TEA STANDARDS

By

R. H. Horne

I believe that it is unusual for anyone so remotely connected with the T.R.I. as I am to be invited to speak at these Conferences. While being deeply appreciative of the honour, I am greatly concerned over the grave risks the Institute is running in letting loose upon you such a totally inexperienced speaker.

Further, as I was unable to be present yesterday, and as I have only just heard what Mr. Lamb has had to say, there is considerable likelihood of my covering the same ground, and also some danger of my expressing contrary views.

Before I go on to discuss better standards of tea I would like to say a few words about the people who assess those standards as far as you are concerned — the men in the Tea Trade, in Ceylon more generally referred to — to put it in its less colloquial but more polite form — as Tea Tasters.

The latter description now appears to have official recognition for the Superintendent of Census has called for a return of Tea Tasters employed by tea firms in Colombo. This would appear to imply that people are employed whose sole work it is to taste tea. I do not think that this is so in any single case. Only part of the process of marketing tea is the assessment of its worth, and even of this part the testing is not all. I suggest that experience and market knowledge play a greater part than actual tasting ability.

Should the University of Ceylon (or London or Calcutta) found a Chair of Tea Tasting (graduates no doubt receiving the degree of T.T.) I imagine that at the passing out examination a very high degree of skill and remarkable unanimity would be shown in placing in order of merit hundreds of teas.

However, I very much doubt whether anyone of these graduates would at that stage be able to take over even a small buying order and execute it satisfactorily.

The experience, the market knowledge, and the close touch with the overseas client, usually gained by personal contact, would be missing.

Tea-Tasting is not a science or an art. It is just part of the commerce of dealing in tea ; requiring some skill in assessing suitability and worth. Any tea-man will tell you "Buying is easy, its selling afterwards is the difficulty."

In much the same way the making of tea is easy but the making of tea that will command a good price is a different matter.

Tea can be made in limited quantities, and not such bad tea either, with no other material than a pair of hands, a piece of tin and a small fire. Our elaborate factories are largely a mechanisation of the same processes to enable us to deal with larger quantities.

Whether making 10 ounces of tea by the hand method or 10,000 lbs. by the factory method, given clean hands, skilful cooking and patience over wither and fermentation in the former, and adequate facilities in the latter, results will be controlled by the material used.

This may seen axiomatic and a stupid remark but there is a little more to it. It becomes a question of the degree to which the standard of the raw material affects the result.

I have seen quite a lot of Ceylon tea from the tea-man's point of view and in many cases I have been fortunate enough to have some line on what has been happening on the estate. I am absolutely convinced after twenty seven years of this that the shortest route to better tea is essentially through the standard of plucking — and of course getting the leaf to the factory fresh and undamaged.

Rapid rounds and careful and selective plucking will cost more as they require more pluckers, but I would ask you to consider your estimates and I think you will find that the cost of plucking, considering its great importance, is a surprisingly small proportion of your over-all costs.

You can spend a lot of money on machinery or factories and you may, or you may not, make better tea, but if you improve your standard of plucking you can be confident of an improved product.

In this connection I would instance the number of very old factories, with machinery to match, which, provided their crop remains within their capacity, turn out excellent tea.

I hesitate to define what I mean by a better standard of plucking as this would be going very much outside my sphere, but I hope that the matter will be well ventilated at this Conference. I would say, however, that I do not mean fine plucking in the sense of 'one and a bud" nor removing immature leaf. Just taking the flush in its optimum condition for tea-manufacture and, as it does not stay in that condition for days, getting round the estate as frequently as available labour will permit.

Unfortunately this getting round rapidly becomes of the greatest importance when it is most difficult to do so. If, in the coming April/May on the S.W. side, crop gets ahead of plucking as it did last year I am afraid we shall see a repetition of very poor prices for a heavy weight of tea. I have no doubt that all concerned will do their best to have the largest possible plucking force available at this time and will plan to be right up-to-date in the immediately preceding period.

You will note, by inference, an opinion that the rush teas of last year would not have been so poor as they were if it had been possible to keep up rounds throughout.

I have assumed, and I hope correctly, that we are all interested in producing a better standard of tea and I have started off by mentioning what I sincerely believe to be the best way of achieving it.

If I detailed why I think it is "good business" to make better tea, even if it costs more to do so, I should take up too much of your time.

In a short Interim Market Report which my firm issued some four-and-a-half months ago we put the case as well as we could in a limited space. Some of you will have seen this leaflet; for others who may be interested I have a few spare copies on this table.

The standard of Ceylon tea undoubtedly dropped considerably during the war years and I am afraid improvement since then and until quite recently has been confined to isolated cases. However, it is my opinion that there was a fairly general improvement in the second half of 1948, though the overall standard is still well below pre-war and still leaves a lot to be desired.

It has been fortunate for Ceylon that teas from other Producing Countries have not been very good over the same period and I think it is probable that Ceylon's greatly increased sales of tea to the U.S.A. in 1948—double those of 1947 and earning somewhere about 25 million U.S.A. Dollars — has been because our standard of manufacture was, over that period, ahead of India's. That country is perturbed by this loss of trade in dollars and there is now considerable activity in India aimed towards an improved standard of tea. Java and Sumatra are getting back into the field and will make every effort to resume their previous excellent standard of manufacture. Ceylon, I suggest has at present a lead but she will have to make every effort if she is to keep it.

