

some of the sugar estates; would the draught be sufficient?

Mr. Richards replied that the existing boiler chimneys would furnish enough draught on the outgoing side, but it would be necessary to have a blower-fan. They had a thick bed and had to penetrate that bed; they generally aimed at balancing their draught; so that they got zero at the top of the fire. He thought many of their chimneys—some of which were pretty high—would give all the draught on the waste gas side that was desirable.

Mr. Murray said he would like to suggest that Mr. Richards get a furnace out here, and the Committee would test it. (Laughter).

Mr. R. W. Saunders remarked that, as the paper was one on the Steam Balance of the sugar factory, the subject of the utilisation of steam (as opposed to its generation) should be discussed. In Cuba, considerable attention is paid to this matter, and it is there considered that a factory should be able to operate on 10 per cent fibre cane, without extra fuel. These results are obtained, firstly by economical combustion of bagasse, and secondly by very carefully layout of the factory, permitting of a minimum of steam piping, extensive lagging and vapour heating. (This

latter should of course be unnecessary in Natal).

Mr. P. Murray replied that the Committee had not got down to that; they had not got beyond the boiler house. The trouble was they had to earn their livelihood in the meantime. They had not much spare time; there was so much competition. (Laughter).

The Chairman then called on Mr. E. P. Masters to present the report of the committee on the handling of cane from field to crusher.

Mr. Masters said he was very sorry that this paper had been very much curtailed, owing to pressure of work. He did not think that those present would mind that very much, as the hour was now getting late.

They had confined their attempts to trying to show where small economies could be effected in the working of cane under South African conditions, in the hope that later on another paper would be forthcoming showing a comparison between their work here and that in other parts of the world. He wished to take this opportunity of expressing his thanks to those who had assisted him in the paper, Mr. Crawford and Mr. Wickes. Mr. Pearce had regretted that he could not give him any assistance.

## Report of the Committee on the Handling of Cane from Field to Crusher.

The usual method of cutting is by an approved brand of knife such as Brades or Collins, and this task is performed under varying conditions.

There is no recognised general standard task for this work, but it might be mentioned that 36 cwt. or about 4,000 lbs., is usual in Fiji with natives and Indian labour, 2,000 lbs. in South Africa and a bonus above these figures in both cases. This applies to trashed cane.

With European labourers, such as are employed in Queensland, a good gang can average 3 to 5 tons per man in burnt cane.

In districts where the habit of burning cane still obtains, in South Africa, the task itself is considerably greater, 3,000 to 4,000 lbs. or roughly 50 per cent. increase, with the bonus of 1d. per 100 lbs. over the stipulated task being usual.

The limiting factor for all this work is the distance the cane has to be carried to the waggon or truck.

Provision should always be made, where portable tramlines are used, to limit the carry to 2 chains—it being cheaper in practice to have a short carry and pay additional for the laying of the track.

We have started off by drawing attention to cutting as well as loading, and the two operations are performed by the same gangs.

### CUTTING BY MACHINE:

There have been several of these machines on the market in different parts of the world, and some have given fairly good results where local conditions have been in their favour, but we have yet to see one that would suit the condition obtaining in South Africa.

### COSTS:

With the usual 2,000 lbs. for trashed, and taking the value of a native or Indian on shift basis, 1/8d. plus rations and proportion of Medical Fees, etc., we find that 2/5d. to 2/6d. is the actual cost per day.

If a man can be induced to load a heavier tonnage by means of a bonus of 1d. per 100 lbs. over his task of 2,000 lbs., at the same rate of pay, the cost per ton is materially reduced, as for instance:—

2,000 lbs. per man 1/8d. + 10d. = 2/6d. per ton.  
3,200 lbs. per man, 1/8d. + 10d. + 1/- bonus,  
3/6d. = 2/4d. per ton.

4,000 lbs. per man 1/8d. + 10d. + 1/8 bonus,  
4/8d. = 2/1d. per ton.

Plus 2/- per ton flat rate haulage main line 4/6,  
4/4 and 4/1.

The last tonnage figure can be looked upon as a maximum under the best of present day conditions for trashed canes.

The above merely deals with cutting and loading and we now have to take into consideration the cost of field transport which must be added to the before-mentioned figures.

