

THE IMPROVEMENT OF QUALITY

E. L. Keegcl

Time and again in recent months we have heard it said or read that if tea is to hold its own against other beverages, which are increasingly becoming popular, it should be well made, clean and of good quality. By this is meant that if tea is to find a ready market it must conform to a certain standard of quality. When the term quality is loosely used in this connection it must be taken to refer to a combination of all the good qualities for which tea is consumed, namely, aroma, flavour, colour, strength and so on. It may even include the appearance of a tea. On the other hand there is a certain distinctive and desirable character present in most high grown teas, a few mid-country teas, and very rarely in some low-country teas, which is also called quality. When used in this sense it serves to distinguish quality from other liquor characteristics. In this article, the term quality frequently appears, meaning either (1) all the useful attributes of a tea, or (2) that unmistakable 'quality' which is mostly confined to a high-grown Ceylon tea, and the reader should therefore have no difficulty in interpreting the term whenever it appears in the context.

For some time after the last war a vigorous and concentrated effort was made towards improving the general quality of Ceylon teas but a decline appears to have set in of late and today there seems to be inadequate supplies of good tea. There are signs that less concentration is being paid to the standard of plucking. Whether this has been the main cause or whether it is the result of over-production, heavier manuring, lack of factory equipment, or less attention to manufacture it is impossible to say. Whatever may have been the contributory factor, the fact remains that the buyer, with whom is associated the consumer, is more discriminating today than ever before. His requirements have to be satisfied or at least partly met if the producer wants a better price for his tea.

In an age of television and colour advertising, the consumer's first thought naturally turns to the colour of a beverage, and it is only natural that today more emphasis is being placed on colour of a tea liquor. Another desirable feature is strength, and the popularity of quick-brewing blends which make a packet of tea last longer is evidence of the consumer's desire for an economic tea. In the case of a high-grown tea, which by its nature is not sufficiently coloury and strong to bring it into a special category, its quality is the more important consideration.

Contrary to general opinion, tea is valued on the London market partly on its appearance and a really well-made tea with a relatively poor liquor may fetch as much as a tea with a poorer appearance but better liquor. Generally speaking, it is the liquor which scores. Yet the fact that stalk has such a lowering value on a tea calls for the most serious consideration on the part of the producer. Whether justifiable or not, the presence of stalk in a tea is not favoured by the trade and is always associated with inferior liquors. The standard of plucking should therefore be as high as possible commensurate with cost of production and yield in order to satisfy one of the main requirements of the trade. Not only is stalk not favoured but a grade should not be ragged, i.e. consisting of different shapes and sizes. It would not matter if it is a little brownish or flaky so long as it is uniform in size. Whether

it needs to be cut or not by a blender attention is still paid to a tea with good style and uniformity and the maintenance by an estate of a uniform standard of leaf appearance.

Unless the highest possible standards in liquor and appearance are maintained Ceylon tea may find it difficult to defy competition not only from other beverages but from tea produced in other countries. The quality of African teas appears to be steadily improving and with new factories being built and selection work expanded, the time is not far distant when teas from these newly developed areas would prove a serious challenge. Indian teas made by the C.T.C. process are steadily gaining ground, and with China now contemplating export, not to mention Argentine which has already entered the market, an improvement in the quality of our own teas is most essential today.

The tea industry in Ceylon has far too long maintained an attitude of lofty indifference to the potential capabilities of other tea producing countries and can no longer afford to ignore the present situation. If no action is now taken to improve the standard of its teas, the reputation Ceylon has built up over the years may decline sooner than expected. The question of merely finding new markets for Ceylon tea is no answer to the problem; what is first needed is a higher standard of quality.

One of the factors outside our control which influences quality is of course elevation. Others are jât, season and the weather conditions associated with the latter, as evidenced by the noticeable difference between teas produced in dry weather and during a wet monsoon. Possibly other uncontrollable factors affect quality to a greater or less degree, but if it is not present in the leaf to start with it is quite impossible to introduce it in the factory.

Though quality happens to be an accident of location there are some factors within our control which can either impair or improve it before the leaf is processed. One method of improvement, for example, is by regulating the crop. The time and method of pruning and/or the time and method of manuring can be so adjusted to avoid phenomenal rush crops with poor quality but still without depressing the annual yield. It may not be possible in certain cases to bring about an even distribution of crop throughout the year by suitable agricultural practices, but where weather conditions are not abnormal it is an objective worth aiming at.

Another factor is the standard of plucking, and a laxity in plucking standards appears to be taking place arising chiefly from the desire to obtain yields of 1,000 pounds and over whatever the consequences, and from the comforting belief that mechanical stalk extractors provide the answer to the problem of eliminating excess stalk. This drift is only taking Ceylon tea further away from the good name it earned in the past and should be arrested before further damage is done to its quality.

