-product of the city sewage plant at Milwaukee, called Milorganite, which carries 5 per cent nitrogen, which is slow acting, and a very small amount of phos-

phorous. We use half of each of these materials as the nitrogen carriers; 50 per cent from Milorganite and 50 per cent from nitrate of soda. You will note that nitrogen is omitted on one set of plots, another received 2%, and another 4%.

Practically any crop grown on peat marsh will require potash in liberal amounts. Potatoes require it especially, but we do not know very much about cranberries. We are using potash in varying amounts—6%, 12%, and 24%. On some plots there is a very heavy amount of potash used.

The Eastern growers recommend the use of sulphate of potash. Mr. Scott made the statement at one time that muriate of potash should be used. We are using sulphate of potash in all cases, but in order to compare both forms of potash, we put in one plot using muriate of potash. This will give us another lead on which to base our work in the future. There is a difference of about $5.00 per ton in the price of the two forms of potash. The muriate is the cheaper form, and if we can save a little money by using the cheaper form and get results, we want to know it.

Now we start with three other treatments that are somewhat different. In the series of plots discussed thus far, we have used 600 pounds of rock phosphate per acre. Cranberry soils are invariably acid, at least in the northern section. Organic acids will react with insoluble phosphates and make them more available for plant use. In this second series, we use 20 per cent superphosphate as a source of phosphorous. The three mixtures employed are 0-20-12, 2-10-12, and 2-20-12. Blank or unfertilized plots are spaced adjacent to each treatment and give us opportunity to study soil variations.

Another thing we wish to study is the effect of fertilizers on the keeping quality. Here again we have very conflicting reports if we refer to the Eastern work. Franklin of Cape Cod reports poor keeping quality of berries where fertilizer is used. Beckwith reports contrary results. We are trying to find out the effect on berries after they have been kept in storage. Dr. Bain and his associates agree to make this study.

We hope, also, this year to get some results of the effect of fertilizer on the size of berries by your standard measuring cup.

If you saw the crop on the Biron marsh now, you would not see any difference in the plots. The vines all look alike, with an excellent set of berries. At the Lewis marsh at Beaver Brook you would see a great difference in two of the plots—those receiving 2-10-12 and 2-20-12. These have a fresh, green, healthy color, and the line is very sharp between these and adjacent plots.

These three inaugurations are on three different bogs, all in bearing condition, planted from five to ten years ago. That is one important part of our work. At Beaver Brook we started with a fertilizer application on new plantings. It is quite important to get the vines in bearing condition as soon as possible. If we could by proper fertilization shorten the period between setting and bearing, we would have accomplished something that would be of service to cranberry growers of the state.

DISCUSSION

Question: How large are the plots?

PROF. F. L. MUSBACH: They are small—one-fortieth of an acre. This is for two reasons: In the first place, we are going to harvest them separately, and we do not want to incur too much of a burden on the growers. It means harvesting each one separately. We want to get weights on each plot. Also, in case we ran against a serious "snag", the smaller the damage the better. We do not expect that we are going to have much damage.

Question: What results have you had on weeds?

PROF. MUSBACH: Weeds will respond to fertilizer like cranberries do. We had an experience of this kind with another crop this year. Conditions were very favorable for weed growth, but very unfavorable for peas. The result was that the peas went down and the weeds came up, and we had a beautiful stand of weeds. Weeds are tremendously heavy feeders, and utilize soluble plant foods. I wouldn't be at all surprised that under certain conditions if you have weedy ground it will be a little more so after applying fertilizer.

Question: What results have you had with the vine growth on the new plantings?

PROF. MUSBACH: We have only one case where we are trying that, and that is on the Beaver Brook marsh. If we get into trouble anywhere, it will be up there. We started with a mixture containing 4 per cent of nitrogen, 9 of phosphate, and 10 of potash. The applications range from 300 to 1200 pounds per acre. Mr. Lewis says that there is a little injury because of burning with the application of 1200 pounds. That is getting pretty high. We have used four different rates—300, 600, 900 and 1200 pounds per acre. Those are small plots. It is possible that we could use more nitrogen on a new planting, and that is what I am especially interested in.

MISS LUCETTA CASE: I would like to ask if they have had heavy rains on Beaver Brook since they applied that fertilizer?

MR. C. L. LEWIS: Yes, we did. I think it was applied on June 17, and we had a good rain the next day after that. We had a great deal of rain up through the 22nd of June, and practically no rain from then until the first of August.

MISS LUCETTA CASE: I asked that question because one year we had heavy rains and had almost immediate success with fertilizer. You spoke about the vines looking so fine, and I think it is because it rained and forced the fertilizer into the soil. The second year it didn't rain, and we didn't see the immediate results that we did the first year.

MR. F. R. BARBER: Are they doing any weeding on the plot?

MR. C. L. LEWIS: We have weeded it once, but the fertilizer had nothing to do with that.

PROF. MUSBACH: If your ground is pretty weedy to start with, it makes them grow.

MR. F. R. BARBER: Weeds respond as much to fertilizer as the vines do, if not more so. There is a bigger area subject to weeds, especially where they are planted in rows. Ours were spudded in in rows, and the space between the two rows would grow up solid to weeds that never had troubled us before on that particular ground.

PROF. MUSBACH: Weeds are not very particular what they feed on. They are coarse feeders. It doesn't take much food to give them a good start. I wonder if there isn't more trouble where vines are thin. If you have a good stand of vines, won't they hold weeds back considerably?

MR. F. R. BARBER: Yes. This was where they had been spudded in. The weeds got so bad we abandoned the whole field. The vines had been old and hadn't been doing well. We applied the fertilizer, and we found that even though we tried to confine the fertilizer to the hill, it seemed to spread out and enhance the growth of weeds between the rows. It formed a solid mass of cut grass.

PRES. A. B. SCOTT: I think there is one thing we ought to bear in mind in using fertilizer. Most weeds complete their growth in a year, and are annual weeds, that show up so prominently on fertilizer. Cranberry vines take three or four years to reach maturity. Those things must be taken into consideration.

