

# MECHANICAL METHODS OF FIELD TRACTION

(Paper by Mr. D. L. Patrick of Empangeni.)

To tractor or not to tractor—that is the question, and in these notes I will endeavour to show that on a small cane farm to-day the tractor is a necessity where the land is too expensive to use for grazing the number of cattle requisite for intensive work.

Further, I hope that the would be tractor owner will see that there is much to be gained by the use of the machine. The aim of a cane farmer should be maximum of output as this means minimum costs per ton cut, with greater profit. Maximum output is synonymous with work well executed. This, in ploughing new lands or old cane lands, means rapid operations to suit the weather conditions; also deep ploughing to obtain a drought proof crop by the formation of a moisture reserve.

In actual practice this calls for at least three ploughings of any land, followed up by harrowings after each ploughing to attain the required tilth.

This intensive work tends more and more to eliminate the most inefficient work on a cane farm—hand hoeing—as in the first two crops only hand weeding in the cane will be necessary.

On a fully developed 500 acre cane farm one will suppose the area to be divided into:

400 acres cane.

60 grazing.

40 brakes, rivers, roads and homestead.

It is desirable to only leave the cane roots in for 8 years (4 cuttings) then one-eighth must be ploughed out every year, or say 50 acres.

This area has to be ploughed three times, harrowed four or more times, and ridged once.

With two spans of oxen, one will be carting cane during the principal period of the ploughing. The other span will, with a two furrow disc plough, do 11½ acres per day on every working day of the month, take 100 days for ploughing; harrowing at 6 acres per day will absorb 33 days; all this in addition to the ridging.

This means between 4 and 5 months for one span to complete the 50 acres ready for planting, and allows no stops for rains or any work of another description. The other span may be released to assist, when the cutting is finished. Or teams may be hired to assist, but then the grazing suffers. Incidentally the Spring planting season is missed.

With a small tractor, say a Fordson, one can cover steadily two or three acres per day ploughing, and up to 12 acres per day harrowing. From my experi-

ence it equals two spans at work. This method of traction gives an opportunity of picking the weather conditions and rushing the work to suit.

This is ideal, you will say. But what about the cost?

I give you the figures for nearly four seasons of running costs only. These figures include all paraffin, oils, greases, spares, native labour and repair work done by a blacksmith to a Fordson tractor and its implements—a double furrow mouldboard plough and a double furrow disc plough, both of Oliver make. Remember that, included in the figures the cost of paraffin was at starting 27/- per case, where it is now much less than half.

To bring all work to a basis of acres ploughed, I estimate four acres harrowing to equal one acre ploughed.

During the four seasons the work done was equivalent to 930 ploughed acres. The cost of this, on items as above mentioned, was £589. This gives an average of 12.66 shillings per acre for the whole period, and for the last two seasons only the figure is 8.1 shillings per acre. This latter figure is the one that concerns the prospective tractor buyer, as it represents normal running costs. From hearing other experience of tractor owners, 10/- per acre may be taken as a fair figure for a Fordson tractor and implements.

With this figure to work on (8.1 shillings per acre) the intending buyer can allow as he thinks fit for capital charges, depreciation, white labour and so forth.

When you are comparing this with ox-traction, do not lose sight of the fact that you must book up the same charges, plus cost of grazing, dipping, etc. Also bear in mind the tremendous factor of the saving of time in operations in the most vital part of the season. And last, but not least, you cannot afford to graze oxen on valuable cane land.

The ideal combination are two spans of oxen and a tractor. The ploughing out of all cane lands to be done by the Fordson and two furrow disc plough. This type of plough slices up the roots into small clods, and partly shatters them with the speed of the ploughing, thus opening them up for the weathering effect. The first harrowing to be done by oxen, and then followed up shortly by the tractor and harrow. The cross and third ploughing to be done by the oxen with the same disc plough when the depth can be

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obtained, and the subsequent harrowings by the tractor.

By this means it would be possible to get the planting done in November, with the minimum use of the tractor if operated by the owner.

Any man who can drive a car could drive a tractor; the only difference being that one is non-productive and the other highly so. If the tractor is driven in moderation, as in the above scheme, no ill effects need be feared by the driver, and the sense of work well done always outbalances any temporary personal inconvenience.