The figures available from various sources would indicate that the cost varies from 5d. to 6d. for laying and transport of line and plus brake boys for taking out loaded cane trucks up to a haul of 2 miles, or 2½ d. to 3d. per ton mile.

In addition there are sirdars, water carriers, etc., which will inflate the cost to 6d. or 8d., equalling 3d. to 4d. per ton mile.

This makes our cost as follows: —

(Interest on track and rolling stock we are not taking into consideration, as those interested can add this on the basis of their capital expenditure).

Cutting and loading 2,000 lbs. 1/8 + 10d. 2/6 ton  
Plus field transport. (mean) . . . . . 7d. ton

Total cost delivered to main line . . . . . 3/1 ton

3,200 lbs. 2/4 + 7d. . . . . 2/11 ton  
4,000 lbs. 2/1 + 7d. . . . . 2/8 ton

With 2/- flat rate haulage, making out final figures 5/1, 4/11 and 4/8.

APPROXIMATE COST OF WAGGON TRANSPORT:

This has the additional expense of again loading into either tram trucks or S.A.R. trucks at main line, and this means extra labour even if mechanical loaders are used.

As an indication of what costs may run into, the following figures may be given as approximately correct for burnt cane.

Say a planter having only one mile to transport to tram siding or main line daily cuts 30 tons burnt cane from a field yielding say 27 to 30 tons per acre. Some 14 natives ought to deal with this work as a daily task of cutting and loading on either ox-waggon or tramline direct. If transported in ox-waggon another 6 natives will be required at the siding or main line to load into tram or S.A.R. trucks.

Transport charges on the main tramline based on a flat rate, places the long and short distance planters on an equal footing. For economical field work where planters are restricted to small tonnages the "zone" (amalgamation of two or more planters) principle is recommended during the cutting season, when it is possible to club the allocation of trucks and labour.

14 boys at 2/6 (1/8 wages, 10d. rations and quarters)	£ 1 15 0
6 boys at 2/6	15 0
Ox or mule transport	1 10 0
Supervision	1 0 0
	<hr/>
	£ 5 0 0

3/4 per ton + 2/- flat rate for loco. haulage = 5/4 per ton delivered at factory.

Note.—Upkeep of waggons is usually very high and can best be estimated by those using them.

The details would be as follows: 6 cutters, 6 loaders and 2 for fire breaks.

For the information of growers in general, we would strongly recommend the tramline system as preferable to ox or mule transport, not only on account of economy in transport (there are, of course, exceptional conditions) but also from a field point of view. It is obvious that it cannot do subsequent ratoons any good to have several spans of oxen or mules hauling waggons about the fields, and in no instance can we recall having seen special roads for this work obviating the necessity of the transport animals tramping indiscriminately about.

Our recommendation is to use portable track where you have a crop of say 2,500 tons upwards, with a haul of two miles and over. Ox or mule transport may suit some of the smaller growers where their crop would not justify a heavy primary capital expenditure for track.

PORTABLE TRACK IN USE:

This varies, but in South Africa, 12 to 14 and 16 lbs. is the usual weight adopted; of the three, 16 lb. is possibly the best for all-round heavy work.

In this connection it must be mentioned that there is a diversity of opinion as to the type of sleeper and method of laying. Some prefer the old method of detaching the sleepers, and transporting sleepers and rails from one part of the estate to another. More modern practice is to have the sleepers rivetted on and to transport the sections. In dealing with curves with the latter method, the clumsy and slow process of bending rails by Jim Crow is not necessary.

Curves, so many per mile, consisting of full, halves, and quarters can be made from the individual lengths before rivetting on the sleepers. Usually 8 full curves, 6 halves, and 6 to 8 quarters will be found sufficient per mile. The full curves are bent from full length 24 or 30 ft. rails before rivetting, rails are cut in half for the halves, and again for the quarters, and all to the same radius; whatever is adopted this should not be less than 100 feet.

The fish-plates and ground plates are rivetted on at alternate ends, in this way whichever way the rails are turned they will fit one into the other and on flat or undulating ground it is unnecessary to do more than push one section on to the other with a crowbar.