Increased yield is of course a worthwhile proposition provided the right type of material is available, but an illusory gain is obtained from trying to increase crop by resorting to coarse plucking. It is well known that the coarser the pluck the greater the quantity of waste tea, all of which is of no value. If a good standard of plucking can be made to give 98 per cent of saleable grades from the total tea made, not more than 93 per cent can be expected from a coarse pluck. Would it not be more profitable to discard the coarser stalk in the field rather than to manufacture it and pay for withering it and all the other operations which follow, let alone its final elimination, which is not easily achieved?

Appearance of a tea is still important and however efficient a stalk extractor machine may be, it can neither bring the appearance of poor leaf up to the standard of good leaf, nor can it improve the liquoring properties of such tea.

It is therefore evident that some sort of a planned system in the field is required if with existing material an improvement in quality is required. Apart from crop regulation, a control over plucking is needed. The latter does not only imply that coarse stalk and leaf should be avoided. Just as important as eliminating these undesirable components, is the keeping out of the factory of tough banji. Banji shoots should be plucked before they become too mature.

Spectacular results cannot of course be obtained by merely having the right type of leaf for manufacture; adequate and suitable equipment must also be available for manufacturing it. But how many factories have within recent years been expanded to cope with increased yields? Unless increased and better equipment is provided, crop should be carefully controlled and it may even be found necessary to rest uneconomic areas or throw them out of production. It is useless blaming high manuring for poor quality teas if in the first place no effort is made to plan the harvesting of the crop in relation to the capacity of a factory. There are still a number of people who imagine that no serious harm results from makeshift arrangements for the manufacture of 'rush' crops, but this is evidently a mistake because it is during a time like this when the leaf possesses a smaller proportion of inherent good qualities that greater attention is needed in manufacture. Because of the fact that owing to seasonal changes the same standard of quality cannot be maintained throughout the year, it is no excuse for a producer to be content with poor results during the off-quality season.

It would thus be seen from what has been said so far that quality cannot be cheaply earned. Let us see how we can manufacture the best possible tea that the leaf can produce.

With reference to a high-grown tea the main requirements are:—

1. the shortest wither economically possible, artificially or otherwise, without resort to temperatures exceeding the maximum day temperature,
2. avoidance of high temperatures during rolling and fermenting, but not neglecting the necessity to get the leaf warmed up as soon as possible in the rollers by adequate pressure in order to get fermentation started,
3. obtaining a uniform dhool and of the size of a B.O.P. grade—whether by double roll-breaking or any other means,
4. care in not exceeding a period of fermentation of 3 hours for early dhools and 4 hours for later dhools,
5. a firing temperature not exceeding 195°F, and a moisture content not higher than 3 per cent,
- and 6. a clean factory.

It is very unlikely that any up-country factory will find itself in difficult straits by observing the foregoing points. Nevertheless, it should be recognized that to attain a high standard of quality in the tea, the properties essential to its development should be present in the green leaf. For more details on the improvement of quality the reader's attention is invited to Monograph No. 4. In an article of this length only the fundamentals can be indicated, but at the same time it may be found useful to

refer briefly to some other aspects of manufacture in relation to the particular type of tea a factory may wish to turn out. The difference in character of the raw material entering the factory must naturally have an effect on the final product, and it is necessary to bear this in mind when considering the following discussion.

Withering

The characteristics of a tea produced from long withers are too well known to call for repetition. A few estates undoubtedly have obtained remarkable success probably because such teas have been needed for a particular purpose, and in the case of an estate which has established a 'mark' for strong, coloury teas a change would not be advisable with a view to improving 'quality'. Likewise, an estate with a 'mark' recognized for its 'quality' has nothing to gain by extending the period of-wither, since even short periods of fermentation do not correct the loss of quality brought about by long withers. However, in some instances it may be found advantageous to extend the period of wither of say the evening leaf only when rolling methods have failed to get sufficient colour and strength, but a lack of briskness in the liquor is inevitable.

Soft withers still continue to be taken by some up-country factories, with unsatisfactory results, in the belief that they will improve the colour of the infusion and liquor. It cannot be gainsaid that during the dry weather exceptionally good pungency and flavour may be obtained from under-withered leaf, but considering that liquors are harsh and the teas brown and very flaky, there is a strong case for taking good withers under normal conditions. There is no evidence to suggest that infusions get duller or colour declines with harder withers if rolling is properly carried out. For the conservation of flavour when all that matters is the shortest wither possible, a little under-withering will do no serious harm.

Rolling

Quite a number of unsuspected defects in rolling are caused by loose pulley belts and shortage of power. Lack of proper organization is also another major contributory factor, and unless these are corrected in the first place the best results are never likely to be obtained.