To meet future competition we must make teas which Buyers prefer to the teas of other countries. We all know that, except for special requirements, they want colour, strength, quality and a well made leaf free from stalk and fibre. It is principally on this last point that Ceylon breaks down. Some may say "They want the tea to drink, don't they, not to look at" but, frankly, they do want it both ways and they will pay more to have it that way; or, to be more pessimistic, they will pay much less for it if its not to their liking. Incidentally, this appearance question is by no means all nonsense. Getting down to the ultimate arbiters of tea, the

housewife does not think much of a packet of tea which contains what she calls "sticks" and I do not think anyone appreciates chasing "floaters" round a tea cup.

It is generally understood, and I think correctly, that the London Market is not so sensitive about appearance as is Colombo, but I have a feeling that when the U.K. blender is once more free to choose his tea there may be a reaction against the stalky tea which he has had to put up with for these years of Control. Having failed to eliminate all stalk in the field the next move is to try again in the factory. Here the general practice is to have a large Beauty Chorus hard at work in the sifting room, none of them doing the tea any good except for the matter of taking out stalk and fibre. By the time tea has reached this part of the factory stalk and fibre have multiplied by breaking and by splitting. Useless hard banjie has turned to small flake. These women are often doing five or ten operations where one would have served at an earlier stage. So I suggest, do it earlier where you can. Sift withered leaf; train the factory staff to detect what, when manufactured, will turn out as stalk and get them into the habit of picking it out at the roller and the roll-breaker, in the fermenting leaf and at the drier feed. You need not throw it away, have receptacles at all these points and run the contents through the drier just before closing the drier down; chop it up to Bro. Mixed and Dust 2 but do keep it out of your good tea.

So far this matter of stalk and fibre is the only point actually affecting manufacture that I have touched upon. I might hazard suggestions to fire higher or lower, longer or shorter, ferment more or less but much matters cannot be generalized. Each estate on these points has to be dealt with individually and the Superintendent should get the advice, as regards what is required at any rate, from the Tea Man his Agents employ or consult.

Regarding general market requirements you will see from your prices that certain grades are in better demand than others, but again I would hesitate to be specific as these things are liable to change. For instance at present Up-country estates are getting a better price for their B.O.P. than for their B.O.P. Fannings, and many are grading accordingly. This position may easily reverse when U.K. Buyers can operate on an open market.

As regards liquor I believe that there is now a definite tendency for Out-Markets to prefer more body and colour in their teas.

Mr. Lamb may have led you to expect from me some bright ideas regarding suiting Market Requirements. I can only say that if you have turned out well made teas of a good standard you have covered the major part of those requirements. Refinements of matching type of liquor, grading and style of leaf to fluctuations in market demand have to be done very carefully and dealt with individually.

Mr. Lamb has dealt thoroughly with manufacture. While I am not qualified to be critical of factory management it is possible that occasional visits spread over a term of years assist one in noting changes that may not be so apparent to those constantly in touch. I think I might say that I notice some falling off in Factory Discipline. There is sometimes delay in spreading leaf. Withers seem to be too often regulated to suit the Teamaker's convenience and there is also slackness about windows, particularly re-opening them. Rollers are frequently overloaded to

speed up the day's work and, following that, drier spreads are increased. Sifting gets behind manufacture and un-graded tea lies about in heaps or open boxes collecting fluff that has just been blown out of other tea.

One point I would like to mention. When sending down experimental samples for examination please let the Tea Man concerned know what you have done and what you are aiming for; — it helps and results in more interest and better co-operation.

In examining teas it is not difficult to detect when a tea has been fired at much too high a temperature, but it is very difficult to discover when some quality has been lost by a temperature just a little too high. It is also difficult to decide whether a slight softness is a mild form of stewing due to too thick a spread and whether a "dry" character is due to too long a period in the drier. It is almost impossible to identify a slight underfiring as this does not show up until lack of keeping quality reveals it. Hence the importance of the Moisture Content Test.

I suggest that driers are the danger spot for loss of quality and that these should be constantly checked. Two points in this connection, tips given me by two experienced V.A.'s. Do not trust your drier to be putting the tea through in 20 minutes just because it should do so on No. 2 pulley; put a tab through and take the actual time. The belt may be slipping; — they often do in the dry atmosphere of the firing room. The other — check that your withering fans are not upsetting the drier draught.

It is probably true that a Superintendent now-a-days has less time available for field and factory work than ever before. But I suggest a full morning once a month spent in the factory, boring though it may be, is well worthwhile. Watch every step through and know exactly what is happening at each stage. With this knowledge, your brief daily visit then becomes of real value, for you can devise checks and you know at a glance if something is wrong.

I note that Mr. Lamb has made no reference to Blister Blight in relation to manufacture. Considering the prevalence of this disease last year and that fertilisers were rationed it is somewhat remarkable that tea shipments from Ceylon were the highest ever. I put it as a speculative thought that Blister Blight and the necessary precautions are more damaging to the average standard of made tea than they are to crop. Crop is maintained by having more tea in bearing in "rush" months and by the stimulated response after attacks. Both these heavier cropping periods make for poorer teas. Additional to this we have the detrimental effects of the Blight during actual periods of infection.

