

Mr. Aird replied that he had not, although he thought the same thing would apply more or less to the disc plow. The point of hitch, the clevis, was the same, but Dr. Cleghorne, who had the matter in hand, had not yet definitely ascertained the correct point of hitch for a disc plow. The experiments which had been carried out so far went to prove that the amount of draft on a disc plow was far heavier than on a mouldboard plow.

Mr. Rapson pointed out that on the coastal belt their work was done by the single furrow plow and very few double or three furrow plows were used for the reason that to use a 3 furrow plow they would have to use the same furrow on the return journey. He asked if Mr. Aird would recommend the use of mules in preference to oxen seeing that by using the single furrow plow the centre of draft would be thrown out by the present yoke.

Mr. Aird replied that he thought better results could be obtained by using mules as the swingle-trees could be altered much more conveniently than the yoke. The same applied to horses or donkeys.

Mr. Armstrong asked if Mr. Aird was correct in saying that the disc plow was heavier to pull than the mouldboard plow. If so could he give the scientific reason for that? Secondly he asked, what length the trek chain should be from the point of contact to the stock? Natives were very fond of hitching on a double trek chain, which of course was too long.

Mr. Aird replied that unconsciously some operators altered it by putting on a longer chain; they did not know the reason why. He had seen good plows under competition at Cedara losing the championship for the lack of knowledge as to the proper hitch. "This represents the difficulty you speak of (indicating a short piece of wire). That has to be added on to the plow to make it deeper," continued Mr. Aird. Some farmers believed in deep plowing.

Mr. J. Armstrong asked which was the easier, to have a short chain or a long chain.

Mr. Aird replied that he had been taught that if the horses were hitched close to the plow it was an advantage to the horses, but for the plowman it was an advantage for him to get the horses as far away as possible. But the correct method was governed by the length of trek chain. If the animals were further away it was probably a little heavier on them, but they were governed by the line coming from the shoulder or neck of the oxen, the horse's shoulder, or the mule's breast, according to the animals being used. As to the disc plow it had been proved beyond doubt that all things being equal the disc plow was heavier draft than mouldboard.

The Chairman thanked Mr. Aird for his remarks and the manner in which he had illustrated the various points on the board. (Applause).

FOOD TO GROW FOR STOCK EMPLOYED ON THE CANE FARM.

By C. EDELMAN, Agricultural Experimentalist, School of Agriculture, Cedara.

Mr. C. Edelman, Agricultural Experimentalist, School of Agriculture, Cedara, then addressed the meeting on "FOOD TO GROW FOR STOCK EMPLOYED ON THE CANE FARM," as follows:—

"I am afraid when there is such a good lecturer here as Mr. Townsend that you have picked on the wrong man in me. I daresay he is perhaps five times more experienced than I am, and could give you much more valuable information than I could. (Mr. Townsend: Not a bit of it). The subject "Food to Grow for Stock Employed on the Cane Farm" is somewhat of a complicated topic to talk on in view of the fact that very little food for stock is grown on the cane farm owing to the expense of the land. I must admit from the outset that I am up against a stone wall and my object is to try and make a slight dent in that wall. Bear it clearly in mind, please, that I have not come here to tell you to grow food for stock instead of sugar cane. I daresay sugar cane farming pays better than growing feed

for stock. If it doesn't pay I do not know what really does pay. I go among the maize farmers and they say mealies do not pay. If I go back a year afterwards they are growing twice as much, I suppose to lose twice as much! (Laughter). I do not know if the cane farmer does the same, but what I know is that cane land is expensive and in many cases you can buy the food cheaper than you can grow it, bearing in mind what one acre of cane is worth. What we want to study then, before growing any crops for stock, is whether we can grow and feed those crops at a profit; whether the land is suitable for that kind of farming or whether you will be better off by just going on with cane and by buying whatever concentrated feeding stuff you require from time to time. But as I have just said, I am going to try and make a small dent in that wall by looking ahead. We never know what might be the position in say fifteen to twenty years time or even before that, and we might arrive at such a position

