

# CANE CULTIVATION COSTS AND COSTING.

By R. G. T. WATSON.

The following paper was read by Mr. R. G. T. Watson.

The main object of the Committee on Cultivation and Planting is to discover means by which improved methods, or better use of existing methods, would lead to an increased yield per acre and decreased cost of production. The method of attack has consisted mainly of an examination of present methods and results, following which, details of the best features were published, with the object of affording to all those interested an opportunity of comparing other ideas with their own. Considering that this means of approach had been sufficiently worked, the Committee decided this year to deal with a selection of subordinate problems, of which Cultivation Costs and Costing was one. The object of this paper is, therefore, to try to demonstrate some of the advantages of a detailed analysis of field expenditure; and secondly, to examine the possibilities of establishing the necessary machinery for the collection and circulation of reliable field statistics.

One of the chief advantages of an analysis of expenditure is that it enables comparison with similar work of previous years, and in order to make comparison correct (that is, comparison in terms of labour) the items incorporated in the group charge "Labour" must be such that tend to be constant from year to year. The following table, compiled from the annual accounts of an estate of approximately 2,000 acres, of which a large portion is wind blown, sandy soil, shows the various items of expenditure as percentages of the total cost.

TABLE I.

Cost of a Ton of Cane.		%
Wages .. ..	..	34.7
Rations .. ..	..	7.7
Ration Fuel .. ..	..	1.1
Livestock Expenses .. ..	..	6.2
		<hr/>
		49.7
LABOUR		
Medical Expenses.. ..	..	1.6
Recruiting Expenses .. ..	..	1.5
Cane Cutting Bonus .. ..	..	5.6
Maintenance .. ..	..	4.3
Fertilizer .. ..	..	5.7
Depreciation .. ..	..	1.6
Salaries .. ..	..	5.4
Bonus .. ..	..	1.0
Loco Transport .. ..	..	8.5
		<hr/>
		85.2
Overhead expenses, Administration		
Head Office, etc. .. ..	..	14.8
		<hr/>
		100.0
		<hr/>

An examination of this table shows that the Labour group accounts for 50 per cent. of the total.

It should be noted that such expenses as Medical and Recruiting Fees, though considered by some as part and parcel of Labour, are liable to fluctuate from year to year, and, if included, would upset the basis of comparison.

Solely on account of its monetary importance, Labour is more open to misuse and waste than any other commodity that the planter has to handle, and this tendency is aggravated by the prevalence of the idea that labour is cheap, by the ease with which it can be wrongly directed—on account of instructions misunderstood or incorrectly stated—and by the lack, in some cases at any rate, of efficient methods of checking processes and of establishing connection between expenditure in terms of units of labour, and return, in terms of work done.

The component processes involved in producing cane, fall naturally into groups and sub-headings, of which the classification is probably more or less standardised throughout the industry. Process costing is the assignment to each heading of its correct share of the total expenditure. To what extent of detail the apportionment should be carried is a question governed by circumstances and the choice of the individual. On the one hand it may be said that costing systems have a habit of accumulating masses of figures that are never referred to; on the other hand, absence of sufficient detail may impede the discovery of the cause of leakage or waste. The following table is an illustration of the apportionment of the total expenses of a 2,000 acre estate amongst the various *productive* processes.

See TABLE II. on next page.

Although, as shown in this table, all processes are chargeable with a proportion of total expenditure, the cost in terms of labour is the only means of comparison.

In order that correct results should be obtained—that is, the cost per acre done—for those jobs in which progress can be measured by area, the cost per ton for others, it is necessary to know approximately the areas of all fields. In moderately undulating and flat lands, where contour planting has not taken place, an approximate measurement can be made by chaining and counting the lines, 132 chains going to the acre where the lines are planted 5 feet apart. Where this is impracticable, a simple method of field surveying is available.

The ordinary books of account supply the planter with only a limited amount of information concerning his farm, chiefly relating to the nature and value of his assets, the gross annual expenditure on various accounts, and the net profit or loss. By means of an analysis of field processes, the planter is placed in possession of a much increased volume of information, by which he is enabled:—

1. To detect leakage and waste (chiefly of labour).
2. To establish a standard for stock or routine processes and so make internal comparison with other departments of all previous years' work.

