Madras Agricultural Journal

(ORGAN OF THE M. A. S. UNION)

Vol. XXII] JULY 1934 [No. 7

CONTENTS

Editorial.

The Trade Position in Coconuts. It is one of the recognised principles in Agricultural Economics that specialised production of a crop as against mixed or diversified farming suffers most in times of economic depression and low prices. In the West Coast of South India, the two main crops are paddy and coconuts, and the prices for both these crops are very low. Coconuts on the West Coast suffer from the competition from Ceylon. According to the Ottawa Agreement, 10% preference was given to copra and coconuts arriving from Empire countries. The preference was adjusted by lowering the duty on copra by 5% for Empire sources, and by raising the duty by 5% for foreign countries. The present rates of duty are 20% for copra and 25% for oil for Empire countries, and 10% more for foreign countries. In the Select Committee to which the Ottawa Agreement was referred to, it was pointed out mainly by the oil millers that the supply of copra in India is insufficient to meet the demand of the Indian oil-crusher.

The reduction in the imports of soaps and vegetable ghee into India and the rapid development of the soap and vegetable ghee industry in India indicate an increase in the consumption of coconut oil. Ceylon obtains slightly higher prices when she sells her coconut products in India than when she sells to Continental markets. The area

under coconuts has remained practically stationary for the past five to six years.

Oil mills on the West Coast are idle. It is a question for consideration as to why these oil mills are idle, when oil is being imported from Ceylon. In the markets outside Southern India, the West Coast miller is unable to dispose of the oil at competitive rates either with the imported Ceylon oil or with the oil produced in the modern installations at Bombay and Karachi even though the Bombay and Karachi oil-mills crush copra after paying a duty of 20%. This is due to the unfavourable coastal steamer freights as against freights from Ceylon. Normally about 40% of the shipments by sea of oil, and about 95% of the shipments of cake, from the West Coast ports are to Bombay and Karachi.

The prices of coconut products have fallen remarkably during the last five years and the producer has continuously endeavoured to check this fall in the prices, by marketing increasingly larger number of nuts. The world's supply of oil seeds, oils and fats has consistently increased over a number of years and in spite of the remarkable fall in the prices of coconut products, the world's shipments of copra during 1933 show a further increase; the total exports for 1933 were 1,115,762 tons compared with 923,926 tons for 1932. Philippines shipped during 1933, 302,492 tons compared with 133,867 tons for the preceding year. The coconut prices are now the lowest on record. The depreciation of U. S. Dollar stimulated phenomenal shipments from Philippine Islands and accentuated the decline in the market. The low prices for butter, and the various measures adopted in several countries, especially Germany, to protect domestic dairy interests, caused the depression of the oil-seeds markets. Import restrictions on coconut oil in several European countries like Germany, Hungary, Poland etc., will continue to hamper business. Improvement in the world prices of coconuts can take place when the shipments of copra are reduced, or when there is a general improvement in the world trade conditions. Visible supplies of oil seeds are plentiful and with the existing low prices of butter the value of edible fats can hardly increase to any considerable extent. It is expected that in 1934 oilseeds and fats with an oil equivalent of about 8·3 million tons are likely to enter the international trade and out of this, the share of coconut oil and copra is expected to be 0·87 million tons.

Rubber Restriction. The Rubber producer has for several years suffered from ruinous prices, and any effort to restrict indiscriminate production with a view to stabilise prices at a level which is fair to the producer and consumer should be welcomed. It is therefore gratifying, that the prolonged discussions on this subject have borne fruit, and an international agreement has been signed on May 7, 1934 at London, by

which restriction of exports from the chief rubber-producing countries comes into force for a period of four years from 1st June 1934. The signatories to the agreement are, Britain, France, Holland, India and Siam who, among them, hold the largest rubber interests in the world. By this agreement, all exports of rubber from the territories of the signatories will be restricted on a predetermined basis, and quotas based on area and production, have been assigned to all the territories on a rising basis during these four years. The immediate effect of restriction has been a sharp rise in the price of the commodity which appears to have steadied round 6½ d. Though this is slightly below what may be regarded as a fair price for the producer, there is no doubt that the restriction has begun to work beneficially for him.