as will make the growing of alternative crops with sugar cane absolutely essential. Then is the time to know what to put in. I am very sorry to say that I have not been among the cane farmers a great deal, and I don't know if they look after their stock, as stock deserves to be looked after. I know when I go up-country the farmers say "I wish I had a farm on the coast where we can have green grass all the year round." The grass might look green in winter, but it has not the same feeding value in the winter as it has in the summer months. Imagination goes a long way in this world and you might imagine that your cattle are feeding on nice fresh green grass in the winter. What I want to point out is that although it might have a fresh appearance during the winter months really it is very dry and not nearly so nourishing as that which grows during the summer months, and I think where it is at all possible a little provision might be made for the stock on the farm by growing perhaps one or two crops or at least a small amount of some of the more important crops. If you want to rest your sugar cane lands we know we have one or two crops which could be put in and not only improve the soil, but if harvested and fed, will improve the stock. There are a number of crops which could be grown on the coast as alternatives to sugar cane, but to know what to grow is really practical and at the same time scientific farming. Our idea to-day is to increase production in one way or another. If we do not increase the production in the way of crops it is our duty to increase the work of the animals by feeding them in the correct way. A very wise man once said if a farmer can grow two blades of grass where one grew before he is doing more good to himself, to his fellow farmers, and his country than all the politicians put together. By that he only meant that where any farmer was able to double his production in one way or another he was really a great asset to the farmers and to the country. Well we also know that the ox forms the main draft animal on the farm to-day, but there must come a time when the horse or the mule must play, or will play, a very important part in the growing of all crops. This lecture is headed "Food to Grow for Stock Employed on the Cane Farm"; by that I mean food to grow for all classes of stock. I don't just mean one class of stock, but stock in general. Now in a classification of crops we can classify them according to the purpose for which they are grown, and the purpose which they serve. In crops we have for example cane crops, we have succulent crops, leguminous crops, hay crops, and we have roughage or coarse growing crops. From these crops we should be able to pick a crop suitable for practically every district of Natal. Now coastal farmers and farmers in the sugar cane belt have advantages over the farmers up-country. You have the rainfall, you have the growing season, and whether you have the money or not I do not know, but judging from the expensive cars I saw outside you must have the money too! (Laughter). You have a pull over the up-country farmer. I will give you a list of what you may be able to plant. You can plant late and you can plant early—(excuse me stopping, but Mr. Rapson wants

to draw my attention, by gesture, to the fact that some planters have Ford cars). (Laughter). You have as I say a pull over the up-country farmers in so far as the climate goes, and that is after all the main factor to consider in the growing of crops. It is difficult to come here and tell you exactly what to grow on the coast, but if you want alternative crops we have the green crops and such crops as the mealie, kaffir corn, buckwheat, and linseed. I am not mentioning such crops as oats, wheat, and barley because I do not think they would do well on the coast. But if you want a green crop and if Mr. Storey has found out something new that Streak disease is not caused as the result of the mealie being grown first, then I think as a green crop that there is nothing to touch the mealie, but at the same time, bearing in mind the disease factor, I know it is a very risky proposition to grow mealies. They tell me that in Zululand you can get 25/- a bag for mealies if you sell them to kaffirs. If that is true or not I do not know. But if you can get 10/- to 12/- a bag for your mealies and 19/- a ton for your sugar cane—(Laughter)—I will cut that down and say 9/- it will pay you to grow sugar cane. But we would certainly recommend maize every time. If you have a lot of kaffirs about the place, seeing that they are going to introduce the tot system I would say grow kaffir corn! As regards the other crops if you want a quick growing crop, there is buckwheat, and then there is linseed. Linseed can be grown or can be sown from October to February. If your only want a crop to hold the ground for three months then I would say grow linseed—it is very nutritive, very rich in oil, and a very good all round feeding crop. Now in so far as roots, tubers, and succulent crops are concerned, here you also have a variety. Whether the sugar cane area will develop into a large potato growing district I don't know.

I see on your last day's programme there is a resolution down about whether the Government is wise in opening up more sugar lands. You don't know what the Government will do these days (laughter), but if they are going to open up more sugar lands then the farmer might have a tendency to go and open up on some other lines of farming. They might drop growing sugar cane altogether! You have also a rival in the sugar beet, I believe, and you never know what that is going to turn out to be. As I said before, we are looking ahead when the time might come when we may have to go on to some other crop, not entirely but partly, to fill in rotation and perhaps as a catch crop also. Speaking about potatoes as a succulent crop, although it is not a crop for stock, yet it might be possible one day to make a good thing out of potatoes by growing them for the winter market, getting it on at such a time as in the early spring market when nobody else has potatoes. If you go in for pigs there is the "mad-umbi." There are many other succulent crops. You have for example a crop such as chamomile and all over Natal it has given very good results. If you want a very quick growing crop for late planting in the autumn then I cannot do better than recommend rape. Another permanent crop is the