TABLE II.

	A	B	C	D	E
SUNDRIES—Stumping, digging and clearing. Other preparation processes—draining, applying lime and stable manure, transport of all fertilisers, all expenses <i>re</i> green manure, other manure, other cultivation processes—Cost per ton reaped .. ..	5.6d.	1.03d.	1.9d.	2.2d.	10.73d.
PLOUGHING—Cost per acre .. ..	18/4.9	3/4.3	6/1.6	5/8.0	£1/13/6.8
CROSS PLOUGHING—Cost per acre .. ..	12/5.2	2/3.1	4/1.5	3/10.1	£1/2/7.9
HARROWING—Cost per acre .. ..	3/4.7	7.2d.	1/1.5	1/0.7	6/2.1
FURROWING—Cost per acre .. ..	7/11.9	1/5.3	2/7.9	2/5.8	14/6.9
HOLING—Cost per acre .. ..	£2/5/10.9	8/7.6	15/0.0	14/1.1	£4/3/7.6
PLANTING—Obtaining setts, planting and supplying .. ..	£1/2/2.6	4/1.3	7/4.4	6/10.2	£2/0/6.5
APPLYING FILTERPRESS CAKE—Cost per acre ..	7/10.6	1/5.2	2/7.5	2/5.7	14/5
APPLYING CHEMICAL FERTILISER—Cost per acre ..	1/10.2	4.1d.	6.6d.	6.6d.	3/3.5
WEEDING AND RELIEVING TRASH—Cost per acre ..	8/10.8	1/7.9	2/11.4	2/9.0	16/3.1
PONY PLOUGHS AND SCARIFIERS—Cost per acre ..	1/11.1	4.2d.	7.7d.	7.1d.	3/6.1
CUTTING AND LOADING (including bonus)—Cost per acre .. ..	2/4.3	3.2d.	5.8d.	5.3d.	3/6.6
TRAMS (including bonus)—Cost per acre ..	2.6d.	0.4d.	0.7d.	0.7d.	4.4d.
OTHER REAPING EXPENSES .. ..	6.5d.	0.9d.	1.6d.	1.5d.	10.5d.

**A.**—Labour directly traceable to given area, ton, etc.—Wages, rations, ration fuel and livestock feed.

**B.**—Labour not directly traceable.—Wages, rations, etc., of labourers on non-productive jobs, divided proportionately to **A**.

**C.**—All other Estate expenses.—Excluding cutting bonus (which is a direct charge), loco. transport, and fertiliser, divided proportionately to **A**.

**D.**—Administration and overhead expenses.—Divided proportionately to **A**.

**E.**—Total cost of process.

3. To ascertain the degree of importance of each element of cost, and so to be in a position to decide where there is scope for economy or justification for additional expenditure.

4. To find out which branches of his undertaking pay and which do not pay.

5. To frame budgets, and,

6. To devise more economical methods of working.

I do not know to what extent the practice of budgetting has been adopted in connection with field work. The framing of a budget is the estimation of the total expenses of a concern, giving particulars as to the amount to be spent in any period, and on what account the expenditure will occur. It may be simply a forecast of the monthly requirements on various accounts throughout the year, or it may include a detailed estimate of

labour requirements which would be co-operative with a system of labour cost analysis.

The advantages of budgetting are as follows. It provides a forecast of the nett result of the year's work. It exposes any tendency to extravagance and enables the tracing of that condition to the department concerned. It is an additional check on the quality of the work performed, for if actual cost systematically exceeds estimates, there is need for investigation. In the case of an abnormal drain on finance, the budget gives warning of the amount as well as the probable date on which it must be met. Finally it assists in forming plans for future capital outlay by providing an indication of the money which will be available for such development a year ahead. There are also some disadvantages. The results of previous experience are the most important

factors in the framing of budgets, and therefore, old errors of unnecessary expenditure tend to repeat themselves. Moreover, cultivation plans are at all times liable to alteration, and by halfway through the season, a planter's intentions may differ a great deal from those he had in mind at the time he drew up his budget. Again, on paper there is a tendency to attempt the impossible; and to struggle to come out on such an estimate by drastic cost-cutting is fatal.

