Thirty-seventh annual proceedings of the Wisconsin State Cranberry Growers Association. Thirty-seventh convention, pavilion, near Nekoosa, Wisconsin, August 14, 1923. Thirty-seventh annual meeting, Wi...

Wisconsin State Cranberry Growers Association
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Thirty-Seventh Annual Proceedings

OF THE

Wisconsin State Cranberry Growers Association

THIRTY-SEVENTH CONVENTION
Pavilion, Near Nekoosa, Wisconsin
August 14, 1923

THIRTY-SEVENTH ANNUAL MEETING
Wisconsin Rapids, Wisconsin
January 15, 1924

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LETTER OF TRANSMITTAL

To the Honorable John J. Blaine,

Governor of the State of Wisconsin.

Dear Sir: I have the honor to submit herewith the Thirty-seventh Annual Report of the Wisconsin State Cranberry Growers Association, with addresses, discussions and reports, and financial statement covering the year 1923.

Very respectfully yours,

Clare S. Smith, *Secretary.*

Wisconsin Rapids, Wisconsin, January 15, 1924.

THIRTY-SEVENTH ANNUAL PROCEEDINGS

OF THE

WISCONSIN STATE CRANBERRY GROWERS ASSOCIATION

HISTORICAL

The Wisconsin State Cranberry Growers Association was organized in New Lisbon, Wisconsin, on January 4, 1887; a special meeting was held in Tomah, February 8, 1887, "there being need for special legislation, and further perfection of the organization." In August, 1887, at Mather, "The First Annual Convention of the Wisconsin State Cranberry Grower's Association met in regular session. On account of so many forest and railroad fires the attendance was very light." Annual meeting was held at Mather, January 10, 1888, this being the first annual meeting. The quotations are from the minute book of the Association which runs from January, 1887, to August, 1907, inclusive.

Thus, the first summer convention preceded the first annual meeting. Early reports were published separately for conventions in summer and annual meetings in January; when first united in 1894 the report was called "Seventh Annual Proceedings" and embraced the August, 1893, convention and January, 1894, meeting. This continued through the Thirteenth Annual Proceedings, 1899-1900, after which separate reports were published till January, 1903. There appear to have been no printed reports of August conventions from then until the publication of the twentieth annual report which embraced the twentieth convention of August, 1906, and the twentieth annual meeting of January, 1907. During the interim convention reports appear in the "Cranberry Grower." August, 1906, minutes were the last made by Secretary W. H. Fitch and January, 1907, minutes were the first made by J. W. Fitch. This report first places the convention notes after the annual meeting notes instead of in order of holding.

The Twenty-first Annual Proceedings also embraced two meetings, twenty-first convention, August, 1907, and twenty-first annual meeting, January, 1908. The next report is not in the Association files, but loose printed pages in the record book, evidently extracts showing minutes, read *Twenty-first* Convention (same as previous number) of August, 1908, and Twenty-second Annual Meeting, January, 1909; the summer convention should have been the *Twenty-second*. This mistake of Secretary J. W. Fitch, apparently connected with the ending of the old record book, has been continued from report to report and handed on from secretary to secretary up to this time. It was discovered by the writer too late for the thirty-sixth report which shows the thirty-fifth summer meeting (instead of the thirty-sixth annual convention) of August, 1922, and thirty-sixth annual meeting of January, 1923.

Correction of this long continued error is made in this report, which includes the thirty-seventh summer convention 1923, and thirty-seventh annual meeting 1924. Accordingly, the reports of this Association show two twenty-first summer conventions, in 1907 and 1908, and no thirty-sixth convention. The old, appropriate title, Thirty-seventh Annual Proceedings, has been resumed, and the old phraseology adopted, provided in the Constitution from the very beginning, CONVENTION for the summer session and ANNUAL MEETING for the January session.

GUY NASH.

MINUTES OF THE THIRTY-SEVENTH SUMMER CONVENTION

Moccasin Creek Pavilion, Near Nekoosa, Wis.

August 14, 1923.

Meeting called to order by the President, C. L. Lewis, Jr., of Beaver Brook. Seventy persons registered and about ninety were present. The secretary read the minutes of the Thirty-Sixth Annual Meeting, at Wisconsin Rapids, January 9, 1923, which were approved.

Secretary submitted financial report for the half year, which is published elsewhere, included with report for entire year. President appointed as Auditing Committee: Mrs. S. N. Whittlesey, F. R. Barber and Herman Gebhardt.

President Lewis spoke on the legislative situation, and our request for state aid in the shape of a part time agent cooperating with the State Department of Agriculture.

Capt. Guy Nash presented Secretary's Report.

Senator W. L. Smith of Neillsville addressed the members on our legislative program, with discussion by Senator Isaac P. Witter and others.

Moved and seconded and carried by rising vote, that we give Senator Smith a vote of thanks for appearing today.

Mr. A. U. Chaney talked of crop situation. Various members spoke of individual prospects.

President announced "There are refreshments of various kinds in the rear of the hall with the compliments of the Wood County National Bank. Every year this bank has assisted us in one way or another, and it has always been very much appreciated."

Mr. Andrew Searls addressed the convention on the subject "Remodelling an Old Bog."

Pumping experiment discussed.

"Watercure" was reported on by Mr. A. E. Bennett, A. U. Chaney and Roy Potter.

Auditing Committee reported: "We, the Auditing Committee, hereby approve the foregoing financial statement as read and accepted at the August 14, 1923, meeting of the Wisconsin State Cranberry Growers Association."

(Signed) MRS. S. N. WHITTLESEY
F. R. BARBER
HERMAN J. GEBHARDT

Herman J. Gebhardt told of recent trip to eastern bogs.

O. G. Malde reported on insect investigation up to July 1st, when available funds ceased.

Representation at State Fair left to Sales Company, as this is not a cooperative organization.

Time and place of next meeting left to the President, with instructions to consult with the president of the Sales Company.

Meeting adjourned.

GUY NASH, *Secretary.*

PRESIDENT'S ADDRESS

CHARLES L. LEWIS, JR.

I will sketch briefly what the Association has been trying to do the past year. A year ago you will remember there was no policy of any kind among the growers regarding state aid. Until 1918 we received an annual appropriation of $2,500.00, principally for an experiment station at Cranmoor. At the time of the war with the cutting down of various things by the state, our appropriation was wiped out and we did not object. Now that things have more or less settled down, growers feel we should receive state assistance.

For the preparation of reliable statistics for presentation to the legislature and to others, a year ago we sent out a questionnaire to every grower in the state, asking specific information about his bog. We were much gratified to receive replies from almost every grower, and where we did not get a reply we filled in the information as best we could.

From these replies we made a summary that was mailed to the growers showing the condition of the industry in the state. With this as a starter we met a year ago and the consensus of opinion was that we should attempt to secure a state field man to visit among the growers and counsel on insect problems, construction problems and in other ways. At last winter's meeting we appointed a legislative committee to present this information to the legislature and to try to induce them to make us a small appropriation through the State Department of Agriculture. This committee was made up of Mr. Nash, Mr. Barber, Mr. Scott, Mr. Bennett and one or two others and myself, and in brief the result was that three of us, early in March, appeared before the joint finance committee of the legislature. Prior to this, Senator W. L. Smith, who represents Wood and Clark counties, had introduced a bill requesting an appropriation of $2,000 annually. Unfortunately, Senator Smith was ill and in the hospital the day of the hearing; I understand he is to talk to us today and will give us good advice as to the proper way of approaching the legislature next time.

I will present to you some of the facts which we called to the attention of the finance committee.

1. A $2,500 annual appropriation which was in effect up to 1918 for the Wisconsin Cranberry Experiment station, was discontinued during war time.

2. Cranberry growers now paying taxes on 50,000 acres in the state, which land is mostly of no use for other purposes.

3. Represents an investment of $5,000,000; producing in 1922, sixty thousand barrels of cranberries with a value of $750,000. About three thousand people employed during picking season.

4. Paying income taxes of many times the amount asked.

5. Cranberry growers are not reached by any form of state aid now available.

6. Wisconsin, third state in the country in cranberry production. Massachusetts supports a cranberry experiment station; one man devotes his entire time to this work with three or four men in the growing season. New Jersey employs one man in the industry the year around with several men during the growing season.

7. It is possible to double and treble the industry in this state.

8. This appropriation is primarily to carry on insect control work in cooperation with the State Department of Agriculture by providing for a field man during six months of the year only. Thousands of barrels of cranberries can be saved by the assistance of a specialist in locating the first indications of insect outbreaks.

9. We believe it is a good investment for the state.

The appropriation asked for is primarily to carry on insect control work by providing a field man for six months of each year only. Thousands of barrels can be saved by locating trouble early. We pay taxes to the state, and these are in proportion to our success, especially as to income taxes, and our success is influenced by the amount of assistance the state gives us.

That is, in brief, what we presented to the finance committee. They received us very well and seemed much interested; about twenty-five members were present, they asked many questions and we talked with them for an hour and a half. One statement that they made was that the legislature was opposed to a great many small appropriations, such as ours of $250. They wanted to know if the Association would forego that appropriation of $250 if we received the larger one of $2,000 and we replied that in that event we would manage to gather up the $250 among ourselves in some way. We left with quite a feeling of confidence. But one of the chief weak points in our proposition was there were not enough of us there; not enough growers were working. It was too much a case of let the other fellow do it.

If assistance is to be secured from the legislature a lot of work must be done and one or two men cannot do it. Every grower in every district must help. The legislature knows nothing about the cranberry industry, they are interested in a thousand and one things down there, and unless constant pressure is brought to bear you are simply thrown into the discard. There was no one to baby our measure along after our favorable hearing. We might have had better results if we had had even one man there right along to call it to their attention and boost for it. We got a lot of good experience. If it is the policy of the Association to continue to go after assistance, next time we must lay out a program earlier. I think it can be secured if sufficient work is done.

Mr. Borden, Secretary of the State Board of Public Affairs, says it is within the power of the State Department of Agriculture to assist the growers, provided the department has funds. Well, the department claims they have no funds, because all funds are specified for some particular purpose. Dr. Fracker has gone more than half way to meet us. They have a general fund for emergency use, in case an insect

attack threatens any crop, and it was from this fund we secured what little help we have had. It was Dr. Fracker who sent out Mr. Malde this year and last and paid for it out of this emergency fund. We were lucky to get these few hundred dollars and owe it to his personal interest.

We must discuss that long postponed pump experiment. I think it was started fifteen years ago. The legislature two or three years ago gave us $500 to complete that work, and it has never been completed. When I began to talk to Mr. Borden about an appropriation he said, "Well, here is $500 to your credit for a pump experiment that's been on the books here for two years." In other words, "What are you down here for asking for money when you have not spent the money you got." We have tried hard to finish the experiment this summer. Mr. Scott was given charge at the winter meeting and Mr. Malde was to have worked with Mr. Scott and Mr. Mitchell after July 1, finish up and report at this meeting. I have a letter from Mr. Scott saying Mr. Malde has not appeared and nothing has been done.

Crop prospects and the exhibit at the state fair should also be discussed.

SECRETARY'S REPORT

CAPT. GUY NASH

We have forty-nine paid-up members for this year, half of what there should be.

Several cranberry bulletins have been published. Dr. Franklin has one,[1] dealing with the fundamentals fo cranberry growing in the Cape Cod district. It does not apply exactly to our conditions, but you will find much interesting matter. The New Jersey Station issued a similar bulletin.[2] Mr. Beckwith, who spoke here last summer, is the author. The Massachusetts station also published a bulletin[3] on the efficiency of low head pumps. I made an abstract of the New Jersey report and if the Association desires, summary of both Mr. Beckwith's and Dr. Franklin's report can be published in our proceedings. If the Association cares to, I will secure a supply of these different bulletins and any others I find, to loan to members. It is during the fall and winter you read.

We ought to have some way of exchanging news. This is done in the east, but only our semi-annual meetings keep us in touch. If you like, I will try to start something after fall work is over, so that occasionally our news can be passed around. But there is no use

[1] "Cranberry Growing in Massachusetts" by Henry J. Franklin, Ph. D. Extension Leaflet No. 72, Massachusetts Experiment Station, Amherst, Mass.

[2] "Cranberry Growing in New Jersey" by Charles S. Beckwith, Cranberry Specialist. Circular No. 144, New Jersey Experiment Station, New Brunswick, N. J.

[3] "Tests of Low Lift Pumps" by C. I. Gunness, Professor of Rural Engineering, Mass. Ag. College. Contribution No. 3, 1923. Mashachusetts Agricultural Experiment Station, Amherst, Mass.

starting if I or any one else must work alone; your share will be to send in your news. It may not seem interesting to you but it will be to the rest of us. You may be doing the same old things and so am I, but what you do is news to me and what I do may be news to you. If you desire, I will try to start this so my successor next year will be ready to keep it going.

Let us aim towards increase of membership. Every grower and many interested persons, not growers, should belong; every active grower should be at every meeting and have something to say.

It is on my mind that we should have an experiment station of our own. We won't get it probably, for several years, but we ought to keep it in the back of our heads and work for it continually. We may never get it from the state, so we might begin to devise ways and means of financing such an institution ourselves.

The only report the Drainage Committee, of which I am chairman, has to make, is that districts might be organized so that water may be controlled within that district. We have found no enthusiasm for this kind of organization in any district, but perhaps the Legislative Committee might be prepared to introduce enabling legislation at the next session of the legislature.

ADDRESS

SENATOR W. L. SMITH, Neillsville, Wis.

I have no set speech for you today. Your Secretary called me recently and asked me to talk to you at this meeting. He gave me to understand that the session would not be lengthy and that I need not talk very much.

