



# THE NEXT TEN YEARS

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In my address at the Tea Traders Convention in January 1966, I outlined what the TRI was doing about tea quality in the field, in the laboratory and in the factory. I forecast that the time will come when so much will be known about quality and flavour that these desirable characters will be obtainable all through the year. That time is now upon us for within this, the Centenary Year of the first commercial planting of tea in Ceylon the TRI will have made the most revolutionary contribution to the tea industry that has been made since the invention of the mechanical roller. By using radioactive tracer techniques, the biochemical pathways that lead to quality and flavour in green leaf have, in the main, been elucidated and what is more, they can be simulated at will in the factory. In the same way that cheese-making and beer-brewing can be standardized to give a high quality product with the desired flavour in every batch, it is expected that the tea maker with the new TRI process will be able to make quality teas with the leaf that comes into his factory — all the year round and not as at present according to the whims of the weather.

Through the strict biological and biochemical control of the processes of withering and 'fermentation', quality, flavour and aroma will be imparted to leaf grown at any altitude. This will be possible without the use of expensive equipment and extensive modifications to existing factories.

One obvious question must be answered before going any further and that is, what will happen if everyone is able to make quality tea all the time? The answer is simply that they will not be able to, unless a licence is obtained and this would only be granted to Ceylon tea producers. How many companies will be keen to use the new process will depend on how high a premium the TRI Super Tea will fetch. The ultimate aim is to educate the tea drinking public into appreciating a high quality, flavoury tea and preferring it to all others. The difference between our Super Tea and *all* others will be as great as that of a vintage wine from a *vin ordinaire*. A variety of flavours — all true tea flavours — will be available to suit every taste.

These discoveries of the TRI biochemists concerning flavour and quality will naturally have an impact on factory technology. Although existing factories can be modified quite cheaply, research is vigorously going on to provide the most efficient factory to match the process. Ultimately nothing of the old-time Ceylon tea factory will be used in the continuous-process quality tea factory. It will certainly *be* continuous and once the leaf is introduced into the first machine it will be untouched by hand until it comes out at the end of the production line in nailed-up chests or sealed paper-cum-plastic sacks. The Japanese have been able to automate a large part of their green tea process and it is envisaged that before the next 10 years are over and if progress can proceed unhampered, the TRI will have a proto-type continuous, fully automated, super tea factory for everyone in Ceylon to copy. But current programmes or modernization or extension of factories should be implemented because it will be some years before our proto-type factory is perfected.

Fears have been expressed that the traditional appearance of the best Ceylon tea will be changed. This will not be so, despite the fact that everything in the proto-type factory can be described as un-orthodox. We will produce the blackest, best twisted, even-sized teas with all the quality and flavour the most discriminating broker could ever ask for. I have left it to my colleagues to describe the depths to which our heresy has sunk or rather, to which our unorthodox has arisen but I will just indicate here a possible flow sheet of our proto-type factory :

- 1 — Delivery, automatic sorting of coarse leaf.
- 2 — Mono-rail or belt conveyance to withering troughs or low temperature holding chambers, fitted with mechanical spreading and timing devices. Automated control of degree of wither (physical and chemical) and temperature control of wither.
- 3 — Transference *via* an Archimedean screw of stainless steel into a screw-fed vertical-plane roller such as the Triturator or Rotorvane then perhaps a twisting machine or combination of two or three of these machines. The air inside or each machine will be chemically conditioned.
- 4 — Transference by slow moving belts in a duct containing chemically conditioned air, so that by the time it reaches the drier the processed leaf is fully fermented. This will be photo-electrically controlled so that it will not be discharged into the drier until fermentation is complete.
- 5 — Drying by novel techniques which should be a great deal cheaper in capital and running cost than present-day driers. The dried leaf will come out of the drier already sorted.
- 6 — Endless belt transference to bulking machines.
- 7 — Compressed air transference to packing machines with samples automatically drawn off for electronic 'tasting'. The results of the objective tests of the automatic analysers are fed into a computer and this will be ready with the value of the tea as soon as it is packed.

### **Instant Tea**

The next ten years are bound to see a very great increase in the demand for soluble or instant teas. As the years go by these will become more and more like real tea and it is expected that the new TRI Instant will be heading the list. By incorporating the principles mentioned in the first part of this article the TRI Super Instant should have all the flavour and quality of the best Ceylon tea all the year round. Because it will be completely soluble in ice-cold water, our Super Instant should do well in the United States market.