MR. H. R. LATHROPE: While we are discussing weeds, it just occurred to me that if people using sodium chlorate used it without any regard to the amount per acre, they will probably get some damage on the crop following. If it is used at the rate of one pound to one gallon of water applied to a square rod, there probably will not be much damage to the soil. Bogs are different than uplands, but a moderate application will not hurt the soil. However, if you would use three or four gallons per square rod, I am afraid you would get a bad killing of the soil for a few years after application. The water used in flooding probably absorbs the toxic effect of the chemical so that it will not have harmful results for as long a time.

MR. L. G. KUENNING: I would like to make a little report on the Potter marsh. It looks as though we are getting results there, especially in vine growth. It looks as though we may have a little difference in the quality and size of the berries. Of course, that is more or less speculative. We will not know definitely until we harvest them. Each plot will be harvested separately and weighed separately. If we get any results, they will be sent to your secretary, so that they will either be sent out to you, or given at the January meeting.

I know many of you growers have used fertilizer. Some say it is worthless, and some recommend this, and some that. I remember Miss Case said 3-10-4 was the best mixture she has used. Probably that is a good recommendation. Our object is to find out what are the best carriers, and how much of each should be used. So often it is the case that the person using the fertilizer does not make a systematic check-up on results, and consequently we have a lot of opinions not necessarily facts. The particular set-up we have at this time we consider very simple and elementary, and probably from this we will have to go on to a bigger experimental field. We at least are going to get definite facts from experiments of this kind. We will try not to jump to any conclusions, and we hope you will not. The results obtained this year may not mean a thing. We may have to go into it another year, and from there may have to go into a more extensive field of fertilization. I am hopeful of the results that may be obtained.

MR. H. R. LATHROPE: Whatever is done this year or next, it should be done with the idea in mind of making it a long time period—three or five, or even more years, because we might get amazing results on one bog one year, and another year the results might be vastly different.

It is a long time program to really get information that will be valuable. Mr. Beckwith has been working on fertilizers for ten years in New Jersey, and his results are certainly very interesting.

MR. L. M. ROGERS: I would like to ask if there is much loss of fertilizer when applied when we have no rain.

PROF. F. L. MUSBACH: If there is no rain, there will not be much loss. If you had a drenching rain five minutes after applying, in the case of nitrogen, the soluble nitrogen no doubt would go down, but neither the phosphate nor potash would be affected by rain. Both are fixed in the soil so there would be no appreciable loss except in the case of nitrogen. Lack of rain would make very little difference, but I am not sure just how to answer that. Some of the bogs are sanded, and some are not. Where you have two or three inches of sand over your bog and the roots at some depth, I question very much the beneficial effect of fertilizer under those conditions. I wonder if it isn't true that you have the ground water at a pretty high level early in the spring, so that the ground isn't dried out completely. If there is a layer of moisture, the nitrogen especially will go down. Your phosphate and potash will not move as rapidly—they do not move far in any case—but in dry seasons you will not get the effects.

Question: Would it be advisable to fertilize after the fall crop was off, and then turn your flood on slowly?

PROF. F. L. MUSBACH: I question that practice of putting fertilizer on in the fall and then flooding. Your vines are going into a dormant stage. I think it would be much more desirable, basing my opinion again on the Eastern work, to apply in the spring after the last reflow.

MINUTES OF THE FORTY-FIFTH ANNUAL MEETING

Meeting called to order at 1:30 p. m., Wednesday, Dec. 2, 1931 at the Realty Hall, Wisconsin Rapids. President Scott addressed the meeting.

Minutes of the last meeting were read and approved. Financial report was read. Auditors appointed were C. L. Lewis, Al Fowler and Chas. Dempze.

Telegram from Chaney Bros. was read, also several business letters.

Motion made and carried that the president and Bernard Brazeau go to Madison to confer with the Commissioner of Insurance in regard to the insurance rates on cranberry warehouses.

The secretary read two articles taken from the editorial page of the Wareham Courier.

Moved and seconded that a vote of thanks be extended to the U. S. Dept. of Agriculture for the splendid cranberry experimental work being carried on in Wisconsin in past years.

Moved and seconded that a vote of thanks be extended to our State Department of Agriculture for the excellent work done for the cranberry industry in Wisconsin.

The principal speakers were E. L. Chambers, state entomologist, Dr. B. H. Hibbard of the Agriculture Economics Department of the University of Wisconsin, and Russell Makepeace, traveling adjuster for the American Cranberry Exchange.

Guy Nash, Herman Gebhardt and Vere Johnson were appointed on the nominating committee. Moved and seconded that the rules be dispensed with and the present officers be re-elected for the ensuing year. Carried.

A resolution of regret of the death of M. O. Potter was drafted by G. O. Babcock, Joe Bissig and A. E. Bennett and read by Mr. Bennett. Moved and carried that the resolution be inscribed in our minutes and a copy be sent to the family of the deceased.

The auditing committee reported the financial accounts correct. Moved and seconded to accept their report.

The secretary gave a report of the state and county fair exhibits, also expressing sincere appreciation of the valuable assistance received and generous response of the growers to all requests made. A rising vote of thanks was given to the secretary.

Business meeting adjourned.

At 6:30 ninety-one growers and friends of the industry gathered at the Witter Hotel for their annual banquet. Atty. Theo. Brazeau acted as Toastmaster, responses being made by Dean Christensen of the College of Agriculture, Dr. Hibbard, E. L. Chambers and R. Makepeace. The remainder of the evening was spent in dancing.

CLARE S. SMITH,
Secretary.

IN MEMORIAM

An all wise Providence has removed from our midst our esteemed friend and member of this Association, Mr. Melvin O. Potter, whose life has been prominently identified with this Association for the past forty years. His able and faithful service in all important trusts to which he was called and the uniform courtesy which characterized him in all the relations of life, endeared him to a large circle of friends and associates of this Association. His many excellent traits of character presented through a life characterized by industry and perseverance rendered him one of the most respected citizens of the county.

The members of this Association in common with the whole community deeply deplore his loss and join with profound respect and regret in placing on record our estimate of his worth.