Unfortunately, when your legislation was up for consideration last winter, I had the misfortune of being confined in a hospital. For this I apologize as it is something that I seldom do. I doubt, however, if your legislation was affected greatly by my personal misfortune. During the past few years the political situation in Wisconsin has become quite complex. Formerly we had an active party government, with party responsibility, which enabled the people to place the blame for careless or ill-advised action or for the failure to enact needed legislation. Under our present system party responsibility is hard to place and there is very little unity of action among those representing the major parties. Men run for office as candidates of a certain party, but when elected act as if they had no allegiance with that group. This destroys the possibility of a constructive party policy, and results mostly in petty and personal politics.

In the last legislature there was little party spirit. It has seemed to me that this results in a lowering of the caliber and morale of each succeeding legislature so that, at present, under a drive for economy we had many members who might be termed penny wise and pound foolish. It was not only impossible to get through new legislation;

there was a constant fight to keep some of the existing helpful legislation on the statute books. As I told the Rotary Club a few weeks ago, if I were to describe some of the members, I could best do so by calling them "radical reactionaries." They call themselves "progressives" but progress to my mind means a forward movement in helpfulness and civic responsibility. A group of men in the legislature representing farmers—and farmers, also, appearing—tried to wipe out the institution known as the Farmers Institute. Many other things of that same nature were assailed as being expensive and useless and the agricultural educational policy of the state was saved, only, after a hard and determined fight.

Therefore, you do not need worry over the fact that your particular bit of legislation was killed. Unfortunately for you, the theory of the legislature and administration was based on an economy program which in many instances seemed penny wise and pound foolish. For instance, the expenditure of a moderate sum of money for the purpose proposed in your bill could easily have stimulated a better condition in your business, resulting in better and finer crops and bestowing benefits alike on the owners of the marshes and the labor employed thereon, to say nothing of the advertisement to our state when a quality product is produced.

On the other hand, certain changes were made in the makeup of the conservation commission, which was heralded as an attempt at economy. Formerly, the commission had been composed of three members, each receiving $3500.00 per year. Under the new arrangement there was one commissioner at $5000.00 and two assistants, each receiving $3500.00. While the change might have been defended from an administrative viewpoint it is hard to figure out where economy in state government has been advanced. A number of things like that were attempted. It would appear to me that the present administration ought not to complain much of Lorimerism, Newberryism, or any other "ism." Their own group was taken care of.

Your President has proposed that I might suggest some way to get the appropriation. He has already formulated and proposed a plan, which, if properly executed, can hardly fail of success. He is on the right track. You need some one at Madison continually to look after your proposition as the members of the legislature are busy every minute of the day. Former Senator Witter can also tell you that it is a job that occupies one's time from morning until night. It is not only the cranberry men who are seeking aid, but from every walk of life and from every industry comes a request for assistance. If you want an experimental station and a field man my advice to you is that you follow the suggestion of your President—send a representative delegation to appear before the next legislature, but particularly keep a man there a sufficient length of time so that the members individually may be advised of your proposition. Tell them all who you are, what you represent and what you desire. I did not have a statement of the size and magnitude of your business such as has been read today, and these are the things that the individual legislator looks to those interested to supply.

Those facts must be impressed on the minds of all the legislators so that they may have a realization of the needs of the industry, and feel warranted in voting for the expenditure of the money needed. I think that if you will follow out the policy which your President has suggested (I'll say that he learned something at Madison last winter) you will have good chances of success. He appears to have an excellent idea of what to do and how to do it so I do not think that you need look for further counsel. I am very sure that future legislatures will recognize your needs, as it isn't always a matter of economy when a penny is saved here or a nickel there. Sometimes, the judicious expenditure of a nickel or a dime will save a dollar and that to my mind is the basis of economical government.

For that reason I advocate the election of men to the legislature who have made a success in their own business and who have had an opportunity of administering affairs involving money. The later elections have been sending men to the legislature who are, as they say, close to the people, many of them never having made a success of their own affairs, or had the opportunity of administering dollars, let alone thousands of dollars. There's nothing against them—I do not mean that they should not be considered for office—but the managing of the State of Wisconsin is a big business proposition. We are spending millions of dollars each year and any man who has not a clear vision regarding business, or who has never had an opportunity of forming judgments involving large sums of money is greatly handicapped as a legislator. I do not know whether you agree with me in this, but my experience convinces me that the state's business must necessarily suffer until the people select the proper type of executive minds to adequately supervise it.

You doubtless remember when Governor Blaine took office a few years ago that he seemed overwhelmed by the numerous demands upon the state and feared that there would not be money enough to meet expenses. Ex-Governor Phillipp told him that he, too, had faced the same contingency but had found that there was always money enough forthcoming to take care of the real needs of the people. There was ample money to have taken care of just such a proposition as you folks are suggesting today. Other matters of less consequence were provided for.

I don't think that I have anything more to say, Mr. President, I am very glad on my own account that you asked me to come to your meeting, and have given me the opportunity to learn something about your business. I frankly confess that your statement that the average member of the legislature knew little or nothing about the cranberry business is very true—and not only about your business, but about many other businesses in the state. You are developing land which is probably not suited for other use. The marshes are not located along the usual lines of travel and doubtless the importance of your industry has escaped not only the attention of the legislature, but of the people in general. It is necessary, therefore, that people interested in industry should carry their message forcibly to the legislature, for, as your

President has said, 1001 things interest the members of the legislature each day and any proposition that is not properly presented is apt to receive little consideration.

DISCUSSION

SENATOR ISAAC P. WITTER: Since you are considering asking a legislative appropriation, I want to say that three men are insufficient to represent you before the joint finance or any other large committee; they are not enough to impress the people on that committee. I have heard it time and again—thirty or forty people come in on some bill, and they think it is a bill of importance or so many would not be sent to talk on it. Get twenty or twenty-five men back of anything you want to get through the legislature and let them appear before the committee and talk, because numbers do influence the members. "They were interested or they would not be here" is the way they look at it. Members of the legislature hear a lot about this; they may hate to see them coming around, but they do get the information over.

You say Wisconsin is the third state in cranberry production; there is no reason why Wisconsin cannot be first for there is every opportunity for us to grow. We are in favorable position for sales, and some strong effort ought to be made to develop these acid soils which are best for cranberries and not much good for farming.

SENATOR SMITH: Have you asked the university for help?

MRS. S. N. WHITTLESEY: The university did help some. The experiment station at Cranmoor was under their management, but that ended in 1918.

CROP PROSPECTS

A. U. CHANEY

There has been no detailed crop estimate and will not be till the latter part of the month. The Cape Cod Association meets the 31st and at this meeting they expect to have a detailed estimate of the crop. Personally, I have gone over each of the districts with the Sales Company representative and we came to a guess of the crop.

Cape Cod will have 350,000 barrels. That guess may be quite wide of the mark for it is a very spotted crop. Some of the bogs are heavily loaded that have not borne for a long time. Others will have a late crop and some are only in bud; whether or not that crop will set and stay on the vines is a problem. With favorable weather it may, and more often it doesn't. If late blooms set a good crop our estimate will be short. Many think there will be 400,000 barrels and no one less than 350,000; personally, I don't think there will be over 350,000 barrels.

New Jersey had a dry summer with many reservoirs now dry, and a spotted crop. Hard frosts have wiped out a certain section while some districts have a very large crop. The larger growers have larger crops and many small bogs are short compared to last year. Our guess is that New Jersey will have about the same as last year.

If Wisconsin has the same as last year it will mean 600,000 barrels in the three states. Cape Cod has 350,000 and New Jersey 205,000 and Wisconsin about 59,000, so that 600,000 in the three states is what appears to be the crop.

The fall apple crop is small compared with last year. Peaches are selling fairly well for fair prices. It is pretty hard to tell what we may expect if industrial conditions continue as favorable as they are now. We believe there will be plenty of demand for the crop. We are not discouraged with the future and you have nothing to worry about as far as selling your crop is concerned.

DISCUSSION

F. R. BARBER: The crop in our immediate vicinity will probably be two-thirds of last year, partly on account of treatment for insects and partly to hail. The Rezin and Weatherby bogs suffered severely from hail, which covered the ground and the vines were bent down as from a snow storm. Lots of berries were damaged.

MISS LUCETTA CASE: Hail has done some damage on our bog. We can see little black spots and lots of berries were knocked off.

A. B. SCOTT: We will have two-thirds to three-fourths of last year's crop, due to shortage of water last fall.

A. E. BENNETT: The Cranmoor district will have fully as many berries as last year.

ANDREW SEARLS: The Minong prospect is for a considerably better crop than last year. They are a little late, but a fine crop coming.

K. B. COLTON: My crop is very poor.

C. L. LEWIS: Beaver Brook will have a pretty good crop, but not so many berries as last year.

ALBERT HEDLER: It would be unreasonable to expect such a crop as last year. Last fall I was much disappointed in the budding, but the buds seemed to appear in the spring. If the bumper crop last year had not given us false ideas, we would say we were going to have a very good crop.

A CRANBERRY HOUSE

S. N. WHITTLESEY

I have built a cranberry house. Whether that is a thing to be proud of or to regret is a matter of doubt in my mind. My sons tell me I am foolish to put $10,000 in a cranberry house, when I cannot expect to take care of my marsh forever, and my successor may let things go to the dogs. Anyhow, this warehouse, built of concrete and hollow tile will last as long as I need a cranberry house and some longer.

It is forty-two by eighty-eight feet, two stories high, each story about ten feet. There are two wings, one on each of the long sides, twenty by thirty-six feet; one is simply a driveway for the wagons to unload, and the other is the picking-over room. From a slightly elevated driveway in the entry, berries are unloaded from the wagon to the lower floor level, or up to an intermediate platform and from there to the upper floor, there being no elevator. The upper story, which is the main storage room, is entirely free from posts and obstructions. The roof is supported by trusses, and these trusses carry a ceiling of insulate, a composition half an inch thick, tough and warm, better and cheaper

than lumber. There is no useful space in the gable, over the insulate ceiling of the upper room. The upper room has numerous large windows, and when the sun shines it gets pretty warm; I may have to put up awnings or other protection. The roof is covered with red slate covered composition, the best roofing I know of.

The mill will be in the wing opposite to the driveway, on a platform so the berries will feed down from the upper floor to the mill, and down from the mill to the sorting tables. The mill has not yet been installed. I have patterned after some of Mr. Andrew Searls' ideas and am obliged to him, especially as to running the tables crosswise of the light instead of end on to it. When berries are stored downstairs it will be necessary to hoist them to the platform in the entry and from there to the upper floor, but for the most part the lower floor will be used for storage of containers, packing, and for storing sorted fruit ready for shipping.

Each floor will hold 2500 barrels of berries, or with half the lower floor filled with barrels and boxes there will be room for say 3500 barrels of berries, twice what I will need this year.

I let a contract for the whole building, and if I wanted to make any changes—I did make some—I had to pay for them.

Mrs. Whittlesey and I invite all of you to come out and see our cranberry house.

REMODELING A BOG

ANDREW SEARLS

There's a mighty lot of difference in the make-up of bogs. Some would have to be gone after one day and some another. At present we are rebuilding our home bog; here all we have to do is to burn the old vines, plow, turning the sod over about four inches in depth, put on sand and replant, planting Searls Jumbos in place of the common native variety. This bog was built in such a manner as to take the least amount of water to control frost, which was our great scare at the time it was built. The fields are nearly level from end to end and not very wide, the fields being about forty rods long and four rods wide. We expect to rebuild so much of this whole bog as is planted to natives. It is just as easy to grow a prime berry which will bring the top of the market as it is to grow small inferior berries.

When I look over Wisconsin marshes, I find little attention was paid to levels on many of them. That was a great mistake; it has been one of the causes for failure to produce paying crops. Where a marsh was laid out in this haphazard manner it would be necessary to burn off the vines, level or nearly level the fields. In the old time many of these fields were laid out square, four or five to ten acres in a field and it was very difficult to flood and save such a field from frost, being often sloped to different corners. Some parts of the field would get too much water and others none and the consequence was, the upper corners would be frosted and the lower corners injured by flood, and

the center would seldom put up a good crop because of the slowness of the water to arrive or the tardiness in getting it off.

My idea is that a great portion of the Wisconsin bogs, now planted to common varieties, should be rebuilt and built into long narrow fields. Most of the fields at Phillips were nicely laid out in this manner. Unfortunately, the depth of peat was uneven; deep peat will shrink in the natural process of cranberry growing, leaving the shallow places high. Still it didn't seem to have been very detrimental the past season.

I think Wisconsin growers should work more above the ears. We have not done enough thinking and studying and it's high time we got busy. We are not making the progress we might, and should, make. Wisconsin is a great, wonderful state to grow cranberries in. We have immense bogs with good water supply and good sand. It is only necessary to work a little harder above the ears. I think we ought all of us to get busy. I am not pretending that I am doing all the work. I am a little the fondest of working below the ears. I was brought up to work and never got over liking to work, but I think it is a mistake to depend too much on our muscles.

INSECT REPORT AND OBSERVATIONS

O. G. Malde

I was sent into the field on the 16th of May this year. Cranberries appeared to have a late start, only a few buds actually opened, yet the surprising truth was, the fire worms were already there, and at about the same stage as last year on the 14th when I started inspection. Last year the vines were earlier and the worms had nice green vines to work on while this year they stayed longer on the first leaf than I have ever known them, two to four days rather than one or two, which seems normal. Fireworms were plentiful, nearly as many as a year ago, and I believe early flooding saved the crop. In places there was quite an attack by the second brood and every one should be prepared to put on an insect flood at the proper time next year, when the worms are pretty well hatched and the weather will permit a thirty-four-hour flood at least.

I was surprised to find the so-called leaf roller so extensively distributed. While not in large numbers except on one or two spots, it looks as if it were on the increase and should be watched. It will feed on sage and hardhack as well as on vines, but if these are kept down, the fireworm flood will probably get both.

