

Approximate Methods of Farm Surveying.—Contd.

Another reason for a fairly accurate farm plan is that it unfortunately happens with a number of sugar farmers that for various reasons they have to get valuations made of their farms (laughter). I don't wish to convey the slightest suggestion that I am in any way belittling the value of the valuator we have to-day. A careful valuator in making a valuation of a farm generally puts a little footnote to the effect that "the areas and quantities are those as supplied by Mr. —." He covers himself in that way naturally; he is not a surveyor and has not the time to measure up all those fields. In his valuation he covers himself by saying that he has accepted the figures with regard to area.

What he is really doing is giving the value of the cane on the area supplied to him by the party owning the farm. From a valuation point of view that may be alright, but it all hinges on the point that the areas may be right, and if the areas are not right you probably find that those valuations are not what they ought to be or what the valuator would make them had he the proper plan of the farm before him and knew the exact area of the fields. For that reason alone I think it is worth the consideration of the average farmer as to whether it would not pay him to get the area of his fields and a general plan of all his farm or estate made out reasonably accurately. (Hear, hear and applause).

Mr. D. L. Patrick: We have had a most interesting talk from Mr. Warner and I must say he got right there. It has often struck me as peculiar that although we weigh our cane on a weighbridge to the last pound when you come to the land on which it is grown very few of us have any accurate figures in regard to that part of it. You may be 10 per cent. 20 per cent. or even 30 per cent. out in your calculations. How can you arrive at your tonnage per

acre if you don't know your acreage? There is not the slightest doubt about the correct way to do things. The method demonstrated by Mr. Warner is an extraordinarily simple one. It is a subject that the majority of us have fought shy of. We don't even know the exact acreage of some of our fields. It has been handed on to us and we have kept it and guessed at it. We owe Mr. Warner a hearty vote of thanks for his paper. (Applause).

Now I would like to ask Mr. Warner a question. The method of measuring is correct, but as a surveyor I would like to know where he would start with his measurements if he was surveying a farm for litigation purposes. Would he take it from a point on the outside of the field equal to the centre of the space between the cane rows, or would he start right up against the roots of the cane in the outside row?

Mr. Warner: I am glad that was asked because it helps to illustrate the need why an approximate method is all that is required for ordinary measuring up of cultivated lands. You will get quite a lot of controversy as to where a field ought to start and end. As a matter of fact you have no definite line. It is a matter of give and take in taking the reasonable acreage of the cultivated land. It helps to show that a very accurate method of survey would not only be expensive but would not fulfil the object for which it was done, for the simple reason that you are not working to definite marks as in the case of land surveys where you have beacons and land marks to work to. I should say that a reasonable point to start from would be at a point on the outside of the outer cane rows equivalent to the centre of the space between the rows. The edges of the fields are more or less irregular and the approximate methods would give you the result just as accurately as the other.

The Chairman then thanked Mr. Warner for his address. (Applause).

ANIMAL TRANSPORT ON SUGAR ESTATES.

(Paper by V. C. SCHWIKKARD, Field Overseer, Sugar Association Experiment Station.)

In common with other branches of the Agricultural Industry of the Union the question of Agricultural Economics plays an equally important part in the production of sugar cane, and planters are seeking ways and means of reducing the cost of production of cane per ton without impairing or reducing their general efficiency.

While it is generally agreed that the cost of Native Labour provides the highest proportion of the cost of production it will be found that the cost of draught animals forms a proportion almost as great.

As a result of the cost of production of maize in-

vestigations it was shown that the cost of ox labour formed 17.7 per cent of the gross cost of production of maize; more than one sixth—and the cost of draught labour in the production of cane does not appear to be any less; it is probably higher. In the absence of any reliable figures giving the cost of production of cane per ton in detail it is impossible to show, with any degree of accuracy the cost of draught labour beyond indicating that this cost forms a comparatively high proportion of the whole.

Of the various types of animal at present em-

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ployed in the Sugar Industry, first place in degree of numbers is occupied by the trek ox to the extent of about 85 per cent, followed by the mule to the extent of about 10 per cent and the remainder represented by the donkey to a negligible extent the horse.

