1901," by Mr. Convey, of Ridgeway, whom I now introduce to you.

Mr. Convey: I have not attempted to treat all the features of this subject, having left some of them to be taken up in the discussion.

LESSONS FROM THE DROUGHT OF 1901.

By Thomas Convey, Ridgeway.

Wisconsin has not suffered as seriously from the drought as some of her neighbors; yet it has been the most serious the state has ever known. In 1895, in a smaller portion of the state, the conditions were nearly as bad in light crops, but in 1901 the area was very much larger, and where supplies have to be purchased this year, the price is nearly twice as high as then. Crops have been fairly good in the northern third of the state, rather light in the central third, but people there are selling not buying; but in the southern third of the state the people are buying, and at the highest average prices they have ever paid. Crops in the latter district will not average better than 50 per cent. of the usual one. This district contains more than one-half of the population and taxable property of the state. More than three-fourths of what would be produced in the district in a good year is consumed there. Stock has been sold off close. A great deal of money has already been paid out for feed-stuffs, but much more will be spent during the next three months. How can such conditions be guarded against in the future?

There is no assurance of better conditions next year. The subsoil is extremely dry and the water supply much lower now than then. Pastures have been almost grubbed out and tramped to death; even the meadows have been pastured close to save winter feed. We have been borrowing from the future and will have to pay interest and principal.
But I am not here to tell you things you already know and feel bad about. Even this dry year some people have obtained much better results than others, and this can be more profitably discussed.

Cultivation has much to do with retention of moisture, and much moisture wasted by careless methods. With sufficient water in the subsoil good grain crops can be produced with little summer rainfall. For small grain, fall plowing or its equivalent (a clean cornfield prepared as if it were fall plowing) gives best results. But the first thing we should do in the spring when the ground is sufficiently dry, is to harrow or pulverize the surface to prevent the escape of moisture. This also prevents the crusty or lumpy condition of the soil and kills early weeds. After a heavy rain the same work may have to be done over again, but it will pay to do it.

Fall grain, harrowed in the spring with a sharp, perpendicular-toothed harrow, will give infinitely better results. This is a good time and manner of getting in grass seed.

Spring plowing is better done as early as possible, but in every case, unless the ground is extremely wet, it should be harrowed, not planked or rolled, close after the plow. This not only retains moisture, but more good will be done by a single harrowing to get land in proper condition than could be done by twice the labor a little later.

When will the manufacturers learn to manufacture and their patrons learn to use tools built upon the correct principles? Can anyone explain why cultivator spoons, especially wide ones, should be run at right angles with the line of draft, wasting from 25 per cent. to 50 per cent. of the power, and producing an open, lumpy and uneven condition of the soil, just the reverse of what we want, and yet taking so much more power. A good cultivator should have the following qualities: perfect adjustability as to depth; should stir all of the soil, and leave an even, finely pulverized surface.

Prepare the soil as deeply as the quality of it will admit. Deeply prepared soil will take up and hold a heavy rainfall, while in shallow preparation there is danger of surface washing.
With most of our crops shallow cultivation gives the best results, not more than two inches; three would be better to retain moisture, but too much root pruning would be done at that depth. Deep cultivation forces the root growth below the richest part of the soil and where the conditions are all unfavorable,—a more compact soil, giving more resistance to root growth. Deep cultivation of a growing crop means more labor and poorer results, and, in the corn crop, will delay maturity about two weeks, and usually, though not always, causes a smaller yield, but always of an inferior quality because of an excess of water contents.

The harrow with upright tooth and the weeder, when rightly used, are among the best of cultivators.

Dry seasons are not without some compensating qualities. They compel us to follow better methods. They compel us to cut and feed corn stover and thereby learn that, acre for acre, it has more feeding value than hay.

We learn by soiling that we can get from three to five times more food value out of a crop by hand-feeding it; also that stacking hay, fodder, or even straw outside will detract from its feeding value from 25 per cent, to 33 per cent. Lumber is high with little prospect of becoming lower priced, but foods are becoming too high-priced in Wisconsin to submit to such large annual losses from exposure, which loss is largely in the lessened degree of digestibility.