There was very great range of vine growth this year. The earliest I saw was on Mr. Getsinger's marsh, where his vines were well started on May 20th. He followed a program of frequent flooding and draining again. His berries started early and is the nicest crop I saw this year. I noticed in spots on other bogs that the early berries are the best crop. In early June vines were three weeks behind normal, but by the last of June they were only ten days to two weeks late.

On the Grand Marsh near Mather where the fireworm did such great damage last year I was surprised to find no more fireworms than appeared for the first crop, but I understand the second brood showed up more. They are cleaning the bog for cropping another year. It is spotted, but in general coming fairly well, but some beds are practically killed out. Beds least damaged last year will have a light crop.

The Mather district showed considerable winter-killing, due to shortage of water. Winter protection is important, for the tops of the vine must be protected to get a crop.

Tipworm has been prevalent as there are not four bogs in the whole state where I did not find this pest. The vines are growing and where the tipworm is ready to kill three starts, the vine is still making another start, so that if we have a late fall, like during the last three years, the damage will not be very noticeable, but if we have an early fall, I would guess the results of tipworm damage will show in considerable shortage in budding.

Fruit worm showed up later than usual and not quite so bad. First worms and first miller were both found the last of June.

Every little grower has some little experiment of his own and if every grower will keep close record of his work it will amount almost to an experimental station and will in summary, be valuable to every grower.

One grower near Tomah, applied hen manure early in the spring and four or five days later the vines had changed to a rich green, while untreated vines still had the dark winter reddish color.

Any treatment must be used with good judgment or it may do more damage than the pest. A thirty-six hour flood seldom means more than twenty-four hours of complete submergence. In the last days of May and first days of June you can generally watch weather conditions and pick a cold spell when water may be left on but you must consider the condition of your vines. If applied late in the season put on the flood in the evening and leave it on all of the following day, and take it off before sun-up of the second day.

GENERAL DISCUSSION

MR. HEDLER: We are building a new dredge along the lines of the old one and have practically changed the entire drainage system of our marsh, so that water can be got on and got off of the marsh quickly.

We are getting ten acres ready for planting next year, five acres levelled and ready and the other five practically ready.

Our big lake reservoir, the water in which is higher now than this time last year, is a great good fortune. We flood more frequently than you do, for we have severer weather conditions. The superintendent has ideas of his own and I am inclined to think he is right; I think it is quite as dangerous to go down nearly to freezing, as a light frost would be, so we flood when there is any possibility of danger of that kind. When the thermometer is down to 38 degrees at seven o'clock we put on a good flood and I suppose a good many of you would do the same thing if you had the water.

I hope the time will soon come when we can invite you all up there for your convention. It is a hundred miles so you would have to stay over a night; we couldn't house or feed so many, but could requisition

rooms for you in Phillips and Prentice, and could help out with coffee and other refreshments. I hope you will come some time.

MR. SCOTT: We will start work on the pumping experiment as soon as the three-inch rotary pump and Mr. Malde both get together in Mather.

MR. STONE: The President announced Mr. Stone is located twenty miles out of Toledo, has forty acres of bog and raised 2000 barrels of berries last year, having been in business four or five years and steadily increased production. He had already left when called upon for a talk.

MISS ELIZABETH C. WHITE: Miss White telegraphed regrets for inability to be at the summer convention on account of the critical illness of her father, one of the pioneer cranberry growers of the country. Mr. White started in Wisconsin, on the Grand Marsh near Mather, but now conducts the famous Whitesbog near New Lisbon, New Jersey.

MR. BENNETT: I have not had so much experience with the water cure as Mr. Potter has. I put eight or ten acres under water and kept it under till July 1st, part of it the whole summer. On the latter, I killed the vines, scalped and started anew. On the part under water till the first of July, part which was moist got a good growth of vines and I expect a good crop next summer and the following year I will put it under again, kill the vines, scalp and replant. The marsh is getting brushy and I find I cannot raise cranberries and brush. We must drown it or something. The water cure is all right. I have a piece we left flooded till June 4th this year, then pulled all the brush and rolled; it's as nice a looking piece as I have in the marsh, but there's practically no berries on it.

MR. CHANEY: In New Jersey we have army worm to contend with when we use the water cure. They may be expected to appear twenty-one days after taking off the water. You can get rid of them if they appear, by flooding.

MR. ROY POTTER: We put twelve acres under water this year. Two years ago we had quite a piece, about six acres. There was half an acre we rolled, and thought we would roll the whole twelve acres to do a real good job we rolled it three times—rolling both ways—and killed half the vines. I think one rolling would be enough. We rolled twice the latter part of May, and once in June, about the 20th. We have been getting a good crop off of what we water-cured last year and the year before where previously we never got more than five barrels to the acre. It is a whole lot cleaner of grass, but the grass is gradually coming back in.

MR. HERMAN J. GEBHARDT: During my trip through the East I was impressed with the freedom of the bogs from grass, often seeing an area acres in extent without a blade of grass in it. I do not know if it is our soil and climate or cultural conditions. They do not seem to have the cows we do, nor does it seem to be so much of a grass country. They practice deep drainage more than we do, actually draining till it hurts. I noticed Dr. Franklin was carrying out an experiment with bees caged in a particular area, and also caged out. I do not know the result, but believe he was favorable to keeping bees around a bog. I was impressed with their preparations for fire prevention, for fighting forest fires; in Wisconsin we are too much inclined to let them burn. I have been using corrugated iron bulkheads for twelve or fifteen years and have had very little difficulty with them except that their front is inclined to be affected by the water. If the front was made of good material, say ingot iron, they would be an ideal bulkhead. I am enthusiastic over them, even though a lighter gauge was used than really should have been.

MR. CARL GETSINGER: Bunch grass is our meanest weed. It cost so much I decided to try kerosene; I sprayed it on the bunch grass and it

killed it all. Last year I used five barrels; weeding would have cost $500.00 but five barrels of kerosene and a man's time for one day did as much work. Just get a spray tank, hang it on your back and squirt the kerosene on the grass; it will stop in a day and lay down in a week or two. The best time is when it is first coming up. The kerosene does not injure the vine but will injure the blossom. Where we used the kerosene the bunch grass was as thick as it could stand and now it's all dead grass. We used it on new vines, young planting. On old planting put it on in the spring early, before the buds break; the grass starts growing before the vines.

I covered four acres on part of which it was as thick as it could stand. Weeding by hand an acre and a half cost me $600.00. You can kill cut grass and cat tails with kerosene also; cut grass is the same as wide leaf. We used a very fine spray; the grass was probably three inches high. If the bunches are big and scattered, the fine spray is not suitable—take the fine spray out and leave just the one hole. I tried the kerosene on sickle grass and it did not faze it. I think I will try cylinder oil with the kerosene. I know I can kill quack grass that way.

MR. CHANEY: A large part of New Jersey has grass of all kinds and the difficulty is to mow it above the vines. One grower is working on a grass cutting machine that has proven successful and effective. He hopes to have it patented and on the market next year. It is built like a wheelbarrow with a bicycle wheel and two pieces of gas pipe for handles, with the sickle in front of the wheel and a small gasoline washing machine motor to drive the sickle. One man pushes it along and cuts the grass above the vines. He proved very conclusively that cutting this grass four or five times a season will kill the grass. He showed me one bog with a good crop this year, where he cut the grass just before it came into blossom and he said the sunlight got it.

CAPTAIN NASH: I have ordered a hedge trimming machine made in Pennsylvania with a wheel attachment for trimming a lawn or long grass, but Mr. Chaney's friend seems to have beaten me to it. This machine is run by hand power.

ANNUAL MEETING: The consensus of opinion was that one evening and the following day was as much as could be devoted to a cranberry meeting on account of the great delays going and coming caused to many growers through poor train connections. This time must include Sales Company meeting. A banquet similar to the one held last year was favored.

EXHIBIT IN COOPERATIVE'S TENT: Regarding request of the State Department of Agriculture that the Association make a display at the state fair, along with other cooperative selling associations it was decided that inasmuch as this is not a cooperative selling organization the request should be referred to the Sales Company. Attention was called to the necessity of so presenting the exhibit as not to mislead people into thinking our success in cooperative selling of cranberries would necessarily be repeated with other lines of production, losing sight of dissimilarities, such as limited production of cranberries, impossibility of rapidly extending production, etc. The opinion of the growers was that while we desire to cooperate with the department in every way possible, we should limit state fair display as in the past to Association or county exhibits, with the Sales Company cooperating as they see fit with the proposed display of cooperative's products.

MINUTES OF THE THIRTY-SEVENTH ANNUAL MEETING

Wisconsin Rapids, Wis.

January 15, 1924.

Association met January 8, 1924, in accordance with the constitution, with the Secretary present, and pursuant to agreement adjourned to January 15, 1924.

The annual winter meeting opened with a banquet at the Witter Hotel on January 14, 1924, with Guy O. Babcock for toastmaster and nearly a hundred growers and their friends present.

Program

Salute to the Flag	Boy Scouts
Song: "Pack Up Your Troubles in Your Own Kit Bag"	Everybody
Toast—"Cranberry Spots"	C. A. Normington
Toast—"Early Cranberry Days"	L. M. Nash
Toast—Late Cranberry Days	Albert Hedler
Ignatz Finkelstein on the Bok Peace Plan	Hugh Goggins
Swedish Monolog	Don Johnson
Address	A. E. Leonard

This banquet, which followed the precedent set by Mrs. S. N. Whittlesey a year ago, seemed to meet with the approval accorded the first one, and seems likely to become a fixed part of the annual meetings.

The thirty-seventh annual meeting of the Wisconsin Cranberry Growers Association was called to order by the President, in the Wood County Realty Company hall at 10:30, January 15th.

Address by President C. L. Lewis, Jr.

Minutes of thirty-seventh summer convention of 1923 were read by the Secretary, and approved.

Secretary presented his report.

Mrs. S. N. Whittlesey of Cranmoor was appointed a committee of one to draw resolution of respect and regret at the death of Mrs. Rufus McFarland, to be embodied in the report of this meeting and copies sent to the members of her family and to the press.

Mr. A. B. Scott presented report of the committee in charge of the pumping experiment.

Prof. G. R. B. Elliott, of the Division of Farm Engineering, University of Minnesota, delivered an address on drainage and cultivation of peat soils, which is reproduced elsewhere in this report except that unfortunately it is impossible to give that part of the address which was illustrated by lantern slides.

After dinner the Secretary presented financial report for the entire year 1923, including regular fund and special pumping experiment fund, which was accepted and referred to A. E. Bennett, Henry Gebhardt and Mrs. S. N. Whittlesey as auditing committee, who later in the session reported "that the Committee had examined the report and find the same correct."

Mr. A. B. Scott offered report of expense of pumping experiment, but not complete to date. Auditing committee were instructed to audit the report with the secretary's financial report.

On motion the chair appointed nominating committee consisting of M. O. Potter, chairman; Herman J. Gebhardt, A. B. Scott, Kingsley B. Colton and Oscar Potter.

Captain Guy Nash presented some miscellaneous matters which are embodied in the secretary's report elsewhere, and a letter from Dr. Fracker, which also appears elsewhere in this record.

After discussion of pumping experiment equipment on hand it was moved and duly passed that the Pumping Experiment Committee be authorized to dispose of equipment to the best advantage and required to turn in to the secretary a list of all equipment.

Nomination Committee reported and election by ballot resulted as as follows:

President—C. L. Lewis, Jr.
Vice President—Guy Nash.
Secretary—Clare Smith.
Member Executive Committee—S. N. Whittlesey.
Member of Executive Committee—Mrs. A. C. Otto.

Mr. H. B. Scammell of Toms River, New Jersey, addressed the Association on general and specific cranberry problems which was followed by extended discussion.

Mr. Albert of the Wisconsin Agricultural Experiment Station spoke of general farming and fertilizers on peat.

A vote of thanks was extended to Prof. Elliot, Mr. Scammell and Mr. Albert for their kindness in traveling, formulating addresses and delivering them to the Association, and to Messrs. Normington, L. M. Nash, Hedler, Goggins, Johnson, Leonard, and especially Guy O. Babcock, whose toasts, talks and fun made the banquet a success, to A. B. Scott for special services on the pumping experiment committee, to Miss Anna Bamberg for arranging the banquet, and to the Wood County Realty Company for the use of their hall.

Mr. Malde made a brief talk on general conditions.

On motion duly carried the Association adjourned.

GUY NASH, *Secretary.*

PRESIDENT'S ADDRESS

C. L. LEWIS, JR.

I have just received a copy of the program from the Secretary and the President's address is the first item listed. Last evening Mrs. Whittlesey told me of an incident relating to an address by Mr. Bennett when he was President of the Association and I would like to do as he did. He started out by saying "The first thing asked for this morning is the President's address; my address is Wisconsin Rapids, Route 3. Come out and I will give you a good meal." I think he must have read of the advice given by the bishop in sending out a young

minister to preach his first sermon. He told him to remember three things: "First, have something to say; second, say it; and then for God's sake quit." Probably before I am through you will wish I had followed Mr. Bennett's example.

There seems to be a deficiency in numbers today from the Mather district. Last summer we had a very large number at the meeting, which we laid partially to the result of the handsome crop of the year before, and it is evident that the Mather district is not well represented today because of their short crop last fall. In years of short crops as well as years of bountiful crops every grower in the state should attend our two meetings of the year. These meetings are our only means of getting together as a body. As cranberry growers we are in a class peculiar to ourselves. Take the merchants, bankers, farmers and professional men, they all have their various associations that meet sometimes weekly or monthly, and they have available any amount of literature devoted to their business which tends to keep them up-to-date on the matters pertaining to their business. But due to the small size of our industry we have only our annual winter meeting, our summer convention and our annual reports to keep us in touch with each other. For this reason we should make a special effort to attend these meetings and do what we can to benefit our neighbor.