GUY O. BABCOCK,
JOE BISSIG,
A. E. BENNETT.

ADDRESS

By PRESIDENT A. B. SCOTT

The results of another season's planning and work are being marshaled before us for our consideration. Poor growing conditions were responsible for short crops in some sections of the state, and while the first estimate of the Wisconsin crop indicated a large production, over 50,000 barrels for the kind of a year we had, the actual production was probably less than 40,000 barrels. The principal reason for lower production was the abnormally dry season. Bogs without a plentiful supply of water were unable to have the advantage of sub-irrigation, which is essential for the proper growth of the cranberry, and were also unable to protect their crops from the disastrous frost that occurred the last of August. On the other hand, bogs with an ample supply of water gave good crop returns. Many growers report that cranberries did not keep as well as last year's crop. This, coupled with the low price, did not make this year a banner year for the cranberry grower.

This loss, however, is not to be compared with that of familiar faces of friends and willing workers of our association who have been taken from us, and for which we can only express our deepest regret and sympathy.

The unusually dry season has brought about two questions of interest to cranberry growers.

One is the increase of fire insurance rates on cranberry warehouses, and the second is the matter of conservation of natural resources.

Despite the long address and inferred assistance promised by Mr. Timbre of the Inspection Bureau at our last winter meeting, the fire insurance rates on cranberry warehouses have been raised over 57 per cent. This is due to a reclassification of the risk. Cranberry warehouses have been placed under a classification that takes a higher rate. One of the reasons, I am told, is the possible hazard of a running fire, brought to the attention of the inspector by the many forest fires that occurred last summer and this.

Mr. McCall of Tomah, who is writing insurance for some clients, has been working with me on this matter of decreasing insurance rates, and I have succeeded in getting Mr. Mortensen, insurance commissioner at Madison, to grant the association a hearing, at which the association can present an argument against the reclassification. I tried very hard to have Mr. Mortensen agree to have the hearing here at Wisconsin Rapids tomorrow, where a number of cranberry growers would be available to introduce evidence in regard to the fire risks of their different cranberry warehouses, but he said it was not customary to hold such meetings away from Madison unless a great many people were to appear to give testimony and suggested that a committee appointed by the growers could present the matter just as efficiently.

The matter of conservation of natural resources was taken up by our committee with Governor La Follette at the meeting in October. Governor La Follette's idea was that the cranberry growers, who are vitally interested, of course, in conserving forests and water for their use as well as for the general welfare of the country, would be interested in working with the Conservation Commission to establish reservoirs, cross dams, etc., to hold back the run-off water instead of letting it go to waste through drainage ditches and other ditches not necessary for the drainage of any particular area. It is their wish that this committee be in readiness to cooperate with the Conservation Commission, and I would like to further state that I believe every cranberry grower should have in mind the possibility of conserving water for their own as well as for the country's welfare. There is no question but what without water the cranberry grower might as well go out of business. I think that any move that any community or association of growers could bring about in this respect would be of considerable benefit.

LITTLE THINGS

E. L. CHAMBERS, *State Entomologist*

Just as the rays of light, insignificant in themselves, collectively make up the warmth of the sun and little drops of rain become great rivers, so we find in looking about us in nature that after all it is the little things that count. Research and investigations reveal how the big things result from these seemingly unimportant little things. We know from experience here in Wisconsin how a little smoldering camp fire, fanned by a little breeze, will break into a flame and lay waste in a few hours to thousands of acres of forest which required nature nearly a century to develop. We have witnessed the introduction of injurious insects and harmful plant diseases on nursery stock so lightly infested or infected that the casual observer did not recognize the organisms until too late, and these pests have played havoc with our crops.

History tells us of the famine in Ireland which resulted in the death of thousands of its people because of starvation, resulting from complete failure of their potato crop due to the introduction of a fungous blight unnoticed until it had become suddenly established all over that country. Similarly a coffee leaf disease cost Ceylon more than 75 million dollars in ten years following its appearance on that Island in 1868, and caused coffee cultivation to be abandoned on an island where it had been very successfully and profitably grown for many years. This same disease, you will recall, made coffee growing unprofitable in the Philippines. Likewise the Panama disease of bananas caused abandonment of nearly 100,000 acres of banana plantations in central America, belonging to a single company. We need only mention the citrous canker and the Mediterranean Fruit Fly as examples of why our citrous growers demand protection against the

introduction of citrous nursery stock or any other possible carrier which might bring more of these troubles into their section of the country. Our New England neighbors have already been sold on the necessity of curtailing wholesale shipments from foreign countries, of plants or other materials capable of carrying new pests, after their experiences with the Gypsy and Brown Tail Moths, the Japanese Beetle, Oriental Fruit Worm, European Corn Borer, White Pine Blister Rust, Chestnut Blight, Potato Wart, etc. Here in Wisconsin we have been very fortunate in not having to deal with many of these pests as yet, although a number of them are almost at our very door, and the white pine blister rust has been making its home with us for nearly fourteen years and the European corn borer, you will remember, came in last summer. Two separate infestations of the corn borer were discovered the latter part of August by our scouting crews working in cooperation with the Federal government along the shore of Lake Michigan in Sheboygan and Manitowoc counties respectively. While only eighteen specimens were found in these fields, it is reasonable to expect that others are present that were not discovered. Every effort is being made with the limited funds available to see that every possible hibernating quarter visible will be destroyed before the overwintering larva can transform into a moth next June. While we have never felt that the corn borer would be the problem here in a state like ours with 115,000 silos and most of the corn going into these, we will, of course, have serious losses to the score or more of large sweet corn canning areas, should this pest be allowed to become established. Corn that has been reduced to a shell in the field by the tunneling of these larvae of course has no food value in the silo, and it will be necessary to employ very careful clean plowing to keep the infestation reduced to a point where it will not do serious economic damage; and then learn to live with this pest as we have the Colorado Potato Beetle and other pests.