Comfortable quarters are absolutely necessary to economical feeding. Everybody admits this in dairying. It holds true just the same with all kinds of stock, even with fat steers. This matter has been tested in experiment station work, and in every case comfortable housing has given the best results.

Many people are inclined to salt feed heavily in mow, or stack, thinking it will preserve the feed in better condition. I consider it a bad practice. It helps the palatability, but compels stock to drink excessive quantities of water and the bad effects are easily observed in the spring.

Too much high-priced feed is being fed to low grade, low quality animals. We have heard about the poor cows often and
all the time, but how about the low quality beef animal? More than 90 per cent. of this class of animals sell for less than onehalf of the best prices prevailing in the general market. This is a Wisconsin condition. This is the problem of the dual purpose cow as worked out by the farmer. He wants a little more milk and butter and introduces dairy blood, a little more beef or better steers, and tries something else. The result is that both cows and steers are kept at a loss, or barely pay expenses. There may be a dual purpose cow, but who has a herd of them? What line of breeding produces them? Where can you get the sire you want for this purpose? Some agricultural speakers and writers are like professional politicians,—they would rather be popular than right. The dual purpose cow should be classed with the general purpose horse, the combined reaper and mower, and things of that kind.

Our first dry season was in 1886. Since then we have had one year of excessive summer rainfall (1892). The almost complete removal of timber in the southern part of the state has, without a question, produced unfavorable conditions,—little summer rainfall, severe storms, hot winds and light snowfall. Hot winds are not produced here, but they are deprived of the power of doing mischief in a timber country.

A most valuable experience is found in the 18th annual report of the State Experiment Station. I refer to the irrigation experiment, where irrigation trebled the yield of hay, more than doubled the yield of corn, and almost doubled the yield of potatoes. Prof. King estimates that a 20-acre farm with a single irrigating plant can be made to produce as much as a sixty acre farm without one. There have been many cases the past season where a well could be sunk, tower and windmill erected, and the entire plant paid for in the increased yield for the past season. This was especially true of small fruit and truck gardening, also of potatoes.

All indications point to dry seasons,—springs and wells dry up, creeks either dried up or reduced in volume fully one-half. Of course, there is no danger of a famine, especially in human foods. This country with its population of about 25 persons to
the square miles does not have the problem to encounter that Japan would, with a population of 280 to the square mile.

DISCUSSION.

Mr. Convey: There are several things that I have not discussed in my paper. One is the necessity of winter application of manure. The main reason for this is that in order to get the benefit from the manure it has to be leached out. With the spring application you do not have the leaching out. Hence, I consider it is absolutely necessary that it be put on the ground early, just as it is produced on the farm, and the fertility allowed to leach into the soil. You will incur less waste of labor. I think it will give the best results in grass land. This grass land may be used for producing a corn crop.

Mr. True: There is a question which has excited a good deal of comment; that is, the stage of growth of the corn plant when it is most severely affected by drought. Last year a good many fields had developed the tassel, which seemed to have dried up. The question was, whether such a stalk would afterwards develop an ear. Did you notice that?

Mr. Convey: It was a common occurrence throughout the southern part of the state, and I think in very many cases the stalk failed to produce an ear. The failure has been largely on the early crop. There were many blanks this year in the corn crop.

Mr. True: The best ears grew on those stalks that had not developed the tassel. The best yield was from the later fields that had not been prematurely developed by the extremely hot wave.

Mr. Roberts: Do you advocate the use of a manure spreader and also the winter application of manure? Can you use a manure spreader in the winter season?

Mr. Convey: I have not used one. It is because of the class of manure we produce. The manure from our stables is such that there would doubtless be loss by leakage, and I am try-
ing to find out what likelihood there would be of loss in that way. If the spreader is satisfactory in that respect, then I can see no reason why we should not use manure spreaders. We want it evenly distributed, and it would be much better to distribute it over a greater area and have it more even; we would get better results.

Mr. Everett: What has the "dual purpose cow" to do with this subject of "Lessons"?