The crop shortage in Mather the past season is largely due to a shortage of water in that locality. The question of water supply is one of the greatest problems that we as growers face at this time. We have with us today Prof. Elliot, formerly in the department of drainage, University of Wisconsin, now connected with the University of Minnesota, and he will tell us some interesting things about soils and the relation of drainage to the cranberry industry. Some of you will remember his work in the Cranmoor district a few years ago; he is familiar with the water problems of the cranberry grower and particularly fitted to talk to us on the subject. In the Mather district some of the growers brought their crops up to as late as the middle of September and then lost them by frost because of lack of water. That is a mighty serious situation, all of us can appreciate that. If there is any possible way of benefiting the people in that district, or in any other district, by securing changes in legislation or by co-operation among the growers, we want to know of it and act upon it. You know that in Minnesota there has been a great reaction against overdrainage the past year. In Wisconsin we have had two or three years of exceptionally dry weather. The lakes have receded and a great many swamps have completely dried up and as a consequence the water supplies have become short. The agricultural communities have drained the swamp lands and they have not reaped the expected benefits from this drainage and in many cases soil that they were trying to benefit was not adapted to farming, and instead of making a good farming district they have simply ruined the district for cranberry production.

We went down to Madison several years ago to interview the authorities there in an attempt to secure some assistance and changes

in the drainage laws and they turned a deaf ear to us. Right now, after this dry season, with the reaction against overdrainage that prevails in the country, right now when public sentiment is behind us, is the time if ever to try and help ourselves and if we let this opportune time slip by I don't think we shall ever secure the assistance we need.

In addition to this matter of drainage or rather of overdrainage which is up for discussion we have present Mr. H. B. Scammell of New Jersey, who will talk to us of conditions in his home state. Mr. Scammell was formerly connected with the Department of Agriculture at Washington and you will remember his excellent bulletin on cranberry insects which was issued recently. He left the government service a few years ago and is now actively engaged as a grower in New Jersey.

We have had two large crops of cranberries in the country in 1922 and 1923, averaging around 565,000 barrels. Previous to 1922 we had two short crops and prices ranged very high. As a result dealers speculated and overbought on the 1922 crop and prices attained a very high point in November of that year. The berries of that season were as a rule below the average in keeping quality and it developed around Christmas time that supplies in the markets were much greater than supposed. It resulted in a rapidly falling market after Jan. 1, 1923, and many dealers lost money on the stocks they held after that date. The result of this was that it left a bad taste in the mouths of the dealers. Although they bought the early berries in 1923 very well, they were very alert and on the lookout for the slightest sign of a weakening market. Not only were the dealers on the lookout, but every shipper of cranberries was watchful, and many growers at the first signs of a weakening market made a special effort to unload, causing additional congestion in the markets of the country and a further decline in price and loss of confidence on all sides. The result of this has been a falling market since Thanksgiving. It has not fallen to the extent it did a year ago and the unsold fruit is in better condition than it was last year at this time and it is hoped that the market will consume the rest of the crop without a further decline.

The reason I have brought up this matter is, that there is bound to be a feeling of uneasiness on the part of the growers of the country. They will talk about overproduction and the need of increased consumption. But we should not be discouraged by developments. Considering the two large crops in succession, the average price for both years has been good. We really have nothing to complain about.

Growers of oranges, apples and grapefruit have been less fortunate than the cranberry grower. The average price of apples in the northwest has been around 65 cents to 75 cents per box F. O. B. shipping point and you know that the growers of apples cannot grow a box of apples for 65 cents and pay all expenses of packing and selling out of that; and oranges have been sold at a price that has afforded a profit for only the larger sizes and the same condition applies to grapefruit. When we compare ourselves to the producers of these other fruits we conclude that our industry is in a pretty stable condition.

Lessons that we should learn from our experiences of the past two seasons are:

We should render our sales managers all possible assistance in their program for the disposition of the crop.

We should watch our costs and not overburden a crop with expense during production.

We should confine production to varieties of standard marketable quality.

SECRETARY'S REPORT

CAPTAIN GUY NASH.

Here are our record of memberships back to 1917, as far as our records go, in consequence of the disastrous fire which destroyed all earlier files:

1917	36 members
1918	72 members
1919	76 members
1920	62 members
1921	55 members
1922	78 members
1923	58 members

Twenty members of this association have paid all dues from 1917 to 1923 inclusive, and doubtless more will pay as soon as their attention is called to arrears.

I have letters to the Association from Lucian J. Fosdick of Dorchester, Mass., Miss Elizabeth White of New Lisbon, N. J., and Paul O. Nyhus of the agricultural department of the state, at Madison. (Letters read.)

Mrs. McFarland died a few days ago, just after notices of this meeting were sent out. Her husband was an early cranberry grower, and since his death Mrs. McFarland has faithfully kept up her membership. A resolution of respect would be appropriate.

The income of this Association from the state is so small, the dues are an important item to us. Every one should make a point of paying promptly. At the summer meeting one gentleman who prefers that his right hand know not what his left hand does, suggested that corporations interested in bogs, take out several memberships, say for all their directors, and lived up to his suggestion by paying for memberships for four directors of his company.

I ask help from every member, especially every old time member. You are all aware that at the time of Secretary Fitch's sad death, when his home was destroyed by fire, all the early records of this Association were also destroyed. We have published reports for thirty-seven years, yet this office has in its files no complete set, nor is there anything like a complete set in the Scott public library in Wisconsin Rapids. I wish very much to get together two complete sets, one to be bound up for the Association, and another to be bound and deposited in

the Scott public library. Cannot some of you send me old numbers that you no longer care for? At any rate, let me know what numbers you have; look them over when you clean house next spring. If any member has a full set or nearly full which he does not care to part with, I would recommend that the Association pay the cost of binding (which would be slight) to insure permanency. Mr. Lewis has a file complete except for one number since 1908.

REPORT OF THE CONCLUDING EXPERIMENTAL PUMPING WORK IN THE MATHER DISTRICT

A. B. Scott.

The new work was started August 22, and continued off and on until November 10, 1923. The equipment owned by the Association was used as far as possible and some new equipment was purchased at a reasonable expense.

A brief description of the system of wells on which the experimental work was done is in order here. Four caissons, from 18 inches to 30 inches in diameter were sunk to a depth of about 30 feet at equal quarters of a circle about 45 feet in diameter. Material inside of the caissons was removed. Three-inch pipes with five-foot sand points on each of the lower ends were placed in the caissons. The space around the pipes and inside the caissons was filled with gravel, the caisson being withdrawn as the filling progressed. Proper connections were made, using elbows, tees and valves to bring the pipes from the wells to a common 4-inch outlet to which the pumps could be connected. Small pipes were sunk near the suction pipes, to be used to determine the water level during pumping.

A 4-inch Fairbanks Morse, centrifugal type, sand pump being connected to the system when we began the work, a run was made with this equipment to determine its pumping capacity from the system of points as above described. Mr. B. R. Mitchell furnished his 12-20 Cletrac tractor for the power. Five different runs were made. A maximum flow of 42.5 gallons per minute was reached, the lowest being 21 gallons per minute, all from well No. 1 of the system. Water could not be raised at all when valves were opened to all the wells at the same time. A 3-inch centrifugal pump, also property of the Association, having been received from Mr. Searles, was then connected to the system of wells. The same power was used in this test. Several runs were made with this pump from wells singly and with two, then three, and all wells open to the pump. Water could not be raised under any operating conditions for this pump that we could bring about.

It is the contention of some pump manufacturers that a centrifugal pump will draw water efficiently through long suction lines and as far as a piston or plunger pump. It is the writer's experience, however, that the centrifugal pump will not work efficiently, and mostly not at all, under such operating conditions as long, tortuous suction lines:

This type of pump works most efficiently when the water flows by gravity to the pump. Furthermore, it is the writer's experience that a centrifugal pump will not work satisfactorily where more than one source of water or liquid is connected to the same pump, unless the pump is so set that the water or liquid will run by gravity to the pump.

In order to use a centrifugal pump efficiently on this work as was planned, it would be necessary to set the pump lower than the low ground water level. The water would then at all times run to the pump, thus eliminating the loss of head and efficiency that would be caused by the long suction lines of the system as now connected together.

After consultation with B. R. Mitchell and President C. L. Lewis, it was decided to discontinue further work with the centrifugal pumps. In order to get some definite data as to what the system of wells would yield in flow we decided to use a piston pump for further testing, if one could be obtained without undue expense. Mr. Malde succeeded in locating a 6-inch cylinder pump with a 24-inch stroke. The pump and pump jack were loaned for our use by and through assistance of Mr. Habelmen, of Tunnel City. After several trials with the cylinder a test was made running 31 hours continuously during which a maximum flow of 148 gallons per minute was obtained, pumping from all four wells. The water was lowered four feet and six inches during this test. The maximum flow from any one well was 76 gallons per minute, this from well number two and number four. To get results the r. p. m. of the jack was increased from 24 to 64, the latter being the maximum speed at which the jack would safely operate.

In one more attempt to determine the maximum yield of the points we purchased from F. E. Meyers & Bro. Co., an 8-inch diameter piston pump with a 12-inch stroke. The valve in the piston of this pump is so constructed that it gives a much larger area for the passage of the water, than the valve in the ordinary cylinder pump. This feature we believed would give us a larger pumping capacity than the six-inch cylinder, hence our purchase of this pump to get an increased yield from the wells. We were disappointed, however, in this, for using the same power and running the jack at the same speed we were able to obtain only 123 gallons per minute for the maximum flow. Length of stroke was increased from 12 inches to 17½ inches to find out if this would increase the flow. Pump did not work satisfactorily on this change, so the 12-inch stroke was used for further work. After this test was finished we found that in order to get additional pumping capacity to increase the flow from the wells, it would be necessary to secure a duplex or triplex geared pump. This class of pumping equipment runs very heavy in weight for the small capacity and the cost is correspondingly high. Inquiry was made of several different machinery houses to find out if such a pump could be rented and while one house had one to sell, none could be found that could be rented. We then decided to discontinue further testing work on the wells at the Mitchell bog.

In order to get some idea of what flow could be obtained from some of the deep wells, the Myers pump and the jack were taken to the A. B. Scott bog. The well tested is a drilled well, measuring 156 feet in depth and cased to the surface with 6-inch standard pipe. The cylinder of the pump was connected directly to the top of the casing. Water stood at 5 feet and 10 inches from the top of the casing. The test continued for 36 hours with little interruption, giving a maximum flow of 50 gallons per minute and lowering the water 3 feet and 8 inches during the run.

While our equipment and material with which we worked to conduct our tests was not as satisfactory as it might have been, we have, nevertheless, obtained sufficient data to enable us to draw certain conclusions in regard to this method of obtaining water for the cranberry grower which we believe will be of interest to him. We find that:

First, The centrifugal pump not being the proper type of pump to be used on multiple suction lines, sand points and long suction lines, it therefore is not suitable for this kind of pumping.

Second, The maximum yield of all the points at the same time using the cylinder pump was 148 gallons per minute. From one well at a time the maximum was 76 gallons per minute. Under proper operating conditions it may be possible to obtain 250 gallons per minute from all four wells at the same time. This would necessitate the use of a duplex or triplex plunger or piston type of geared pump and would weigh about 1,000 pounds and cost from $300 to $400 f. o. b. factory. But the yield of one of these pumps with its system of points is not sufficient to enable the grower to do anything toward averting the danger of loss by frost. Assuming that we had four of these units working, furnishing 1,000 gallons per minute or one acre inch in about 27 minutes. (An acre inch equals 27,152 gallons.) On a 5-acre bog it would take 135 minutes or 2¼ hours to raise the water 1 inch and 4½ hours to raise the water 2 inches. In order to be effective the number of pumping units would have to be increased materially. Then would enter into the question, the problem of the location and the distribution of such units. If they are located too close together the yield of the ground water is lowered so much that the rate of pumping is also lowered. If far enough apart to avoid this difficulty, the necessity of individual power plants arises and with that operators to care for the pumping units during their use, all of which entails considerable expense for operation and maintenance, not to say anything of the first cost.

Third, Taking into consideration the rather close proximity of many of the bogs to each other, the pumping of the underground water in quantities large enough to assist the grower in protecting his crop from frost, will in time, disturb the equilibrium of the useful water in that immediate vicinity. For instance, a number of pumping units are placed to furnish water for a certain bog. In most cases they would be placed on the upper side and at a considerable distance from the beds to obviate the short circuiting of

the water from the beds back to the wells. It would not be long before your neighbor above you would find that he was unable to hold the water on his beds as he had previous to the construction of the pumping plants below him. You can readily see that this would furnish grounds for misunderstanding and trouble and in many cases litigation would be resorted to, such as has characterized many irrigation projects in the west.

Fourth, If all the growers in a section resorted to pumping from underground sources, quantities of water sufficient for their use in growing cranberries, that there would be a gradual depletion of the quantity of water in the section caused by surface drainage and evaporation, finally resulting in a partially drained section, and such a serious shortage of water that the growing of cranberries in such a section would have to be given up.

Fifth, As an alternative we would suggest the raising of reservoir dams, construction of cross dams in the upper parts of the drainage area to hold the flood waters back, a more vigorous control of fires to enable the saving of vegetation and the young forests in the upper drainage areas and the construction of large capacity auger type pumping plants to be used for returning the water to the reservoir after use on the beds. This method would mean a conservation of the water that we now have and a gradual increase of the quantity of useful water in the section as opposed to a gradual depletion and loss of the water by the pumping method.