The advantages outweigh the disadvantages provided budgets are regarded simply as indications, and not as rigid limitations.

It is somewhat natural that any producer should raise objections to making public any information connected with cost of production, because by doing so he believes that legislation, and other forces beyond his control, may react to the detriment of his profits. Notwithstanding this impediment, publicity of certain facts bearing closely on the cost of production, holds great advantages for a class of producers who are all engaged in the same pursuit under similar conditions. The periodical publication of statistical records of factories is an example in the sugar industry of what can be accomplished by co-operative exchange of productive data. There is no doubt that the current attainments in factory efficiency reflect the influence of this publicity and the competitive element stimulated by it.

A parallel organisation to serve the requirements of the planting industry would presumably have similar advantages; assisting the development of a keener interest in field work standards, fostering competition, and inducing efforts which would culminate in cheaper production. Planter standards can only be set up by reference to planter work, done under such conditions as normally prevail in connection with a commercial farming undertaking. Experiment Station cost records, therefore, would not appear to be what is required, and it is suggested that certain data should, by arrangement with planters, be collected from them through their associations. The latter, in their turn, would render the summarised information to a central bureau of field statistics, run by the Experiment Station.

The information required annually would be somewhat as follows:—

**Name of Planter's Association.**

TOTAL ACREAGE UNDER CANE.—Of all planters submitting cost data.

TOTAL TONS OF CANE.—Of all planters submitting cost data.

COST PER ACRE DONE.—Of ploughing, harrowing, furrowing.

- (a) Livestock.
- (b) By tractor.

COST PER ACRE PLANTED.—Of planting, including obtaining seed setts, covering, etc.

COST PER ACRE OF TOTAL AREA UNDER CANE.—Of all cultivation expenses (grouped).

COST PER TON OF CANE REAPED.—Of all reaping expenses (grouped).

COST PER ACRE OF TOTAL AREA UNDER CANE.—Of total Labour.

Cost to be Labour only, plus (in the case of tractor work) fuel and oil.

COST PER ACRE-INCH OF WATER APPLIED.—Of irrigation.

(a) Gravitation schemes.

(b) Pump schemes, the latter to include in their cost per acre, total cost of pumping.

CHAIRMAN: This paper which Mr. Watson has given us is one which fills a need. Unfortunately I think that amongst Planters and those who run estates there is not the systematised costing that there should be. Unless you have got some form of costing you are working largely in the dark. Your costing system should be in the running of your farm, what the laboratory is in the sugar factory. It shows where you are and tells you where you are doing the wrong thing, and where you are doing the right thing.

Mr. H. E. H. PALAIRET: I entirely agree, this is a most valuable paper. At the same time it is slightly contentious. There is one point about this costing that I think it would be a good plan to have discussion on, and that is the method of costing. As Mr. Watson has pointed out labour is about 50% and when you come to do costing it is the cost of your labour that is really the most important. I believe a number of people find difficulty about this, though it is actually about the simplest form of costing to cost your labour in detail. I know a lot of Planters cost their labour by their daily record of the number of shifts on each class of work, and that is summed up at the end of the year to a total number of shifts worked. The total labour cost for the year is then divided by that sum giving you the cost to two decimals of a penny per shift per task. Multiply that by your shifts and the labour costs on each operation are then immediately before you. I expect that is the usual method, and if there are any better methods I would be very keen to hear them. Mr. Watson has made a suggestion at the end of his paper about the collection of data, and there is a great deal in it. But how do you propose to do it? that is a thing we should go slowly on. I would like to see costs of ploughing, harrowing and furrowing, by livestock and by tractor; also the points of haulage with various classes of haulage. If something could be done in the way of collecting data of the various costs giving conditions of those particular things we could make great use of it in reducing our costs. But I would certainly be inclined to advise caution when you come to collecting other data with regard to costing. Let us take one point where a man would be convinced he was doing no harm by giving it, and make a good show of that, and then later we could carry on with the other things. I am certain if comparisons were made on the points I have mentioned it would be of tremendous help to a large number of planters.