The white pine blister rust is a disease which some of our cranberry growers will have to reckon with in their plans to protect their watersheds by reforestation if white pine is to be grown. White pine is a very desirable species for reforestation and the majority of the trees now being distributed from our state nursery are of this species. The control of this disease is a simple one, however, as compared with most pests and consists in removing the wild currant and gooseberry bushes growing within 900 feet of the pine to be protected. The fungous causing blister rust must spend a portion of its life cycle on the currant and gooseberry bushes before it can again infect another pine.

While it is a slow process figuring out how these various maladies do their damage, careful investigation over a period of years usually finds the weakest point in the enemy's attack and permits the solving of the problem. Probably one of the most outstanding achievements along this line have been with human diseases such as malaria, yellow fever and typhoid, the discoveries which made possible the building of the Panama Canal which had been given up in despair several

times by other nations and finally was completed by Uncle Sam, when he found a way to stamp out the mosquito and fly menace responsible for the death of hundreds of working men prior to this time. The clean-up has been so thorough there that the land, once over-run by mosquitoes and house flies, is noted today for its freedom from these pests.

We certainly envy Panama after a summer such as we have just experienced with such an abundance of house flies continually annoying us, and while we could stamp them out and would be compelled to do so if typhoid fever became epidemic as it does in some sections of the world, we are willing to put up with a lot of annoyance before being willing to pay the price for such a clean-up. If Uncle Sam were to clean up the mosquitoes we have here in Wisconsin, I'm afraid some of our cranberry growers would quit working and think they were in Heaven, because Wisconsin mosquitoes certainly can bite without any apparent effort on their part. Scientists have recently introduced in Hawaii a non-blood sucking species of mosquitoes which feed upon plant life, and the young wigglers of this species feed upon the larvae of the blood-sucking forms in the water. If these adult non-blood sucking mosquitoes would annoy the weeds in the cranberry bogs by their feeding half as much as our native mosquitoes do the folks about the bog, they certainly ought to be able to put a lot of them out of commission.

It may interest you to know in this connection that the entomologists now hold "schools" for training the ladybird beetle used so extensively in California for controlling the mealy bugs in the citrous orchards there. The young ladybird beetles are fed nothing but mealy bugs in an enclosure from the time they are hatched, and upon "graduation" from these schools have so acquired the habit that they will eat nothing but mealy bugs. Late last fall, eight million humble little ladybugs collected on the tops of California mountains where they hibernate among the rocks, were shoveled up in their sleep and kept asleep in cold storage by one organization and released at the critical time this summer. They were offered on the market at a price of $1.00 per thousand, which number is considered sufficient for an acre of orchard.

Speaking of depression, which seems to be the topic of the day, I wonder if any of you recall the serious economic depression caused by a little insect that came into the United States from Mexico in 1892. It was known as the Mexican Cotton Boll Weevil and caused hundreds of thousands of people to move from their farms to nearby towns and to other states, forcing them to seek other occupations. Scores of banks closed their doors because of this one insect, which punctured the squares of the cotton to lay its eggs, causing them to flare and either hang and dry on the plant, or fall to the ground. Land values fell, not only 50 per cent, but frequently they dropped to one-third or even one-fifth of their former value. Families who had lived proudly on the same plantations for generations lost their lands and homes, and in thousands of cases were left practically pen-

niless. Mercantile establishments that had flourished for forty and fifty years were bankrupt by the dozen. The business of the entire nation felt the effect of this one little insect, as it first spread across Texas, Louisiana and Mississippi, and finally throughout the cotton belt. What happened then? Scientists and cotton growers with good sound horse sense cooperated in an attempt to solve this problem and they succeeded; and only a few years ago the cotton growers of the South erected a monument to this boll weevil because it had revolutionized the cotton-growing industry and made it better and more profitable than they had ever dreamed it could be, by the employment of crop rotations, sanitation and cultural practices.

While the number of problems confronting the cranberry grower are increasing each year, as they are in every other industry, we believe that the growers are making as good progress as any other branch of horticulture in getting their problems under control. We believe that the problems of insect and disease control are likewise being solved about as rapidly as can be expected with the funds available for this type of work and that eventually cultural practices, chemical treatment and the planting of resistant varieties will make it possible to guard against heavy losses from these sources, and to this end too much emphasis can not be placed on the importance of planting vines as free from these various pests as possible.

TAXATION

By Dr. B. H. Hibbard, *Agricultural Economics Department*

I have been asked to talk to you on the subject of taxation. No doubt you are all aware of the fact that we are carrying out a certain scheme, plan or system of taxation which reaches substantially all of the business people and farmers of the state. At least, I have found no place where they are free from it or free from its difficulties.

There is no other class so heavily and severely burdened by taxation as the farmer, and the fact can be explained. It may be, of course, that individuals are taxed too heavily, and it may be that certain industries are taxed too heavily, but probably no other one so heavily as the farmers.

The reason is an historical one. It comes out of the distant past, centuries back, as a matter of fact. No one knows when we adopted our general property tax. It was brought over to this country—hardly more than the first nucleus of it—with the first settlers. They didn't tax anybody to speak of. In some of our colonies there was no system of taxation worthy of the name. They were still living in the stages when other words were used which preceded the word "taxes"—aids, gifts, contributions, help—and a long column of similar words. Taxation means contributions demanded and apportioned on some basis agreed upon. This is very different from aids, helps, gifts and the like. In the colony of Maryland, before the Revolution, they had no system of taxation, but they needed money to run the local govern-

ment. They had committees which got together and made estimates of what different members of the community ought to pay. The method of collecting dues from church members is very similar. They estimate what Mr. A, B and C should pay, and they usually pay it. They pay it out of pride, if nothing else. They are glad to be estimated in Class One, even though not able to make the contribution. In these Maryland communities they estimated the amount different members should contribute to the support of the local government, and let them know what the estimate was. The money wasn't all forthcoming, and it was voluntary. If it wasn't paid by a certain day of the year, they made out a list of those who hadn't paid and nailed it to the church door, printed in large letters: "These people have not yet paid their contribution". It was entirely voluntary on their part—depending upon how you interpret the word. After the Revolutionary War, we clamped the general property tax down—gently at first, and more severely later on—on virtually everybody. We weren't using it much during the war, although we knew what it was, and had used it in certain places. It is as simple as A, B, C, and was believed in by a great majority of the American people. It is believed in yet. We have as much faith in it as in the good old rules and regulations and wise sayings taken from scripture. It is an archaic, outrageous system of raising money. One hundred fifty years ago, it was a moderately good system, because things were different then than now. Property was widely and rather evenly distributed. When people made money, they would invest it in property, and their ability to pay was no doubt moderately well measured by the property owned.