I apologise to experienced Planters and to keen tea-makers for the dullness of my talk but I would remind them that there are at present a number of Superintendents who have comparatively recently taken charge and to whom pre-war practices such as throwing away tippings leaf, making young leaf separately, and starting manufacture at 3 a.m. are as strange and as unheard of as, to you 10, 20 or more years ago, would be any suggestion of holding manufacture over for a day (and in some cases I believe more) to save overtime and running expenses.

Before I conclude I should add, to save Dr. Norris the trouble, that cautious phrase so often seen in the T.R.I. Quarterly "The Institute does not necessarily endorse views expressed by others than Members of the Staff."

Gentlemen, I thank you for your patient hearing. I believe that it is now time for the discussion and the arguments to start.

THE CHAIRMAN : I now invite discussion on the papers read.

COL. T. Y. WRIGHT said that when he first came to Ceylon, many years ago, pluckers carried a basket for fine leaf and a sack for coarse leaf. Fine and coarse leaf were manufactured separately and some very good teas resulted from this practice. At the present time most superintendents tried to get as much crop in as possible. Fine plucking, although very advisable would result in a reduction in crop.

Continuing, COL. WRIGHT referred to the subject of Tabloid Teas which were produced by the Tea Research Institute and which he thought were very good indeed. He asked whether it was the Blenders who were responsible for their failure.

MR. LAMB in reply said that he had no doubt that the practice of having a basket and a sack to separate fine and coarse leaf was an excellent one which would justify the extra amount of trouble. It was practised in North India until very recently but has now been abandoned and all the leaf went into one basket.

With regard to "Tabloid" teas he pointed out that the word "Tabloid" was a patent name belonging to Messrs. Burroughs & Welcome. It should be called Tablet tea. Blenders were partly responsible for the lack of development but the crux of the matter was that the present organisation of the tea trade did not allow it to accept such radical alterations.

Experiments were being continued along the same lines and it was hoped that it would eventually be possible to produce a type of tea by the same basic process which would eventually conform to the requirements of the trade. In fairness to the Tea Trade it should be pointed out that theirs was the task of effecting actual sales.

MR. G. K. NEWTON said : Quite apart from the difficulty of keeping good leaf separate from poor leaf and harvesting the best leaf possible, which had been pointed out during the morning, the working planter today was faced with the difficulty of getting his pluckers to bring him the leaf which he required. They all knew that not many years ago one was able to say to one's pluckers that they had to pluck to a certain standard and if they did not do it they were punished. Things today were rather different. One heard from working planters that they were dependent upon what their labourers were prepared to do for them as opposed to what their labourers should do. He did want to make it clear that those gentlemen who kept on stressing the point of the need to have the finest quality tea perhaps did not fully realise the difficulties that the working planter was faced with today, particularly on those estates where the labour leaders made it a point to upset the labour or interfere with the quality of leaf going to the factory. (Applause).

MR. A. T. SYDNEY SMITH said he thought Mr. Newton's remarks most admirable and referred to the fact that very little picking over was now done in the field on account of various difficulties including overtime.

On the subject of quality very little had been said about Blister Blight. A lot had been said about damaged leaf producing poor quality teas but his experience was that in withering blistered leaf became pulverised.

MR. SYDNEY SMITH then expressed his disappointment that little had been said about the possibility of reducing the cost of production. Everything he had heard during the morning, for instance the emphasis on finer plucking, was going to make for higher cost of production. The cost of production continued to show a steady rise.

MR. LAMB, replying first to Mr. Newton, said that the staff of the Tea Research Institute did, most emphatically, appreciated the difficulties of the working planter and drew attention to the fact that he had specially referred to such difficulties in his address. With regard to Mr. Sydney Smith's question about blistered leaf he said that the effects of blisters were the same as mechanical damage so far as manufacture was concerned. Leaf which dried out during withering caused loss of both appearance and potential liquoring quality. In severe cases light withers might limit the effects of the attack. He supported Dr. Gadd's suggestion that leaf should be harvested before white blisters developed (that is about three weeks after the actual attack) during periods when conditions greatly favoured Blister Blight. This obviated many difficulties with manufacture.

He emphasised Dr. Gadd's warning that a period of close plucking should be followed by a period of lighter treatment to allow the bush to maintain the requisite amount of foliage.

New foliage stood little chance of survival during periods of severe attack and Dr. Gadd's point was that the leaf was much better harvested than wasted. The whole emphasis of the Conference was on the functions of foliage leaf and it was of the utmost importance that the bush should be compensated for the harder plucking practices employed when conditions favour Blister Blight.

In reply to Mr. Sydney Smith's reference to the cost of production, Mr. Lamb said that all the work on tablet tea and E.P. rolling had been motivated by cost of production problems. It would be very difficult to reduce cost of production so long as the market insisted on forms of tea which rigidly conformed to traditional types.

MR. O. L. M. LEBBE then pointed out that nothing had been said about bought leaf.