The immunising of horses against horse sickness has not been yet brought to a stage of practical utility and until this stage is reached or other economical means of combatting this fatal disease is found, the employment of horses is not advised.

Owing to outbreaks of East Coast Fever from time to time and the consequent restricted movement of cattle in those areas, and on account of their low initial cost, donkeys have been substituted for oxen. Donkeys once they are acclimatised are immune or resistant to disease but from an economic aspect there is little to recommend them as draught animals. They are considerably slower than oxen, whilst they necessitate the employment of the same number of attendants, require a grain ration and housing and a great deal of patience on the part of the driver.

From both a practical and economical point of view horses and donkeys do not bear favourable comparison with either oxen or mules as draught animals on the coast and it is not proposed to discuss them any further beyond giving a few words of advice on the purchase of donkeys to those who for any particular reason contemplate their employment. Donkeys, other than those bred on the coast or introduced from the Low Veld of Natal, do not survive under local conditions. There is a case on record of a planter who brought donkeys from the Karroo because of their cheapness, and within three months not one survived.

South Africa is practically the only country today which has retained the ox as its main source of draught labour. In the majority of other countries of intensive agricultural development, the ox has been supplanted by either the horse or the mule. The Coastal belt of Natal and Zululand as far North as Matubatuba is the most intensively cultivated stretch of country in the Union. In Natal where cultivation is even more intensive than Zululand and where the more broken and hilly nature of the country does not lend itself to the extensive use of tractors, the question of grazing has become a serious problem and the feeding of the oxen employed more difficult and costly as time progresses.

One of the most important factors determining the employment of oxen on sugar estates is not only the price of the land but also the potential value of its productive capacity. After paying due consideration to this factor and many other factors which will be dealt with later, it is contended that the ox is no longer an economical source of draught labour on sugar estates and a few figures and obser-

vations are here collated in support of this contention.

By further reference to the cost of production of maize investigation it is found that the average cost of ox labour per day is about 4¾d.

As the average cost of maize land is considerably lower than the average cost of cane land and the cost of maintenance of animals is cheaper, this figure can be taken as a conservative estimate of the cost of ox labour in the cost of production of cane.

From figures obtained from planters of long standing who employ mules and from many personal observations, the cost of mule labour per day is estimated at not more than one shilling.

Now eight small mules are equivalent in energy to twelve oxen, i.e. eight small mules will pull the same load for which 12 oxen are necessary. Again mules travel much faster than oxen, consequently it follows that the mules will draw the same load in the same time a greater distance than the oxen. In order to give a practical illustration it is necessary to take some standard operation such as ploughing: 12 oxen drawing a single furrow hillside plough under coast conditions will plough ¾ acre per day, employing three attendants, viz: driver, ploughman and leader, each costing 2/4 per day or a total labour charge of 7/- per day. For purposes of comparison eight mules drawing the same plough under similar conditions and employing the same labour at similar cost will plough 1¼ acres per day.

By a deduction from these figures and from the respective cost of ox and mule labour per day it is seen that it costs 15/8 to plough one acre with oxen and 12/- with mules—a saving of 3/8 per acre favouring the employment of mules or about 23 per cent. Time saved is money saved and taking a further illustration from the figures quoted in the previous paragraph it will be found that it would take a team of 12 oxen twenty days to plough 15 acres while it would take a team of eight mules twelve days only to plough the same acreage. This saving of time 40 per cent in the case of ploughing, is of incalculable value to the planter especially when, owing to conditions of drought and other causes he has been unable to prepare his land at the proper time for the usual planting.

The maintenance of an adequate supply of labour is always a serious problem and in this direction mules also show a big saving in the number of labourers required. Properly trained mules can be controlled by means of reins thus eliminating the necessity of a leader. An illustration of the labour saved by the employment of mules in preference to oxen can be shown by making further analysis of the figures already quoted: to plough 15 acres with oxen would entail the employment of 60 units of labour and to plough the same acreage with mules employing (a) three attendants, would entail the employ-

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ment of 36 units of labour a saving of 40 per cent (b) two attendants, 24 units of labour only a saving of 60 per cent.

