Mr. Hansche. Yes, and a good crop too. It grows a little longer in the fall on the marsh land and may get hit by the frost.

Dr. Sherwood. What mistakes have you made with your 120 acres?

Mr. Hansche. The 15 inch main falling one inch per 100 feet is not big enough at all times to drain 120 acres of land, receiving the run off from about 150 acres of surrounding land. I wish I had a 20 inch outlet.

Mr. Cheesman. What would you be willing to pay for your 120 acres as it is now situated?

Mr. Hansche. I would not invest in that kind of land now. I would take my money and buy some wild marsh land and do the same with that as I have done with these 120 acres.

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DAIRY FARMING ON PEAT.

Carl Foll, Holstein Breeder, Deerfield, Wisconsin.

Sometime ago Professor Jones sent word to me "Will you come to the meeting of our Drainage Convention and give us a talk on peat farming?" I promised to come. Now, worthy listeners, I am only a common farmer. Don't expect from me a fine talk, like a lawyer gives, or like a minister, or like a professor from the Experiment Station. I was born and raised in a foreign country. I cannot talk the American language as plainly and correctly as you gentlemen who have been born and raised in this country, so if I make mistakes in talking the American language, please pardon me.

Forty years ago, when I came to this country, I knew nothing about farming. I had never plowed a furrow in my own country; I had never seeded grain by hand or by machine; had never mowed grass with a scythe or with a machine; in short, I didn't know anything about farming.

The first thing after I landed in Deerfield I looked for work. I found work, and hired out on a farm for the year. I worked on that farm for nearly four years. During this time I tried to study farming all I could. I kept an agricultural paper, and I went to some successful farmers I knew, looked over their
farms and had a good talk with them. Then I studied the crops. If you go thru the country at the time the crops are growing, you can learn a great deal. I must say you can learn something about these things that a professor from the Experiment Station cannot teach you.

After a while I had a chance to buy a farm on a contract, and I thought to myself, "If I take this chance I cannot lose much because I have not got much." So I made a contract and started farming for myself.

I would like to explain to you about the farm on which I started to work. It was the poorest farm in the town of Deerfield—a peat farm. It was a farm of 187 acres of which about 60 acres were under plow, 5 acres timber land, about 20 acres marsh, and the rest of the land was covered with willow brush, tamarack stumps and tamaracks, and was rough and wet. Many times the cattle became mired and I had to go in with a spade and dig them out. That was the condition of the farm on which I started.

I bought the farm in the fall and after I bought it my problem was how to make improvements on this poor peat land. The following spring we had lots of water in the marsh through which ran an old ditch. After most of the water had run away, I went through that marsh with a pair of hip-boots and examined it. By doing this, I could plainly see that the old ditch was not running the proper way. So I staked out a new ditch, but that did not dig it. No money; no help; two little boys, one four years old, the other only two! But, if you have a will, you will find a way. I knew I had no money to build that ditch, so I went to the former owner of the land and explained it to him. He told me, "Go on, young man, build that ditch, and if you have no money I will advance you the money without interest for a whole year." So I hired a man to dig the ditch, and I made that ditch 10 feet wide at the top, 3 feet in the bottom and 3½ to 4 feet deep. The ditch was completed during the first days of June, and I felt that the money I spent for that ditch was well spent. Early in July I had my other marsh all cut and brought in the hay in good shape. Some years we could not cut that marsh until late in July or until August.

During the summer, the marsh got pretty dry. Cattle could walk over it without miring. One day I went on the marsh
with a spade and examined the soil. I found in some places 3 to 4 inches of black soil on the top, and below was raw peat; in other places I found 5, 6 to 8 inches deep of black soil, then raw peat; in still other places I found a foot and more of black soil and then the raw peat. I decided that if that marsh could grow willow brushes it should be able to produce some hay. On the side of the new ditch I cleaned off the willow brushes from 5 acres, dug up the tamarack stumps, leveled off the big bogs, dragged it and seeded it down with timothy and red top. After a while my seeding came up nicely. The middle of October I had a very nice stand of timothy; but the last part of October and first part of November we had a lot of rain. After the rain was over, I went and examined my seeding and I saw it was covered from 1 to 3 inches with water, and that water stayed there until it froze up.