Things ran along with no difficulty and not very much complaint, although you can find complaints going back to the Revolution, and even before. You might be interested in a few criticisms. One was from an assessor who said, "We are unable to estimate the value of certain stocks of goods." You pick out an assessor from a town which comprises a little village as well. If your assessor is a farmer, he has no trouble in estimating the value of farm land and animals. He knows farm property. But when he comes to the little hamlet, here is a stock of goods he is not very familiar with. He asks the keeper of the store what his goods are worth, and the storekeeper says $2,000. The assessor imagines it is worth $4,000, but he doesn't know. If he asks any questions, the proprietor will no doubt produce an inventory sheet and say, "This is the way we set it down". It doesn't mean much to the assessor. The law says he shall view the property and estimate the value of it. Next consider a drug store, where you will see all sorts of substances with all manner of colors. There is probably no one in the room who can accurately judge what a stock of drugs is worth. The assessor asks a farmer what his farm is worth. He says he doesn't know, or that it was assessed last year at so much. The usual procedure is to copy the books of the previous assessor.

Assessment has become complex. Would you be surprised to know that the value of personal property—that means stocks, bonds, mortgages and notes, and bank accounts—in many a small city is worth

more than all the property you can see? We do not assess the intangibles in this state. We do not make people perjure themselves in giving us the amounts. There is a persistent belief that mortgages should be assessed. Kansas made the most desperate attempt of any state to collect taxes on mortgages. They provided that anyone who failed to disclose to the assessor the amount of the mortgages he held on other people's property should forfeit the interest for the year. Then, if he failed to report for a second or third year, the whole mortgage became void and not collectible. What do you suppose any of your friends, who hold mortgages, would do if they passed a law of that kind in Wisconsin. What they did in Kansas was to move to Kansas City, Missouri, and establish an office there, or assign the mortgage to a friend. Can an assessor go out of the state? While it may be legal, it isn't followed up. The personal property goes with the residence of the owner, so in the case cited the mortgages became Missouri property, and Kansas could not tax them. Kansas gave up the practice. We have in all states failed pitifully in collecting taxes on the intangibles. It should not be said that it cannot be done; rather, it never has been done.

There is another phase which I mentioned with respect to the store goods. Would you be surprised to know that in every large city, from Milwaukee down, personal property is worth more than the real estate? There is more personal property than real estate in Chicago. There is more by far in New York City than the equivalent of all of the real estate of the city. The personal property of those different places pays from twenty per cent down to three per cent of the taxes. They simply do not collect the tax from the personal property. They cannot find it. So the property tax becomes substantially nothing more or less than a tax on real estate. Our general property tax is a real estate tax.

Do you begin to see why, in the matter of tax payments, the farmers are in hard lines? Other people do not pay on the basis of what they own to any such extent. The farmer's property is visible, and while we do not tax personal property to anything like its full amount, we do assess fully the personal property of the farmer. It is assessed by one of his neighbors. He pays on the personal property, and pays to the last farthing on his real estate; he is assessed the full amount of what he has, whereas the city man is not. In other words, the property tax becomes a real estate tax, and we raise in different states sixty-five, seventy-five and ninety-seven per cent of all taxes in many taxing districts on the real estate. Personal property is very largely exempt. We do not dare exempt it formally and finally; we get, in spite of its weakness, $18,000,000 from it, and don't know how to raise an equivalent additional sum from a different source, so we keep it on the list.

Taxes Should be Raised From A Broader Base

Long ago in New England we developed a regular system of settlement. They didn't let people go out at will and settle in the wilderness, because there were too many dangers. They might be scalped by the Indians. Massachusetts provided that no settler should go back into the wilderness beyond a certain line without permission from the general court. This permission prescribed that before they made a new settlement there should be sixty families in the settlement; they should pick out a site and tell where they were going to settle; and they were to take with them a minister of the gospel and a school teacher. They were obliged to establish, when they arrived, a church and a school. Very little was said about roads. While they had settled upon them by public authority the absolute necessity of establishing churches and schools, roads were taken for granted. If they wanted them, they had to build them. There was no state government of any size to help them. They had no state aid in building roads, no state treasury, and no state aid to schools. We are hardly away from the doctrine yet which requires that every community shall educate its own children and build its own roads. In prairie communities, usually four square miles constitute a school district, and for the last hundred years the people in that four square miles have paid almost the whole of the educational bill for their children until they were through the eighth grade. Many still believe that people should educate their own children. That is what they did very literally in England and in this country until after the Revolutionary War. In some parts of the country they hired a governess in each family, or the mother did the teaching, if she could. They literally educated their own children, and the education was usually poor enough. The idea that we should take care of ourselves is honorable as far as a historical setting goes, but it doesn't appear logical.