Though India produces only about 1½ per cent. of the world's output of rubber, South India, comprising the States of Travancore and Cochin and portions of Madras, is actively concerned in the prosperity of the industry. The basis on which the International Committee arrived at their figures appears to be the average exports for the years 1929 to 1932. It should be borne in mind that in S. India, especially Travancore, there are innumerable small holdings which figure in the rubber market only during prosperous times and that most of these holdings have not got included in official statistics. Since the quota for India is based on exports between 1929 and 1932 and on figures of acreage hitherto regarded as correct, the South Indian producer, both big and small, is bound to lose. So long as South India represents only a small percentage of the world's output and any revision of the quota for India is not likely to upset world figures to any appreciable extent, India can legitimately represent her case for the allotment of a fair quota. We trust that the Indian rubber grower will not suffer by default.

THE POSITION OF MADRAS IN THE TOBACCO INDUSTRY OF INDIA

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Introduction. The tobacco plant has advanced from the status of a weed to that of a highly cultivated plant of major social and economic importance. As a source of revenue this has gradually become supreme so far as the plant products are concerned. In all civilised countries it is now an important source of revenue. The advancement of tobacco is due to its smoking qualities. A perusal of its history reveals the high place it occupied in religious ceremonies in the past, and the present high status in medical and social fields. It was introduced into India about 1605 (Watt), and the earliest experiments recorded on this crop date as far back as 1786 (O'Connor, 1873). The habit of smoking has increased so much that since 1914 there has been a sudden increase in the consumption of tobacco in the form of cigarettes.

The World position of Tobacco production. A glance at the figures of the tobacco production of the most important tobacco producing countries of the world shows the unique importance of India in the tobacco industry.

Table I. Tobacco production in the World - 1933.

Country.	Quantity in million lbs.	Percentage.
United States of America.	1298	28·2
India.	1000	21·7
China.	485	10·5
Russia.	386	8·4
Balkans.	341	7·4
Empire countries (except India).	83	1·8
Other countries.	1007	21·9
Total	4600	100·0

The above table shows that India ranks as the second largest producing country. She produced about 22% in 1926, and in 1933 28% of the total world production, and about 90% of the total colonial tobacco. The production in 1931 totalled 1281 million lbs, of which approximately 30 million lbs were exported, about four-fifths of the exports being consumed in the Empire.

Internal position of the Industry. The relative importance of the Madras presidency will be recognised when the position of the industry in the several provinces of India is discussed.

(i) *Acreage.*—Tobacco is grown over a million and a quarter of acres all over India, including the native states, the major portion being contributed by the several provinces of British India.

Table II. Area in thousands of acres under tobacco in 1931–32.

No.	Province.	Area in 000 acres.
British Provinces.		
1.	Bengal.	293
2.	Madras.	269
3.	Bombay including Sind.	155
4.	Bihar and Orissa.	141
5.	Burma.	87
6.	Punjab.	85
7	United Provinces.	67
8.	Central Provinces and Berar.	16
9.	Assam.	14
10.	North West Frontier Province.	13
11.	Delhi.	1
	Total British Provinces.	1141
Indian States.		
1.	Hyderabad.	78
2.	Baroda.	32
3.	Mysore.	25
	Total Native States.	135
	Grand Total for India.	1276

Analysing further, we find in the several provinces the following important districts having considerable areas under tobacco.

Table III. The position of a few important districts.

District.	Province.	Area in 000 acres.	Percent to total tobacco area in the Prov.	Percent to total tobacco area in India.
1. Rangpur.	Bengal	175·0	62·3	13·7
2. Guntur.	Madras.	103·0	38·1	8·1
3. Purnea.	Bihar & Orissa.	66·1	41·1	5·2
4. Vizagapatam,	Madras.	52·0	19·2	4·1
5. Muzaffarpur.	Bihar & Orissa.	41·3	25·6	3·4
6. Darbhanga.	,, ,,	27·6	17·1	2·2
7. Coimbatore.	Madras.	33·0	12·2	2·6
8. Godavari East & West & Kistna.	,,	29·5	10·9	2·3
9. Dacca, Mymensingh, Jalpaiguri.	Bengal.	46·4	15·8	3·6