The next spring we had a lot of water again, and on my marsh the seeding was covered with water. It was so wet I could not walk through it until the first part of June. Then I could see weeds starting to grow quickly. Some of my timothy started, too, but I made up my mind that I had to watch those weeds or they would kill the seeding entirely. So the first part of July I concluded to cut the weeds down, but how could I cut them? I could not go in with the horses as it was too soft. I went to a blacksmith and I got wooden marsh shoes made, 18 inches square. We put them on the horses and found that they could then walk on the soft ground. I used the mower to cut the hay, but sank down with it several times and had a hard time to get the mower up again. Finally I got it cut. After it was dry, I used a horse-rake, but could not go in with a wagon and stack it. So we piled it. I hired another man, and we took poles and carried it together. After a while, my timothy that was left started to grow for second crop—some weeds too. The middle of September, I cut that same marsh again. Then it was fairly dry, and I hauled it out with a wagon. It was pretty fair hay.

The same year I cleared another 5 acres and seeded it down, but had no better results the second year than I had the first year. I believe that the hay that I got from those 10 acres would not pay me for the work that I had done on it. So I made up my mind that it was no use to spend my hard labor on that peat marsh. I left matters rest for a number of years.
After a while the farmers organized an association and bought out a mill pond which was about 5 miles away from my marsh. About 100 rods away from my marsh was Koshkonong Creek. That creek ran into the millpond and the millpond backed up that creek, and that was what made the underground of my marsh so very wet. *After the farmers bought the milldam*, the creek went down from a foot and a half to two feet, and the underground of my marsh got a good deal drier. I then made up my mind that it was time to improve the marsh. I went on with my same work, took five acres, leveled it off, seeded it down; but, I had no better results than with my first five acres that I seeded down.

But still I did not give up. I took another 5 acres the next year, and seeded it down. The same result followed.

Now I shall tell you a little more. Before the millpond came away, the marsh produced generally at two cuttings, from 50 to 60 tons of marsh grass a year. *After the millpond had been away about four years*, that same marsh went down in the yield. The marsh grass got thinner and shorter, and wild barley, June grass, and lots of other weeds started in. I had only half the hay that I had the time the millpond was there. I had to go out cutting hay on shares, rented grass, to get hay enough for my cattle.

I could now see plainly that in this way, I could make nothing more than a bare living on my peat farm. So I decided to sell the farm. I went to a real estate man and gave it over for sale, but he could not sell it. The people to whom they showed that peat farm would not buy it. *The next year I deducted a thousand dollars in the price*, and offered the agent, 3 per cent commission. But, still he could not sell it. So I was bound to stay on it. I could not move away and leave the farm because I did not have much. I tell you I was the uneasiest man that you could find. The boys were growing up—they had to have schooling, and where could I earn enough to give them an education? I made up my mind that I would have to experiment with that peat farm in a small way, and I'll tell you what I did.

I dug a hole on my upland 4 feet square and about 2 feet deep. Then I took that raw peat from the marsh and filled the hole up, put a little manure on the top and let it lay over winter. The following spring (middle of May) I took a spade and spaded
it over, raked it off with a garden rake, and planted 25 kernels of corn. The corn came up nicely. Every Sunday morning, after I was through with my chores, I went over there, hoed that corn, and picked out the weeds by hand. The corn grew up 10 and 12 feet high. In the fall I cut the corn down and husked it, and I had 28 ears of corn. It was not quite ripe, but it was as big as any corn I ever raised. After I had husked my corn I stood there and looked at that peat and thought to myself, "Now, you d—n peat, you raise corn here and in the marsh you raise weeds. What is the matter with you?" But the peat didn't answer at all. I stood there and thought and thought, "What is the reason?" I found no reason other than that here was drainage while in the marsh there was no drainage. I had discovered that peat raised corn, but how was I to drain the marsh? I had seen in agricultural papers some articles on tiling but I had never seen tiles and didn't know how to lay them. I went to the first clearing that I had made on the marsh at the side of the new ditch, measured off 100 feet and began to dig another small ditch about 2½ feet wide and about 20 inches deep. I ran the ditch along on the side of the old ditch about 26 rods and then slanted off into the old ditch. Where I started the second ditch I made another slanted ditch into the old ditch, so I had practically one acre that was ditched all around. The water ran nicely from my new ditch into the old one. After a while that land got dry and I could go in with the horses. I built a little bridge over the new ditch, and plowed the land. About a week after I plowed it (it was pretty late) it froze up. In the winter time I covered that acre with 12 loads of barnyard manure. The following spring, after I was through with my other corn the last part of May, I went over there with a pulverizer, pulverized the land, dragged it and planted corn. I bought the Yellow Flint corn. The corn came up nicely. We had to hoe it twice as the weeds grew very quickly. In the fall we harvested that corn and I had 42 bushel baskets of corn,—solid Flint corn. Now I could see that the peat marsh could produce corn if it was drained. I plowed that same piece over again in the fall, took another 12 loads of manure in the winter-time and spread over it, and raised another crop of corn. The next year I had 63 bushels of solid Flint corn.
This was enough to show me that that peat land could produce corn if it was properly tiled,—but how to tile it was a problem to me. I asked several about tiling. They laughed at me, and said, "Why do you want to tile that peat? That peat is good for nothing." I didn’t argue with the people—I knew from my own experience that peat would produce corn.