Those companies who are fortunate enough to be in the lead by adopting our proto-type black tea factory could very easily have an Instant factory in the same building, sharing some of the same machinery. Alternatively leaf tea will be tailored for manufacture of the TRI Super Instant in overseas facilities.

### **In the field**

I have purposely dealt first with the progress to be expected in factory technology as a result of the researches of the TRI biochemists and engineers. This work also affects the policy of research in the field, especially in the selection of clones. The emphasis I put on this subject early last year is already beginning to lessen, because if quality and flavour can be imparted in the factory then there will be little need for growing lower yielding, higher quality clones. At present we are trying to get the best of both worlds by hybridizing clones having high quality with those having

high yield potential. This project is so long term that it is certain that the biochemists will overtake the plant breeders and within a year or two the latter will be concentrating on quantity, hardiness and fermentability together with pest and disease resistance. Establishment of new clearings will be so streamlined that costs will be drastically cut and present-day acreages accordingly will be multiplied several times.

Inseparable from the genetic aspects of quantity in yield of tea are the nutritional requirements of the bush. The higher yielders have inherited the ability to make the best use of nitrogen and other nutrients. As a result of all the fertilizer experiments now being run from the TRI, in the very near future, changes in fertilizer policy can be expected. If urea is manufactured in Ceylon then a switch to this nitrogenous fertilizer will occur and the cost per unit of nitrogen will decrease considerably. The maximum yield of tea in the low-country now stands at 8000 lb per acre with about 500 lb nitrogen applied per annum. It has been shown in Japan (presumably with urea as the nitrogenous fertilizer) that linear responses to nitrogen can be expected up to 890 lb — it would thus seem that a target of well over 10,000 lb per acre is not unreasonable in the low country. Up-country estates will be thinking in terms of 5-7500 lb per acre but mid-country estates are still an unknown quantity in our reckoning. If an answer is obtained to the problem of Shot-hole Borer then, of course, they will be able to compete with low- and up-country producers. If no such answer is forthcoming, it may be that only the most efficient of them will survive and the rest will be converted to other purposes. But there is a fair chance of a new chemical turning up in the next 10 years which will control Shot-hole Borer and better still there is a fairer chance of biological control becoming a reality. Search for insect parasites has already begun by Entomologists of the Commonwealth Institute of Biological Control who are operating all over the world. Also a novel means of attack is being tried out in which fungus spores that are specific feeders on this type of insect are sprayed at regular intervals onto the tea bushes. Inherited resistance is also being sought and already a few clones show promise.

Other problems of production such as nematodes will also have been largely solved by planting of resistant clones and heavily fertilizing them. The fungus diseases which a few years ago were thought to be devastating are now so well under control that future advances will be mainly in more economical methods of application of cheaper chemicals. The ideal would be a cheap systemic fungicide that could give long-term protection without taints. Cultivation costs will be minimized by the use of herbicides and by having fuller stands of bushes. Physiological problems such as shade, die-back after pruning, length of cycle, best types of tipping and plucking will no longer be problems as experimental data accrues for all the best clones and seedling jats grown under all ecological regimes.

With so much more tea being produced per acre the next problem is how it will be picked with labour forces already inadequate in many districts. The Japanese solved this one many years ago by shears and small motorized plucking machines. The latter are being tried out experimentally now in Ceylon and there is no doubt that for clonal tea there will soon be a model available that is suitable. These machines will never be as selective as a pair of nimble hands but with careful use on trained clonal bushes, more frequent rounds and improved factory technology, mechanically plucked leaf should not affect selling prices.

In conclusion I will just reflect on the delicate subject of markets for all the tea that will be produced during the next ten years. The upward trends of quantity will certainly level off ; countries producing plain teas will be the first to stop expansion. Quality teas will always be in demand and it is anticipated that the same demand will be found for the TRI Super Tea. By improving the flavour of black and Instant teas, as the TRI process will do, the attractions of tea as a drink should spread to a wider public and if this can include only a small fraction of the kola and coffee drinkers of the USA and the continent of Europe, then the future of tea will be very rosy indeed.



*St Coombs—The Centre of The Ceylon Tea Scene*