Mr. OWEN J. JOHNSON: I am very interested in this question of costing in the production of cane. There has been quite a lot of discussion lately on that question, especially by those who are handling the inner circle of the Industry. I had a discussion only a few days ago and one man said he could produce cane for 8/6. I said "yes, how do you manage it?" He said "that is what it costs, and there are men in this room who give it out that they can produce at 8/6." I said "yes, what is your method, what do you put down for overhead expenses?" "Oh, head office does that" was the reply. Well how are you going to get at the actual cost if you don't take all these things into account? We expect interest on capital. I am told we must not put interest on capital in the cost. Why shouldn't we have interest on our capital included? As far back as 1917 when Sir Howard Pim came to Durban to investigate, I could not get anyone to give me what was the cost of producing cane. I hunted everywhere and then he tackled me. I told him I would show my accounts privately if he would give me a ruling. I said "If I take my total cash expenditure, including interest, something for myself for a living, and put that against the total money received, and divide the tonnage into that, would you grant that is the correct way of costing?" "Yes," he said, "I will grant that." I showed him that, and he picked out the figures himself, and he was satisfied, and said "you are not getting sufficient, you ought to be getting more." When the Fahey Conference was on, we hunted all over to get the details of costing to produce a ton of cane, and they varied from 12/- to 25/-. After we had gone through them the only solution arrived at was that it costs 15/6d.

This detailed costing is excellent. I thought about this, and once started a ledger with all the numbers of the fields and everything, but I thought I would just keep out of the Maritzburg "Red House" so I gave it up. (Laughter.) But I know what my cane costs me every year, and according to the tonnage, so the cost per ton increases or decreases. I think this paper is excellent if it could be carried out, but as I say,—life is too short!

Mr. O. J. ASKEW: I would like to know about this item on the first line, whether he has included interest on capital, because as Mr. Johnson says, the only way to get at the cost is to take interest on the cost of the farm, and your general costs and divide that by the tonnage, to get the cost per ton of cane. I work a few farms and I know what it costs to work and produce a ton of cane on each farm. I can work it out to a few pence to my own satisfaction. They vary per ton but don't vary much.

Mr. WATSON: The total expense is in.

Mr. ASKEW: It does not mention interest on capital cost of the farm. If you have a farm which

costs £10,000 or £12,000 with interest at 6% or 8% you must add the interest. I should not like it to go forward that we can produce cane at 7/- to 8/- per ton. All I can say is that it is not correct. I should like to know about these other items, ploughing, harrowing and furrowing. I know from my records of the various farms what it costs me.

Mr. POUQUET: Mr. Askew and Mr. Johnson are quite surprised to find out how much it costs per ton, but I would like to know how they manage to reduce their costs, and where to cut down.

Mr. ASKEW: You can manage that alright if you know your farm and your men. I have cut down my meat account a halfpenny a pound (laughter), that does not sound much, but it counts up all the same. Every other account has been cut down. The labour account has been cut down considerably this year. You have to watch your costs, and you won't do it by bookkeeping. It is penny wise and pound foolish though, to cut down costs if you can't work the farm efficiently. You must not have men on the farm if they are not doing their work efficiently.

Mr. W. JEX: I would like to congratulate Mr. Watson on his most admirable paper. I feel very strongly on this matter because my feeling has the force of years of very strenuous effort. I think that Mr. Watson has really summarised for us our essential problem at the moment. They say that an Irishman's success in life is due to his ability to spend double what he earns; perhaps some of our planters gauge their success in the same way. (Laughter.) I know some years ago I spoke to one of the prominent individuals in the sugar industry. He said "Jex, what are always bothering about costs for; show me my balance sheet and how much money I have in the bank and I am perfectly satisfied." Yes, but that is not enough. Those days were not the days of fierce competition. These are the days of fierce competition and we are now exporting, and increasing our export quota, and we must take notice of what Mr. Watson has told us. He has dealt with the subject in a most admirable way (hear, hear). We know quite well the most valuable work done by the critical examination of factory reports; those have all been tabulated at the Experiment Station, and they are a perfect mine of information which has been most profitably used, but the same has not been done in connection with field work. I don't know whether it is the reluctance of field men to consider and deal with figures. But the need for standardisation and the need for costs is paramount at the moment. Mr. Askew has given us some sound words on efficiency; he is an economist, he farms cane for a profit. Mr. Johnson farms cane for profit. I am not sure I do, I hope so! I have listened carefully to what they have both said. As regards costing itself, I am sure Mr. Watson will put you on sound lines; it is not