The Fordson lends itself to various other operations on a cane farm.

Ridging is well done with the ordinary ridger hitched up behind the tractor, substituting a slide for the gauge wheel.

(Sketch on blackboard)

Pony ploughing can be carried out with the tractor and two disc or mouldboard ploughs.

Cultivation of lines is quickly and well done with the tractor and Stranaek type disc machine, or with a tine machine similar to the Martin (which has to be extensively altered to suit). The disc machine is preferable for hillside work as by its construction better tracking is obtained.

A three ton cane wagon is easily hauled by a Fordson, and the cane pulled off also, but care must be taken to use a 40 ft. longer chain when pulling off so as to decrease the angle of bind. I do not recommend a small tractor for anything but casual haulage.

With hillside ploughing, the Fordson will break ground straight up and down on a rise 2 in. to the foot; going up 4 in. or 5 in. deep, and coming down the full depth, the process to be reversed in the next ploughings.

With old cane lands of the above or greater grades, the better method is to plough down on two sides, full depth, and return idle. The cost is slightly greater but the efficiency of work done is high.

(Sketch)

One of the operations in cane planting, the planting itself, may be combined with the last ploughing where the field is not hilly. As the furrow is opened up the fertilizer is fed in, and the ready cut cane put in. The tractor plough covers this on the next round, and goes round a second time to give the necessary width of row. This I have found excellent as the cane is planted when the weeds are turned, and no moisture is lost. Having the cane ready cut into short lengths, for planting by this method calls for a rough method of seed selection by the rejection of poor sticks, as each stick is handled closely.

(Sketch)

An 8 ft. disc harrow can be easily handled with a Fordson, and does excellent work, for the wheels batter down the old cane roots. For the benefit of Fordson owners the following tips are given:

Specify "Skefko" thrust ball races for the worm thrust drive.

Specify "Kent-Atwater" ignition to replace the commutator and roller. This only uses one coil, and leaves 3 in reserve. The spark has an amplifying effect and is much "fatter." When the air washer copper floats get water-logged, replace with blocks of cork of the same size, using the same guide frame. Reinforce the outside spokes of driving wheels with discs of sheet iron one-eighth or 3-16th thick, bolted to both the hub and the arms.

For the users of Oliver Ploughs I can recommend: All wheel grease caps to be fitted with a 1/4" gas plug, and have a grease pump to fit same. This makes the greasing a very sure operation. Extension grease pipes on disc bearing bring the grease cups in a position for easy operation, and where they cannot be spun off by the movement of the soil coming away from the discs. Wearing plates, made from old steel tyres, should be fixed underneath each disc housing to prevent the severe chafing from the edge of furrow. An extra wide rim can be fitted to the land wheel of disc plough when in soft ground, to obviate the increased draft when the narrow wheel sinks in.

All these tips bring down the cost of repairs and replacements.

The Oliver Tractor disc plough is about the best on the market for use with oxen, and the automatic self lift dispenses with a boy for operating the plough.

These notes have been put in a very condensed form, so that any planter without a knowledge of engineering or accountancy, can see the results obtained and decide whether or not a tractor is going to help him over the hill of difficulty.

I welcome criticism, destructive or otherwise, for our mutual benefit.

## DISCUSSION ON THE PAPER.

Mr. Forrest said he would like to draw attention to an extraordinary contradiction which Mr. Patrick had made. First he had told them that anybody who could drive a car could drive a tractor and yet from his own experience he had given them some of the most valuable tips. He was afraid he could not agree that anybody who could drive a car could drive a tractor. It had been his experience whenever he had to take his car in to the garage, that the man was not at the garage but was away busy fixing up somebody's tractor. He wished to know whether Mr. Patrick had allowed for his own time in his estimate of cost, as he understood Mr. Patrick had driven the tractor himself. There was also another point. While the planter was busy ploughing his land until late in the afternoon probably, there ought to be a certain deduction made for the time that his labour was doing nothing because he was out of the way and busy. He did not know if Mr. Patrick had had any experience of the work of a tractor on sandy soil, as it seemed to him that a tractor of that description could only do really good

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work on a fairly heavy soil; on sandy soil he thought it would dig itself in.