Oxen cannot be worked continuously on grazing alone and in consequence require to be rested from time to time to enable them to recuperate and regain their condition. Unfortunately there are no figures available showing the number of working days per year, it is possible to work oxen, but an estimate of 60 per cent is considered a fair average; on the other hand it is possible to work mules continuously with very short or no periods of rest. It is considered that the percentage utility of mules on the basis of working days per year is about 90 per cent.

This factor of utility is most important when it is remembered that the demand for draught labour on sugar estates is constant throughout the year.

In the Spring more than at any other time of the year, it is essential that the draught animals should be in good hard working condition and fit for the heavy work demanded of them, but it is at this period when oxen are at their lowest utility value, on account of their low condition and strength caused by the lack of sufficient grazing and sustaining food.

Except under exceptional conditions of heat, it is possible to work mules throughout the day. Oxen on the other hand are soon affected by the heat and become distressed, when they should be outspanned immediately otherwise fatal results may follow. In consequence of the distressing effect heat has on oxen it is the common practice to work oxen during the cooler hours of the day only and cases have occurred during periods of excessive heat when the moon has been favourable that oxen have been worked at night instead. It may also be remarked that the employment of any animal in the rain is to be deprecated as damage results by chafing wherever the harness comes in contact and the use of the animals is lost until the abrasions are healed.

Feeding and Care of Oxen and Mules:—More oxen die from poverty every year than from any other cause which is a matter that demands enquiry and remedying. Overwork is a contributory factor but the main cause can be described as nothing short of slow starvation. Owing to the limited extent of the farms and the high price of land very little is retained for grazing purposes and what is retained is always the worst land which is considered unsuitable for the growing of cane, whilst even the grazing value of this land soon deteriorates. Cattle like all animals, select the more palatable grasses first. These grasses are invariably the most valuable and nutritious but have a peculiar shallow rooting system as a result of which with constant grazing they are pulled out by the roots and their total elimination ensues. The place of these grasses is

taken by what is commonly known as wire grass—a most unpalatable grass of low feeding value except when grazed when very young.

During the Winter months practically the only source of food available is cane tops, which are very often burnt and little or no provision is made for the feeding of oxen at night. Any animal which is worked during the greater part of the day must be fed at night. While the purchase of fodder for the purpose of supplementing the food for the oxen is desirable it cannot be recommended on economic grounds, but during the cutting season it is possible to gather cane tops for this purpose. Where burning is practised these can be cut daily in advance of the cutters before burning. In order to secure the full feeding value of cane tops they should be chaffed up and fed to the oxen at night from mangers.

It has been observed that many planters merely broadcast the tops in the kraal or paddock—this method is obviously wasteful as the greater portion of the tops are trampled upon and destroyed. Now cane tops alone are insufficient for the proper sustenance of the oxen and the question of finding cheap supplementary foods arises. The planter is in the fortunate position that such foods are easily and cheaply obtained almost at his back door. The value of molasses as a stock food is not realised. Molasses is easily handled and can be obtained at a nominal cost from any sugar mill and its use as stock food cannot be too highly recommended. By mixing a judicious quantity of molasses with the chaffed cane tops in the manger is the best method of feeding this commodity.

In feeding molasses it must be recognised that this is essentially a carbohydrate food and contains very little protein and should be balanced by the addition of some food such as oil cake or cotton seed meal, rich in protein.

Few animals respond better to food feeding and care than mules and the planter who treats his mules properly will be repaid many fold. Where cane tops and indigenous sweet grass are available on the farm it is unnecessary to purchase fodder as these will prove sufficient. All cane tops and grass should be cut fresh daily—the former chaffed and fed from mangers and the latter placed in a heavy rack above the manger at a convenient height. As with oxen the addition of molasses to the chaffed cane tops is recommended.

A daily grain ration of about 3 lbs. per mule supplemented by $\frac{1}{4}$ lb. oil cake or cotton seed meal, given in equal quantities night and morning will be found to be sufficient. The grain ration can be fed in the form of either crushed mealies or oats.