such a difficult matter. You don't have to sit up late at night about it. It is only a matter of putting your daily labour down on a chart and allocating it to the right job. The Estates make it part of their routine and the Planters can do the same without any trouble at all. I think if the Experiment Station are asked to draw up a standard form of chart for your guidance they could quite easily do it. Then you have something to guide you exactly on the lines that Mr. Watson tells you. It is of infinite value to you. I remember seeing years ago that the great bulk of insolvencies are due to insufficient capital and insufficient records. Well most of us suffer from both complaints. I think that the remedy in the one case will cure the disease in the other. If we have the costs we will soon have the capital, as we will know how to guide our operations. There is one feature of this Table that I notice, and that is the small percentage of fertiliser, as compared with the larger percentage of labour. That is to say most of the labour is upon weeding; you might say that is policing your fields. That costs a much higher percentage than the feeding of the cane. After all our position is one of feed. If we give a small amount of feed necessarily we must take care that the enemy doesn't eat up that small amount of feed, and we have to keep a big army of labour to eliminate the thieves,—I mean the weeds. That is our fundamental problem. On examining the figures of some plantations in Hawaii I found the percentage of fertiliser was up to 46% as compared with 17% on weeding. Now here the figures are almost reversed; we spend in general about 16% on fertiliser and say 45 to 50 or even 60% on weeding. If our problem is to feed the cane do we give it enough fertiliser, or is it that we have to contend so much against unfavourable weather conditions? All these things will have to be revealed if we get down to costs. I am sure we can draw wonderful conclusions from it and I would very strongly support the plea that Mr. Watson has made for statistical data to be furnished to the Associations. I am sure most valuable information can be compiled and directions can be given resulting from it. I congratulate Mr. Watson sincerely. (Applause.)

Mr. A. TOWNSEND: Mr. Jex has more or less said what I proposed saying, but I would just add that I certainly don't agree with Mr. Askew that you have to depend a great deal on the men on the spot to find out what it is going to cost you. I think many of us could put our fingers on quite a number of men who have gone down simply because they have not known what their cost of production has been. It has been the fault of a number of young planters, who go out, shove in the cane and trust to providence, and not realise what the financial position is until too late. How are you going to arrive at your financial situation unless you carry out a proper system of costing? I am afraid I don't do it, nor do a good many others,

but we should keep a system of bookkeeping by which from month to month we could check our financial position, which after all is the soundest principle we can adopt. Whether we have time to carry out this costing is another proposition. The man who is really interested in his farm will learn more by going into all this. But as Mr. Jex said the problem before the planter is really to bring down his cost of production. That is not going to be reduced by spending time over costing. The great object is to give the cane sufficient food and see that that food is not stolen by weeds. Often when planters come to weed their cane there are more weeds than cane. What is the result? At least 20% of the fertiliser has gone in to the weeds and when the weeds are taken out the fertiliser goes also. If one has a comparative statement as shown by Mr. Watson you can soon tell whether your field Manager is doing his work correctly in regard to his different fields. One of the greatest bugbears in Natal is our weeding cost, and no doubt it is the highest of any of the costs. I think on the whole the reaping costs average very low, but I must say the weeding costs are far too high considering the conditions under which we work. This is due more or less to ignorance and neglect of opportunities, and perhaps "Natal fever" thrown in; but there is no doubt that is our problem here, to reduce our cost of production. We have it in all these mills and factories, you have it in the coal mines, and you will find that month by month statistics are supplied to the head offices showing every detail of the working costs. If it can be done in mines it can be done in the sugar Industry. This is a lesson we should take to mind, and find out our cost of production. We should be very grateful to Mr. Watson for this valuable paper. (Applause.)