From the foregoing deductions, we would therefore conclude that the method of pumping water, for the general use on cranberry bogs and for protection of vines and crops against frost injury, from underground sources other than deep wells is theoretically and economically unsound, impractical and inadequate for the requirements of the average cranberry grower.

Respectfully submitted,

COMMITTEE.

DISCUSSION

MR. A. B. SCOTT: The matter of expense is not complete. Including the check which was issued to Mr. Mitchell (for work prior to the summer of 1923) we have expended $353.10 for labor, $56.15 for equipment and $82.60 for expense. Labor includes time and work of Mr. Malde and one or two assistants, the equipment consists mostly of 8-inch Meyer pump, costing $40, and small items like pipe fitting, and expenses include hotel, railroad fare, telegraph and telephone expense. It makes a total expenditure of $491.85, leaving a balance of $8.15. We have charged a small freight item for return of pump to owners, $5 or $10, and there are some other charges not yet in. It will take more than the balance above to clean up. I didn't charge anything for my time—I didn't devote much time to actual work.

MR. MALDE: The equipment at present is at the Mitchell cranberry marsh, not all of it—we are renting the rest. I have a sketch of the articles, noting on it where they are located, but not the complete list. Part of it is at Mr. Swett's, part at Mitchell's, and part at Mr. Webster's at Sparta, who gave us the benefit of his experience before we purchased the Meyer pump. He has the centrifugal pump. The stuff should be sold as soon as possible. Mr. Mitchell does not want it now.

The Meyer pump would make some grower a good power pump for house supply. There is a four-inch main with three-inch trench pipes and the bottom five inches, and each of the four well points are different.

MR. C. L. LEWIS: This experiment was started in 1916. There was not much enthusiasm a year ago for continuing the experiment, but considerable money had been spent and appropriation given us for completion of the experiment. The thing to do was to carry it to a definite conclusion. This has been done, the money all spent—and from the report of the committee evidently very well spent—and the project definitely laid to rest. Now the only thing to do is to salvage what is left as well as possible.

DRAINAGE AND CRANBERRYING

G. R. B. ELLIOTT, Assistant Professor of Agricultural Engineering (Drainage), University of Minnesota

It gives me a great deal of pleasure to come back to Wisconsin Rapids; Wisconsin Rapids seems more like home than any other part of this country, and I hope my friends in this neighborhood like me as much as I like them.

Mr. Lewis has told me some of your difficulties during the last ten years; I knew some of them myself, and knew they were serious, some so serious that they would have put a number of growers out of business if not corrected. I am a drainage man; I get the money from which I live by drainage, and I believe it is one of the most necessary things for all communities in which there is already too much water. Social life in a community that is too wet is not very pleasant. Even the cranberry growers know what it is.

The earliest civilizations of which there is any record are those developed around the production of rice in the tropics and wheat in the subtropics of the old world, and maize and manioc in the tropics of America. In his wild state, man picked his living as he could and no community idea was developed. He soon found he could do better more or less fixed in one locality where food was abundant; in places food was produced by nature and could be had in large quantities for the taking, as where the shell mounds were built up, but still the community idea did not develop. When, however, he began to increase his supply of vegetable food, cultivation became necessary, and he was compelled to clear land for his planted crops. It would seem that he discovered the easiest way to clear land was to get it already cleared by nature and to alter the climate by changing the water supply. Then the rice civilization developed, in which men altered the supply of water from wet to dry, killing out wet vegetation by drying the land and dry land weeds by flooding. This method of cultivating the land required cooperative effort on a considerable scale and from this cooperation developed the first known civilization. Putting that same idea into effect in here in this neighborhood, you will get your highest social development where you have the highest possible cooperation in the use of those natural forces which you have at your disposal.

Speaking of drainage, a number of years ago there was a great campaign to clean up the wild lands, and this was justifiable, and drainage campaigns were carried on all over the country. There wasn't as much known at that time as there is now about the movement of underground water. There has been a great development in the knowledge of underground water in the last few years. Wisconsin spent a great deal of money on it, and we in Minnesota have spent much more, and we know now facts we did not know when drainage systems were put in.

Most of these drainage districts in Minnesota and Wisconsin are in peat areas. There are two kinds of peat, almost as different as night from day. There is acid peat, developed where there is an insufficient supply of mineral matter, and alkaline peat, developed where there is sufficient flow of water to carry in sediment. I do not know that it has yet been proved that the cultivation of acid peat is economically practical as a general farming proposition at the present time. There have been heavy crops grown on acid peat under controlled conditions. The successful cultivation of acid peat requires a very high order of technical knowledge on the part of the grower, and that technical knowledge is not generally available. Now the cultivation of alkaline peat is easy; it resolves itself into comparatively cheap fertilization and comparatively costly water or drainage control. We are now starting a number of districts in Minnesota in which the cost is running between $60 and $100 per acre. I believe those districts will be very profitable for the owners of the land. We are getting crops that range in value from $50 as a minimum to over $1000 per acre, and that very high valuation of crop is due almost entirely to a system of water control.

One of the reasons why acid peat is not easily cultivated is this: microbic growth, which is necessary for all plant life cannot develop under those acid conditions. Lime must be applied to neutralize the acidity. Then microbic growth only extends into the peat as deeply as the alkaline condition extends. If you have a lime application that will sweeten the top eight inches, you cannot expect to get much root growth below the top eight inches. If you apply lime which will sweeten the top foot and a half, you will get root development and microbic growth about one and one-half feet. The acid peat does not permit the water to pass through it as readily as does the alkaline peat and the acid peat is very subject to droughty conditions. If that peat is comparatively shallow and underlaid by sand and gravel, in a dry season that area is droughty, you cannot get away from it. Drainage does influence the acidity in a peat soil; it carries away a great deal of the soluble acids. The remainder cannot be neutralized by any method short of burning or the application of lime, either in the form of lime or of soil containing a high percentage of lime.

You have here underlying all your cranberry area a sandstone which is extremely porous. Such soluble minerals like lime as originally existed in that sand stone has been entirely dissolved away, so very little but sand is left, and if the water in that area is depressed to six or eight feet below the surface of the land, and there is only two

or three feet of peat, you are going to have droughty conditions just as sure as the sun rises. In several ways that can be controlled. At the time those ditches were put in deep drainage was thought to be the best method of control under all conditions but that the ditches should not in all cases be allowed to function at that depth is now proved beyond all question. Much of the peat in this neighborhood is shallow, and if the water is dropped too low in the sand, no upward movement of water is available to supply the wastage of evaporation and transpiration from the crops growing in the peat. The best depth to maintain the ground water will vary with the depth and character of the peat, and the character of the subsoil. Deep peat areas are not so subject to droughty conditions as are shallow peats; however, they are subject to greater acidity and a much heavier application of lime is necessary in order to sweeten them.

There are three ordinary types of plants found in nature: there is the mesophyte or ordinary upland plant; the hydrophyte, which develops in water and has the peculiar property of having channels which run down through the leaf stalks and stem of the plant and give oxygen to the root; and the zerophyte, which is extremely susceptible to dry and wet conditions, and has not the highly developed channels, and when conditions do not suit it, it ceases to function as a plant and remains dormant until conditions become right for it again. An example is the cranberry, which is partially a zerophyte in the sense that it ceases to function as a plant when conditions do not suit it. In order that the cranberry shall grow properly it must have oxygen to its roots. It has not the ability to convey air down through the stem of the plant, and therefore in order to nourish the plant the oxygen must get to the roots externally. If the water is too high over the roots of the plant, it will remain partially dormant—the bloom will not develop properly, and nitrification will not take place in the soil to supply the growing plant with food.

A very easy method to control the movement of water in the peat is by the application of sand, which compacts the surface and increases the movement of the water in the peat below. The acid peat, unsanded, remains loose on the surface and there is hardly any movement by capillary attraction. When it is sanded the fibres of the peat are compacted together and the water movement increases. Ideal conditions, then, for the cranberry are to have the surface compacted and to have the actual water levels in the peat at such a height that proper conditions develop for the cranberry roots. Mr. Malde has done considerable research work in cranberry culture and he can tell you what height this should be. He will tell you the facts upon which he built up his experimental knowledge.

I think we are ready for the slides. I have a number here which will show you the measured movement of ground water in various types of soil and will show you how drainage will influence soils of different character. Mr. Malde furnished me with a great deal of data which was available at Madison. I believe that of all men in the cranberry business in Wisconsin there is probably no one who has done more for that business and has received so little from it himself as Mr. Malde.

There is one question which has been asked me in very numerous forms. It all gets back to the same question, though the ways in which the question has been put have been as various as the number of persons asking it. Does a drainage district hold a proprietary interest in the water in their channels– I say, no, absolutely not. The drainage district holds a sovereign or rather a police power over the water in that ditch. It is not the property of that district to convey to any one person or for any purpose unless special legislation has been granted to that district for that purpose and even then the landowners in the district would have a prior right to it. The water in that neighborhood is the personal property of the landowners in that district and the construction of a drainage ditch in that neighborhood does not give to that district the right or title to that water. I know that there are people in this room who will disagree with me in this opinion, but I believe this opinion is correct. The district no more owns the water in that ditch than does the county own the traffic that passes over a road which has been constructed for the benefit of the people in that county. They hold police power over that traffic but the road was constructed for the joint benefit of all, to be used by them for their purposes, and the traffic which passes over that road is not the property of the county, and the water which passes through the drainage ditch is not the property of the drainage district. So long as the functioning of that district is not impaired, so long as the personal rights of the property owners in that district are not impaired, any person in that district who owns a personal right to the water in that district may use that water for their purposes providing they do not impair the functioning of that ditch for the joint benefit of all concerned.

The cranberry growers of Wisconsin are very greatly handicapped by the fact that they are operating as individuals in the neighborhoods in which a very considerable proportion of the population is operating collectively in organized enterprises for the drainage of their lands. There has been in the past a very great deal of friction and litigation between the cranberry interests on the one hand and the drainage interests on the other. Both have suffered, but the cranberry interests most seriously, I think principally on account of lack of organization. I do not think that the interests of the cranberry growers and the interests of the drainage districts are necessarily conflicting. In fact I believe that the drainage law of Wisconsin could be so construed that it could be made to operate for the benefit of the cranberry growers. If it were possible for them to organize as drainage districts they could meet the districts already organized on terms of equality. It would be possible for them to install such works as would give them the maximum efficiency in their reservoirs and canals and eliminate a very great deal of duplication which under the present arrangement cannot be avoided. It would perhaps be possible to divert water into large reservoirs which would be located at points where the seepage through the substratum would be a minimum or at strategic points which would permit rapid flooding with a minimum of loss.

There is no question that the ditch of the Wood County District is diverting water from the lands of the cranberry growers to the west. The influence of this ditch probably extends half way across the Cranmoor marshes. We have been carrying on exhaustive research and have definite records which show that a deep drainage ditch in sand or gravel will influence the ground water from one to two miles away. Similarly the drainage ditch of the Remington District is diverting water necessary for the operations of the cranberry growers in the Mather District. I believe that it is possible to so construe the Wisconsin drainage law that in the Cranmoor district a district could be erected which would couple on to the Wood County and Cranberry Creek drainage districts and in the Mather district a drainage district could be erected to couple on to the Remington district and divert water for the purposes of the cranberry growers and yet not in any way destroy or impair the functioning of these drainage districts. I believe that the erection of such districts and consequent cooperation with the drainage districts would be the solution of the cranberry growing industry of central Wisconsin.

In the Cranmoor neighborhood the annual losses from lack of water capitalized at 6 per cent would more than pay the cost of such a district four times over and would permit of much greater expansion. In the Mather district the annual losses capitalized at 6 per cent would pay the cost of such a district ten times over and would also permit of greater security and expansion.

Professor Elliot showed a great many slides illustrating his address, and some features of drainage, plant growth and ground water movement not covered by reported address. We regret that all of these cannot be reproduced.—Secretary.

Madison, Wis., January 7, 1924.

CAPT. GUY NASH,
Wisconsin, Rapids, Wis.

Dear Mr. Nash: For several months I have had on my calendar a memorandum that the Cranberry Growers' convention would probably be held during the first two weeks in January. It is such a pleasure to attend your meetings that I was looking forward to this one with considerable anticipation.

An eastern trip prolonged itself more than I had anticipated, however, and is followed immediately by the Horticultural Convention here. Under the circumstances it seems impossible for me to get to Wisconsin Rapids next Tuesday. I am sure that I regret this more than any of the cranberry growers can.

As years go by the importance of the cranberry insect survey, which was begun on a small scale two years ago, becomes greater. Intensive cultivation of any crop results in an increase in the pests breeding near it, so that the slightest lack of vigilance may result in irreparable damage.

This is particularly true of cranberry insects, which are so minute that they are easily overlooked, especially when their work is just starting. I believe the cranberry growers could well afford to secure a specialist to go over the bogs several times each season at their own expense, if necessary, and feel sure that such a project would pay dividends. However, the taxes of the growers are high enough so that you are entirely justified in asking assistance from the state.

One of the difficulties in the last legislative session was that the senators interested in the cranberry districts were not fully informed regarding the project. Arrangements can well be made at this meeting to be sure that all members of the legislature, or candidates for the legislature, are informed fully regarding your needs, then as soon as the session starts you will have friends looking after your interests.

If the growers still feel that such a service will be of value to them, perhaps a resolution passed now or at the summer meeting would induce the commissioner of agriculture to have the item included in the budget. This would at least give a preliminary "send-off" to the work and if followed by strong support from the assemblymen and senators in the cranberry districts, should secure support for the work.

I sincerely hope the meeting is a successful and interesting one and know that it will be enjoyable.

With sincere personal regards to all the growers, I am

Very truly yours,

S. B. FRACKER, *State Entomologist.*

PRESIDENT LEWIS: We appreciate Mr. Fracker's good wishes and suggestions. Any action on legislative work we can let go until a later date.