Mr. Patrick in replying to the first point, which Mr. Forrest had called a contradiction, said that he stuck to his point that every man who could drive a car could drive a tractor. He had given them all these tips because he was an enthusiast on the matter. There were a lot of men who were driving tractors who had not had the benefit of these things and were still working tractors. With regard to the owner's time, that was not included because he regarded his services as management; although he was owner he was the manager of his farm and that included all his services. As to what the rest of the labour was doing whilst he was driving the tractor, he had time enough apart from tractor driving to look after the labour as well and one had to at times. But a man's labour did not suffer to any great extent. Taking the average planter how many hours a day did he actually put in in his fields? Although he drove a tractor he put in just as much work in his fields as a planter who did not drive a tractor. If he drove his tractor until 11 o'clock and did not start again until 2, he had all that time to see what the labour was doing. In any case if they had a good Induna they could get just as good results from the labour. With regard to working in sandy soil he did not think the tractor would be suitable. He had not tried it himself. Even steam ploughs had failed on sandy soils at Empangeni.

Mr. Ladlau stated that although all Mr. Patrick had told them had been applied to his farm, he (the speaker) thought if he was not an experienced planter he would have gone astray. Mr. Forrest was quite right that the tractor would not work in a sandy soil; even a caterpillar tractor would not work in sandy soil. As regards ploughing up and down hills, Mr. Patrick might be able to do it on his farm, but he was afraid he and others would not be able to do so. The first heavy rain would wash the ploughed soil away and it would be dangerous to do it.

Mr. Patrick had omitted to tell them how far his farm was away from the mill or station, how much came that span of oxen had to carry, and how far. He had told them that by using a Fordson tractor one could plough in winter, which was the proper time to do it, but what would the two spans of oxen be doing then. He might say that the ground was too hard for the oxen to pull ploughs during winter. But if the oxen could not pull the ploughs then the Fordson tractor could not do it.

Mr. Patrick in replying said he presumed Mr. Ladlau referred to the proposition he had put up of a 500 acre farm with two spans of oxen. In any case they would have to have at least one span carting, no matter how far they were from the station.

Mr. Ladlau stated that one span would be useless, it depended on the distance.

Mr. Patrick stated that his remarks would apply

even to more than one span. He did not think he had any point that oxen could not get into the ground in winter. In ploughing they had to do it in winter. It was the most essential thing that the first cane that was cut was the cane they were going to plough out. That was done in winter under the worst conditions, and in any case it was done whether with oxen or tractor. They took the conditions as they were and they got in, that was the point. He had never seen ground yet that he could not get into in winter. Whether he could do it profitably was another thing; it might pay to wait for a month and get the first shower.

Mr. Ladlau stated that Mr. Ladlau had told them a tractor would be able to plough during the winter. Why couldn't he plough with the same oxen as he used in summer for carting.

Mr. Patrick replied that they would probably be doing part of the ploughing. When cutting, one span would be carting and the other would also be put on ploughing out. With regard to the use of a tractor on sandy soil, he would like to point out that on sandy soils there was probably not the necessity for intensive work as on hard ground. It was not so much a question of deep ploughing.

Capt. Greig stated that it was very interesting to hear Mr. Patrick's paper on the Fordson. No doubt the time was coming when they would all have to turn their attention to some form of tractor ploughing, particularly those men who had small farms. In the last three years he had tried to get a tractor to do some work and he had been rather disappointed. Some time ago a man had offered to plough for him with a light tractor. He wished to say that his land was particularly heavy; heavy black soil. This man was very unsuccessful and managed after seven weeks to scramble through about 18 acres of ploughing. The man was paid for it, but it all had to be ploughed over again. Later on a demonstration took place. A firm sent a tractor up. It was there for five weeks and 4½ acres were ploughed. He was not condemning the particular tractor at all; he thought it was possible the man driving it had a great deal to do with it. There was no doubt the heavy land on his farm was very difficult to work with any tractor. Later on another tractor came along which was less successful than any of them. It ploughed exactly a quarter of an acre and went away. Notwithstanding the advantages to be gained by the use of a tractor as mentioned by Mr. Patrick, he thought Natal men ought to be very careful before going in for one to be certain that the land was suitable for tractor work. He knew of certain Zululand farms in which the soil was of a soft nature. He knew Mr. Beningfield's farm where he worked his "T.C." But in the winter he defied any Fordson to get in to his (the speaker's) fields. Sometimes it was impossible for him to get in with any form of plough. Nevertheless Mr. Patrick's paper had been very interesting and his tips were very useful.