Before leaving the subject of portable track it must be mentioned that to be able to work an estate with the minimum of track, it should always be laid to the furthest point of a field, and only sufficient cut out by the labour to reach this point. When the terminus is reached, cut out and pick up for relaying. It will be readily seen that if the reverse method is applied, the track cannot be shifted until the whole field is completed.

Lastly, those who adopt portable track should be assured that their grades are not too excessive or the curves too sharp. A well graded track means economy in stock, rapidity of transport and reduces the wear and tear.

For the preservation of the above, bitumen has been recommended in preference to coal tar, and although the former is the more expensive, it is more easily handled and covers a greater area.

#### ROLLING STOCK:

Types of rolling stock in use vary to a considerable extent according to local conditions, but there are excellent types to suit all, some of the standard pattern of certain firms being built to suit conditions here after long experience. There are also others which have been developed by some of the larger growers and improved on from time to time to suit their own local conditions.

The type with the wooden centre drawbar is probably the most popular with those that have used it, having as it has, certain distinct advantages over most of the other types. There is less friction in negotiating curves and the bumps are distributed through the whole frame. So far as the ordinary field trucks are concerned, we in South Africa have very little to learn from other parts of the world.

We now come to the type that the South African Railways use, and there is certainly room for improvement here. The Department has adopted a sympathetic attitude to this aspect and we believe that certain recommendations have been made.

What is really required is some system of posts to hold the cane on, possibly hinged to lie flat against the truck when not required, or during the season kept upright during transport, laid against the side when loading, and then replaced in the upright position and tightened across the truck by wire or chain when loading is completed. In this direction there is more scope for individual recommendations.

#### LOCOS:

The consideration of the type most suitable for various local conditions for hauling the small trucks to the factory depends entirely on the capital cost, type of truck used, curves, etc., and tonnage to be hauled per trip.

The usual practice is to use 10 to 15 ton locos on 30 lb. track or even less, but where the haulage exceeds 4 to 6 miles, it has been found more economical in some cases to replace this lighter track with 45 lb. and use the 30 lb. track as feeder lines.

Here again grades are the chief consideration and these should be limited to 45 to get satisfactory results.

The locos should be designed to negotiate curves with the least possible friction and grinding.

On the coast the upkeep of locos is considerably higher in bearings owing to the sandy nature of a great deal of the road on which the track is laid, and

this wear is further enhanced on those Estates that run filter press cake to the fields on their system.

#### CANE OFFLOADERS:

Mechanical loading of cane carriers is necessary for any plant grinding above 15 tons per hour.

Mechanical offloaders in use in this country are as follows:—

- (a) Derrick with grab.
- (b) Derrick with slings or chains.
- (c) Travelling gantry with grab or chains.
- (d) Rakes.
- (e) Tipping Tables.

There are two types of derricks used in mill yards locally. The one type of U.S. manufacture is a vertical derrick post or mast with a horizontal jib of about 60 feet radius. This jib is never at any time "luffed," that is, raised or lowered, but is permanently attached to the mast. For slewing radially, the jib and mast are rotated circumferentially on a geared track, and can therefore operate within a complete circle.

The mast is held in a vertical position by a swivel bearing at the mast head, this bearing being securely guyed by several (4 or more) stout wire rope guys anchored rigidly to concrete blocks in the mill yard. With this form of derrick the operator is housed at the base of the mast where the engine or motor is directly under his control.

The second type of derrick is of British manufacture and is self supporting or contained, in the fact that wire rope guys for guying the mast in position are entirely dispensed with. The derrick post or mast is of structural steel made in the form of a square tower and rigidly fixed to the foundation at its base. The horizontal jib is swung radially, round this mast or Samson post. The operators cabin, together with the driving engine or motor is at the rear end of the jib some 40 feet above ground level, and the operator thus has a clear view of his field of operations.

The working wire ropes of this type appear to be of longer length than that used in the former type of derrick. On the other hand the complete elimination of wire rope guys on this second type is some compensation which might be a consideration where mill yard space is restricted.

The travelling gantry is the usual type of crane commonly used in lumber yards. The radius of operation is naturally limited to the span and overall length of runways. The runway is made to the required span of a maximum of about 38 ft. to suit South African Railway waggons.

This type of crane must necessarily be driven electrically. The driver's cabin is attached immediately underneath the main beams of the travelling cane and he thus has a clear view of his work below.