Mr. HAYES: I was reading an article in an overseas paper a few days ago which has a great bearing on the subject of Mr. Watson's paper, and it was trying to impress on farmers the similarity between their farms and the chemical factory. The main object of the paper was to show that every farm is a chemical factory, nothing more nor less, and in times of economic stress a manufacturer goes more fully into his costs of production. Any industry will spend more money during times of competition on their statistics, than in times when things are going swimmingly, and I think the same thing applies to farming. Being an industry, it is not a haphazard thing, but an exact science, and to meet overseas competition the same methods will have to be employed that are employed in the factories which are actually manufacturing the chemical artificially, and not with the aid of nature. (Hear, hear and applause)

Mr. FOWLIE: I would like to say a few words to support Mr. Watson in some of the things he has said or suggested. I would like to say first of all a few words about one side which has not been mentioned by any previous speaker, and that

is this, that in these times undoubtedly certain estates are still producing at a profit. Various estates and farms are working at a loss. Without an exact costing system it is difficult to say whether the loss is due to causes that are capable of being remedied or whether it is due to causes over which the Planter has no control at all. If it is due to causes which can be remedied then the costing system would probably help to point the way to the remedy. If it is due to causes which cannot be remedied, the sooner that planter is out of business the better for himself, the Industry, and everybody concerned. There are certain farms that undoubtedly are being cultivated for cane to-day that are only sources of loss and disappointment to everybody who has anything to do with them and the sooner those concerned know that and get out of them the better for themselves and everybody else concerned. Now I don't know how far the suggestion for a costing system supplying returns to a central office at the Experiment Station, or the Association in some way, is capable of being carried out. I think that it would be very useful if we could make a start even on a very small scale to get figures of some sort, even if we only confined ourselves as Mr. Palairt suggests to getting costs of a few of the operations. We know the difficulty there is about showing too much of our business to the public, and whatever we get in these ways of course would be public. That will be understood. I would like to get the feeling of the meeting as to whether we ought to try to make a start with this scheme. If there was encouragement enough given I think a small Committee might be formed from our Association to go into the matter of the actual figures to be asked for, and then we might make a start. But unless there is at least a reasonable chance of support from planters and estates we can't do anything. We have to get an idea of how many people would be prepared to supply the figures we would like to ask for, and I should say for a start we should not ask for too much. Ask for figures that would be to everybody's advantage without any risk of their being used to the detriment of everybody.

CHAIRMAN: Mr. Fowlie has brought up something which will probably lead to a considerable amount of discussion. What I would suggest is that the Committee of this Association should bear in mind what Mr. Fowlie has said and give it its consideration and make a report on the advisability

of it and see if there is any possibility of it being done. I think I can say that the Committee of the Association will do that, and at any rate find the general consensus of opinion before asking anybody to take part. I would ask Mr. Watson to reply to the remarks made so far and we will proceed to the next paper.

Mr. Watson: In replying to Mr. Askew's question I must ask your permission to try to explain figures to him outside the meeting, because it is rather an ordeal to try to explain figures which are quite clear to me, in front of the meeting. I would like to mention one point which has not been alluded to, and that is this: Mr. Askew very rightly says that your fields must be watched, your chief energies must be put into the actual working of the fields. That is what I took him to mean, and I don't for a moment contradict that, or in any way fail to endorse that opinion. Also I don't doubt for a moment that Mr. Askew is able, by simply looking at his fields, to be perfectly certain as to what pitch of efficiency his fields are being managed, but it is not perhaps realised that we are not all in that enviable position, or others of us have to depend on people, on whose visual control we can't depend to the fullest extent, and therefore some form of check is essential. The whole point is this, Mr. Askew's arrangement has reached a very high pitch of efficiency, and if he were able to produce analysed costs all planters would benefit from that. At present this sort of thing happens: I meet a neighbouring planter and it transpires that he claims to be able to do ploughing or reaping or whatever it may be at about 20% less than I do. After the conversation is over I part from him with a feeling of respect and ponder the matter over for about half an hour. Then I come to the conclusion that he is wrong in his areas or this or that, or that he has not included something which I have included, and I dismiss the matter from my mind and continue under the impression that I am doing cheaper than he is, and so the whole effect of comparison is lost because nobody relies on what they hear.

CHAIRMAN: Judging by the number of replies we have had and the interest in the discussion there is no doubt Mr. Watson has produced a paper which is going to give you all food for thought (hear, hear). We must thank him most heartily for what he has given us. (Loud applause.)