MR. LAMB replied that if teas made from bought leaf were to compete in prices with teas made from estate leaf then the standard of bought leaf must be as high as it was on estates. He then referred to the very high standard of bought leaf he had seen during a recent visit to Morawak Korale.

MR. ALBAN WIJESEKERA then asked whether Blister Blight actually affected quality and if the answer was "No" what was the result when the greater part of the crop was affected.

MR. LAMB repeated his previously expressed opinion that the effect of Blister Blight on quality was the effect of the amount of damage it caused to the leaf. If leaf was very severely damaged by blisters then naturally the same quality could not be expected. He suggested that where estates were caught out with severe damage, the way to make the best of a bad situation was to take a very soft wither and to follow it up with correspondingly light rolling. Firing conditions should also be adjusted to meet the extra load of moisture. Badly blistered leaf could not stand up to a hard wither. Dr. Gadd's suggestions obviated situations of this sort.

MR. G. K. NEWTON asked for information about the loss of outturn caused by long withers. He expressed doubts as to whether it was a fair question as he was under the impression that Dr. Evans had worked on it before Mr. Lamb's time.

MR. LAMB referred to Mr. Sydney Smith as the expert on long withers. Dr. Evans had investigated the matter and published figures shewing a four to six per cent loss of dry matter. The average loss on a 48 hours wither was somewhere in the region of 4 per cent dry matter. When green leaf was spread on the tats it was still living and continued to breathe. As it was cut off from its normal food supplies it had to live on its own reserves which were in the form of starch stored in its tissues. The leaf used up 4 per cent of its own weight in a 48 hours wither.

(Note by Mr. Lamb. This approximates to a 1 per cent loss on total outturn. When a 25 per cent made tea on withered leaf is obtained in 18 hours then the loss in 48 hours is exactly 1 per cent i.e., 25 minus $\frac{4}{100} \times 25 = 24\%$).

MR. GLEN DICKSON asked Mr. Horne if too much importance was not attached by blenders to "appearance" and whether it would not be a good thing for the Propaganda Board to stress that poor leaf teas could make a good cup of tea.

In reply, Mr. Horne said that Buyers, perhaps more particularly those buying for outmarkets, were definitely very leaf-conscious. He thought it would be quite impossible to take a census of world-wide public opinion regarding the point raised, and in the tea trade it had to be accepted that tea buyers were interpreting the wishes of the public or, at any rate, that they were expressing informed opinion on the teas they found sold best in packets. Mr. Horne said he had dealt with this point to some extent in his paper and the questioner would have noted that Mr. Gervas Huxley, in a talk in Canada, had stated "I have come to a firm conclusion that it is quality and not price that is the most important factor in promoting the sale of tea to the consumer." He suggested that Mr. Huxley was referring to quality in its general nature as meaning a good standard of tea, including that of a reasonably good standard of leaf.

MAJOR LEBBE asked if there was any prospects for green tea contracts.

MR. HORNE replied that no green tea was being manufactured in Ceylon at the present time. Some green tea was being made for sale, he believed, principally in India and Pakistan. North Africa was purchasing green tea from China, probably at rates that would not be remunerative to Ceylon producers. The difficulty of marketing green tea produced in Ceylon was that all grades had to find a market. This used to be arranged by some grades going to the U.S.A., some to the U.S.S.R. and some to other destinations. At present there did not seem to be sufficient enquiry to indicate that it would be possible to place all the grades at a remunerative price.

MR. MORFORD, referring to the question of short plucking rounds in the rush months, asked Mr. Horne whether he thought there was a danger that this would result in thin and poor liquoring teas.

MR. HORNE said that unfortunately records were not available as to what each estate was doing regarding plucking methods, but he would say, that, so far as his experience went, rapid rounds with a good standard of plucking produced good quality teas and he thought there was little

danger of the teas being thinner or poorer liquor in than they would otherwise be in a rush period, in fact he would rather expect the contrary.

MR. SYDNEY SMITH suggested that finer plucking would reduce crop and considering the present high cost of production, this was a serious point.

MR. HORNE said this was a matter which could be better dealt with by the Scientific Staff but he believed there was some reason to believe that, over a long term, a good standard of plucking at frequent intervals could be maintained without loss of crop.

MR. HORNE was asked if teas could be sent down to Colombo for sale in lots of less than six chests. In reply Mr. Horne said that for teas to be included in the public auctions the lots had to be of at least six chests — teas not included in the auctions did not receive the full attention of Buyers.

MR. MORFORD said that there was a certain amount of doubt in the minds of many as to what was meant by 'close plucking' and 'closing the rounds' during times of Blister Blight attack. He also asked whether the Tea Research Institute could give a definite assurance that more careful plucking and its increased cost would not result in a heavy loss of crop. His third question was directed to Mr. Horne. He asked whether the rush crops of the spring mentioned by Mr. Horne would result in thin liquors.

DR. GADD briefly reviewed the development of blisters and emphasised the importance of the interval between infection and complete development. When leaves were blistered they were of little use either to the teamaker or the bush. It was not, therefore, worthwhile letting the flush stay on the bush sufficiently long for the blisters to develop. That could be prevented by 'close' rounds by which was meant shortening the interval between pluckings. By close plucking was meant the removal of flush close to the level of the plucking table. Leaf above the table should not be left to develop further when it was likely to be blistered at the next round. But the pluckers' hands should never enter the bush. Shoots developing in the bush below the plucking table must be left alone.