ADDRESS

DR. H. B. SCAMMEL, of The Double Trouble Company, Inc.,
Toms River, N. J.

Your Secretary has kindly given me the whole field of cranberry culture in which to roam so I am taking the opportunity to say a few words about New Jersey conditions in general and to devote the larger portion of this paper to some thoughts on the tipworm. I would prefer to come before you with a concise report, covering some original investigation, which would be the final word on how to reduce to insignificant numbers a particular insect or to annihilate one of the rots or to perform one of the numerous operations that have to be met on a cranberry property.

There was a time when I thought the last word had been said about the control of the cranberry girdler. Recently, however, Mr. Chambers and Mr. Beckwith have come to the front with the astounding tale of how they flooded a twenty-acre bog in August for a period of three days, secured elimination of the girdlers and lost only a small part of the crop. We figured that to be an extremely nervy operation. Perhaps you might apply some other term to it. At any rate we put ourselves in the same category when we carried out a very similar operation on a fifty-acre bog of Howes and Blacks, flooding it for a period of thirty-six hours, commencing August 1st with a splendid crop on the vines. The treatment was a success, eliminating the girdlers except on a narrow fringe along one portion of the margin where the water stood not more than twelve hours and causing so little damage to the crop that it was almost negligible. I am not in favor of treat-

ments like that except as a last resort but when no other remedy applies I believe it is better to strike a severe blow and take a chance on saving the crop than it is to have the source of annoyance remain with one for a long period of years and take toll every year.

There are about 12,700 acres of cranberry bogs in New Jersey and I have heard the statement made that not over 10 per cent of the land suitable for cranberry culture there has been set out. At the 1921 meeting of the New Jersey Association the opinion was advanced by Dr. Franklin that we were entering a period of prosperity for the cranberry industry, that it was no time to be bearish but rather it was a period in which to buy bogs. Some properties did change hands in the next year or two and I think a spirit of optimism prevails among growers in spite of the dullness of the cranberry market this winter. Nevertheless there is no boom going on in the development of cranberry land in our state. No doubt the high cost of improving land has much to do with the non-expansion of the business but it occurs to me that there is another factor to be considered which will play an important part in holding our acreage at about its present level for some years to come. This factor is the development of the cultivated blueberry. Already, there are cranberry bogs changing ownership whose fate it will be to have the vines plowed under and to be planted in blueberries. We have many old bogs on savanna bottom which are making poor returns at present but which can be brought into a higher state of productivity if blueberries are substituted for cranberries. It simply means that the poorer cranberry lands will cease to be listed as cranberry acreage in our annual reports and will accrue to the infant blueberry business. On the other hand the total yield of New Jersey bogs may be expected not to decrease because we are constantly improving our cultural practices which means larger returns per acre.

As an instance of how blueberry culture is affecting cranberry culture I know of one company that has abandoned its plan of developing 100 acres of cranberry land in favor of the development of some run down cranberry bogs and uncleared upland as blueberry fields. I do not expect this blueberry development to be a rapid one but I think it is bound to turn some of the capital which might go into cranberry enterprises away from that path and in that manner will have much to do with preventing any large increase in our cranberry acreage. There are many growers who make their cranberry business a side issue while some of us depend wholly upon it for a living. If diversification of crops is a good thing for the general farmer then it is high time that the cranberry grower ceases to carry all of his eggs in one basket. Just imagine the satisfaction that will come to the grower when the returns from his blueberry crop will pay all of the cranberry harvesting costs. Perhaps I have digressed too much from our subject in bringing up this, to me, engrossing subject of blueberries. If I were to risk a forecast it would be that the blueberry industry will prove of distinct advantage to the cranberry industry.

The New Jersey Station is doing a valuable work in its study of cranberry fertilizers under the direction of Mr. Beckwith. Those of us who

have used the station formula feel that our bogs have been greatly benefited. Vine growth, even on mud bottom, that has been slow in coming into bearing has been thickened and made to produce heavily without any apparent disadvantages. Run-down bogs, planted in the native Jerseys, have doubled their yields by the use of moderate applications of fertilizer. Heavy applications are apt to increase the amount of rot and to influence adversely the keeping quality of the berries. On the Double Trouble bogs we are not applying fertilizer annually to the same areas but toning up the vines where they evidently require it and thus trying to bring all the acreage into a uniform, thrifty condition.

So far as I am aware we are not competing with Massachusetts in trying to develop a picking machine. Our Mr. Harrison, however, has invented a light machine for mowing grasses and weeds which, unfortunately, infest the New Jersey bogs as well as the Wisconsin marshes, so I am told.

As a means of reducing cranberry diseases on the bogs, the application of fungicidal dusts with power and hand dusters is being tried in several places. This is, with us, a new field of investigation and may yield some valuable results.

At our last meeting, in the past summer we had a paper on the Japanese Beetle situation by Mr. Smith of the Riverton Laboratory. This pest is spreading into the cranberry district and is one that we must view with apprehension. If it takes a liking to cranberry foliage and fruit we may have difficulty in combatting it. In its larval stage it lives below ground, feeding on roots while in the beetle stage it feeds on foliage and fruit. My understanding is that it is advancing at the rate of about ten miles per year and it is a strong flier. It may be transported long distances by alighting on traveling automobiles so there is expectation of an outbreak at remote points.

Wisconsin False Blossom—it seems unfortunate to have the name of your state coupled with the term false blossom when that particular affliction of the cranberry vines can be found in other districts where the origin of the disease can not be traced in any way to Wisconsin. False blossom is not a serious trouble with us but I have found it occurring on numbers of bogs in New Jersey, attacking such varieties as Howes, Early Black, Centennial and Jersey. It appears on our mud bottoms and our savannas, where drainage is good and where drainage is poor. We are now trying an experiment of turfing off some badly infected Jersey vines having first burned over the area, in the hope that the disease will not appear again when the land is reset with Howes. A patent weed killer containing some form of arsenic has recently been used in Massachusetts on areas infected with false blossoms to kill the vines and roots preparatory to replanting with healthy vines. This experiment is still in an early stage and will probably be reported upon at some future time. My only serious effort to learn if false blossom infection could be carried from diseased plants to healthy plant by insects ended negatively. I found a false blossom area where plant lice were also present on the infected vines. Numbers of

the aphids were transferred to vines procured from a bog twenty miles distant where no false blossom was detected and no vines had ever been secured from Wisconsin. This experimental cage was continued for two years without resulting in the appearance of false blossom on the healthy vines.

Cranberry Tipworm—I have noted, in looking over some of the recent reports of your Association, that frequent mention is made of the tipworm as being a pest of considerable importance to you; in fact, the tipworm and blackhead fireworm seem to hold front rank in the list of insect pests on Wisconsin marshes. Comparing the information gained from one of Mr. Malde's addresses on the tipworm with our own knowledge of the life history of the tipworm I find there is no material difference in the habits of this pest in the two states. While in the employ of the Federal Bureau of Entomology I had the opportunity to give some time to the study of the tipworm and it occurred to me when I was casting about for a subject to discuss that I might have some data on this pest which would be of interest to you. First, let me say that I wish to side with Mr. Malde in his protest against the use of the name, tipworm. It is in reality a maggot and the term worm is a misnomer.

The blackhead fireworm is sometimes spoken of as the tipworm and we have another insect, known as the blossom or bud worm, which cuts off blossoms and the terminals of uprights. These are both very serious pests but are not so generally distributed over the cranberry bogs as a whole as the genuine cranberry tipworm, Dasyneura vaccinii Smith. This insect is always with us. We find it on every bog and I should say it is the commonest cranberry insect and the least understood. Very few growers pay any attention to it and some do not recognize its injury to the vines at all. I have seen bogs where the shortness of crop seemed to be due to the tipworm and other bogs that cropped well and still had considerable infestation. My only regret in making this trip is that this is the closed season for tipworms in Wisconsin. I would like very much to see some of your marshes and compare tipworm infestations with those which I have seen at home.

The manner in which this insect passes the winter was long a subject of conjecture. I think Dr. Franklin was the first to note that it hibernated in its cocoon on the ground. At any rate, it was he who pointed them out to me and since then I have collected many of the tiny white cocoons attached to fallen leaves on the ground in late summer and fall and have carried them through the winter for observation. The tipworm remains as a dormant larva in its cocoon throughout the winter and changes to a pupa in the spring, emerging shortly afterward as a small fly or about the time when the new growth of uprights is fairly started. Eggs are then deposited on the upper sides of terminal leaves. This occurs with us in the early part of June. So far as I can determine the first brood does not shorten the crop as the growing tip is killed above the point where the blossoms have started and these flourish as well as do blossoms on uninjured uprights. During the first week in July, in the midst of the blooming period the

second brood of maggots will be found in the tips and whether these infested tips produce fruit buds for the following year's crop seems to depend largely upon the vigor of the vines or, it might be said, upon the availability of plant food in the bog.

I am convinced that in New Jersey the insect is two brooded, although there may be a partial third brood. An important difference in the habits of the two broods is that the cocoons of the first or June brood are formed in the cupped leaves at the tips of the uprights while the cocoons of the second or July brood are formed on fallen leaves or trash under the vines. Occasionally I find a cocoon attached to an upright or runner above the ground.

We have long looked for a tipworm remedy in which flooding would be the means of control. I am sorry to say that I see no hope for control along this line aside from a flooding which also sacrifices the crop. In support of my contention that flooding cannot be relied upon as a control I wish to recite an experiment made while living at Whitesbog in 1916. On June 15th I collected uprights which showed infestation by their cupped terminals and completely submerged them in a running brook. At the end of five days and three hours the uprights were removed and an examination of the tips revealed six live, naked larvae, five live larvae in cocoons, three live pupae in cocoons, a total of fourteen live specimens and one dead pupa in its cocoon. After an experience like that I was about convinced that here was a job for an icthyologist. Aside from this experiment I have repeatedly found the tipworms surviving four and five days of actual bog reflowage in June. Therefore, I have concluded that the ordinary and some extraordinary reflows have little effect in reducing tipworm numbers. The cupping of the terminal leaves probably is of value to the tipworms as a protection from water submergence in this way—these cupped leaves hold air for several days in the shape of bubbles beneath the water and also keep imprisoned oxygen given off by the leaves.

It is not infrequent that a bog owner in New Jersey holds the winter flowage over the vines until July 10th or later to destroy insects and to eradicate grasses, losing the crop of the current year but perhaps doubling up the following year. Numbers of bogs having had this treatment have shown tipworm infestations shortly after the flowage was drawn and I am inclined to think the tipworms did not come from the loosestrife or other host plants, if any, because at that time of year there is usually no activity of tipworms under normal conditions, that is, where they have not been held under water.

From 100 infested tips collected on a bog winter flowed until July 15th, I obtained thirty-one female and fifteen male tipworm flies from August 15th to 17th. I think this shows their ability to withstand a very long period of flowage while still dormant and indicates that a complete cleanup can not be made in that way.

It is customary to reflow New Jersey bogs immediately after picking in September or October for a period of from two days to a week or more. At this time tipworms are hibernating as larvae in cocoons on the ground. Numerous observations have shown that infestations are not reduced to an appreciable extent by this treatment.

So far as I know at present the most promising method of reducing tipworm numbers is to use a nicotine sulfate spray. I have succeeded in killing some of the larvae by this method on small experimental plots but have lacked time to go extensively into this procedure. The time of appearance of the first brood in late May and June is so long drawn out that I do not believe it best to attempt spraying at that time. The second brood is more closely bunched during the blooming season so that greater execution may be obtained if the vines are sprayed about the first of July. One of our growers, following the suggestion, sprayed with Black Leaf 40 at the rate of one gallon to 800 gallons of water and was surprised at the freedom from tipworm the following year. With the advent of nicotine dusts and in consideration of their value against certain soft bodied insects, a promising field for investigation opens up in the trial of dusting to kill tipworms.

I have made considerable study of injured uprighths with a view toward determining the actual amount of damage caused by the tipworm and have reached the conclusion that health of vines is a most important consideration in this respect. Where the vines are grown under such conditions of care and treatment as to make them productive of fruit they are able to resist tipworm attacks and to set fruit buds in spite of the destructive attacks on the terminals. In this connection I have reason to believe that the moderate use of fertilizer is an excellent means of invigorating infested vines. Wet bogs appear to be more heavily infested than well drained ones, hence the adoption of a better drainage system is indicated in these cases. There is little sanding done in New Jersey so we can not rely on that operation to smother tipworms as is done in Massachusetts. Natural parasites, in the shape of small, hymenopterous insects, frequently attack the larvae in cocoons and must be of very great help in keeping down the numbers of the host.

Several years ago I made an attempt to learn how much injury or loss of crop the tipworm actually was causing. Some growers believe the work of this insect results in a mild and harmless pruning of the vines while others point to unproductive areas as examples of the seriousness of tipworm feeding. I am inclined to think that we are underestimating its importance and that a thorough study of the whole problem would be worth while. In this connection I wish to give you some figures illustrating my contention. I made it a practice at one time to collect cranberry uprights on bogs in various localities, usually 100 at a place, to determine the percentage of infestation. Out of twenty-three such collections the least amount of infestation was 9 per cent at Browns Mills, N. J., and the greatest amount was 90 per cent on a bog at Wareham, Mass. An infestation of 80 per cent was found on a wet, grassy bog at Hammonton but I must say of the Wareham case that the bog in question was a model of culture. In a total of 2956 uprights examined 33 per cent were found injured by tipworms or practically one-third. Going into this matter still further I secured counts on the number of uprights that formed buds in the fall after having been attacked by tipworms in the summer. In a total of 2946 injured

uprights 47 per cent recovered to the extent of forming buds either at the terminal of the upright or on the side of the terminal. The other 53 per cent remained simply as stubs. Considering the 47 per cent that formed buds after attack it is important to know that only 15 per cent of these buds were actually terminal buds, the others were side buds. In many places and for a number of years I have examined fruiting uprights and have found in most instances that fruit comes from a bud directly at the terminal and rarely from a bud formed on the side of the terminal. As a general thing I have observed that side buds produce fruit only when the vines are in a high state of productivity due to fertilizer applications or to naturally productive soil conditions.