I knew a neighbor’s boy who had taken the short course in agriculture at the University. I went to see him and he said that they taught tiling at the college, but since his land was rolling he had not paid much attention to that work. How I wished I could go to that school!

Then a bright idea struck me. I had a boy who had finished graded school, and I decided to send him to Madison. He argued that he had schooling enough for the farm. By fall, however, he had changed his mind. Perhaps the gold watch I gave him helped. At any rate he entered the Short Course that fall.

At Christmas time he had learned nothing about tiling. The same was true in March. But a year later he came home with his diploma and a medal won judging live stock. He had also learned how to tile and to use a level, and had had many talks with the instructor in soils about the proper fertilizer to use for peat.

That summer after we had our grain stacked he borrowed a level from the Agricultural college and he and his younger brother began to survey the marsh. They set a lot of stakes and put marks on them that I did not understand, but by night he had made a map and a plan. He explained it to me and then I understood it. He made a list of the tile of different sizes that we needed. I had to borrow money to pay for the tile and the tools with which to lay them.

While we were laying that tile a good friend of mine came to me and offered advice. He advised me to quit burying money in the peat marsh. I thanked him for his good intentions, but kept on tiling, and am glad I did. In four weeks we had tiled 10 acres. It looked good to see the water running out of the 6 inch outlet. A 12 quart pail full every three minutes. In two weeks the tile had stopped running, because they had the 10 acres dry. With three horses we plowed that marsh where no horse had ever walked before without bog-shoes.
In the middle we left a strip for a road. We had, in the barnyard, about 40 or 50 loads of manure, and we put it on the top of the plowed land. In the winter time we finished manuring it. Next year, about the 25th of May, we went in there with three horses on the pulverizer and two horses on the drag, and we put in the corn. It took us about 8 or 9 days. Then we dragged it twice while it was coming up.

One Saturday I went down to see the corn and I made up my mind I had to start Monday and cultivate that corn. Weeds were springing up pretty thick. From Saturday to Sunday we had a frost. Sunday morning I could see in the low marsh there was a white frost. I thought right away of my corn. After breakfast, I and the boy went down and our corn was frozen down to the ground, and the ground was frozen as thick as a lead-pencil. We made up our minds that Monday we would drag it well and plant it again.

But the pathmaster saved us without knowing it. On Sunday he came and I told him that our corn was frozen in the marsh and we would have to replant it. He said he had to have us to work on the road with two teams for two days, and we had to go. When I came home from working on the road the first day I went down quickly to look at the corn and could see it coming nicely again. Next morning we went and examined it carefully and we could see plainly that every kernel was coming again. The corn grew very nicely and we took good care of it. It grew up to 10 and 12 feet high.

Then the boy began to talk silo. "A silo! What is that?" He explained to me what a silo was. All I needed then was the money. We finally got that and built the silo. It was the first silo between Madison and Lake Mills. That was 17 years ago. After the corn was ready to put in the silo we wanted to know how many tons of corn there was. So we went in the center of the corn field, measured off one square rod; cut the corn by hand and carried it on our shoulders out to the road; loaded it on the wagon; went home and put it on the scale and I tell you, my good friends, I had 24 tons and 700 pounds clean corn per acre. Our silo held 180 tons. We filled that silo and we had 36 to 40 shocks of corn left.

The same fall we plowed that piece again but put no fertilizer on it. In the spring we put corn in it again, and we
grew a nice crop of corn but it was not as heavy as the first crop. Nevertheless we filled our silo with 10 acres of it.

Then we took another piece of marsh, 12 acres, and tiled it. At the same time took the pulverizer and pulverized that piece on which we had the second crop of corn, and put rye in it. We also put in 8 pounds of timothy seed and 1 pound red top per acre. The rye grew up nicely, and we harvested 22 bushels per acre, and I had a lot of straw that I could make into manure. A good manure pile is a farmer’s bank. We had on the second tiling a good crop of corn too, but still we fertilized it with barnyard manure. After the rye was cut from the first tiling, the timothy, alsike clover, and red clover I put on in the spring grew up nicely, but some weeds came too. The middle of September we cut it and we got 10 good loads of hay. I saw it was a good hay crop. There were some weeds in it, but those little weeds cut no figure.