With respect to the main groups of teas made in Ceylon, a criticism often levelled at some high-grown teas (particularly Nuwara Eliya's) is that they are too thin. It seems more than probable from the results of recent investigations on the effect of age from pruning that the long pruning cycles in practice in such districts may be one of the contributory causes of this characteristic property of these teas. It has not yet been definitely established that with increasing age from pruning quality progressively improves, and it may very well be that with shorter pruning cycles Nuwara Eliya teas would be more valuable with improved colour and strength. It is quite impossible of course even by harder rolling to bring such teas into the category of coloury teas because by their very nature they tend to be light, but it is possible that by harvesting softer leaf more body can be introduced.

For places in the mid-country that do not make a very good quality tea, one matter very difficult to decide is whether liquor should be sacrificed for appearance or *vice versa*. Elevation and jât must in any case be the first consideration, and the number of rolls adjusted accordingly. Where some doubt exists as to whether 4 rolls or 5 rolls is preferable, assuming the initial rolls are carried out in such a way as to conserve appearance, it is suggested that (a) for mainly appearance only 4 rolls be carried out to give 20-25 per cent B.B. (b) for liquor, an additional roll be carried out to reduce the B.B. to 10 per cent.

One very serious shortcoming in most Ceylon low-growns is that though they possess some colour, they lack the necessary strength to command a better price in the London market. Those low-country estates manufacturing teas for this market would therefore be well advised to make a radical change in their rolling, which for a long time had appeared only as an objective. The uncertainty of the Middle East market and changing tastes, may also result in black, tippy teas with poor liquoring properties being of little value in time to come.

The emphasis on colour and strength has led to the adoption of continuous rolling on many estates, one method being to roll the big bulk continuously and the other the replacement of dhool with an equivalent amount of withered leaf. There are two disadvantages in the former method: (1) no proper control of fermentation of the later dhools, and (2) excessive heat resulting from the rolling of combined charges.

The importance of having a large roller for amalgamating charges need hardly be stressed, and the only circumstances which justify the adoption of this method is inadequate equipment to reduce the B.B. outturn to a reasonable figure. As regards the continuous rolling of withered leaf due care should be taken to have a good standard of leaf and a good wither, and to avoid the following pitfalls:—

1. an excessive initial charge,
 2. insufficient dhool outturn,
- and 3. over-fermentation.

Roll-Breaking

A roll-breaker plays a most vital rôle in manufacture, but it would appear that this machine is still taken too much for granted. A lengthy chapter has been devoted to the subject of roll-breaking in Monograph No. 4, and it is quite unnecessary to go over the same ground again beyond stressing the points that size and uniformity of dhool are the two major considerations. The extra care taken over this process will be repaid many times over since the final characteristics of a tea depend mainly on the size of dhool taken out and its degree of evenness. If the mesh is incorrect it should be replaced, and if the correct type and size of dhool is still not obtained, double roll-breaking should be carried out. If at all experimentation is needed in a factory, there is no more useful machine to start on than the roll-breaker. Few tea-makers even today realize its importance and understand its main function.

Fermentation

A tea taster's first criterion is colour and brightness of a liquor—a dull liquor is rejected. Yet too much attention still appears to be paid to the infused leaf which is out of all proportion to its importance, with the result that in attempting to correct a greenish infusion over-fermentation is brought about. Heating of fermenting rooms is one of the methods employed. Another is extending the period of fermentation and a third method, thickening the spread unduly. All these sometimes prove of no avail and quality is sacrificed.

One essential requirement for fermentation is warmth and this can easily be overdone by the methods frequently practised. All that is required is generation of sufficient heat in the rollers in the early stages of rolling to provide the necessary heat for fermentation to start. Delay in doing this will result in loss of quality.

A matter that still puzzles many is the correct order of firing dhools. From the evidence now available it would appear that for heavy rolling, firing the early dhools first is the most suitable. Where rolling is light in the early rolls and a greater proportion of the initial charge is carried over to the 4th and 5th rolls, it would be better to start with the last dhoool. In any case the period of fermentation should not exceed 3 hours at the time any particular batch is first taken to the drier. Should the required liquoring properties not be obtained with this fermentation, then obviously something is wrong either with the leaf or the method of rolling.

The period each dhoool should be fermented varies of course with individual circumstances and the type of liquor required, but it is always necessary to remember the close relationship which exists between colour and quality. Since the early dhools have the most quality, it is particularly important that in the case of high-grown teas they should not be over-fermented. It is possible now in the light of further results obtained on fermentation, to give some guidance on the matter, and the following data may be of assistance:—

		<i>Minimum</i>	<i>Maximum</i>
Dhoool 1	—	2 hours	3 hours
„ 2	—	2½ „	3½ „
„ 3	—	2½ „	3½ „
„ 4	—	3½ „	4½ „

The lower figures are recommended for the conservation of quality and the higher ones for the development of colour. A period of fermentation somewhere between these two would probably give the best all-round tea. However, they should be checked in each individual case by observing the cup characteristics of each dhoool.