Using the foregoing figures as a basis for calculation, the indication is that approximately 25 per cent of the uprights on the bogs examined were out of commission due to the attack of the tipworm. If the form of injury were more noticeable to the casual observer, something that instantly attracted the attention like fireworm damage I am sure we would be up in arms against the tipworm.

In closing may I express my appreciation of your courtesy in extending an invitation to me to address you at this meeting. It has been most considerate of you to have invited me to two of your summer meetings and I have greatly regretted my inability to be present at a time when some of the marshes might be examined.

It was a great pleasure to have Mr. and Mrs. Lewis visit us two years ago and I am sorry that Captain Nash and party did not stay around long enough last year for me to meet them at that time. Should any of you contemplate a visit to the New Jersey bogs at any time I hope you will feel free to write me so that we may be on hand to extend the same cordial welcome that you have given me here.

DISCUSSION

MR. SCAMMELL: The fertilizer we used last year was one the New Jersey Station recommended—525 pounds nitrate of soda, 1265 pounds acid phosphate and 215 pounds sulphate of potash; the acid phosphate is a different form from ordinary, there is some lime and was made up to suit our difficulties. We used 500 pounds to the acre and in some cases 1000 pounds, applying early in June. It was designed for sand bottom but it worked equally well with us on mud bottom. The effect shows the first year of application. Apply in June and it will show in the amount of blooms set into fruit, and the size of blooms. It will show the next year in the amount of crop, and the acid phosphate will show for several years, the nitrate of soda does not last so long. We do not think the acid phosphate has an injurious effect; when I say acid phosphate that is the way the company gave it out. First, it was a mixture of rock and acid phosphate. It has a very noticeable effect in bringing in grasses, but at home we find the grasses are not permanent.

MR. J. SEARLES: We used rock phosphate but it brought in a lot of grasses and they stayed with us.

MR. SCAMMELL: Then you must write Mr. Harrison and get one of his mowers. It has a five-foot cutter bar in front of a bicycle wheel with two handles like wheelbarrow handles and a Maytag engine to drive the cutter. You can mow at any height and although it isn't perfected we hope to get one.

MR. A. E. BENNETT: We went over the whole marsh with a mower and team this year. Next time we are going to put the sickle in front of a Ford on big wheels.

MR. S. N. WHITTLESEY: I keep the mower off my marsh religiously. I get rid of that grass by rolling it down. It don't injure the vines so much but it certainly does discourage the grass. If you cut high enough to miss the uprights you are not doing the grass any damage.

MR. SCAMMELL: Mr. Davis on Long Island makes a practice of mowing his bogs with a mowing machine and horses cutting vines as well as grass, thereby renewing the vine growth. It is perhaps the finest piece of cranberry culture in the whole country. I saw him mowing in August, but do not know his regular practice.

MR. VERE JOHNSON: We have had fairly good success rolling our bog. The best success was two years ago just before the freeze-up and was real wet with two or three inches of water on the surface. It was covered with wide leaf and it not only killed the wide leaf practically 100 per cent perfect, but it seemed to stimulate the vines and press them down.

MR. WHITTLESEY: The grass starts growing a week or so before the vines, so I catch it with the roller after the grass starts and before the vines start. If you wait too late you do more damage than good.

MR. LEWIS: Have you made any study as to time of development of fruit bud? Dr. Franklin told me you can not be sure a fruit bud is a fruit bud.

MR. SCAMMELL: For ordinary purposes you can say "This is a fruit bud and this isn't." I cannot say that I ever followed what was apparently a leaf bud through the winter to see if it developed into a fruit; while it is possible I don't think many of them do. We have never considered injury to fruit buds by fall frosts.

MR. LEWIS: A frost in 1895 is reported to have spoiled two crops.

MR. M. O. POTTER: The frost came so early— and there is where you are flooding up to July. You must take care of the bud till late because it is so tender it will go as quick as when it starts out in the spring.

MR. BENNETT: You can develop a fruit bud in the spring with water into a leaf bud. That's been done quite often. Start a well growing fruit bud with water (as in June flooding) and it will grow too fast and grow away from your fruit and make an upright. Mr. Gaynor called it "telescoping your vines."

MR. LEWIS: What per cent of uprights is a good one to produce fruit buds?

MR. SCAMMELL: I should say three-fourths. That ought to be taken up in connection with tipworm study. Some bogs seem to produce a crop and rest a year but the best ones will produce fruit year after year.

MR. ALBERT HEDLER: When we took over our marsh, three sections had been planted to Searles Jumbos and had been neglected and were very grassy. We started to pull these vines to plant elsewhere, and actually scalped two of the sections. A good deal of grass was pulled in pulling the vines on the third section and the following spring the remaining vines grew so rapidly they crowded the grass out and we got a fine bed of vines. The other two sections could have been saved the same way. On one plat our vine growth was very heavy and we sanded heavily; the following year we gathered twenty-seven and a half barrels from sixteen square rods out of that heavily sanded bed. One section of our marsh is very grassy, I think from lack of drainage. We have increased drainage and the vines are gaining on the grass. Mr. Lewis suggested sharpening the heart shaped center of an old shovel

for attacking bunch grass. It worked very well and we are no longer afraid of that pest. Star grass is bothering some; I intend to attack it by drainage, and if that doesn't work, by pulling, and if not that way I will pull vines and everything and give it drainage and try to give the vines a new start. I am going to try rolling on the south plat.

MR. SCAMMELL (answering questions): There are two or three hand dusting outfits and some power dusters. At Whitesbog they blow dust with a power duster as far as possible and finish with a power sprayer; hand dusters with nicotine dust is worth trying. It looks like the best bet for tipworm. You must use a soap solution with spray and the dust would get into the tips better. We may try it another year.

A berry from every upright would be a tremendous crop. A berry to every square foot is about a barrel to the acre. That is 43,000 berries to the barrel.

No one in New Jersey is trying to make a picking machine. They have one in Cape Cod which was demonstrated last summer and it is quite improved but nowhere near perfected. It is a large machine weighing 1400 or 1500 pounds, with a Chevrolet motor. I think a movement is on foot to raise funds for developing a picking machine in New Jersey.

The most ice I ever saw in New Jersey was eleven inches thick and plenty of water under that. The vines are not even frozen in many places. So far as I have found the ground is never frozen in our bogs.

MISS LUCETTA CASE: Two years ago when I got an idea cranberries should be fertilized everyone tried to make fun of me. We tried two kinds, 9-7-0 and 3-10-4, two hundred pounds of the former and six hundred of the latter to the acre to equalize the amount of ammonia. These were spread on plats with check plats between, on several places on the marsh. Toward the latter part of July I could see a difference in size and quantity of fruit and on grassy bogs the vines thickened up so as to leave very little grass; the last fertilizer was thrown in handfulls and where the handfulls went the grass was gone. We found we got rid of grass with fertilizer. When it came berry time we were crowded for time with reservoirs dry so we raked as fast as we could. On some freshly sanded plots we found that 3-10-4 had six times the fruit and 9-7-0 three times the fruit that the untreated plat had. This spring we did away with the experimental plat and spread fertilizer on all the south side of our marsh. They raked twice the number of berries on the treated plot as on the untreated, and on the plot where the 9-7-0 was put last year we put a small amount of 3-10-4 and on that there was a wonderful crop this year, much better than on the plot only treated for one year. The plots are in such condition a cranberry man could tell from tone and color of vines where the fertilizer went and they have thickened up so that the grass is practically gone. We had a wonderful amount of new growth this year, from nine to eleven new uprights to a stem. We have some deep peat, some shallow peat and some that has been sanded. We had more fruit on the sanded than on the unsanded bog with the fertilizer, but it helped on all. I corresponded with the state department and found there were several experiments and they said sodium nitrate was not good on peat soils. This recipe I got from Professor Wheeler in Boston, had been tested on peat soil and worked out, and through Professor Wheeler these experiments in Wisconsin were carried out.

MR. OSCAR POTTER: I used rock phosphate on the ground before sanding and there is a marked difference in vine growth, the vines being much heavier where the fertilizer is on.

MR. GEBHARDT: A few years ago I bought several tons of sodium nitrate and applied about 150 pounds per acre. I got a heavy crop of large berries of good keeping quality but I could not find them. The vines were so thick I raked them against the lay of the vines with a horse rake. The results were quite beneficial.

MR. SCAMMELL: Some say that the acid phosphate is the main element that is considered most essential in the fertilizer.

MR. MALDE: Our tests show that where rock phosphate, acid phosphate and potash, and nitrate of soda, the vines were doubled. Invariably the phosphate and the combination of phosphate and potash gave the best results. Next to that was the nitrate of soda.

GENERAL AGRICULTURAL POSSIBILITIES OF PEAT SOIL

A. R. ALBERT,

Hancock and Coddington Branch Experiment Stations, College of Agriculture, University of Wisconsin.

My experience is largely with the Coddington Station on the Buena Vista marsh, about fifteen miles east of here. This peat soil is a non-acid peat. Mr. Elliot this morning emphasized the different kinds of peat. Our peats on the eastern side of the area are not acid after they are drained. Before draining they contain a considerable quantity of organic acids, but these are carried off after drainage functions properly. West of the river I have done some work at Cutler and Sprague and find the peat there quite universally acid, even after a more or less thorough drainage. The data I present has all been collected on non-acid peat; that must be borne in mind. Furthermore, they are from tiled land, but it is my opinion a good deal of land in central Wisconsin if well ditched will react about the same even if it is not tiled.

The first step in the development of peat soil is to get the water off, a matter for larger capital to promote through drainage districts, selling the land for enough to pay cost and a profit.

Our work at Coddington shows conclusively that these peat soils cannot be farmed successfully without fertilizer. Hence a settler attempting general farming must purchase cheap enough so that he will have surplus capital, comparing his purchase price with that of good upland soil, with which he can pay the cost of fertilizer. In other words, a man cannot expect to pay $125 per acre for peat soil and expect to fertilize and make good with general crops.

The Wisconsin Bulletin on Marsh Soils presents a table of relative content of nitrogen, phosphorus and potassium in different types of soils. Those are critical elements—perhaps lime should be added. Clay loam and silt loam soils, ordinarily thought of as fertile, contain about 3,000 pounds of nitrogen, 1,600 pounds phosphorus, and 50,000 pounds of potassium to an eighth inch depth. Sandy loam contains 1,500 pounds nitrogen, 1,000 pounds phosphorus and 20,000 pounds of potassium. There is a larger drop in potassium than in anything else. Peat soil runs 10,500 pounds of nitrogen, four times as much as sandy soil contains, but only half as much phosphorus and one-thirtieth as much potassium. Considering that part of the potassium is not available and an average crop requires forty to fifty pounds, you will see that this meager supply will soon be exhausted. The farmer's experi-

ence with general crops on this soil, has been that they can produce a crop or two and then there is a general decline, which is due to exhaustion of available potassium. There is considerable marsh border type of soil in Central Wisconsin, sand and peat mixed. It is better than peat for several reasons. It contains more potassium and more phosphates.

About the first consideration the peat farmer is up against is a type of farming suited to peat soil, and I frankly confess I have not made up my mind what would be best. Peat is a special type of soil; it is adapted to growing specialized crops, for it is abundantly supplied with nitrogen, that most expensive ingredient of commercial fertilizer. It is a soil easy to cultivate and for that reason especially adapted to certain kinds of crops You have found that one of the crops which can be grown is cranberries. You know that a specialized market must be developed for a specialized crop, and you are also aware that we could not devote all this area to celery or onions or hemp or any one crop or group of crops. There is so much peat in this country it has been stated, I believe, that one or two per cent of it will grow all the garden truck needed for the country. Hay farming, I believe, could be developed as I will show later, though even growing hay successfully depends upon the use of commercial fertilizer. Who ever heard of fertilizing for a hay, grass or pasture crop? And yet, if hay is to be successfully grown on these peats, they must be fertilized. And then dairy farming—if you grow hay you need a grain crop to seed down with a combination suited to a few dairy animals, and if you have dairy animals you need a silo and corn, a questionable crop; but as a substitute for corn you can use roots. Don't put all your eggs in one basket; corn is apt to be caught by frost. I have here a chart showing the number of frost days, beginning in June, 1921, and you will see that the only month in which we have not had frosts is July and in my opinion we are just as liable to have a frost in July as in June or August.

We began work on the Coddington station in 1919. An experimental field was laid out in a four-year rotation of hay, corn, oats and rye. Some of the results of the application of fertilizer are shown in the appended tables. Potash seems to be the limiting factor and should be applied if only one element can be furnished on account of expense or for other reasons. We have not gotten increases with acid phosphate and we have received no beneficial effect from lime.

I agree with Prof. Elliot that it is essential on all peat soil to remove the water rapidly in the spring so the soil may warm up and the plants root deep. That is essential. Later on in the season after the surface of the peat has dried out it will take a very heavy rain to saturate a peat soil to a sufficient depth to do much good. Time and again I have seen a half-inch rainfall absorbed in the surface two inches of soil. The roots are below that and get no benefit. During the last three years we have produced good crops, that is good—if they do not freeze. Some of the years have been very dry, so I must assume that that crop has been able to feed on the moisture stored up in the peat.