Mr. Convey: It has a whole lot to do. All over the state farmers have tried to get high returns from low grade cows, have become disgusted and let the cows go dry. Many farmers in this state are feeding steers that they will get only two or three dollars a hundred for.

Mr. Roberts: I did not get a satisfactory answer as to whether the manure spreader would work in the winter season.

Mr. Convey: In order to get good service you would have to keep it in the house so it would not freeze up. The manure must come from the stables to the field, it must not get into frozen lumps. The only reason that I have not used one is that I have feared it would allow the liquid of the manure to leak out. In feeding ensilage the liquid is not all absorbed by the solids, and in that case it would leak.

Mr. McKerrow: In the early spring you can drag before you begin to work your land.

Mr. Roberts: We have done that a great many years.

Mr. Convey: Do you think you get the manure as evenly spread as you would like?

Mr. Roberts: Not with a hired man,—the average hired man. I think I can do it myself as well as these manure spreaders. They will slip when it gets wet and in the winter. I think that is the trouble.

Prof. Carlyle: On our farm at Stanley we use a manure spreader all the time, winter as well. We have deep snow, and we have no difficulty in using it all through the winter, for the reason that we use a good deal of bedding. The use of the manure spreader in winter depends upon the character and the amount of bedding you use. If you do not use much bedding,
you will find great difficulty in handling it, because the manure freezes so solid it will not work. If you use a great deal of bedding, so that the manure does not freeze, you can use the spreader all through the winter with excellent results. We never have any difficulty with slipping, the snow is usually so deep and soft. On a hard road it would probably slide.

Mr. McKerrow: Do you have any trouble in the summer?

Prof. Carlyle: I have not noticed any.

Mr. Convey: It is a common complaint among farmers that, in a season like this, if you run over a lump, it will slip. They recommend corrugations on the outside wheels to guard against this slipping.

Question: I would like to ask if there is any difficulty in putting manure on the ground evenly with the spreader on a windy day. We experienced some trouble during the past summer in using the spreaders,—we found it difficult to do much on a windy day.

Prof. Carlyle: You will find that the case with fine manure. Our horse manure is mixed with shavings and it is as fine as powder. After our cow barn manure gets rotted it will blow away. With the ordinary farm manure as it is used I think there is no trouble.

Mr. Convey: You will experience the same difficulty in spreading in any other way. I remember fifteen years ago in the southern part of Wisconsin in nearly every field you would find small piles of manure dropped to spread. We do not find any now. You go up north and it is a common occurrence up there yet.

I would like to call your attention to the advantage of raising certain crops in dry seasons. The past season quite a number of people undertook to raise wheat and oats and in nearly every case they got better results from the mixture. We have tried peas and oats for a number of years and have found it a very valuable combination. About once in five years you will have a failure. The wheat and oat crop should receive more encouragement if we are going to have the dry weather we have had. It is a dry weather crop. While wheat does
not show as great a protein content as oats, yet it contains more nutrients. This is largely due to the fact that the carbohydrates are more largely digested in the wheat than in the oat plant. For that reason I think we might sow wheat and oats together.

Mr. McKerrow: For thirty years we have grown most of our wheat and oats combined. We have had the best average crops of any in our township by measure, and a good deal better by weight. We are satisfied that it is as good, and a little better, pound for pound, than the oats alone. It is a better crop to seed down with because it usually stands up better. We have sown pure oats side by side with it and have found the mixture to stand up better.

Mr. True: Mr. Convey, how much importance would you attach, in a dry season, or in a prospective dry season, to forage crop planting for the purpose of helping out the pasture, or perhaps for curing? That will be a very vital question the coming year.

Mr. Convey: You can sow the rape plant for several classes of stock and get good results; sow at intervals during the summer season; and provision should be made for an early corn crop, early sweet corn, for instance, will furnish about the first feed in the corn line that we can get. In every case we should aim to furnish extra feed. We need extra feed in the early part of the season, when the stock are turned on grass, or the quality of the milk will depreciate very materially. In other words, we do not have the material in the grass to make the proper quality of milk, and a little extra feed tends to not only simply keep the stock in good condition, but it improves the quality of the milk very materially as well. Formerly we depended upon grain. Now it is too high. Just as soon as we can get anything to feed, it pays to feed it. Feed during the principal part of the summer.