There are three drives to the crane. Hoisting, travelling, and traversing, each operated by its own motor.

We have this type of offloader at three local factories and they appear to give every satisfaction.

#### CANE RAKES:

Is an appliance made up of 2 or 3 chains (right, left and centre) driven by sprocket wheels. To these chains are attached angle iron toothed rakes, spaced about 3 ft. apart. The rake is superimposed directly above the carrier, and the raking end of the machine is arranged so as to be raised or lowered at will as the level of cane being raked off the truck varies. This operation is performed by the attendant by means of a geared chain wheel and balance weights. It must be understood that this type of offloading rake can be used in conjunction with open sided trucks and only on such trucks where the cane is loaded across and not in a fore and aft manner.

It must be admitted that this type of offloader appears to be losing favour in this country, due no doubt to the fact that by raking cane on to a carrier the cane is dumped in a loose manner and is not "compacted" until passing through the knives.

As grinding tonnages have gone up considerably within the last few years, these rakes have had to give place to grabs and tippers for more tonnage per hour; though rakes appeared quite satisfactory for say 30 tons per hour, when two rakes were employed, each rake required its separate siding and trucks for operating.

#### TIPPING TABLES:

Tables are used in quite a number of factories for disposing of the cane off the estate trucks which have open sides.

The main feature of a tipping table is that the truck to be offloaded is first secured to the tipping table, the table is then canted to the required angle by means of a hand wheel and screw. When the table is canted at a greater angle than the angle of repose, the cane slides off on to the carrier below. The machine is of very simple construction and may be designed to work by hand power very economically. Tippers are also made to be operated by steam, electricity, or hydraulic power, as local conditions may obtain.

In milling cane much depends on an evenly and well loaded carrier. The most favoured method is for all loading to be performed in the first place from trucks or wagons into an auxiliary or supplementary carrier. The auxiliary carrier need not be loaded particularly evenly, thereby giving the crane a fairly free hand in its operations. This auxiliary carrier must be driven by a variable speed engine or motor. It can then be speeded up or slowed down in order to feed the main carrier in an even manner.

In selecting a type of mechanical offloader one must be conversant with the local conditions obtaining such as mill yard space and arrangement of trucks, what percentage of S.A.R. and estate trucks, and ox waggon, etc., are to be dealt with. It is,

therefore, quite impracticable to voice any opinion as to the most suitable general type for this country.

Generally speaking, a derrick or travelling crane with grab for South African Railway trucks, and tippers for estate trucks meet the case.

Where ox-waggon are used, the derrick with a complete circle of operation is desirable; in this case the cane is lifted off the waggon by slings. The derrick type is very useful if storage of canes is not a factor to be considered of any great moment, as in the larger factories, where grinding is in the region of 50 tons per hour.

There are two types of grabs used locally. The one type of U.S.A. manufacture and the other of local manufacture, the latter having been designed and made on one of the estates locally; both types of grabs appear to give satisfaction and are automatic in operation.

#### TO SUMMARISE THE FOREGOING:

1. *Types of Knives:* Good standard quality. This is important to obtain a fair tonnage.
2. *Task:* Encourage labour to do their maximum by the payment of bonuses.
3. *Portable Track:* Limit the carry and work back from end of block, throwing out the necessary feeder lines; line is recovered in this way for transport to next field.
4. *Cutting by Machines:* Further experimental work is required.
5. *Waggon Transport:* Limiting factor, distance to transport. Waggon should be loaded to capacity and a careful check kept on cost per ton mile. A case came under notice recently of one planter who was cutting a fair tonnage and decided that waggon transport for 6 miles would pay him. He did one trip per day, hauling  $2\frac{1}{2}$  tons. Taking a waggon and span at £1 per day, it was costing 8/- per ton to siding.
6. *Roads or formation for track, both permanent and portable:* Grades should be very carefully studied to enable locos to haul a reasonable tonnage, and to provide a firm bed for the sleepers.
7. *Types of Portable Track:* Any good standard: the only consideration is the question of type of sleepers and method of using, by rivetting or the ordinary in and out method. Trough pattern sleepers not less than 10 lbs. are recommended.
- Main Line Track:* Recommended B. S. S. trough pattern sleepers, spaced every yard.
8. *Rolling Stock:* Centre drawbar type recommended with either one or two chains, the former suits under some conditions, the latter under other.
- S.A.R. Trucks:* Any new recommendations should be submitted to the officials.
9. *Cane Offloaders:* A subject where no special recommendations can be made, there being such diversity in the requirements of certain centres.