Should every community provide itself with schools, insane asylums, etc.? When these settlements moved back from the Atlantic coast line in 1840 and 1860, they were self-supporting. They made their own clothing, shoes, horseshoes and horseshoe nails; they had their own doctors and surgeons, so far as they had any. They had no one to appeal to, and families and communities were mainly self-sufficing. Their living was made within narrow limits. We were told that the cranberries they are eating in Madison were grown in Cape Cod. They are getting some of our money. Mr. Nash, who manufactures his cars at Kenosha, says that only three per cent of the Nash cars are being sold in Wisconsin, which shows that we like them just as well as do the people of any other state, and no better. We look at the Nash, Ford, Studebaker and other makes, and take our choice. We often hear it said, "We make our money in this city, and this is where it should stay." How about Mr. Nash? Does he make his money in Kenosha? Mr. Nash makes his money mostly in the United States,

not especially in Kenosha or Wisconsin, and if the government takes a little tax out of it, it is perfectly logical. A proposal was made in the legislature last winter to take away from the local units a large part of the income tax collected by the state and paid back to those units. The representative from Shorewood appeared before the committee at Madison and said, "We do not propose to let go of all the money made in Shorewood". I have driven up and down the streets of Shorewood, and it never occurred to me that any money was made in that village. Some real estate man, no doubt, makes a living there. Shorewood is where the people from the smoky part of the city come to live and spend their money. They say, "Let the money be spent where it is made". It was certainly not made in Shorewood. They merely report their incomes from Shorewood. We should, however, not hit them too hard at one time; just deal with them gradually, and bring about better conditions as best we can.

It should be made clear that we have outgrown these small town units, and the economic world is no longer cut into districts of four square sections, each one an independent school district. A state is not even too large a unit for the payment of many bills, and probably the whole state of Wisconsin should be responsible for the children of Wisconsin pretty much as a unit. Years ago we had no way of traveling except on foot, on horseback or by team. The reason we had school districts every four square miles is because the short legs of a six-year-old child cannot measure off a longer distance, so he must have a school house within about two miles. We had to have a township six miles square so that everyone could go to the town meeting. Do you know how big a county is? It is just big enough so a man with a fairly good pair of horses can leave home early in the morning, go to the court house to pay his taxes or serve on the jury, and get back at night. Where the roads were better, the counties were bigger. If we were planning counties at the present time, how big would we make them? At least much larger. They are little political units made to fit pioneer days.

Many are trying to tell us the tax system is sacred, and we mustn't put our hands on it. Local people should pay local expenses. In our sparsely settled state are many good roads. They aren't all covered with gravel yet. Who do you suppose is paying for those roads? The federal government is paying a higher portion there than in most cases, and they are concentrating federal expenditures on a few lines rather than spreading it over many. There is many a locality which cannot stand the local burden of a good road. We must put extra money into it. We have outgrown the littleness of years ago, but have left the taxes largely where they first rested, and we think there is something magical and wonderful about this old system, and admire it so much that we do not want to change it.

General Property Tax At Fault

Let us notice three instances of the imperfect working of the general property tax. If we have a farm worth $10,000 and put on a two mill tax, we make the man pay $200, but his income, as you know, is very low. Now we come to a store in town with a stock of goods which, ignoring the difficulty of assessment, we will say is worth $10,000. We charge him more because he is in town, and he pays $400. We will say this man in the store is making the modest returns of $4,000 a year. The farmer is making perhaps $400. We charge the storekeeper, who makes ten or twenty times as much, only twice as much in the way of taxes. Then we go to a meat market. It is reasonable to assume the man in the meat market makes as much as the man in the small general store. What do we find his stock of goods worth? Instead of $10,000, it may be worth $1,000. Then we will charge him one-tenth as much as the general storekeeper. He makes $4,000, but instead of $400, he pays $50 or $65, or some similar figure. Next we come to a lawyer's office. We ask the lawyer what he has. He says, "You can see what I have. I have a library worth $300, but the books are old". So we tax him $7.50. The lawyer has a home. The storekeeper has a home. The lawyer has an income of $4,000. Tax commission people will give you thousands of instances where storekeepers pay $400, meat market owners $65.00, and lawyers $10 to $30 on property pertaining to the business. In this state the income tax helps a bit to balance the matter. These people may invest their money in non-taxable securities, or where they please, or they may spend it, but they do not directly help to support the state to any extent.

That isn't all. When we tax the storekeeper on his goods, unconsciously he adds the tax to the goods, and you and I pay it in the sugar, salt and tobacco we buy. They'll rise up and dispute that statement, but let them dispute it; it is still true.

Another difficulty with the general property tax is this: that money is not primarily made out of property. From one to three hundred years ago it was so made to a greater extent than now. Money is made out of the cleverness of people who buy and sell; it is made out of transactions. Money is made by brokers, or settlers of disputes; by those who preach sermons or give lectures or perform tricks, such as taking rabbits out of hats. These are ways of making money, but not in proportion to goods owned. An important fact in the case is that the farmer is obliged to own more goods in proportion to the farm income than is owned by almost anybody else. For instance, the wholesale establishment is among the most profitable in the mercantile groups, and they never have much on hand. The wholesaler's turnover is daily or weekly or monthly, and he has six or ten or fifty times as much in his own name during the year as you can find at any one time.

We are the most progressive people in the world; yet we are the last people to throw over the property tax. Not that we should abolish it entirely—we need it. England, Germany, Belgium and the Scandinavian countries gave it up as the main source of revenue a long time ago. It had broken down completely. Our is also breaking down. The cities get seventy per cent of their taxes out of general property. In Iowa, where they do not have either cities or income taxes, they get as high as eighty-five per cent of their taxes out of general property.

Money Moving To The City

We speak of farmers moving to the city; farmers aren't going to the city half as fast as their money is going to the city. The money is accumulating in the city, which is unfortunate for everybody. It has been piling up at a tremendous rate, more especially in the prosperous years of 1921 to 1929. The cities, during these years, outgrew anything ever known in the world before in wealth, while farm wealth decreased. This is happening in all manner of ways. When farmers give mortgages, it is nearly always owned in the city. We are doing more and more of our work in the city. Machines are built in the city, law and business is transacted in the city, nearly all doctors are in the city, and professional men of every kind, manufacturing and processing of food stuffs, is all done in the city. Our breakfast foods all come from the city; our clothing is made in the city.

Much work previously done in the country is now being done in the city. For example, much of the clothing, all of the machinery, furniture and building material is processed or manufactured in the city. Even baking and laundry work for the farms is more and more being done in town. Money is moving to the city. What we have failed to do is to put taxes on the people in proportion to their incomes.

We are the smartest and most progressive people on the face of the earth, yet this is what we are confronted with. We want better roads, and must have them. There is no person here who would vote for poor roads. The Good Book says the roads of the next world will be perfect, but it doesn't say anything about motor driven cars, so let's have the roads while we are sure of the cars.