Mr. Faville: This preparation for the dry season should be made the year before, not wait until it has come. Suppose it is as dry next year as it was last year and the spring before, you would need your soiling crop. But there has never been
a season since I have been in Wisconsin (fifty-eight years) but that some part of the season something would grow. The latter part of this last season the late corn crop matured to make a good silage crop. My plan is (and I am quite positive that it is the very best one) to put in silage to carry us over the dry season. When the dry season comes early, we have the silage. If it does not come until July and August, we have the silage. A year ago last summer it was the dryest in June and July. We did not have any pasture. I went out to Jefferson county to see my nephew, who had a large dairy and was milking sixty cows. I supposed I would find him with his face as long as your arm. I found him smiling, and when I said, "You must be having a hard time with this large stock of cattle," he answered, "I have an abundance of feed to carry me through May and June—through this dry season—never had them do better." He had silage to give them, all they needed. This suggestion I want to make: that every man depending upon stock should lay in a sufficient stock of ensilage to carry him through. He cannot do it in any other way so cheaply and surely. With your grass you do not need to take it out. It is just like the ladies' canned fruit when the strawberries are ripe.

Mr. Convey: We fed last year silage from August until June. This year we started in in September and will feed it as long as it lasts.

Mr. McHerrow: If it had not been for ensilage and the five-acre piece of alfalfa that we had last summer, we would have gone out of the stock business. That carried us through in good shape and very cheaply. I never found so much value in the silo as I did last summer from the middle of last June to the first of September.

Mr. Convey, have you had any experience with alfalfa as a siloing crop.

Mr. Convey: I have not.

Mr. McHerrow. It is comparatively new, but I know a few who had pretty good satisfaction last summer. I guess Gov. Hoard was one. I think it was the third crop that was pretty good, and the previous crops were also good. In our own case,
as were as poorly fitted for growing alfalfa as anyone in the state, yet a five-acre plot last summer paid us enough so that we can afford to experiment if we only get such a crop from the third. I do not think we will be very successful on our hardpan subsoil. But I think that every farmer in the state should put in a half acre of this product, to experiment with at least. Sow it on a rich piece of ground very early in the spring, either with no other crop or with oats or barley that you can clip off later. Clip back often. Every time you see a blighted leaf on it, run your mower over it and cut it back. The next year cut before it comes to blossoming. When it is three or four years old it is better than when it is a year old. Its most dangerous time is when it is young.

Mr. True: Do you consider, Mr. McKerrow, that it is as safe against winter-killing as the ordinary red clover?

Mr. McKerrow: Yes, just as safe. Our alfalfa has not winter-killed as badly as the clover, although it has winter-killed some.

Mr. Faville: It will stand the winters better than the ordinary red clover and it will stand the drought very much better.

Mr. McKerrow: Last summer was the dryest we ever experienced in Waukesha county. Our clover made no second growth to speak of, but we cut a part of our alfalfa three times, with a heavy crop the first time.

Mr. Wright: Is the alfalfa identical with the Lucerne?

Mr. McKerrow: Yes, just the same thing.

Mr. Wright: I think some of those old Germans have had it for a long while. They call it "Lucerne."

Mr. McKerrow: I imagine, Mr. Wright, on a great deal of your soil in Marathon county it would thrive well.

A Visitor: Where I live in New York, there is a piece of alfalfa that I know has been cut nine or ten years and they have cut three crops a year. I put in a few acres myself last spring and I am going to keep on until I get ten or fifteen acres if it goes well with us. Speaking of silos: with us, a good many do not dare to depend on our pastures at all. We let our stock
run and we feed eleven months in the year. If we have plenty of feed we do not feed so much silage. If we do not have feed, we feed silage. I supposed it was all silo out here, where we get our good literature from. I spent two days in South Bend, Indiana, and I never heard anything about the silo, except one man who advocated silage and corn meal. I asked him if he had not better put his money into cotton-seed meal. Before he got through, he said that when his silage was too rich with corn, he took a horse-rake and raked the corn out of the ensilage and fed it to his hogs. I wrote home to my boys that I wished they would rake some of the corn out of the ensilage and go to feeding it to the hogs, because I had learned about it and it was something new. He was the only man that said anything about the silo down there.