A brief explanation is necessary in the selection of the above districts from the several provinces Items 1 to 4 indicate the districts which rank high from all considerations. Items 6, 8 and 9 are included with a view to give due importance for the agricultural tract represented by those districts (Items 1 to 4), though the area in the several districts represented by these items may be individually and relatively small. Rearranging the data according to representative

tracts e. g. Guntur, Godavari and Kistna areas ' eing added together as they form one tract, and similarly those of Purnea, Muzaffarpur, and Darbhanga their areas being totalled together as they form another tract, we have the following percentages of acreage of these tracts with reference to the total area in India under tobacco.

Tract.	Percentage to the total tobacco area in India.
1. Rangpur.	13·7
2. Muzaffarpur.	10·7
3. Guntur.	10·4
4. Vizagapatam.	4·1
5. Coimbatore.	2·6
6. Dacca.	3·6

It is obvious that the chief centres of tobacco cultivation in Madras contribute 17·1% of the total area under tobacco in India while those in Bengal contribute 17·3%, and Bihar and Orissa 10·7 per cent.

It will readily be seen from the following that Madras is the most important province on account of the *kind* and amount of tobacco (*Nicotiana tabacum*) grown or the 'Tobacco' of commerce, while in other tracts like Rangpur and Muzaffarpur, the tobacco grown is almost half and half of *Tabacum* and *Rustica* which are either grown for purposes of 'the Cigar' trade in the former tract, or for ' country smoking ' and *hooka* in both the tracts.

(ii) *Uses of tobacco.*—It is however necessary at this stage to point out the several uses for which tobacco is put to so that the importance of the acreage of the tracts given in the table can be better appreciated. It is used for the following purposes

(a) Cigarette.
(b) Cigar, for refined tastes.—(of the ' Cigar Trade ')
(c) Pipe tobacco.
(d) Beedies.
(e) Cigar, for ordinary tastes.—(or country cigars)
(f) Chewing.
(h) Hooka.
(i) Snuff.
(j) Medicinal purposes.
(k) Insecticidal purposes.

The order in which the several uses of tobacco have been mentioned is alloted from the considerations of financial importance. The advance of the cigarette in general favour can be made out from the world position given below.

	1907	1924
Cigarettes.	23·8%	58·5%
Pipe tobaccos.	71·1%	40·0%
Cigars.	5·1%	1·5%

Remarks. Annual consumption of cigarettes.			
India	Pre war	1000 millions	cigarettes.
	1927	6500	,,
United Kingdom	1929	42 598	,,

But as for the other items of use, though exact statistics are not available their effects are quite well recognised in each and every province. The habit of smoking is predominant all over India whether in the shape of cigarettes, cigars, beedies or hooka. The habit of chewing tobacco and the use of snuff, for which only minor quantities of tobacco are required occupy their ranks next in order. The quantity of tobacco used for medicinal and insecticidal purposes is almost insignificant. Further, since the manufacture of country cigars, beedies and hooka preparations takes place in the country side and as cottage industries, collection of their statistics is no easy task. Similarly the amount of tobacco used for chewing and snuff purposes cannot be correctly assessed. Again the demands of popular 'taste' in the several products (even in the country products) e,g. country cigars are different in different tracts. For instance, the people of Godavari, Vizagapatam, and Ganjam districts require mild flavour in the cigar as characteristic of the 'Lanka' cigars of the Godavari Dt., while those of the Kistna district appreciate a medium pungency as is provided by the Nuzvid (Kistna Dt.) tobacco. The people of Guntur and west of Guntur will not be satisfied unless the flavour be of a strong and pungent type, which is termed as bitter in the markets of Kistna districts. Similarly it may be instanced in the case of beedies, hooka and snuff as well.