The Income Tax The Best Hope

This brings us to the point that there are some sane ways of collecting taxes. We collect eighteen or twenty million dollars in income taxes. Do you know you pay taxes out of your income no matter how you are taxed? A farmer would faint if we would say to him, "You are going to pay $200 on your income." But tell him he must pay $200, and tell him it is not on his income, and it will be all right. He doesn't want a tax which will decrease his income. Between you and me, we are going to increase the income tax. We used to be afraid business might move out of the state. It has been proved that some

few businesses have moved out because of the state income tax. The main income tax doesn't come from the few millionaires, but from people who have a few thousand dollars of income. It was said that the Palmolive Soap Company has moved out of the state so far as the bulk of its business goes. We will get along without them. We could probably also get along without Mr. Nash, though he does not even threaten to move. Since we need revenue, we will get it from those who have it instead of those who do not have it. About half of our state and local revenues should be raised on income, and less than half on general property. When we are wise enough to see this, we will have very much less bankruptcy and tax delinquency; but there is going to be a merry fight, for this reason; the people with incomes have much more resistance against the enactment of a new and improved tax than those without the incomes.

Question: Will Mr. Hibbard please give us his opinion of the gasoline tax?

MR. HIBBARD: The proper gasoline tax is the highest one you can collect. Ours is 4c. My first suggestion would be to make it 5c, and if that goes well, I would suggest making it 6c. It is about the only tax which can be collected in proportion to the benefits derived. The people who want to get out and "tear up the roads" do it for fun in many cases. People must have gasoline. A gasoline tax goes right to the spot and doesn't cost much to collect. However, it should not be used for general purposes, but should be used for roads. It means that we let the people who use the roads pay a little more for them. Between you and me, I wouldn't pay for the highways for transporters of freight and let them furnish only the motive power, without asking them to contribute a little more than they yet have for the maintenance of highways. When railroads were new, it was suggested that the state might put down the ties and rails and let anybody run a train on it who wanted to. That is what we are doing with the highways. If you have a small freight train you want to run up and down these roads, you may do so. Our truck operators should pay more.

We should all pay more for gasoline, until we get as high a tax as any other state in the Union where it is successfully administered. The highest I know of is 7c, and the people pay it without grumbling. That is in Florida.

MR. F. R. BARBER: If that tax is so successful, why not a general sales tax?

MR. HIBBARD: The inference, I would say, is not good. A general sales tax doesn't meet the measure of justice of paying according to the benefits received, not ability to pay. You are really paying for a particular service when you pay a gasoline tax. You save, first, in the quantity of gasoline used, after a road is improved. Secondly, you save in tires, and thirdly in the wear and tear on the car; not to mention the added comfort. A general sales tax is a tax on consumers and is not distributed at all on the basis of ability to pay.

ADDRESS

RUSSELL MAKEPEACE, *Travelling Adjuster*,
American Cranberry Exchange

In the first place, I have no explanation to make for these Early Blacks. It may be we should have shipped them in cardboard instead of white pine.

Since I have been here I have talked to several growers in regard to raising cranberries in Wisconsin—how much it costs you, and the frost protection measures you have to take, etc. We have frost protection, but we do not have to use it as much as you do.

Dr. Franklin at East Wareham has been trying to find out what caused a lot of our bogs to wither and die. The soil became loose and the vines seemed to have no roots. He went into the soil to find out what was the matter and found some very interesting worms, very much like your common grub worm that you find in your garden and dig for fishing. In some places we would find but a few of them and in other places, they would completely wipe out bogs. He made many experiments as to how to get rid of them and finally gave us a solution of the problem, which is a cyanide solution of about 6 oz. of cyanide to 100 gallons of water applied at the rate of 1 gallon per square foot. On a 100-acre bog it is quite a job. His next conclusion was that those particular grub worms do not show up on cranberry bogs under twenty-five years of age. The only explanation of that fact that I can give you is that those grub worms feed on the small fibrous roots of the plants, and in a young bog the roots are not sufficiently developed in the soil for the worm to live. After the soil becomes filled with these little fibrous roots, the grubs do live in great numbers. I have walked over a piece of bog sprayed from five to six weeks previously and by a little digging have found a great many worms that had been killed by this cyanide poison. This ought to be done sometime in June, or possibly the first of July, mainly because the ground will not receive one gallon to the square foot and in the fall it is dried out and much harder and we do not get the results that we do in the spring when there is more moisture in the soil. Another interesting thing is that it is a four year development. The young worm hatches out, lives four seasons, and then turns into a bettle which crawls around for a while. Birds get a few, but not many. Then it goes back and lays eggs, and comes back another worm.

That is one of the things we have there that you do not have here. It is known in Massachusetts that if not this year, within five years we will have to spray every piece of bog we have at least once a year. I sprayed for fire worm four times on one bog this year, and even at that lost a lot of berries, besides the damage of dragging the hose over the bog. This is just another one of the pests we must control.

As far as false blossom is concerned, I don't think you can point out a piece of Howe vines in Massachusetts to-day that does not show some false blossom. .It is everywhere. We have used quite a few

methods of control, most of them pyrethrum sprays, and in some cases found it has actually killed the leafhopper, and in addition the false blossom itself seems to be going away from that particular section. It seems to be weakening its hold, but we do not know enough about it yet to advise this method. We only know it checks it to some extent.

Mr. Lewis suggested to me that we had too many cranberries on Cape Cod, especially Early Blacks. He though it would be a good idea to flood them next summer until the first of August, which would help the Wisconsin crop out in good shape. I will carry that idea back to the first meeting they have, and I am sure they will receive it with a lot of enthusiasm.

I might say a few words in regard to the depression in general. In every town I visited, from New York to Denver, with the exception of Minneapolis, the average dealer and broker said "The depression is bad, but not as bad as in Cedar Rapids, or Cleveland, and Denver." But in Minneapolis a man said, the other night, "I think we have the best of the depression here. I might say that Minneapolis is suffering a slump in the depression."