Jerusalem artichoke. I have just given you a few samples of some succulent crops. What we do up-country for a succulent crop is to grow a crop for silage and we have on the coast several crops which can be put to that use, one of which is teosinte. This grows well under good coastal conditions. So far as feeding oxen goes I know you depend on cane tops and bye-products from the sugar factory. Coming to leguminous crops, I think I said something about them last year and the year before, and again I would like to impress on you the importance of growing more legumes. We know that from a soil improving standpoint there is nothing to touch a legume and also from the feed standpoint. I think the velvet bean gives excellent results. In addition to being a good soil improver that crop is very high in feeding value and instead of turning the whole lot in you might leave a strip, cut it, and convert it into hay for some of the farm animals. In regard to lucerne which we know as the king of fodders, it does not do too well under coastal conditions owing to the humidity, but in some parts I think you could grow lucerne quite O.K. The seed should be put in in March or April. With regard to the natural hays, I know you are not going to leave your land idle in order that you may harvest a hay crop, but there are such grasses as guinea grass and other grasses, that could be cut here and there and form very useful roughage for the stock. The smaller hays are teff, millet, Sudan grass, etc., and of these you should be able to select one to prove suitable on your farm. You will see then in so far as roughages go there is generally a sufficient quantity of roughage to fulfil the demands of the animals, but there is one direction in which we do not make allowance as a rule. That is to say when an animal is working hard, it very often gets the same ration as when it is doing nothing. We must make a difference between what is known as a maintenance ration and a working ration. In so far as the maintenance ration goes the roughage on the farm is generally sufficient for that purpose, but when the animal has got to work hard whether it is working to give milk, beef or labour you must differentiate in regard to the feeding. I know perfectly well that in many cases the animals may be sent away during the winter and only worked in the summer. Yet we know also that livestock has played a very important part in the farming of other countries and as we go on, in years to come no doubt livestock may still find a very prominent part on some of our sugar farms. I told you just now about the politicians and the farmer who could increase his production. Well there might come the day when the farmer will decrease his acreage under cultivation to get the same yields. That of course is out of our line now since Mr. Dodds has taken charge of the new Experiment Station, and we leave that work in his hands now. But at the same time, although I am somewhat hurrying this, I am giving you a brief outline of a few crops that may be grown. There is one I would like to make mention of and that is Kudzu Vine. That is a legume and is perennial. If you plant it once on the farm it is there

for good and it grows much like the Velvet Bean. It is a creeper and it also gives a heavier return per acre than the Velvet Bean. We have had it growing at Cedara and if you can get perennials established they are always better than annuals. Being a legume it is high in feeding value and naturally the cattle will enjoy it. It is a hot climate plant. It should thrive when the weather is warm, and goes off with cold weather or frost. Then you have the seasons, you can grow crops late, you can grow them early. When it becomes necessary I want you to remember that you can classify our crops and that you are able to select a suitable crop for growing on the farm. You will be able to answer the question: "Can you grow crops at a profit or does it pay you to grow crops and feed, or does it pay you to grow crops and sell them?"

So far as you are concerned it pays you to-day to grow crops and sell them, and not to put them into your animals.

Talking about legumes, very often when your land wants a rest you might grow monkey nuts. That is quite a good catch crop and it is also a soil improver. I am beginning to wonder if I have begun to make a dent in that wall I was speaking about. If we look ahead our system of farming will have to change.

Then the maintenance of stock in good condition will no doubt tell. Above all I would like to say that the two-legged animals are well looked after so why should not the four-legged animals be looked after also. (Hear, hear). Furthermore I would like to add that by growing crops and feeding them to animals we are really saving the fertility of the soil. We are really maintaining the fertility of the soil, which after all is the secret of success of farming to-day. (Applause).

Mr. Rapson asked if Mr. Edelman would recommend perennial crops on cane farms seeing that they wanted to replough the ground.

Mr. Edelman replied: Artichoke is really an annual, but you get so many tubers left in the ground—each little piece of tuber means a new plant—that I generally term that a perennial. But there are others. The Kudzu Vine is also a feeding crop and you could plough that in but it takes a long time to establish.