Mules, if fed in accordance with the above directions will thrive and maintain their conditions under regular and constant hard work. As a paradox it has been observed that mules often lose condition

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when rested. In order to maintain a constant supply of green food for the mules employed the planter is recommended to set aside a small area of cane sufficient to ensure a progressive supply of fodder after the first cutting is completed. Only a small area will be required when it is remembered that during the cutting season a plentiful supply of cane tops will be available, it being then necessary to make provision for the off season only.

Mules should be housed in an open shed or stable, with the sides which are exposed to the rain and prevailing winds, protected. The floor requires to be bedded down with a litter of grass or trash every night and removed in the morning where it can be conveniently dried and aired ready to be returned again at night. The grass of trash soon becomes unfit for bedding when it should be dumped into a pit or heap for future use as manure.

The Type of Animal to Employ:—While the employment of mules is advocated in preference to oxen it is recognised that some time will elapse before oxen are supplanted by mules. They are therefore included in this survey.

Experience has proved that the ox showing any pretensions to breeding other than Africander or Zulu is quite unsuitable for draught purposes under coastal conditions. Oxen of this type are hardy, maintain their condition and are less affected by the heat. The supply of coast-bred or coast-acclimatised oxen is limited, but when obtainable their purchase is recommended in preference to oxen from other localities even at an enhanced cost of from £1 to £1 10s. per head.

When buying oxen from other localities the planter is recommended to buy only oxen from what are known as the gallsick and redwater areas of Northern Natal, such as portion of the Estcourt district and the districts of Ladysmith, Dundee, Newcastle and Vryheid. The best time to introduce cattle from these districts is during the months of June, and August. It is only during this period that such cattle can be introduced to the coast with any degree of safety, where gallsickness and redwater are so prevalent.

As a further precaution the oxen should be worked soon after arrival. The lower value of imported oxen lies in the fact that they take a season to acclimatise. Imported oxen, until acclimatised, do not maintain their condition and require to be rested frequently, which naturally reduces their utility value to a great degree during this period.

At the present time the mules employed in the Sugar Industry are almost entirely the small type ranging up to about 14½ hands in height, and up to this point the scope of this paper has been confined to the discussion of this type, but the question of the extensive employment of mule labour also opens up the question of the relative merits of the smaller type of mule and the larger type ranging from

15½ hands high and upwards. Apart from the comparatively higher initial cost and slightly greater cost of maintenance there is no doubt that the larger type of mule is the more economical to employ. It is considered that six big mules are equivalent in energy to 10 small mules, and the quality of the work performed is higher.

Unfortunately the demand for the large type of mule is greater than the supply in consequence of which the prices demanded are prohibitive to the sugar planter. If mules of this type can be purchased at a price of from £25 to £30 they are recommended in preference to the small mule.

Since mule breeding is not practised on the coast the supply of mules is drawn from various parts of the Union. Similarly to imported oxen, mules take a season to acclimatise during which period their utility value is reduced as they do not maintain their condition.

By purchasing young mules, 5 to 6 years old the planter is assured of from 12 to 15 years service, before it is necessary to cast them. The employer of mules is also warned against purchasing unbroken mules unless he has had previous experience, the facilities and time to train them, otherwise he will have cause to regret his purchase. A well broken mule is always worth £2 to £3 more than the unbroken mule—at least to the sugar planter.

Owing to the incidence of horsesickness the immunisation of all mules employed is essential, but when purchasing the planter is recommended to buy mules which have not been previously immunised but to have the mules immunised on arrival in the district where they are to be employed, as it has been observed that the degree of immunity is higher when mules are immunised in the district where they are to be employed and it has been observed further that immunity is better maintained by housing them in an open shed or stable. The cost of immunising is about 10/- per head when performed by a Government Veterinary Officer and the time occupied to recover from the operation is about three weeks.

When introducing unimmunised mules to the coast it is necessary to do so after the horsesickness season is over otherwise there is a danger of the mules contracting the disease before they can be immunised or in transit. The most favourable time to introduce such mules is during the months of July and August.

When appointing a driver, the planter is recommended to exercise the greatest care in his selection, that not only is the Native accustomed to handling animals but knows how to treat them properly, and when a suitable driver has been found, to retain him for that purpose only as neither mules nor oxen tolerate the frequent changing of the driver, nor do they give of their best unless constantly driven by the same man.