CRANBERRY FINANCE

Until the crops of cranberries raised by small and casual growers are marketed in an orderly manner there is little likelihood of prosperity returning to the industry as a whole.

It appears to be useless to expect full co-operation in any marketing plan from those to whom the cranberry business is merely incidental and not their main reliance. Such growers are not much concerned about the general effect on the market if their fruit goes into already glutted markets.

They sell, or consign, their fruit as soon as it is picked, at any price they can get and add fuel to the fire which feeds the market glutting.

It would not take a prohibitive amount of money for the larger growers, to whom the stability of the business is essential, to buy such crops and market them through their own organizations.

Some sort of cranberry finance corporation would do the trick and in controlling the sale of such fruit, determining when, where and how it should be shipped, most of the present difficulties will be removed.

In order for the big growers to be prosperous the small growers must likewise prosper. There must be more uniformity in prices received by big and small growers. The big growers must see to it that the smaller ones have an opportunity to dispose of their crops at prices which will remunerate them for their efforts and which will keep the "cheap fruit" out of the competitive markets.

It is a problem which "big business" would solve by the consolidation method, but one which for the cranberry growers must be solved by other means such as we have suggested.

Considering this plan now and not waiting until next year when the crisis becomes acute will prevent much "grief" to those who have big interests at stake.

(Editorial Page—*Wareham Courier*, Wareham, Mass.)

CRANBERRY PRICES

If cranberry culture is to continue to prosper and be profitable it is the concensus of opinion of those who have given thought to the matter that there will have to be greater co-operation in marketing.

The bulk of the crop presents no difficulties. Probably 60% to 75% is now marketed in an orderly manner. It is the remaining 40% to 25% of the normal crop which goes to itinerant buyers and commission merchants which causes difficulties.

This year, with a crop above the normal, the difficulties have been particularly serious; overstocked markets, poor fruit and anxiety to dispose of the crop by smaller growers brought the prices down to below the cost of production and wiped out all possibilities of profit.

Last week we instanced the plan of the California grape growers who were confronted with a like situation and showed that it was the very same plan discussed by the cranberry growers which might have saved the situation had it been put in operation.

There is no lack of intelligence among the cranberry growers. They realize the situation and have a good idea of an effective remedy. What they lack, as a whole, is the will and determination to put it into operation.

Within recent years cranberries have brought as high as $15 to $20 a barrel, an unreasonably high price which advantaged those crops; and this year we have seen them selling as low as $4 a barrel, and even less. The difference being all out of proportion to the size of crops and due to unscientific marketing more than anything else.

There is no more reason why cranberries should sell for the higher prices than for the lowest. A fairly stabilized price somewhere between the two extremes would be of far greater benefit to the whole industry.

Such stabilization does not appear to be impossible to attain and is highly desired, not only for the benefit of the growers themselves but for the entire community the prosperity of which is seriously affected by present conditions.

Growers who have the biggest stake in the industry should take the initiative. They should commence at once an educational campaign aimed to convince the smaller growers of the value of co-operation. The smaller growers should be taken care of and given opportunity to participate in marketing advantages enjoyed by the big growers. The whole crop should be more effectively "pooled" in order that it can be more scientificially distributed among markets of the country.

Leadership is required. Who will furnish it?

(*Wareham Courier*, Nov. 13, 1931—editorial page.)

FINANCIAL STATEMENT
OF
WISCONSIN STATE CRANBERRY GROWERS ASSOCIATION
Calendar Year 1931

				Receipts	Disbursements
Jan. 1			Balance on hand	$276.85	
Jan. 2	Check No.	92	Erma Gaulke—steno. services		$ 15.00
Jan. 2	Check No.	93	C. S. Smith—salary to 1/1, 1931		40.00
Mar. 4	Check No.	94	H. J. Rahmlow—52 subs. to Horti. maga.		20.80
June 1	Check No.	95	Mrs. Irving Kabitsky—memo.		4.75
June 1	Check No.	96	H. R. Ebsen—memo. T. Nash		10.00
July 10	Check No.	97	A. C. Rockwood—200 wrappers, 200 st.		4.76
July 15	Check No.	98	C. S. Smith—salary to 7/1, 1931		40.00
July 17			Dues	2.00	
Aug. 4	Check No.	99	A. L. Fontaine—P. M.—150 d. post card		1.50
Aug. 19	Check No.	100	H. R. Ebsen—Wood memo.		15.00
Aug. 19			Dues received—Aug. meeting	28.00	
Aug. 25	Check No.	101	A. C. Rockwood—p. o. order, st. Fair ent.		2.55
Aug. 27	Check No.	102	Wood Co. Bank—Ins. Trav. Cheques		100.25
Sept. 12			St. Fair Prem. 75—Over Exp.—34.70	109.70	
Oct. 1			Dues	4.00	
Nov. 1	Check No.	103	Kabitsky Glad. Gardens—Potter memo.		12.00
Nov. 1	Check No.	104	C. S. Smith—county fair expense		50.00
Nov. 20	Check No.	105	Erma Gaulke Shroeder—report Aug. meeting		15.00
Nov. 20	Check No.	106	H. R. Ebsen—memo.		4.00
Nov. 23	Check No.	107	A. L. Fontaine—125 d. post cards		2.50
Nov. 23	Check No.	108	Mrs. L. Rogers—State Fair Exp.		45.00
Nov. 23	Check No.	109	C. S. Smith—State Fair Exp.		45.00
Dec. 2			Dues—Dec. 2, meeting	22.00	
Dec. 2			Dues—Dec. 2, meeting	26.00	
Dec. 2	Check No.	110	Joe Arnold		12.00
Dec. 7	Check No.	111	L. P. Daniels		11.00
Dec. 15	Check No.	112	Erma Shroeder—steno. services, Dec. 2		15.00
Dec. 15			Wood Co. Board Appropriation and dues—viz. 300—6	306.00	
				$774.55	$466.11
Jan. 1, 1932—Balance on hand					308.44
				$774.55	$774.55