When the standards of 'likes' and 'dislikes' differ so very widely even within the area of 4 to 5 adjacent districts it is not strange to expect sharply defined standards of flavour required in the 'tobacco of commerce' to prevail in the international markets. As indicated above, the volume of the tobacco trade is more towards the supplying of huge demands of the 'cigarette of the world'; naturally all attention towards the solution of the tobacco problem of India must, therefore, necessarily be directed to the improvement of the cigarette tobacco and its immediate relationship with the cultivator. The requirements of the pipe and cigar tobaccos deserve the next earliest attention.

It may appear to some that the cigar industry of India demands the earliest attention in preference to that of the cigarette. But excluding Burma, which is fairly well noted in the tobacco trade for its *cheroots*, the volume of tobacco trade of India is more in favour of the pipe and cigarette tobaccos. Many advantages. as for instance, the comparatively greater ease in cultivation and curing, the wider markets, and the higher price per pound of leaf of the cigarette tobacco, outweigh the importance of the cause of the cigar. Lastly, though not the least, the disabilities attending on the increase in duties on cigars in spite of the preference for the Empire tobacco preclude any further consideration for the cigar problem.

Having found that the problem of the cigarette tobacco claims more immediate attention, it is easy to make out that Madras is the largest

contributor towards the amount of production of the cigarette tobacco of India. In the Rangpur tract (Bengal) the tobacco grown is more suitable for cigars and *hookah*, and in the Muzaffarpur tract the tobacco grown is mostly for chewing and *hookah* purposes. So this situation makes Madras an uncompeted first in the order, where the tobacco is grown extensively for cigarette purposes.

(iii) *Financial aspects.*—A preference on Empire tobacco was accorded in September 1919 by the grant of a rebate of 1/6th of the full rate of the import duty. At that time this represented an advantage of 1 s. 4½ d. per pound of leaf. But in July 1925 the rebate was increased by 50% to one quarter of the full rate or 2 s. 5⅛ d. per pound and by the Finance Act of the following year the preference was stabilised at this figure for 10 years from 1st July, 1926. This preference represents in recent years more than the value of the leaf itself.

The Imperial Economic Committee, 1928 finds during the course of its labours that India has not derived much benefit from the preference. This is ascribed to some of the constitutional defects of the tobacco position in India. The committee classifies the tobacco growing colonies of the Empire under three categories.

(a) India with a large home market and a surplus for export which though large, is yet small in proportion to the crop.
(b) Canada and South Africa with considerable home market and considerable surplus for export
(c) Nyasaland, Southern and Northern Rhodesia dependent almost entirely on export for disposal of their crops.

At this stage a consideration of the history of the cigarette tobacco in India helps to elucidate many points at issue. For finding suitable varieties of tobacco for cigarette purposes, the Botanical Section of the Imperial Institute of Agricultural Research, Pusa, gave extensive trial to a large number of the local varieties and found all of them to be unsuitable. The introduction of the exotic varieties from America was sufficiently experimented and it was found that Adcock would suit the Indian conditions to some extent. The later efforts were directed towards breeding better types of quality and quantity of leaf by hybridising Adcock with T. 28, an indigenous tobacco type. Meanwhile the designing of the tobacco flue-curing barn to suit Indian conditions, and for curing the leaf for cigarette purposes has been perfected since 1924. The results of the cross have been exceedingly successful in the evolution of some of the best hybrids H. 142, 156, 177, etc. which have received through tests and trials for the last 4 or 5 years.

But in Madras, though the Agricultural Department has been conducting *ad hoc* experiments since 1921 on the Agricultural Research Station, Guntur, to find out the suitability of three exotic

American varieties Adcock, White Burley etc. it was left to the hands of the Imperial Tobacco Leaf Trading Company, Calcutta, to record the further progress of the industry in Madras. The latter body took it up earnestly due to its interests in the trade, and established small model farms demonstrating better methods of growing seedbeds, curing the leaf etc. suitable to the Virginian types. The company did considerable propaganda and helped the ryot to grow Virginian types approved by them with the understanding that they would buy the leaf and which they would cure themselves in their own barns. This gradually led to the further education of the ryots, who have erected about 1400 barns (Gopalaratnam 1933) at present and learnt to cure the leaves themselves without much aid. The company has therefor automatically become a purchasing agency for the leaf, though it grows even at present quite a good area under its supervision and 'bond'.