Now for the method of application of fertilizers. You see the relation between rainfall and the application of fertilizers. For crops to benefit, put the fertilizer where the roots are. The surface dries out and only a very heavy rain will penetrate to the lower depths of the soil and carry the fertilizer along. All peat soil has very high absorbing power and tends to hold rain in the surface layer. Therefore fertilizer should be applied to a depth where the soil is moist and the roots can get it, either with a fertilizer drill or an attachment of some sort. I do not think fertilizer should be plowed under as it gets too deep into the soil. There is machinery for sowing grain and fertilizer together, planting potatoes with fertilizer, setting plants with fertilizer and corn planter attachments.

Almost every soil has a problem of some kind; heavy clay soils of Northern Wisconsin have tillage problems. Southwestern Wisconsin has overflow problems during heavy rains. Sandy soils have droughts and on peat soils we have the fertilizer problem and frosts. As we must take the weather man into account it seems a weighty problem. We can control fertilizers, but not weather. But what we can do is to select crops least liable to freeze, which have a short growing period and which will meet the needs of the farmer.

A peat soil should be plowed as little as possible; it is not necessary to stir the soil and have it loose, it will stay loose. I believe fall plowing is a good practice, not so much that the soil requires it but because farmers' time in the spring is too valuable. One of the difficulties with the farmers has been they are slow getting crops in—they must do in spring work which should have been done in the fall.

We are going to have an invasion of snap dragons and Canadian thistle and quack grass which is going to cause considerable trouble unless taken care of.

Grass, grain, or whatever crop is planted should be rolled or compacted in some way so as to firm the seed bed upon the seed, especially if the weather is dry. In case of rain that contact will be established anyhow.

Here is one rotation we have found to operate fairly well. Starting in with Alsike clover hay; second year, mixed hay or pasture, manured in fall and fall plowed; third year, root crops, followed the fourth year by corn, and then grain seeded down in the fall. The root crops we are growing successfully so far are potatoes, carrots, mangels and sugar beets. The sugar beets are not successful as a sugar crop, but they have given us a fairly good supply of feed. The roots are taken off, the land disced the next spring and seeded to corn, disced again after corn harvest and seeded to rye, and the fifth spring we use a grain disc drill to loosen the soil and sow grass or clover seed. Corn, as I pointed out, is a questionable product, and I am not certain that it will remain in this rotation, but if a man has a silo he can grow corn and sunflowers. Crops can be adapted and changed to suit the needs of the farm. Fertilizers are applied for the root crops such as are shown here. I have given the yield of some of our crops in the following tables:

Effect of Fertilizers on Roots and Alsike Clover

These crops occur in the five year rotation mentioned. The rotation has not been in effect long enough to have had roots on clover sod, but the fields on which the potatoes and carrots were grown had been lightly manured.

The potatoes and carrots have been of good quality and they are easily grown and harvested. The potatoes are of course in danger of frosts, but the carrots are not readily injured.

The Alsike clover land has never been manured, and the fertilizers indicated had been applied the previous year for oats, which yielded 50 bushels per acre, at 300 pounds per acre. Therefore the effect on clover was a residual effect of fertilization.

Treatment	2 Year Ave. Potatoes Bu. per A.	2 Year Ave. Carrots Bu. per A.	1923 Only Alsike Hay Lbs. per A.
500 Lbs. 0–10–15	145.1	392.2	1945*
None	107.1	331.0	922 weeds
500 Lbs. 4–10–15	137.4	348.7	2334

*Where no fertilizers were applied, the clover was considerably thinned out by starvation for potash, and the recorded yield of 922 pounds was mostly weeds, while the other hay was of very good quality.

Effect of Methods of Applying Fertilizers

The following data shows that small amounts of fertilizer produce the best results if applied in the row, but the maximum production is possible only through a double application. On corn it is unwise to make a heavy application in the row, due to the effect on the germination of the seed. A safe application is not quite sufficient for a maximum crop on this soil, and so it is well to make also a broadcast application. An application of manure can easily take the place of this broadcast application, for manure is a good potash fertilizer.

Treatment in Rows	No Other Treatment	Plus 200 Lbs. 0–10–15 Broadcast
None	2.6 T. Silage	3.6 T. silage
75 Lbs. 4–10–15	3.5 T. silage	3.6 T. silage
150 Lbs. 4–10–15	7.3 T. silage	9.0 T. silage
300 Lbs. 4–10–15	6.6 T. silage	8.4 T. silage

Yields of Sundry Crops When Properly Fertilized

These crops were grown on land which had been under plow for about four years and during that time has never received any manure or commercial fertilizer in any form. In 1923 the 400 lb. application of 0–8–24 was drilled in on the fertilized part of the field with no manure, and the other part was left untreated. The yields are given below. In addition to other points they show how differently various crops respond to potash.

Crop	Fertilized With 400 Lbs. 0–8–24 per Acre	Not Fertilized
Oats (grain and straw)	5,424 lbs.	2,595 lbs.
Oat and pea hay.....	4,599 lbs.	1,650 lbs.
Peas	9.5 Bu.	1.6 Bu.
Hemp straw	10,756 lbs.	2,100 lbs.
Soy bean hay	4,233 lbs.	1,422 lbs.
Millet	4,760 lbs.	2,647 lbs.
Parsnips	15,880 lbs.	Not harvested
Early Ohio potatoes	136.2 Bu.	32.3 Bu.
Rurals	151.4 Bu.	31.6 Bu.
Sunflower silage	27,400 lbs.	3,960 lbs.

The above data need no further comment. They show that in 1923, which was probably an average year with a frost the latter week in June and again the last part of August and a freeze on September 13, satisfactory yields of a good many crops could be obtained when the proper soil treatment was applied. Without that they were uniformly failures.

SUMMARY OF TALK TO THE WISCONSIN CRANBERRY GROWERS ASSOCIATION

Recapitulating briefly what I have said, I would say that I am convinced that in order to succeed on the peats of Central Wisconsin:

1. The maximum area of tilled land that one man and team should attempt to handle is 60 acres. It is far better to fertilize and till this properly than to scatter seed and labor over a larger acreage with very questionable success on all of it.

2. Drainage, whatever its form, must be sufficiently rapid in the spring to permit the warming up of the soil and the deep rooting of the plants.

3. Potash and phosphate fertilizers must be employed liberally at the start and their use subsequently continued as supplementary to manure.

4. Careful thought must be given to the proper selection, and the manner and rate of application of fertilizers.

5. Rotations must be planned and carried out or so adapted that:
   a. Plowing will be reduced to a minimum.
   b. Weeds can be controlled by timely and thorough intertillage.
   c. The crops grown will be those least subject to frost hazard and so diversified as to still further reduce the calamitous effects of a frost and yet provide the necessary cash and feed crops.

6. Some dairy cows must be kept to provide a steady if small income, consume the roughage produced (possibly excepting hay), and providing the invaluable manure, but, in all cases the size of the herd should be so small as to permit an annual carry-over of a certain amount of feed.

7. On acid peats the application of lime for the successful production of Alsike should be carried on.

8. Seed beds must be compacted when weather is dry.

9. Alsike clover and all other legumes should be inoculated.

10. Finally, a class of peat farmers who either already know the conditions and understand the management of peat, or are willing and able to profit by instruction and observation, must come into existence.

You would consider a man improvident who, with very limited capital and no experience with cranberries, would come among you and risk his all on a cranberry venture. You well know what would happen. Similarly, do I know what is going to befall the man, a prairie farmer, let us say, who arrives in March with all his stock and machinery and only a small capital reserve. By the next spring he will be discouraged, his cattle mostly skin and bones, and he would like to go back to where he came from. Let us all cooperate to avoid such failures whenever possible. The peat area is enough of a problem to those who know it, without adding to it a bad reputation such as such cases are bound to create. If such new men were only told and would only believe that these peats must be fertilized if they hope to win, then there would be a good prospect that they would learn enough the first year to enable them to make good the second and later years.

Some day these peaty areas will be successfully farmed, but it is just possible that their reclamation was a little premature or too extensive, considering the large areas of other undeveloped lands. That time will decide. In closing I repeat that success is improbable without the judicious use of potash, phosphates, and sometimes lime. Whether the man who does use them succeeds or not then depends not on the soil but on himself, the weather, and general economic conditions.

I would like to extend an invitation to all of you to visit our experimental station at Coddington on our field day next year, or at any time when you are in the vicinity. Your secretary, Capt. Guy Nash, has blazed the trail. He was with us last year.

DISCUSSION

MR. O. G. MALDE: Last summer was late and last fall frost came early, September 12th or 13th. At Mather, where I was, I was astonished at the work of the frost, which touched 12 degrees with no water. Quite a few frozen tips of vines and buds appeared, which I think will shorten next year's crop 25 per cent. This loss, I believe, can be attributed back to the tipworm, for the parts injured by the frost is where the tipworm caused one or two starts and the late buds were tender.

Some upland insects seem to be encroaching on the marsh following the dry season. There are a couple which appear like leaf rollers, but they don't kill whether they feed on the top or bottom of the leaf. I have seen more in the Mather district than ever before. I found some as late as November after that frost, and millers flying on November 5th, some of which I sent to Dr. Fracker, who sent them to Washington for examination.

The bog, which has been using hen manure and commercial fertilizer, continued their use this year. They showed up well, but not so well as in the past, he making annual applications. In trying out fertilizers I think they should not be put on every year, but once in two or three

years should be the maximum. Miss Case's experience indicates the use of fertilizer is going to increase production in this state, and it will be well for each grower to make a small test on his own bog.

CAPTAIN GUY NASH: Relative to rock phosphate and acid phosphate, I have in mind that Mr. Beckwith stated there seemed to be something about the sulphuric acid radical which is permanently injurious to the cranberry plant so that so far as possible sulphates should be kept off the marshes. Mr. Albert's charts indicated that with general crops on peat soil, the same conditions exist, rock phosphate giving better results than acid phosphate.

Bear in mind that conditions vary greatly in different cranberry states and in different parts of the same state, especially ours. New Jersey now shows great enthusiasm over fertilizers; our conditions seem more similar to Massachusetts than New Jersey, and Dr. Franklin's long series of experiments with fertilizers were unsatisfactory, giving increased yields at first, but later interfering with bearing qualities, besides affecting keeping quality of the fruit, and lessening vine vitality. Let's keep on experimenting, keeping close track of results, but working on plats and not fertilizing the entire bog, as Mr. Malde suggests.

The only solution for some of our problems is an experiment station. You and I have not the technical knowledge, or we may not be able to give the time at a vital period, just as Miss Case had to rake her berries in a hurry to save them. We are not going to get one at this next session of the legislature, nor probably the one after that. But let us make up our mind we are going to have one and probably will have to put up quite a lot of the money ourselves, but let's get one as soon as we can and work it to the limit when we have it.

MR. MALDE: Personally I feel a field agent would give better results than an experiment station, because we could try out checks on various marshes under commercial conditions.

PRESIDENT LEWIS: In regard to the expressions of Mr. Nash and Mr. Malde, we will undoubtedly appoint a legislative committee at the August convention, and these matters can be discussed then. We will have to get some money to work with and may have to ask the companies and individuals to contribute to a fund to start the ball rolling, or should I say, to start the *log-rolling?* We will probably need $500, but that need not be discussed now. A motion to adjourn is in order.

ACCOUNT OF FINANCES

THE WISCONSIN STATE CRANBERRY GROWERS ASSOCIATION

Calendar Year 1923

Regular Fund

1923				
Jan.	1	Balance on hand	$477.78	
	12	Dues	46.00	
Mar.	21	Dues, State Treasurer Receipt No. 2328	2.00	
	30	Dues, State Treasurer Receipt No. 2494	4.00	
July	1	Annual appropriation	250.00	
Aug.	17	Dues, State Treasurer Receipt No. 5326	10.00	
Mar.	14	Dr. H. J. Franklin, Honorarium		$139.40
	29	Printing Board, letter heads		7.79
June	20	S. N. Whittlesey, Expenses Leg. Com.		15.82
	20	C. L. Lewis, Jr., Expenses Leg. Com.		26.66
	20	Mrs. S. N. Whittlesey, Sec. Sal. and Ex.		120.89
Sept.	5	Mrs. Nellie A. Dolan, Steno		25.00
Dec.	31	Balance forward		454.22
			$789.78	$789.78
1924				
Jan.	1	Balance on hand	$454.22	

Special Pumping Experiment Fund

1923				
Jan.	1	On hand	$500.00	
May	29	B. R. Mitchell, Labor and Ex.		$161.20
Sept.	6	O. G. Malde, Time and Ex.		72.48
Oct.	6	O. G. Malde, Time and Ex.		101.67
Dec.	6	O. G. Malde, Time and Ex.		78.88
Dec.	31	Balance forward		85.77
			$500.00	$500.00
1924				
Jan.	1	Balance on hand	$ 85.77	

Tribute

In the passing away of Mrs. Susan Bender McFarland, which occurred January 2, 1924, the Wisconsin State Cranberry Growers Association lost a valued member. Although for many years not directly connected with cranberry culture Mrs. McFarland retained her interest in and loyalty to the Association by keeping up a fully paid membership, and attendance at the meetings when health permitted.

We pay sincere tribute to her memory, and extend to her son, daughter and other relatives our heartfelt sympathy.

MR. C. L. LEWIS, JR., President,
CAPT. GUY NASH, Secretary,
MRS. S. N. WHITTLESEY,
Committee.

OFFICERS OF THE WISCONSIN STATE CRANBERRY GROWERS ASSOCIATION—1924

President.....C. L. Lewis, Jr., Beaver Brook, Wis.
Vice President .....Guy Nash, Wisconsin Rapids, Wis.
Secretary .....Miss Clare Smith, Route 3, Wisconsin Rapids, Wis.
Member Executive Committee.....S. N. Whittlesey, Cranmoor, Wis.
Member Executive Committee..Mrs. A. C. Otto, Wisconsin Rapids, Wis.