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Mr. Patrick referred to Capt. Greig's remarks that no tractor was suitable for his soil, and remarked that it was essential for anyone who had difficult soil and intended going in for a tractor, to make it a condition that the agent come and demonstrate the work which it would do, on the worst of his land. Tell him he wanted to see economic work done on that land. If it was left to the agent naturally he would choose a nice bit of land and do the work beautifully.

Capt. Greig replied that that was what he did. He said "There is the land, if you can plough it satisfactorily the tractor will be bought." If it was not satisfactory he would pay for the land ploughed. They had the whole of his farm to go at but the result was what he had already told the meeting.

Mr. G. H. Hulett said he wished to say a few words in defence of the tractor. Unfortunately his son was not able to be present; he would have been able to tell them how he had done sixty acres since December, which he would never have done without a light tractor. He had not only ploughed but cross ploughed and harrowed. He (the speaker) agreed with Mr. Patrick that they had to look in future to the tractor to do their work. It was impossible for a man with 400 acres to keep that farm in the cultivation necessary to produce to the fullest extent unless he had mechanical appliances. The day of the ox was gone. Where there were a number of small planters adjoining, if they would only combine and get a mechanical tractor and work in co-operation thus lessening the cost of each individual, that was the only way they were going to get on in this country.

Mr. Patrick stated that a tractor was a thing a man had to take a keen interest in himself. It was different to a car. The tractor was going on day after day and the wear and tear was enormous and it had to be looked after continually. If properly oiled and greased and looked after generally they only required ordinary care. One did not need to be an engineer to tackle a tractor. It was a matter of pure commonsense.

Mr. Kelly stated that as a tractor user he thought they were a mixed blessing. There was a lot of work they would do and a lot they would not. On certain soil they were no good, but on an average farm they were pretty useful.

Mr. Johnson stated that if Mr. Patrick had a farm big enough he would not be troubled with a tractor. He (the speaker) had started with a Fordson in his heavy land and it was practically useless. Mr. Patrick may think they did not use it rightly but the land was heavy and the gradients steep. This sea-

son he had tried a bigger tractor. He had started at the end of November and ploughed and re-planted between 70 and 80 acres, and they had got the whole of that land ready (twice ploughed and harrowed) by the end of January. He had gone into the cost of the ploughing but did not put in any charge for depreciation. It had worked out at 12/7 an acre. The figures included the cost of the tractor driver as well, also charges for repairs. He considered it was necessary to have these tractors, but they ought to have one in reserve. If a tractor broke down in the middle of ploughing a man would be hung up considerably unless he had a reserve tractor. If a man with a small farm was determined to work up to date and get the best out of his land it was necessary for him to have a tractor.

Mr. Patrick said he was glad to find enthusiasts like himself. He was sorry that no one had brought out any figures with regard to the cost of ox ploughing. His own figures for the last two years had come out at 8/- per acre and he did not think anyone could touch that figure with oxen. Even if they could in cost he did not think they could in average efficiency.

Capt. Greig remarked that he did not think he had managed to plough more than a quarter of an acre a day with an ordinary plough and oxen. If a man averaged half an acre a day with an ordinary mouldboard plough he was doing quite well. He had done very well with a double disc Ransome plough.

Mr. P. J. Mahon remarked that he was afraid the tractor was not looked upon in its proper sense. It was a scientific product to be used in a scientific manner. He had tried a steam plough last year and the price was 30/- per acre for one ploughing, plus two spans of oxen delivering water with attendant drivers and leaders. So he thought the figures which had been brought out compared favourably. He stated that people did not expect a motor car to go plunging through drifts and water, so why should they expect a tractor to do it; a tractor had to be used properly. The ordinary tractor had been built for ordinary grain producing farms, and yet they wanted it to work in cane fields which were altogether different.

In reply to a question as to the life of a Fordson tractor Mr. Patrick replied that if they had three ploughings he considered that with reasonable looking after a tractor would last four years at the very least.

The Chairman then thanked Mr. Patrick for his interesting and practical paper, which he felt sure was of benefit and interest to all planters.