Plucking acted as a stimulus to the bush to produce one or more shoots to replace the one removed. From the pathological point of view it was inadvisable to stimulate a bush to produce new shoots at times when they were very liable to attack. The young leaf above the plucking table might well be taken but all growth below the table should be left alone.

The word "close" meant the shortening of the interval between pluckings, and the shortening of the length of shoot to be plucked. It did not mean stripping which usually meant taking everything that could possibly be taken.

DR. GADD realised that he was offering counsel of perfection. He had attempted to explain the underlying principles on which recommendations were founded. It was impossible to lay down rules to meet all the different conditions which arise during Blister Blight attacks, but if the principles were understood it would be easier to assist the bushes by appropriate action.

DR. EDEN, answering the question whether the Institute could give an assurance that close plucking would not result in a decrease of crop, said that no such assurance could be given. Neither he nor anybody else could give an assurance

as to what would happen when someone else did the job. What Dr. Gadd had suggested was correct: the Institute's job was to give the principles, leaving them to work out their application for themselves.

He suggested that reference should be made to an article in the Tea Quarterly he wrote two years ago about hard plucking in relation to Blister Blight. Hard plucking to the fish leaf, far from affecting the crop detrimentally, had the opposite effect. In the first four-year cycle the experiment showed that fish leaf plucking gave 50 per cent more crop than did plucking to the single leaf. That was a very surprising result. It did not mean that one could continue plucking to the fish leaf indefinitely, because that altered the bush's economy. Instead of 50 per cent of the leaf being plucked and 50 per cent being left on the bush, the balance was altered to 80 per cent harvested and only 20 per cent left on the bush, later to be pruned off, to do all the work the leaves had to do in the vital physiological processes of the bush.

Although he could not give the required assurance he thought it clear that the result of what Dr. Gadd had suggested would be the harvesting of good leaf when Blister Blight was prevalent and the building up of the bush when it was not prevalent. The bush would continue to give good yields without prejudice to the formation of permanent foliage and wood.

Mr. N. M. Sanders asked whether recovery from pruning was affected more by the age of the bush than by the length of time from the previous pruning.

Dr. Eden said that he did not know what effect the age of a bush had on its recovery from pruning. He had no information to suggest that a bush 20 years old would recover more quickly than one 40 or 50 years old. The length of time between prunings, however, certainly affected because buds from say 2-year old stems normally began to grow earlier them buds on 4-year stems. The time between prunings decided the age of the stems pruned. Other factors played a part. If a bush had been rested and had a good canopy of leaves it would develop shoots more rapidly. An exception to that generalisation occurred when bushes were 'lung pruned' as the new growth on the lungs often decreased the speed at which the pruned wood produced shoots. Those observations briefly summarised the information he had on the question.

Mr. Lowry said, in regard to vegetative propagation, he had some bushes for this work which had been allowed to grow right up. At the moment they seemed to be more or less immune to Blister Blight. Should one let these resistant bushes be allowed to grow up or should they be put into plucking?

Dr. Eden replying said his experience in this matter came from experiments on St. Coombs, some of which had been in plucking ever since Blister Blight came to the Island, and others of which were in various stages of recovery from pruning and had been allowed to run up beyond the tipping stage. Comparing the two cases it appeared that a rested bush was less susceptible to Blister Blight infection than the bush which was in active plucking. In 1947 when there were bushes of this nature it had been found that there was very little Blister Blight infection on them at all; whereas the older portions of the flush, the third leaf of which Dr. Gadd spoke, showed that there was considerable evidence of Blister Blight infection. In 1948, however,

every leading shoot had been knocked out by Blister Blight. He thought the conclusion was that when bushes were allowed to run past the tipping stage they were not quite as susceptible to attack of Blister Blight as bushes in plucking. The programme he suggested for this business of sorting out resistant types was that when you had a bush that seemed worthwhile propagating because it had not shown Blister Blight infection, it should be pruned, say, three months before a heavy Blister Blight attack would normally be expected or perhaps, at slightly lower elevations than St. Coombs, two months before. When that bush was coming into the pre-tipping stage it would experience the full weight of the Blister Blight attack and be thoroughly tested as to resisting powers. This was the method of selection used on St. Coombs with quite appreciable success.

MR. ALBAN WIJESEKERA said that for the last 25 years the question of controlling soil erosion had been under consideration but nothing has been done. He felt that nothing effective could be done until clean weeding was stopped. Tea estates, he considered, were the largest contributors to soil erosion in the Island. He also felt that an efficient and effective cover of weeds would prevent soil erosion to a certain extent, and hence he was in favour of establishing a cover of grass and weeds, of course, under a certain amount of control. A more thorough cover of the tea itself would also assist.