Most of the figures used are approximate only for the purpose of indicating where some saving might be effected.

This paper has dealt with South African conditions only; it was hoped that we would have had time to make a comparison with other countries, and the members of the committee regret that pressure of work has debarred them from doing so.

Mr. J. Murray said that last year Mr. MacMaster had made a great point of the hinged truck which he had seen in Cuba. In that system—he had also seen it himself—he understood they had one man to knock the hinges, another to work the tipper, and another to work a superimposed carrier—that was, three men for a mill grinding 2,500 tons a day. At that time Mr. MacMaster was very enthusiastic about it. He did not know whether anything further had been done about the matter since last year.

Mr. Masters stated he would have liked to have got Mr. MacMaster and discussed the matter with him; but unfortunately he was laid up at the present moment.

Mr. J. Murray pointed out that at Mount Edgecombe they had a superimposed carrier, they had S.A.R. trucks, it was near Durban, and one thing and another; it would have been a suitable place to try it; but nothing had apparently been done.

Mr. Masters said they had submitted something to the Department, but what the result was he did not know.

Mr. Eadie pointed out that the Committee's recommendation on page            was "to use portable track where you have a crop of say 2,500 tons upwards, with a haul of two miles and over. Ox or mule transport may suit some of the smaller growers where their crop would not justify a heavy primary capital expenditure for track." Well, supposing that the tonnage were 5,000 and 6,000, what would be the point at which they would consider the use of a portable track—or rather, the abolition entirely of waggon transport on the fields? With 6,000 tons did they think it would be worth while bringing their portable track right up to their cutting?

Mr. Masters replied that where a planter had a crop of 2,500 tons and over and had a main line, to which he could deliver within two miles, this should justify expenditure on a portable track. The 16 lb. track cost in the region of £330 a mile. So, roughly, 2 to 2½ miles would be sufficient to operate the fields. Waggon cost £60 to £80 and required spans of oxen, and on most of the estates on the coast the grazing area was limited. Though the oxen could be used usually in the off season for ploughing, at the same time, the proposition of using a portable track for 2,500 tons, was an economical one, every time, with the conditions mentioned.

Mr. Eadie said another point that struck him was in connection with the damage done by using oxen

on the fields for transport from the cutting place to the tram line. He could not remember having heard the point made before; it had never occurred to him before that it was one of much importance; perhaps he was entirely wrong, as the Committee considered it an important factor.

Mr. Masters said there was no cane that he knew of, except Uba, which could stand the knocking about it got by oxen walking over it. He thought Mr. Dodds would support him in saying that there was hardly a variety of cane known that would stand the knocking about the Uba got without contracting disease in some form or other. The idea of establishing other varieties was sooner or later to try and have certain areas of cane to take the place of Uba, should a catastrophe happen to this hardy variety of cane. Even in Uba cane, the roots did not come on so well after being walked over by spans of oxen, especially in wet weather. Where ox transport had been utilised for pulling waggons, that cane was a month to six weeks behind the rest. That was a point that had struck him very forcibly.

The Chairman remarked that in certain circumstances, where it required a tremendous amount of labour to take the cane off as quickly as possible, he had noted that some part of the field had been completely destroyed by the oxen tramping over the ground.

Mr. W. Saunders asked whether Mr. Masters could give him the approximate cost per mile of picking up a 16 lb. track and relaying it again on either sandy soil or heavy soil?

Mr. Masters replied that where the track was rivetted, such as he had outlined, eight units, costing £1, should relay a mile of track per day where the grades were fairly decent, and the foundation in good order, *i.e.*, where they had not to do a great deal of digging and cleaning up. Where the rails were taken apart from the sleepers in the usual way and transported, it would take at least 12 units of labour to do the same work.