On the second tiling, the second year, we had a crop of corn and we had plenty of corn to fill our silo—good crop—and on our first tiling we had a wonderful crop of hay—timothy, alsike clover and red clover. I judge we had 2½ tons per acre, and we had a second crop with 1 ton per acre.

Then we went to work and tiled another 10 acres, and we went on this way until I got 70 acres tiled. I raised on that tiled ground, 2 years corn, 1 year rye, 3 crops of hay, and 2 years in pasture. That is an 8-year rotation. Furthermore, at the time when I had done no tiling I had on that farm 4 horses (some years we raised a colt); I had 25 to 28 head of cattle—cattle that were no better than common cattle; today I call them scrubs. After we had tiled that marsh and had it in the 8-year rotation, we had good feed and good feed makes good cattle. I started a thorough-bred Holstein herd. I still had a big debt on that farm, but I made up my mind to have good cattle, and as I told before “if you have a will you will find the way.” We started in a slow way with a pure-bred sire. Later on when I had money, we bought a few pure bred females. Today you can come to my farm and find a herd of cattle between 50 and 60 in number that are worth from $13,000 to $15,000. While the marsh was wet my cattle were worth only from $700 to $800. I invite you to come to Deerfield to see for yourselves.
Furthermore, at the time that I bought that farm the buildings on it were all poor. Today you will see a dairy barn 90 feet long, cement floors, patented stanchions and a milking machine. You will see a separate horse barn which holds 11 horses; a house which cost me about $4,000.00. You may see all these things on our place. What brought us this? That peat farm.

Now, friends, I have explained to you what you can do with your peat land or with your marsh land. You all can do it, but you have to have drainage. Some of you gentlemen will say "If we drain our own marshes they may get too dry—they may then produce nothing." I don't agree with you. I have told you fully my own experience. Take a sponge, fill it with water and hang it up on a string. The water will run and run and run. At last it stops running and drops and drops. At last it stops dropping, but take hold of it and it is full of moisture. It is the same with your peat marsh. If you tile it, you will not get it too dry. By tiling the peat marsh, water will run out while there is too much in it, but peat will keep some moisture. I have farmed that peat marsh now for 17 years and I never had a crop failure. Of course on a dry year or a dry spell your crops don't grow, but I never get such a dry spell in my peat marsh. It never has gotten too dry and never got too wet. That is the success I have met raising crops on a peat marsh. All that is against me is sometimes a hail storm or, in the fall, an early frost.

You now have heard me talk about peat marsh. You can do the same thing today. You can do it better than I did it 20 years ago. I could not get the information from an agricultural school as you can today.

Now I have taken a lot of your time; and thank you for the attention you have given me.

Question. How long ago did you go on to your peat farm?

Mr. Foll. About 34 years ago.

Question. Haven't you, in more recent years, used some commercial fertilizer?

Mr. Foll. Yes. After I tiled and fertilized my marsh several years, I could see (especially in some years when my clover crop failed and I ran short of manure) that I took away too much manure from my upland. The crops and the yield got shorter on my upland. Now, what should I do? Really I
didn't know. I wrote a letter to the Experiment Station, and I believe that letter came in the hands of Professor Whitson. Professor Whitson wrote me, "You can use potash on your marsh, but before you go to a big expense we will send you 200 pounds of potash for an experiment. You take the 200 pounds of potash, go in your marsh, in the center stake off an acre and sow it evenly on that acre of land. Around that acre for about 3 rods you put nothing. On the rest you can put barnyard manure. Then watch the result." I took his advice, and the potash I put on that acre was just as good a fertilizer as my barnyard manure.

The next year I bought a ton of potash from the local dealer in Lake Mills. I opened the bags, and it came to my mind that the potash didn't have the same color and looked not as clean as the potash I had the year before from the Experiment Station. So I went to work, took a cigar box, opened all the bags and took evenly from each bag a handful and filled that cigar box. There were some tags on those bags on which was a guarantee of potash from 48 to 50%. I took some of those tags and laid them in the top of that cigar box, and sent it to the Experiment Station for analyzing. The Experiment Station sent me a letter and told me, "The guarantee of your potash is from 48 to 50% but the analysis shows only 28%; but wait a week and we will go over it again." I received another letter which told me the first analysis was all right. "Go back to your dealer and explain to him. You paid too much money for your potash." I believe I paid $45.00 a ton. I went to my dealer and showed him the letters from the Experiment Station. He said, "We bought it in Chicago. We are not responsible for that." But I told him, "I bought it from you, and if you don't settle with me this thing will be reported to the state. You'll have to settle with the state." In four days a man from Chicago came to my farm and he made a settlement with me. I paid only $25.00 a ton. He paid me my money back and told me, "It is cheaper to settle with you than with the state."

