interests of the state. This branch of work has a wide field of usefulness and will grow to be one of the largest factors to improve the dairy cattle of the state. It is bound to be an educator for when the farmer sees how poor his cows are he will want to improve by getting a better sire. He will also pay more attention to feed and care of his herd that he may make a better showing in the years to come.

I note we are in the lead as regards the number of cow testing associations and of course we should be as we are the leading dairy state of the union having over two cows to every inhabitant of the state. The recent report of our state Dairy and Food Commissioner, Mr. J. Q. Emery, says the output of Wisconsin dairy products for the past year foots up to the enormous sum of over $100,000,000. A sum of which we are unable to conceive. He also states that this is a gain of 85 per cent in the past five years. A very good showing I think, but we can do better and we must not be content with past achievements.

The association can well point with pride to the fact that they have ever encouraged the construction of silos. The amount of succulent food put up in the form of silage has increased very rapidly. Silos are going up so fast that one wonders where it will stop. I saw a recent estimate that 50 per cent or better of Wisconsin’s corn crop for 1914 had gone into silos. It has been estimated that 95 per cent of the silage put up is used for dairy cattle. The number of silos on our rural route was recently counted and to my surprise there were eighty in all. A silo contractor in my locality had contracts for thirteen silos to be built in 1915 before he had finished building silos this fall. This would go to prove that dairying in our state will continue to grow. In conclusion I wish to say let us work together unselfishly for the best interest of dairying that we may have better herds and more of them.

BEST CROPS FOR THE COW

T. A. HOVERSTAD, Minneapolis, Minn.

When a farmer is so situated that he can go into the market and buy whatever feed he wants it is a simple problem to make
out a ration which is both profitable and will produce a large milk flow. But the pioneer is very often without money and without sufficient experience in the care of live stock, so that the ideal conditions are far from his possibilities. It is necessary to adjust the practices to the conditions in such a territory.

The most essential food is corn. Corn will grow splendidly in northern Wisconsin and produce a large amount of feed to the acre. It is wise, however, for the farmer to build a silo just as soon as possible. He can then have succulent feed for his live stock twelve months of the year and he can be quite independent of adverse climatic conditions. A farmer should build a silo, no matter if he has to borrow money for its construction. The returns from a silo are so large that a person can well afford to pay interest on the investment. It is wise for the farmer to build a silo a great deal larger than he actually will need immediately, so that he can have a large amount of silage to bridge over in any adverse season. I met one farmer who told me he had kept silage in his silo for 28 years and it was in a splendid state of preservation yet.

Corn alone is not a balanced feed. It is necessary to feed in conjunction with it some feed that contains a good deal more protein. The two crops that do well in northern Wisconsin and contain this necessary element are alfalfa and clover. Clover grows naturally, and about all that is necessary in order to secure a crop of clover is simply to sow the seed. Alfalfa, however, will produce more feed to the acre and contains a higher percentage of protein. In one experiment on some very sandy lands where clover failed on the adjoining field, we were able to secure this year eleven large loads of alfalfa in three cuttings on 2½ acres. This land was manured, inoculated and limed.

There is a new crop that is being introduced, that promises to be of great value to the farmers of northern Wisconsin. I refer to the soy bean crop. In several trials that we have made on very sandy land the returns have been very satisfactory both for grain and pasturage. The soy bean produces a very large amount of feed to the acre and it is one of those crops that contains an unusual amount of protein.

It would appear that from these three crops a farmer can make up a ration which will be well balanced and very palatable and should give good results for the investment.
There is no doubt grain and mill feed can at times be fed with profit, but it involves the purchase of expensive feed, and the pioneer farmer usually avoids buying any more than he absolutely has to.