The Chairman said as regards the question of rails being rivetted to the sleepers, was it not found in practice that when the rails were not exactly opposite one another it caused trouble in setting those rails on portable tracks? That is to say when the rails were not rivetted they could always knock one with a hammer and adjust it; but when they were rivetted they could not move them; sometimes they would have one line longer than the other on curves, and so on. Was not any trouble found in practice in that respect?

Mr. Masters answered in the negative, adding that the lengths of the rails could all be the same. When fitting the sections together, a boy should stand in the centre and guide the fish plates on to the section, previously laid. The rail is then dropped, and forced fully into place with a crow-bar. There is no difficulty at all, as with even a quarter-inch fitted the bar does the rest.

Mr. Schwikkard said he fully endorsed Mr. Master's advocacy of the use of tramlines in solving the transport problem. He did a fair amount of travelling through the cane belt. One thing that struck him, more particularly in Zululand, was the enormous amount of double handling of cane that took place there. Where planters were within easy distance of main tramlines put down by the mills, they still persisted in using the primitive means of transport by ox waggon and consequently the double handling of their cane. It called for nothing greater possibly than a mile at the most of portable track to avoid that double handling. They were all concerned primarily with the cost of production, and it was quite obvious where double handling was entailed, the cost of production was increased. Reverting back to Mr. Master's figures, it would be realised that quite 25 per cent. of the value of the cane was taken up in the harvesting of it, and that, he thought, was an important factor which should be further considered.

Another matter that had struck him in connection with Mr. Master's paper, and one which he thought called for attention was that of greater co-ordination between mill and field. The Technologists' Association was primarily concerned with the manufacturing side of the industry, but he thought they reached a point where the interests of mill and field were common, and he ventured to suggest that the scope of the Sub-Committee should be extended a little in order to take in that side, and, considering that the Association was composed to a great extent of chemists, and so on, he thought the question of fertilisers might also be included.

Mr. Eadie stated that he had raised that point because it seemed to him to be of extreme importance, perhaps more from the technologists' side than the planters' side, but he hoped that the opportunity would be taken to bring that section of the paper dealing with the field side before the Congress, which the planters would attend, because it had always seemed to him that there had been too little consideration of the question of the transportation of cane from the field to the tramlines. Waggons seemed an extraordinary expense with their innumerable oxen or mules, drivers, leaders, and all the rest. Each wagon would probably take 2, 2½ or 3 tons for a matter of a mile. He knew it was done. It seemed an extraordinary waste of expenditure; but the planters' point of view certainly ought to be brought to bear upon it.

Mr. Dodds said that, with regard to the question of increasing the scope of the Association, he had also considered this matter, and it now seemed to him that the time had arrived when the Association could very well extend its field of usefulness. It was understood, of course, that it was originated, primarily, for dealing with problems of manufacture; but he saw no reason why it should stop there, and, if they followed the excellent example of the Hawaiian Sugar Technologists' Association, they would deal, not only with transport, but also fertilisers, and such

things as care of transport animals, and many other problems of vital importance to the industry as a whole.

The Chairman pointed out that, of course, the primary object was to deal with the science of the manufacturing part of the industry; that the chemists and the engineers would work together to try and improve things; but, in the interests of planters, he did not see why, in a General Meeting, they should not propose for membership anyone who was interested in the Association.

Mr. J. Murray said that many years ago Mr. Wickes and he had got out a machine for shifting cane in the field, which consisted of a frame about 30 ft. long, with a single chain, and attachments, the idea being that two or three units would be between the cane cutters and the track, which would be driven by a motor or something at the other end. It did the work very efficiently; but they never got any further than making the one unit. He did not know whether Mr. Masters had ever seen such a thing, or tried it out. They made it so that two men could lift the one unit, and, as soon as the boy cut the cane, before they could say "Knife" it was at the other end. (Laughter).

Mr. Masters said he had seen it used across valleys, not across slopes or on the flat.

Mr. Booth asked Mr. Masters whether he had any particular type of truck to recommend? He referred more particularly to the economical handling of cane. In Zululand particularly a planter generally tasked his boys so that a truck represented possibly two boys' task for the day. Up where he was they had a nett weight of 3 tons. The mill was good enough to extend it to 3½ tons; but occasionally, when they got straight cane, they went a bit further. Recently the proposal had been brought forward for the ordering of more trucks, and a burning question was whether it should be a 3 or 4 ton unit. Most of the planters had expressed the hope that it would be a 4 ton truck so as to increase the task of the labourers. He thought the figures Mr. Masters had brought up depended on the carrying capacity of the trucks.