Mr. Convey: In Illinois, a man proposed to balance up a forty-pound ensilage ration with oat straw, corn fodder and five pounds of clover hay and get sixty-five dollars net returns on ten or twelve cows with that class of feed. That paper has been quoted in several agricultural papers.

Question: What kind of cows?

Mr. Convey: He had dairy cows.

Mr. Jones: What variety of alfalfa do you sow, Mr. Mc Kerrow?

Mr. Mc Kerrow: We have not had any large experience, but we have sown the Turkestan,—fifteen to twenty pounds to the acre. I have had only a limited experience and a little observation in Canada on the same kind of soil we have. My friend in Canada has made a success of it. I believe that while we need a good stand of alfalfa, we do not want it too thick, for my friend tells me that the alfalfa plant that gets a thick root quickly in the first two or three years and goes very deep is the plant that does the best. We do not want too many small roots. On a good, even seedbed twenty pounds is enough. Mr. Cook, of New York, says thirty. He wants it thick, he says. On our hard subsoil I would rather have less roots and have them good, big ones. Of course, when you come to break it up, you will swear a little more if the roots are big.
Mr. Convey: I think the rape plant should be discussed at this meeting in order to get it into the report. I would like to hear from Prof. Carlyle or Prof. Henry, or some of those people who have a better knowledge of it. The people of this state are taking an active interest in the growth of rape and get good results from it. I think it has a place in Wisconsin agriculture more extensively than in the past.

Prof. Henry: Mr. President, Prof. Carlyle has had direct charge of that work. I can say that the Wisconsin Experiment Station learned of rape through the Canadian Agricultural College, when I saw the crop growing in 1890. We began to grow it in 91, and in 93 published our first report on rape growing. It had been grown on the University farm before 1880, but not to any large extent. We introduced it in 1891 from Canada. Rape should be grown upon every farm. It is a splendid feed for pigs, for sheep and for cattle. It is especially useful with young stock if you wish to have them go into winter quarters in good, thrifty condition. Have a plat of rape for them to run on. Do not grow less clover, but grow more rape. For dairy cows, Mr. Carlyle thinks it is useful, but it must be used carefully, not feeding just before milking, and not feeding while the plants are immature or after they are badly frozen in the fall. We can feed rape profitably for heifers and bulls and steers. For sheep it is the feed par excellence. Mr. Carlyle can tell you of the results with pigs. It is a great help to the pig feeder.

We have been pushing the growth of the rape plant in Wisconsin as hard as we knew how. If some agent had sold rape seed at six or seven dollars per pound, the use of rape might have spread faster than it has with the Experiment Station's endorsement. We are more interested to have somebody tell us that we can make a thousand dollars an acre on some new plant in order to get us interested so that possibly we can make ten or fifteen dollars, which is a fair profit. I know that most of the farmers in this room are familiar with rape and its advantages and do not need to listen to exaggerated statements. Mr. Carlyle will tell you of the pig-feeding experiments.
Prof. Carlyle: The full details of the work of pig feeding and the resume of it are given in this year's annual report, now being issued from the Experiment Station. There you will get the results of the experimental work which has been carried on the past eight or ten years,—the average results from the feeding of pigs. We found that an acre of rape would save in grain, mixed grain,—say, corn and middlings—from 1,500 to 2,100 pounds of grain, in feeding pigs for market. One acre of average rape will save from 1,500 to 2,100 pounds of grain. You see, it is worth saving. We find it especially valuable in the spring of the year for young pigs with their dams.

Just as early as possible, in some dry spot on the farm, we put in probably a quarter of an acre of rape in drills. It comes on slowly and in about four weeks at most it is ready so we can turn in the sows with the young pigs. It is interesting and amusing to see the little fellows revel. The rape certainly has a wonderful influence on the milking qualities of the sow. About three weeks later,—from two to three weeks later,—we put in another small plot, three in succession. We have fed it to dairy cows, but the cattle are not quite so greedy for it as the sheep.