**DISCUSSION**

**Prof. Moore:** We have been working on soy beans in our department for seventeen years. It was a southern crop brought up to the North and I have taken quite an interest in the experiments, not only with soy beans but with cow peas, which have been of such benefit to southern agriculture. We find we cannot grow cow peas to advantage in Wisconsin, indeed, that the less we had to do with them the better we are off, but its twin sister, the soy bean is all right for Wisconsin. We carried on breeding tests with these soy beans and bred up certain kinds which we ripen nicely within the range of our climatic conditions. We have several kinds that will mature nicely in our state. We did not begin to push the soy bean work until quite recently because there were a great many problems that had to be considered. We desire this crop mainly for sand lands. The sand lands appeal to a good many coming in to the state because they are cleared, they get located on the sand land and try to grow crops and they take out what little nitrogen there is in the soil. After the nitrogen is gone, has been taken out by the cereal crop, the man is left helpless. So we wanted to help that man on land that was too poor to grow clover. So now we have a crop that will grow on any kind of sand land and, by inoculating the seed with soil where we have grown a crop for a number of years, we get a perfect inoculation and we can grow soy beans upon these sand lands and get good crops. For hay, we can get two or even three crops of good hay, hay which is as good as the finest kind of clover and as good as ordinary alfalfa. We feel that this is going to help the dairymen upon these sand lands where he has hitherto been helpless, where he could not grow clover, could not get grass started and consequently he could not grow into that great line of farming which we are all advocating, the line of dairy farming. We find that by growing soy beans for two or three years upon this land, we fill the land with so much nitrogen that we can easily grow a corn crop or get a good catch of clover.
is no plant that has the power of taking nitrogen out of the air, depositing it in the soil and building it up with this great requisite as the soy bean. It fills the ground with nodules and those decay and leave a great surplus of nitrogen in the soil so you can use it for other crops. It leads right up to clover on the farm; the soy bean is a preparation for clover and there is no other crop that has brought such great benefit as clover. I want you all to stick to clover, that has been the farmer's friend. Of course now we are growing alfalfa quite extensively but don't give up the clover.

Mr. Glover: Mr. Hoverstad, don't you believe that roots can be grown to advantage on the small farms in this section where the clearing has not been sufficient to justify the construction of a silo.

Mr. Hoverstad: We build our root houses and we build silos and we feed the roots in the fall up until about the first of February when the roots are fed out and then we feed the silage and I do not see that there is any difference in the milk flow. The cattle eat it every bit as well, in fact I like the roots a little bit better. Now, it may look like a big problem to raise roots, but it isn't really so big. The big job is to haul the crop home. I like mangels a little bit better than the rutabagas, but the rutabagas are a little bit more easily grown. The way we should grow them is to first manure the land and then grow a crop of millet for hay,—that cleans the land so it is in pretty good shape for the following year. Then cultivate the land well and sow your rutabaga seed. We usually sow the prize winner and sow it about the first of June. I sowed with a four horse grain drill. I could do the work faster by sowing it in rows about thirty inches apart and dropping the seed every inch or so. Of course that is very much thicker than we want to have the roots grow but we want to have such an abundance of plants growing that we can thin out and still have plenty left. As soon as the roots come up, set to work cultivating with a one horse cultivator. We thin them out until they were from twelve to eighteen inches apart, and when they were as far as eighteen inches apart we would really get more to the acre than when they were as close as six inches apart. After a man gets used to hoeing and thinning out those rutabagas he can do it very rapidly. The thinning of the rutabagas is much more easy than the mangels. In thinning out we must
be careful to leave the strongest plants always. We keep cultivating during the summer season. In the fall a man would go in with a sharp hoe and he would go over the field and cut the tops off, he would go right along as fast as he could walk. Then he took a harrow and turned them right over and left them. Then the big job was to haul them out. Do not put in four or five acres the first year, because if you do you will never plant them again. Grow a little patch two or three rods square in your garden and measure the space and amount that you get. The next year you can grow an acre or two. Start on a small scale and it is surprising the amount of good feed that you can get out of a very small acreage. In storing them keep them as cold as you possibly can without letting them freeze and they will stand a good deal of cold weather. A person should have a root cutter to cut them up. I have fed tons and tons of big ones without cutting up but I never feed small ones without cutting. A good many farmers find the digging and putting in an awful job but it isn’t so bad and they make good feed until you get your silos. The silo will crowd out the root crop after a while.

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CROP ROTATION

Prof. R. A. Moore, Madison

We need a rotation of crops upon the farm for several reasons, first of which we might mention for the sake of equalizing the soil elements that are taken from the soil and those returned to the soil. It is perfectly apparent that no farmer could go on continuously drawing the same elements from the soil year after year by a one crop system without exhausting these elements. It is also true that if we continue growing the same crop for a long period of years it not only takes the same soil elements from the ground annually but it invites disease and insect enemies which prey upon the crop. We have certain diseases and insects which work upon certain plants belonging to the same variety or family, and it is quite largely due to the ravages of these diseases and insects that the farmers in many instances have been made to observe some system of rotation. Many who