Mr. Masters stated that he did not think the type of truck would enter into question of the task the labourer did. For instance, if they were tasking two men or three men to go on ordinary 2-ton trucks, on a 4-ton truck they could put the same amount of units, or labour or increase them to load trucks to capacity. There were various reasons why the one truck would suit in one place and not in another. If they were working on steep grades of 1 in 30 or 1 in 35 with a number of curves to contend with, it was more profitable, in his opinion, to use the 2 or 2½-ton trucks. If they were using 4 to 6-ton trucks and one happened to go off, they were hung up for a considerable time in clearing the track of these, thereby keeping their transport animals out later and keeping the mill back also, and possibly also running the mill out of cane. Moreover, portable

track would have to be laid far more substantially. Where the ground conditions were easier, such as one got in Zululand, it was an open question whether the 4 to 6-ton trucks were not preferable to the smaller ones. He had an open mind on the question. After all, the great thing with trucks was to get them into the field as quickly as possible, and return them to the factory with least possible delay. Where they are using bigger trucks there might be more difficulty in loading them with a composite gang than there would be with small trucks; with the latter they could regulate their labour, and put their weaker members at the tail-end and increase the number, if necessary, to load the trucks. But still, he did not think it was a point anybody could be dogmatic about; it depended entirely on the conditions.

Mr. Schwikkard said he thought there was one point which ought to be borne in mind with regard to the use of the larger trucks. It had been his experience that most of the field track was laid in a hurry, was thereby indifferently laid, and that the lighter rails were unsuitable; they were not heavy enough to carry the heavier type of trucks. That also, was a factor which he thought should be considered.

The Chairman remarked that he certainly thought when they had a long track to deal with, the trucks of 2 to 3-tons gave the best results.

Mr. Dodds asked Mr. Masters whether his Committee had considered the possibility of using the travelling cane-loader which had proved so successful in other countries, such as Louisiana and Hawaii? During two seasons that he had spent in the Louisiana plantations, he did not think he ever saw a single stick of cane being loaded by hand on a large scale. It might be that these machines might have some application here.

Mr. Masters replied that he thought he knew the type of machine to which Mr. Dodds referred; but the wages bill in Louisiana was a great deal higher than it was here, and it was a question whether it would pay to put in a machine of that description in South Africa to handle cane under present conditions, where the ordinary labour costs 2/3d. to 2/6d. a day. The type to which Mr. Dodds referred they had under consideration now on one of their estates, *i.e.*, a travelling loader.

Mr. Dodds said the type he had in mind was the smaller loader which picked up the cane and put it into a waggon on the other side. There was one obvious difficulty regarding those trucks under conditions here, namely that they picked up the cane with a "grab." On their flat fields here they would pick up a lot of trash, whereas in Louisiana the cane was grown in ridges and the cane after being cut was laid across the ridges and the "grab" could get underneath without picking up any of the dirt; but he understood the larger types used in Hawaii had a different system—he had never seen one—but they picked the cane up previously laid into slings, which would not have the same objection here as the grab.

Mr. Masters said it was a jolly good idea, and would reach this country in good time. They had had the same experience in Hawaii, when Japanese labour suddenly jumped from 3/- up to 10/- within about six months, and they had to look for labour-saving appliances. Under conditions like that, loaders of the description of those mentioned would perhaps be the ideal thing, but would not be an economical proposition in South Africa at the present time, more particularly on account of the contour of the lands here, but he was open to be corrected.

Mr. Warner said that Mr. Masters had made mention of the cost of transport of a portable line with 8 units; well, as the majority of planters' tonnages were from 25 to 40 tons a day, it would not pay to have portable lines at the cost of a pound per shift. The main thing in connection with portable lines was the distance, etc. over which they had to carry the cane, that was to say, if they got their fields fairly level they could put a portable line at right angles to the main line about every 200 ft. One method he had seen in another part of the world was where a cart was used with a single mule to carry the cane to the siding; there were also small loaders that lifted about a ton, and the cane was lifted completely out of the cart and loaded on to the truck; but the trucks there were different to those here; they were long trucks with sticks put up at the sides. The cane could be lifted out with a chain and laid across the truck and could be carted quite safely to the mill. Here they had only 2½ to 4-ton trucks.