DR. EDEN replying said that the opinion had been expressed that tea estates were the greatest sinners in regard to soil erosion. The last speaker had suggested the tea itself should be encouraged to cover more ground as one of the most effective methods of preventing soil erosion. They had been talking for the last two days on subjects all of which suggested that they should get away from hard pruning, and it was hard pruning which, in his opinion, exposed so much of the ground bare to the inevitable ravages of soil erosion. One could not of course go back to a state of nature in this matter. Agriculture involved a disturbance of the settled order of nature in the interests of getting much more rapid growth than you would get in a natural condition. There were areas on St. Coombs on which they had adopted a very much lighter pruning. As a result they had a spread of the tea bush which was quite remarkable from the very early stages of the pruning cycle and they had had no difficulty in maintaining the yield through out the cycle, provided plucking was adequately attended to. He did not think that there was any doubt that one could maintain the yield if one really kept down the plucking table and saw that the bush was adequately plucked. He, therefore, quite agreed with the speaker that the increase of the spread of the tea bush should receive very great consideration not only from the point of view of yield but from that of protection of the soil.

The second suggestion was that one should grow grasses and weeds. For the last twelve years he had been struggling with this subject, and the more he saw of it the more formidable he found the problem. Until more was known about the succession of weeds on estates, that is to say, the way a particular weed or particular group of weeds could become dominant and smother everything else, efforts to do something about the weed problem in relationship to the cultivation of tea would be very futile indeed. It had been intended, following instructions given by the Board of the Tea Research Institute that these problems should receive high priority, that

such weed surveys should be carried out by himself in co-operation with Dr. Bond. It was not a survey that could be done by an Agricultural Chemist alone — it must have the co-operation of a Botanist interested in Ecology. The project fell through when Dr. Bond went away, and until more was known about that particular aspect, he would hesitate to recommend the complete abandonment of tea fields even to soft weeds. Certainly, as far as grasses were concerned, there was evidence to show that they were detrimental.

He believed that if tea was allowed to grow and spread, it would, as results in the Bulletin showed, keep weeds down to a sufficient degree to make them less harmful to the tea, while still keeping them as a very competent and effective preventative of soil erosion.

MR. E. E. MALLAWARATCHIE said the cost of production was based on a stand of some 3,500 trees to the acre. If that stand could be increased to 7,200 or over 7,000 it would cut down the cost of production appreciably. He enquired if alteration of the present plucking table to a barrel-shaped table would reduce cost of production.

DR. EDEN said that his answer to the first part was that 3,500 was an overestimate of the number of bushes per acre. Some time ago he had carried out an actual count of the bushes for the whole of the 300 acres of St. Coombs Estate, and allowing for roads, drains, paths and all the rest of it, it had been found that the average number of bushes per acre was just slightly over 3,000, and he thought that applied to most estates. The Institute advocated that whenever anybody was opening up new land, a stand very much greater than 3000 should be maintained. As far as he knew, with every crop he had had anything to do, the yield per acre and the cost of production were in direct proportion to the number of bushes or plants per acre, up to at any rate a certain critical figure, which could not be exceeded on tea estates because it would not be possible to plant so many. On St. Coombs' new areas the Institute had adopted a figure of 5—6,000 plants per acre as being a good, economic stand. To attain that they were using modified contours and that met the soil erosion problem.

MR. H. S. HURST considered that much more use could be made of tea hedges than was now done. In fields planted fifty years ago where tea hedges had been put in the soil saved was remarkable. When supplies were being put out and some of the plants were found to be unsatisfactory they planted them in hedges. He was reminded of this by Dr. Eden's remarks about modified contours. He thought these hedges had proved to be a remarkable way of preventing the soil running away.

DR. EDEN said he quite agreed that tea hedges were a most valuable method of stopping soil erosion and that one could use extremely unpromising material out of the nursery with success. The Tea Research Institute had done it on their road edges, and of course, there was the question as to whether or not one wanted to establish tea hedges across rows which were already planted up and down the hill. He realised there would be difficulties about plucking and all that sort of thing but the soil was a wasting asset and, in his opinion, it would be worthwhile to take some trouble over tea hedges, even if it meant increased difficulty in regard to agricultural operations.

MR. C. C. HOPE said that Dr. Eden had told them that 50 per cent of the tea bush's requirements was water. They also knew that light supplied a tremendous stimulus to the bushes. In tea districts the period of greater light stimulation often coincided with drought. It appeared that there was a colossal potential wastage during that period and it occurred to him that their field engineering methods might be a little old-fashioned. He suggested that the Tea Research Institute should carry out irrigation experiments of a quantitative nature to stimulate interest in capital expenditure on irrigation.

DR. GADD thought that the suggestion was based on a fallacy. He said that 50 per cent of the harvested crop was derived from water. Hydrogen and oxygen were built up with carbon atoms to form sugars, starch, cellulose and other materials which became part of the tea bush. Light was essential for the manufacture of these substances but the work done was not directly proportional to the intensity of light. Too much light was as bad as too little. There was an optimum value for light intensity at which the bush worked best.

The amount of water a bush required was far in excess of that used in the manufacture of food supplies. The excess was evaporated from the leaves. Normally the bush got more water than it required, and when it didn't the first indication of the shortage was a wilting of the leaves. If the shortage persisted, as in times of drought, the bushes might die. On the majority of tea estates the bushes got their requirements from rainfall. In fact the tea areas had been selected for the purpose because the rainfall distribution was normally suitable and sufficient. If there was any intention of extending tea to areas with insufficient rain, irrigation would have to be used. But irrigation of existing tea areas in Ceylon did not appear necessary and the problems of irrigation did not arise.