Since I had poor potash, I bought some acid phosphate fertilizer. I mixed that with my potash, and I put 400 pounds per acre. I got just as good corn as I could wish. Mr. Jones came at the time I cut that corn, and saw it. So I say to you, if you have no barnyard manure you can use potash and phosphate.
How your peat is, I don't know. You will have to have it analyzed and the Experiment Station will tell you what fertilizer you need. Be not afraid to buy it. You will have results.

I had more experiments with that commercial fertilizer. The next year I bought potash and phosphate, mixed it together again, and put on only 300 pounds per acre on the same field, but I left one acre to see how it would turn out. Where I put on the 300 pounds there was a good crop of corn. It was just as good as I could wish, but not so on that one acre where I put nothing. The next year I put on rye, and in the spring I applied 100 pounds of potash and phosphate. I had a pretty good crop of rye,—18 bushels per acre. The one acre on which I put nothing was not worth cutting. The next year I had it in hay. I put on 75 pounds only per acre. I had a nice crop of hay; but where I put on nothing,—well, there was nothing, anyway not much. The next year I put on 75 pounds again and I got a good crop of hay. The next year I put on nothing, but still I got a fair crop of hay, and on the two years past I put on nothing but still it was good.

*Question.* Have you ever raised potatoes on your peat?

*Mr. Foll.* Yes. My peat is of two classes; one class is a loose peat mixed a little with sand; the other peat is a solid peat. I tried the two kinds of peat out in potatoes. On the loose peat I put on barnyard manure and raised a crop of corn. The next year I put it in potatoes, and I raised a nice crop of potatoes. My judgment says I had at least from 130 to 150 bushels of nice solid potatoes. They were not enormously big potatoes, but good sized potatoes, round, smooth, with shallow eyes, and a good taste.

I tried potatoes in the solid peat marsh, but there they didn't grow so well. I tried vegetables too. In the loose peat the vegetables (to my notion) didn't grow well. I didn't know how it was, but I found it was too loose for vegetables. But where I plowed the solid peat in the fall and gave it a coat of well rotted barnyard manure as a top dressing in the fall I pulverized it in the spring and put vegetables in it with good results. I had wonderful cabbage, splendid beets, and good rutabagas. Now remember if you plant them in clay ground they will get all kinds of forms (long heads), but if you raise them in the marsh they will be round like a bean, no long heads at
Tiling Deep Peat—Zeasman

all and have a very sweet taste. I had carrots in the marsh, 10 inches long with tops that measured 3 to 4 inches in diameter. I had onions as big as a coffee-cup, but still there were some smaller onions there too. Tomatoes grow large in the marsh, but you have a great time to get them ripe as there is too much moisture in the marsh.

TILING DEEP PEAT

O. R. Zeasman, County Representative, Green Lake, Wisconsin.

Before discussing the tiling of deep peat, let us decide what we shall call deep peat. The average man thinks of peat as something used for fuel in some European countries. If you were to ask the average marsh land owner in this state if he had any peat in his marsh, he would say, "No!" It is a brown or black muck, 4, 5 or 10 or more feet deep. Upon examination this so-called black muck nearly always proves to be peat.

Peat is the accumulation in old lake beds of partially decayed vegetation such as grasses and mosses. Color does not determine whether it is peat or muck. It may range in color from yellow or light brown to black. It may be fibrous, soft and spongy, tough as a felt boot, or loose and friable and well decayed. It is nevertheless peat in any of these stages of decay. For purposes of the present discussion, we will arbitrarily apply the term deep peat to beds over 4 feet in depth.

There are perhaps 1,000,000 acres of undrained deep peat in Wisconsin. How to reclaim this waste land is a live question. About half of it has an outlet, natural or artificial, and is waiting for supplementary drainage. The other one-half million acres require dredge ditches to give supplementary drains an outlet. On this matter of outlets there is agreement of opinion. But what sort of supplementary drains shall be installed? Some drainage engineers and other men experienced in drainage, say "tile"; others object to this and say "you cannot tile deep peat successfully." I propose to touch upon a few of the important points that should be considered in tiling deep peat.

The depth at which tile should be laid in peat is one of the