In the light of this brief history it is easy to understand why India has not been able to derive full benefit from the preference. The want of suitable cigarette types, lack of proper methods of curing and absence of vigorous propaganda coupled with the easy buying of the leaf have all out weighed the advantages conferred by the preference and the prescribed time limit of 1936 for the preference to operate is approaching fast. It is therefore evident that India has not gained anything at all in this favourable period.

(iv) *Inadequacy of marketing facilities.*— It has been shown that the Indian Leaf Tobacco Development Company, Calcutta is the first and foremost buying agency in the market. Due to their propaganda, the area under cigarette tobacco has enormously increased. It has gained a firm stand in the cropping economy in the Guntur tract. But the provision of marketing facilities and the return of substantial profits for the ryot are yet to be realised. The I. L. T. D. Coy. being the solitary purchasing agency in the market till very recently, the ryot has been getting poor returns. When India is paying Rs. 2—8—0 to Rs. 3/- per pound of imported Virginian leaf, she is not able to pay a flat rate of even 12 annas per pound of her home-produced leaf, which as some authorities and tobacco experts conscientiously feel, approaches very near in body, flavour etc. to that of the imported leaf; and it is surprising that the price of the home produced stuff is kept at an incredibly low figure of a flat rate of 5 to 6 annas which is only a tenth of the price of the imported leaf. When the condition of the home market is so very deplorable, it is easy to visualise the state of Indian tobacco in the foreign markets.

Want of proper knowledge on the part of the ryot in correct methods of curing, grading and packing, the way in which the bales are presented for sale, and the lack of any interested organisation in the United Kingdom (the largest market for tobacco) to sponsor the

cause of the Indian tobacco do all prejudicially affect the market for Indian tobacco.

It is only of late that a few enthusiastic purchasing agencies have sprung up in the indigenous market; and a few more cigarette factories go to help the ryot to clear his produce. It is hardly understood whether this is all enthusiasm or money which is largely required in a substantial beginning of cigarette manufacture and allied branches of the tobacco trade.

It is painful to recall the days of 1928-29 when some of the chief purchasing agencies were paralysed due to some cause known only to themselves, and a difficulty was experienced to dispose the leaf in the hands of the ryot. It was lying in stock with him for over an year and the country (deshi) market could not find a way to help it. The ryot was hardpressed both for money and space in his humble hut, when the local Agricultural Department wisely advised him to use the stuff for manuring the paddy fields.

(v) *Cropping economy.*—It will be interesting to study the progress of the tobacco industry in the Guntur tract and incidentally the effect of the rebate of import duty on the industry. The progress will, as with any industry, be reflected in the acreage under tobacco which is noted below. The figures of the Guntur district alone rather than of the tract, are given to present a clearer perspective of the situation.

A. Pre-preference period.

Year.	1911—12.	12—13	13—14	14—15.	15—16.	16—17.	17—18.	18—19.
Acreage in thousands of acres	50·4	57·4	65·7	78·6	52·8	54·4	58·3	85·4

Mean acreage per year—62·9.

B. One-sixth rebate on import duty.

Year.	1919—20.	20—21.	21—22.	22—23.	23—24.	24—25.	25—26.
Acreage in thousands of acres	70·4	55 0	38·5	60 9	64·5	99·7	70·5

Mean acreage per year—65·6.

C. One-fourth rebate on import duty.

Year.	1926—27.	27—28.	28—29.	29—30.	30—31.
Acreage in thousands of acres	66·3	110·3	98·2	100·6	65·3

Mean acreage per year—88·1.

Though this indicates the growth in the area under tobacco, it is difficult to estimate the area under cigarette tobacco for want of adequate statistics, one of the great obstacles in the correct estimation of

the agricultural improvements in India. But the seasonal notes of the Madras Agricultural Department help us to some extent out of this impasse.

Year.	Acreage under cigarette tobacco.
1924—25.	5000 acres.