In practice it will not be found possible to give each dhoool its optimum period of fermentation for the simple reason that, when only one drier is being used, one dhoool should follow another to keep the drier fully loaded. But in the case of a factory using 2 driers more flexibility is afforded and more opportunities exist for obtaining the most suitable periods. For example, instead of dividing the dhools between two driers at the same time, as is customarily done, two different dhools may be fired simultaneously. Another possible modification is to bring one drier into operation later than the other. Thus by the latter expedient the overall period of fermentation can be radically altered without in any way upsetting the rolling room organisation.

Firing

There appears to be a smug satisfaction that if the exhaust thermometer during firing reads between 120-130°F there is nothing to worry about. Frequent cases have come to light where owing to unsatisfactory conditions under which a drier is being operated, a recorded exhaust temperature of 125°F has proved to be very unreliable. Erroneous exhaust temperatures can arise from a number of causes such as:

1. excessive air speeds
2. uneven distribution of air
3. empty trays
4. uneven spreading

5. faulty thermometers
6. thermometers incorrectly placed.

It is not always that a drier is without any of these shortcomings. Hence it is most important that entire reliance should not be placed on the exhaust temperature. Moisture contents should be checked occasionally. For correct firing, tea leaving the drier should not have more than 3 per cent moisture.

This brings us to the question of moisture meters of the infra-red type, and the warning is given to estates to ascertain before they purchase such instruments the actual conditions under which they should be operated. The correct height between lamp and pan, and the time of drying should be clearly indicated by the suppliers and not left to the estate to determine by experimentation. Since none of these instruments can give a true reading over such a wide range of 1-7 per cent moisture for a fixed position of the lamp and a fixed drying period, it is certainly desirable to have a calibration chart with each instrument.

Grading

How does grading affect the general quality of a tea? One of the ways is excessive handling, which includes sifting, cutting, picking and winnowing. To reduce these operations to a minimum we return again to the importance of having a good standard of leaf, a good wither and proper rolling. Restriction of off-grade outturns without relation to the standard of plucking can also obviously affect liquoring properties of all the main grades. Besides, the indiscriminate use of breakers and stalk extractors can have a very adverse effect—more than what is generally believed—and it appears likely that the present craze for reducing picking costs may do more harm than good. The misuse of these machines and the temptation to pluck coarser because of their availability may well spell ruin to Ceylon quality.

The appearance of a tea still counts and although the present trend is for teas of smaller size, there is no justification for any factory to carry out abnormal methods for increasing the outturn of the fannings grade unduly. In the London market small B.O.Ps are acceptable because even when mixed with fannings they do not make much of a difference to the uniformity of a blend. Most blenders try of course to avoid as much cutting as possible because of the adverse effect on liquoring properties and the formation of dust; and that is why fannings types have a ready market. But it does not follow that by excessive cutting up of teas in a factory the fannings produced will be more valuable than a well made B.O.P. True grading is now a thing of the past, but let not the B.O.Ps and fannings deteriorate still further to the detriment of Ceylon teas.

It is hoped that the foregoing suggestions will help the producer to ensure the highest standard of manufacture in these difficult times of competition, but it needs to be stressed again that only the best type of leaf can produce the best quality.

Summary

1. To command a good price, teas must conform to a certain standard of quality, which includes appearance.
2. Stalk has a definite lowering value on a tea, and its elimination requires the most serious consideration of the producer.

3. A higher standard of quality is required of Ceylon tea if it is to meet competition from other tea producing countries in the future.

4. The current tendency to obtain 1,000 lbs. yields and over would lead to a deterioration in quality if steps are not taken to regulate crop in relation to factory equipment.

5. Quality cannot be cheaply earned. The properties essential to its development should be present in the green leaf; the standard of plucking should be good and the right equipment available in the factory.

6. To make the best possible tea from high-grown leaf the essentials are short withers, short fermentation, avoidance of unduly high temperatures in rolling and fermenting, dhools of small and uniform size, correct firing and a clean factory.

7. Manufacture in general:

(a) *Withering*.—It is best to avoid long withers unless an estate has established a 'mark' for the particular type of tea resulting from prolonging the wither.

(b) *Rolling*.—The adoption of continuous rolling calls for a good standard of leaf and a good wither.

(c) *Roll-breaking*.—Size and uniformity of dhool are two major considerations.

(d) *Fermentation*.—Too much attention still appears to be paid to the infused leaf and in many cases over-fermentation has resulted from attempts to correct greenish infusions.

(e) *Firing*.—Entire reliance should not be placed on exhaust temperature readings. Moisture contents of the fired tea should be checked.

(f) *Grading*.—Excessive cutting and indiscriminate use of stalk extractors should be avoided.