Mr. Dodds: I would like to express my appreciation of Mr. Edelman's remarks. To my mind anything which tends towards rotation of crops in a single crop area is all to the good, and it does not matter very much what crops you grow so long as you get some kind of rotation. You can even grow mealies (maize) provided you don't try to grow cane also.

We have been told by Mr. Edelman the alternatives of growing of crops to sell and to feed. There is, also another alternative which to my mind is very important in the case of sugar planters, and that is growing crops to bury, because I think the best use to which we can put alternative crops in the condition of our soil is to plough them in for green manuring. I should be sorry if any of our planters were to grow crops for

feeding and at the same time fool themselves that they had been growing green manuring crops. However, provided the all important question of green manuring is not lost sight of I think the more food crops that are grown the better. There is perhaps one exception—Mr. Edelman referred to it although he did not really advise it,—he mentioned the possibility of growing mealies. Our experience has been, and the experience of many other countries is, that mealies and cane won't mix. You might grow mealies and get 25/- a bag in Zululand—if you are lucky, or you may grow cane, but you can't grow both of them. The experience we have had of the transmission of both Streak and Mosaic diseases seems to shed very grave suspicion on growing mealies anywhere near cane. Regarding the question of food-stuffs for animals it always appears to me that we have a very valuable foodstuff within easy reach of most planters, which is very largely neglected; that is the molasses which can be had at a very cheap rate, considering its high food value, from almost any mill. A ration of molasses should form an essential

part of the feeding of any plantation livestock, and also the native labour.

Mr. Rapson asked what Mr. Edelman would recommend on the Coast for feeding oxen assuming they were in the cane cutting season when they fed nothing practically but tops. What should be added to make a balanced ration.

Mr. Edelman replied: I know that is practically what is used, but if that was to be balanced properly it would be necessary to introduce some legume hay. I know even the stock farmers up-country do not worry much about feeding their oxen on balanced rations. They give them as much mealie stalks as they can eat and other roughage. I think that to make up a balanced ration you would need a little leguminous hay—lucerne, velvet bean, or soya bean.

The Chairman on behalf of the members expressed their appreciation of Mr. Edelman's interesting address, it had been of great educational value to them. (Applause).

At 5.30 p.m. the Congress was adjourned until the following day at 10 a.m.

Third Day—Wednesday, 14th April, 1926.

HANDLING OF CANE FROM FIELD TO CRUSHER.

By M. McMASTER.

The Congress resumed at 10 a.m.

The following report on "HANDLING OF CANE FROM FIELD TO CRUSHER," was given by Mr. M. McMaster, namely:—

"I have not had any time to do anything more than make a few notes on this question as I have been very busy since I came back. But I think it is such an important question, and so much can be saved in the handling of cane, that it should be brought up at the Congress. One of the most important costs in the Sugar Industry is the handling of cane from the field to the mill. Every country has its own peculiar conditions and things that are applicable in one country or one place in a country are not of course necessarily applicable to any other place, so that every local condition has to be considered separately. I am personally of the opinion that the time is now ripe when a great deal more mechanical methods should be used in the handling of cane. Of course the first and most important way to cheapen the cost of handling of cane, that is right from the cutting to the delivery at the mill, and one of the biggest economic factors I believe in the whole field of manufacture of sugar, is to grow the

maximum tonnage possible to the acre. Now there are some really wonderful concerns I have seen which are really being crippled in Cuba by the distance that cane has to be transported from the fields to the mill. The old lands are getting worn out and the yield per acre is going down and down. To keep those mills full they have had to shoot the railways out further and further. The result has been that the cost of handling this cane has gone up and is one of the prime costs at these big sugar producing factories to-day. And whether it is the cutting, transport, or handling, or anything else, the prime factor is to get the maximum amount of cane to the acre that can possibly be obtained. I do not think anybody can disagree with that. Now if we start to analyse each operation separately: I personally can't say anything about the cutting of cane in this country. I understand the average daily task per cutter, per day, is about 2 tons for burnt and $1\frac{1}{2}$ or $1\frac{1}{4}$ for trashed cane. That as a daily task compares favourably with most countries, but of course the only way that can be reduced is by the efficiency and organisation of the labour. There is no other method—I don't think for many years at