The increase in total area under cigarette tobacco and tobacco in general is therefore mainly the direct result of the Imperial preference for colonial tobacco. But the interactions of the other crops manifested in their prices in the trade, which immediately affect their acreage and consequently of other crops like tobacco in the rotation contribute no mean quota towards the increase of acreage under this crop. For example, tobacco was running a race with groundnut and cotton and at times chillies in the Guntur tract. In 1925–26 tobacco sowings were restricted in parts of Kurnool as the groundnut prices were more favourable. In 1926–27, 27–28 cotton was replaced to some extent by tobacco in parts of Guntur and Coimbatore; and groundnut continued to replace tobacco in Kurnool. In 1929–30 chillies was partly ousted by this crop. In 1930—31 tobacco was replaced in Guntur by other crops, as heavy stocks of leaf had been carried over from the two previous years resulting in slack buying of the leaf by the companies. Space will not permit to go into further details of the interactions of the other crops and other factors effecting the prospects of this crop, which, by its immensity and complications demand a separate study by itself. It will thus be seen that a large number of factors have been affecting and are likely to effect the prospects of this crop, which is just in the infancy of its expansion.

3. Scope for Future Expansion of the Tobacco Industry in Madras (a) Acreage:—Time has sufficiently proved that the climate of the Madras presidency is quite suitable for the cultivation of tobacco in the three chief tracts (1) Guntur comprising Guntur, Kistna and Godavari East and West districts (2) Vizagapatam, (3) Coimbatore. Their normal acreages under tobacco are

Guntur tract.		132,500 acres.
Vizagapatam.	,,	52,000 ,,
Coimbatore.	,,	33,000 ,,

The soils and conditions selected are also such that the crop suffers from few diseases as compared to other parts of India. Of the above it is only in the Guntur tract that extensive replacement of the indigenous tobacco with cigarette types has taken place due to the benevolent efforts of the I. L. T. D. company. The substitution has first to be stabilised before further expansion can be sought for. A firmer stand of the cultivation of the cigarette tobaccos in the presidency will be obtained only when the ease of sale and favourable prices are established. Towards achievement of these, some suggestions are tentatively discussed in a later para.

The replacement of the indigenous types in the Guntur tract can be furthered conveniently in such tracts as the Nuzvid and 'lanka' lands of the Kistna and Godavari districts. Nuzvid is noted for the production of mild flavoured tobaccos of the bright type, due to the light loamy soils of lighter colour. The lanka lands used to be auctioned on temporary leases; and the name of Mr. T. H. Barry, which is quite familiar to many, is associated for a long time with the cultivation of tobacco on these lanka lands Unfortunately the propaganda and introduction of the cigarette tobaccos were not very vigorous then; or else these lankas would have been the nuclei of the cigarette tobacco plantations long ago. The soils are well drained light sandy loams retentive to moisture due to the silty nature of the soil and are frequently recouperated with silt in the flood time. The cool moist breeze in the day time from the Godavari river helps the crop to grow in excellent condition. These lands and old river and tank beds prove to be the best situations for the cigarette tobacco. The increasing patronisation of the I. L. T. D. Coy has kindled an extension of the tobacco cultivation in the bank canal area along the river Kistna in the villages of Parimi, Nerukonda etc.

The soils of the Vizagapatam district are light sandy loams. Though in general the soils of the Coimbatore district are heavy either being black cotton soils or red clayey loams attempts may be made to extend this crop on the lighter soils along the valleys and banks of the Noyal and Amaravati rivers. As the tobacco grown in Coimbatore district is largely by irrigation from wells, whose water is not so sweet as desired for the production of good cigarette tobaccos, it is worth while to plant tobacco, after a fallow, in the south-west monsoon season during which period the moisture is carefully conserved. As the climate of Coimbatore district is very well suited to the production of the high class cigarette tobacco by virtue of milder temperatures (the maximum temperature not rising far above 100°F in the hottest summer as compared to the climate of Guntur), more cloudy days in the year, and absence of winds which frequently visit Guntur in the growing period of tobacco a detailed survey of the tract to find more suitable areas for further extensions of this crop is worth the trouble. Tobacco produced on the red and black soils of the district may compare favourably with that in the Guntur district.