He was very surprised to hear the cost of transportation of the cane to the mill was so high; it was practically 25 per cent. of the cost of the cane. He thought the planters looked upon the cost of the cane going to the mill as being, roughly, half-a-crown to 3/-.

Mr. Masters stated that he thought Mr. Warner was under a misapprehension regarding the portable track. He was afraid he had not perhaps made it very clear. The lifting of the portable track and the relaying of it from one position to the other would cost about eight units, or £1. If it cost £1 to lay a mile of portable track and they transported only 80 tons of cane over that one mile of track, it was costing 3d. per ton mile for actual relaying. If they took 160 tons, it was costing 1½d. per ton mile. The cost per ton mile for that track would be in proportion to the amount of cane hauled over it before it was taken up and relayed in another section of the field. Each time that track was taken up and relayed, a good gang of platelayers—8 of them—would lift, transport and relay where the road was properly formed. The cost per ton mile could be reduced to a halfpenny per ton mile, according to the amount of cane. He advocated that the distance to carry cane should not be more than 2 chains on either side. When they laid a mile of track, every 2½ chains represented an acre, 32 acres of cane represented a mile, 20 tons per acre would be 640 tons; 640 into £1 would be the cost per ton mile, which would be portable track.

Mr. J. Murray said when he was in Cuba there were no tram lines at all. He thought Mr. Masters was wrong. They had two-wheeled carts there; the man cut and topped it in the usual way, then cut the stick one-third up and by twisting the knife, this piece of cane was made to travel a considerable distance to a heap. The second piece was dealt with likewise, and the man threw the remaining piece on the heap. It then went to the main line and was put into a truck; at that time there were no tram tracks at all.

Mr. Masters said he had not stated that it was not done, but argued that it was bad practice. No up-to-date farmer would dream of putting his cattle over sweet cane. It was a well-known fact that in knocking one's cane about one was looking for trouble in the way of disease. It might not be apparent in the first instance, but apparently, if one knocked the cane about, those diseases which were lying dormant seemed to come to life. He remembered one disease—the Fiji disease—it was generally accepted that this was brought into prominence by the way certain cane was knocked about on introduction there, though it was probably latent. Certain varieties had to be discarded for that reason.

In Fiji in a period of 18 years no less than five standard varieties went right out for various causes. Badilla, the present standard variety, had a very bad start. The main trouble was the borer (Elephant beetle). By spending a large sum of money in collecting the beetles in the leaf sheaths of the cane—by paying so much per lb. to native kiddies, and so on, they were gradually able to re-establish it in nurseries and keep it clean. Within eight years, from having 8 per cent. they increased it to 50 per

cent. The Colonial Sugar Refinery Company at the time, limited the area planted to 60 per cent at this time, knowing how prone a single variety of cane was to be wiped out. Badilla, at the present time, was 98 per cent. of the crop in Fiji, and in part of Queensland it was something over 90 per cent.

Mr. Dodds said the great bulk of the Cuban crop was certainly transported by ox-cart at the present time, and a large amount of the cane was trampled down and eaten off by the oxen; but the difference was that the soft variety canes which underwent that treatment almost invariably died off. The hardness of Uba cane, in this respect, as in many others was most remarkable.

Mr. Warner said he quite agreed with Mr. Masters' remarks anent the trampling down in the fields, not so much with the oxens' hoofs as with the wheels of the cart. He had noticed where they had much carting done or a track made in the field, that cane never came up in the same way as the other cane did. He did not think they need look to Cuba for much in that way. He thought they were as far advanced in Natal as they were in Cuba. The tendency to-day was to do away with all carts in the field.

The Chairman said it was nearly five o'clock. He thought they could now stop, as their day's work was over. They had been through the agenda. He was sure they were very gratified to see that the attendance had been so good during the least two days. He trusted what they had heard during that time had been of interest to them.

Mr. Murray then moved a vote of thanks to the Chairman for having presided so successfully. This proposition was met with loud applause, and the meeting terminated at 4-55 p.m.