MR. GOURLAY said that it might perhaps interest Mr. Hope to know that he (Mr. Gourlay) had recently seen a tea garden in Rhodesia with a rainfall of 8 to 10 inches a year, which was artificially irrigated and yielded 1,500 lbs. per acre annually.

MR. HOPE thanked Mr. Gourlay for his observation and added that he himself had seen tea irrigation in Natal where there was rainfall of 60 inches per year. But, even with that rainfall, they did irrigate.

Remarks by the Chairman

Before proceeding with my summary of this Conference, I am going to introduce you to "Little Willie." I am one of those who are keenly interested in the vegetative propagation of tea, not only in determining whether or not a particular bush is a high yielder, but at the same time the quality of the tea it produces. To roll the leaf from individual bushes my teamaker constructed this little roller.

If you feed the roller slowly with about 100 points (bud and two leaves) of withered leaf from a selected bush and roll for an hour, you will get a nicely rolled dhool. Thereafter this is fermented in the ordinary way and put into the drier in this small drying appliance which is bolted to the side of an E.C.P. drier in place of one of the small inspection windows.

I have sent down many samples for report to Colombo and it is most interesting to see the considerable variation in quality there is between the bushes that one selects. I invite you to inspect this little roller; I trust that the construction of one on similar lines may assist you to determine the quality of bushes you intend to propagate.

As Chairman of a conference such as this, one cannot but be anxious that those present should be satisfied that the papers read receive the discussion they may invite or deserve. One or two planters said after our session yesterday that the papers covered their ground so well that little appeared to be necessary in the way of question.

After thanking the readers of the various papers, the Chairman continued. There is at least one gentlemen present whose influence with labour is considerable. I appeal to him or them not to make labour conditions difficult by encouraging our labourers to do slow or careless work, for such can only react against the quantity and quality of tea producible and, therefore, the ultimate economy of the Island to which tea makes such an important contribution. Labour is the life-blood of the industry and must be contented if the best results are to be achieved.

Much has been said and appeared in print recently about the certainty that the production of tea will be equal to the demand in the not distant future, especially due to the fact that production from Indonesia is likely to increase materially when a solution of the political problems which at present impinge on every aspect of the national economy is resolved.

The production of tea from Indonesia in 1948 was about 25 million pounds. Sir Percival Griffiths and Col. Tasker paid a brief visit to Indonesia in December last; they estimate that production is likely to be :—

In 1949 — 30 to 40 million pounds.
1950 — 60 to 80 million pounds.
1951 — 90 to 100 million pounds.

I was interested to hear yesterday from H.E. the Governor-General that there is a potential market in Africa for an increase in tea consumption, for such is the opinion of the international Board, whose efforts in this field are scheduled to be intensive.

But few will deny that forward contracts on a large or Government scale tend to produce teas which are not as good as they could or ought to be. Human nature being what it is, I regard this as inevitable, whereas, with teas sold on the open market by weekly or frequent sales, one's interest is kept quickened by competition with one's neighbours and the market average.

Mr. Horne has told us this morning that the standard of Ceylon teas, even with the improvement that is evident in the latter months of 1948, is not equal to that they attained before the war. We must regain that standard and, if possible, exceed that standard; then, for certain, Ceylon teas will receive a favourable reception by tea consumers

And now I come to the moment when I am due to say farewell to three of our eminent scientists in the persons of Drs. Gadd, Eden and Tubbs.

As the Director said yesterday, the loss of these three officers with their long service and experience is of course a disaster of the first magnitude. The services of Drs. Gadd and Eden extend over 23 and 22 years respectively, and that of Dr. Tubbs over 18 years. I know you will be as conscious as I am of the desirability of continuity from all important members of the staff, especially from members of the Senior Staff. I am pleased to think that but few regard the Institute as of but little use to the tea industry and ask you to reflect for a moment what the position would have been without the Institute as a consequence of the arrival of "Blister Blight" in Dolosbage about October 1946.

Alarm was widespread, but with out scientific staff to guide us, a calmer outlook as regards its probable effect and control was soon in evidence. Especially were the efforts of Dr. Tubbs eminent in his personally unsparing efforts to convey information regarding the pest and suggesting methods of control to most, if not all, of our District Planters' Associations. In case there are some present today who were not present yesterday, I will quote what the Director said in his opening address to the effect that "Dr. Tubbs has settled down to an interesting post in the United Kingdom. Dr. Eden, whose last public appearance in Ceylon this will be, is about to apply the somewhat esoteric methods of his statistical approach to tea experimentation to the tea industry in Kenya; while Dr. Gadd, after a long and productive term of service in the East, hopes, I think, to sit back and relax, or at least to enjoy a change of occupation from laboratory to domestic chores."

Drs. Gadd and Eden are each leaving us with a hand-book or monograph, which embodies in a readily available and practical form a record of their work with the Institute. It is so often the case that a complete file of the "Tea Quarterly," Bulletins and Annual Reports are not available in Estate Offices and, at the best, it is a tiresome matter chasing up a subject in the many publications with the help of the index; I thank you, Drs. Gadd and Eden, for leaving with us memorials of your work.