For sheep we consider rape very valuable. Those of you who have had sheep will know something of the rape plant. It is very valuable in the late fall for feeding breeding ewes. But care must be exercised in feeding both cattle and sheep late the last plot has been eaten off, the first plot has grown up again. We go through with the cultivator and stir up the soil and the rape grows again from the root, and those three plots, averaging one acre, will be sufficient for ten to eighteen brood sows. We the past two years, but our results are not such that we can as yet make any positive statements.

As a soil ing crop we have found the rape will give a larger return in tons per acre than any other crop we have. We get thee tons an acre of the green rape.

The dairy experts did not seem to notice any difference between the milk which we sent and the milk which the rest of the farmers sent. We began very lightly, however, and gradu-
ally increased the amount fed. The first time the rape is fed you can smell it in the milk, but after the cow becomes accustomed to it, thee does not seem to be any trouble in this way. Cows do not like immature rape, neither do sheep. It is better to feed on the mature rape. For cows, especially, it should obtained in that way.

Nothing has been said as yet concerning sorghum. Last year we had the very best results from sorghum. Dry, hot weather is just right for it. When we have a dry, hot season along in May and June, I would certainly advise putting in a crop of sorghum. Our sorghum grew last year some sixteen feet high in that hot weather. There is nothing which our cows like better than sorghum. The herdsman down in the barn insists every spring that I put in a larger and larger plot each year for the dual purpose cows.

Mr. True: Prof. Carlyle, is it practical to sow sorghum broadcast, and about how much seed would you put to the acre?

Prof. Carlyle: Last year we carried on a small experiment. We sowed sorghum with a drill, an ordinary grain drill, and in one plot allowed all the spouts to run. With every spout running we put in about 25 pounds per acre, "Minnesota Early Amber." The next plot we put in about 50 pounds per acre. Then we put in 25 pounds to the acre with every drill running, and 25 pounds with every other drill running. We found that the thickly sow sorghum gave us the kind that the cows liked best if we let it grow longer than the others. It took it longer to develop and get to the state where the cows liked it. Early in its life the cows do not like it. After it begins to form sugar the cows enjoy the stalks. I should recommend sowing with a drill, if possible, and let every other spout run. You will get an earlier crop and fully as much per acre, and the amount of seed is about 30 pounds.

Mr. Faville: How do you harvest it?

Prof. Carlyle: By cutting, as we do corn. Usually we cut it with a sickle or corn knife.

Mr. True: Do you consider it impracticable to sow it thickly enough enough to cut with a mower?
Prof. Carlyle: I would not expect in that way to get so palatable a food. We find that the cows do not like it unless it is pretty well matured, unless it is sweet. I think that is the reason why many farmers have not been in favor of it. It grew too thickly and did not get as much sweetness in it and the cows did not like it.

Mr. Convey: The question has often been asked of the institute workers: Can you sow rape in the fall as late as would be necessary after taking the early corn crop off? Would you get growth enough to justify you?

Prof. Carlyle: It would depend very much upon the season. Last year you would not have gotten rape to germinate at all. If after a heavy feeding crop, such as oats or corn, that has taken a large amount of moisture out of the soil, you would find it difficult to get very much of a catch. It requires much moisture and the soil has been depleted by the preceding crop.

Mr. Convey: I know parties who have sowed rape at the last cultivation and got good results in that way.

Prof. Carlyle: That is a good way.

Mr. McKerrow: Back in 1880 we began to grow this rape. I imported some and paid at the rate of 70 or 80 cents a pound for seed. Prof. Craig brought it when he first came to the Agricultural college. I am heartily in favor of rape, but I do want to drop a few words of warning about some phases of this matter. In the first place, most of the seedsmen advise sowing five or six pounds of seed to the acre. To my mind that is altogether too much, because the plants are so thick that they do not mature soon enough to give you the most value. Two or three pounds are enough.