For myself and on behalf of those assembled here and all connected with the Tea Industry of Ceylon, I extent to you, Dr. Gadd, to you Dr. Eden and to Dr. Tubbs a regretful farewell. May each one of you find profit, pleasure and contentment in the future.

I associate myself and you, gentlemen, with the Director in extending a very cordial welcome to Mr. Portsmouth. Mr. Portsmouth, you are succeeding Dr. Tubbs as Plant Physiologist. I entertain little doubt that your services will be of immense benefit to us, and I trust that your period of service with the Institute will be as pleasant and profitable as any that you have enjoyed in the past.

Again, I associate myself with the Director in his expression of appreciation to the Minister of Agriculture for his readiness and success in obtaining an increase of the cess from 14 to 25 cents per 100 lbs. made tea as from the 1st January, 1949. It will enable the Institute to expand and intensify its efforts to further the prosperity of the tea industry which is no vital a factor in the economic stability of Ceylon.

I express the thanks of the Institute and those attending the conference to the following: to the Principal of Trinity College for the use of this splendid hall; to the Ceylon Tea Propaganda Board for sending one of their vans along to refresh us with tea at the close of the conference yesterday and this morning; to Mr. Chas. Hope for doing his best to billet many who have attended the conference and lastly, to Dr. Norris for organising this conference and for the excellent detailed arrangements for which he is responsible.

It is gratifying that the conference has been so well attended by representatives of London interests the Planters' Association, the Agency Section, the Low-Country Products Association, proprietors, visiting agents, and working planters. Especially have I been pleased to see present such a large number of our Ceylonese friends.

I trust that all of you have been interested in the proceedings and that the

Institute has achieved and will achieve results which, as His Excellency the Governor-General remarked yesterday, will react on estates to the benefit of field and factory by those who take advantage of them.

Dr. Gadd said that he would like to thank Mr. Scott for his very kind remarks and the audience for the generous way they had been received. They were all travelling along roads with many twists and bends and he had arrived at a corner beyond which he could not see. Dr. Norris with his usual foresight had warned him of what probably lay beyond. But he was not concerned for the moment with the future so much as with the past. Looking back he saw that he had for many years travelled along an extraordinarily pleasant road encountering friends and kindliness the whole way. When he arrived in Ceylon thirty years ago on that stage of his journey he was fortunate in having as a guide a gentleman whose death occurred recently. He referred to Mr. T. Petch who at that time was Botanist and Mycologist to the Department of Agriculture and later the first Director of the Tea Research Institute. There was a little kink in the road when the Institute started work. Was the road to be rougher then ? Some had confidence and others were critical. But the road proved smooth and friendly.

As to his work he realised that his failures were his own but that his successes were mainly due to others. Bits of information were picked up here and there and when a few were successfully pieced together to make a pattern the sources of information were almost forgotten. Many pieces had come from his planting friends and some from his colleagues. His colleagues of the Senior staff were always ready to give him a helping hand. He was also grateful to the members of the Junior Staff for their support and aid in whatever way requested. He would leave Ceylon with many happy memories and he thanked them all for the very kind way they had received his efforts.

Dr. Eden then addressing the meeting said that he had now really begun to feel — what he had hardly had time to feel till then — that he was leaving the Institute. He wished to thank the Chairman and Dr. Norris very much indeed for the very kind references they had made to his association with the Institute. The best thing he could say in response to their good wishes was that he had thoroughly enjoyed his work with the Tea Research Institute. He thought there could be few people in his position so fortunate as he had been, living as he had on terms of friendship with his brother scientists and supported by the authority of the Board and the encouragement of the planting community for whom he had worked. The atmosphere of personal contact and friendship which had surrounded him had not only greatly helped his work but would be difficult to repeat in other walks of life.

He would like to endorse what Dr. Norris had said about the colleagues with whom he had the privilege of working. Scientists like other people had their ups and downs, their good points and their bad points. He remembered when he was in Australia talking about the people gathered at St. Coombs to the wife of a scientist who had formerly worked in Ceylon who asked : "Are there any other normal people there like yourselves ?" He did not feel disposed to answer that question ; all he could say was that it had been a great pleasure to him to work in Ceylon. He and his

colleagues had argued about the work in progress and how it should be done and had, he thought, succeeded in maintaining an atmosphere of friendliness which had done much to help the work forward. They were very much indebted to Dr. Norris for shewing them that differences in professional opinion should never make a difference in personal relations. He felt that he was leaving behind him a host of friends — his colleagues of both the Senior and Junior staffs and the planting community. He would feel this loss, quite frankly, very bitterly. He hoped that at some future time he might have an opportunity to come to Ceylon on a holiday and meet them again.

The Chairman, after again thanking the Visitors for attending, then closed the Conference.

On the proposal of Col. Wright the gathering passed a hearty vote of thanks to Mr. Scott for his duties in the Chair.

On the afternoon of the 22nd a large number of those attending the Conference visited the Farm School and Experimental Station of the Department of Agriculture by the kind invitation of the Principal.