When the replacement of the indigenous types in these tracts has progressed to a large extent, it is not difficult to find suitable areas in other tracts as Madura, Kurnool and Arcot districts.

(b) *Suitable cigarette types.*—The extensive studies of the Botanical Section, Imperial Institute of Agricultural Research, Pusa, have resulted in the production of good cigarette types, e.g., H. 142, 156, 177; and these have won appreciation all over India for quality and

quantity of leaf per acre. Harrison's special of the I. L. T. D. Coy. has been found equally satisfactory and it is already largely grown.

(c) *Suitable designs for flue-curing barns.*—The initial difficulties of finding the suitable designs of barns have been overcome; and the large number of barns erected by the ryots themselves is a testimony to their intelligence. The Guntur ryot now-a-days feels the handling of the tobacco crop very easy, as with the help of barns the whole crop can be cured and prepared ready for bulking within a much shorter time than by the tedious process of rack curing in elaborate sheds resulting in lower net returns. During the off-season the barns are useful for seed-storing and other useful purposes.

(d) *Organisation for the disposal of the crop.*—The organisation must be built on sound economic premises. The stabilisation of any industry requires the development of a good home market with considerable surplus for export. It is most advantageous if the requirements of the home market do not clash with that of the foreign market, as in the event of the commodity not being able to find a ready sale in the foreign market, the home market must be able to consume the stuff. The problem may be studied under the two principal items.

(i) *Development of good home market.*—The steady growth of a good home market for cigarettes has already been indicated. In the earlier years a good amount of Virginian tobacco used to be imported into India for the manufacture of high class cigarettes.

Year.	Import of Tobacco into British India.	
	Quantity in lb.	Value in Rupees.
1928	10,498,497	Rs. 2,62,53,596
19.9	10,690,846	2,65,40 564
1930	6,311,446	1,82,15,805
1931	4,980,241	1,23,00,048
1932	5,104,274	89,38,767

These figures indicate that the import of tobacco into British India is getting reduced gradually as a consequence of greater usage of home grown tobacco in the high class cigarettes.

With the increase in the import duty on tobacco, for the high class cigarettes, from April 1934, the quantity of imported tobacco will be reduced still further. Evidently the local manufacture has very well adapted itself to the greater use of Indian tobaccos in high class cigarettes.

The establishment of a large number of cigarette manufacturing concerns appears to be a secondary symptom of the growth of a strong home market.

Internal organisation of the market.—It has already been indicated that I. L. T. D. Coy. is the chief controlling factor in the market. The presence of such a strong firm in the market hampers the free growth of other newly established concerns. Consequently the ryot

is also at a disadvantage in not being able to effect a keen competition among the purchasing concerns so as to realise a fair price for his produce. Such a difficulty has already arisen in the case of the sugar industry, and it is wise to anticipate such a difficulty and devise suitable measures to protect the interests of the ryot and the manufacturer as well.

Such a situation may be improved by restricting (by Legislation) the quantities in the several grades of leaf purchased by the several purchasing concerns. Limits of their purchasing capacity both as regards the quantity and the prices paid to the ryot per pound of leaf may be fixed. The limits of quantities will of course be fixed from considerations of individual capacity for manufacture. This will be of advantage from many points of view :

1. It will allow a free growth of new concerns.

2. It will guarantee a minimum price to the ryot.

3. Since the quantity is limited, purchasing at a lower price and over-stocking leading to duller demands in the subsequent years and attendant effects are averted.

4. Since the quantity is limited, the ryots will begin to appreciate the production of only the best tobacco for sale on good suitable lands. This will automatically check the spread of cultivation on unsuitable lands. If necessary the quantity may be revised with the increase in the consumption of tobacco in the market.

5. Since the quantities in the several grades will be specified, the ryot will be able to exercise better judgment in grading; and the manufacturer is prevented from the bad practice of purchasing the best and rejecting the poorer stuff.

6. In view of unchecked growth of newer concerns, some more concerns will be established from the considerations of the profits the older concerns are making.

7. The manufacturer will be obliged to make use of all the stuff from the several tracts and blending will be developed to the highest pitch of excellence so as to accomodate all the kinds of leaf in his brand. This is a feature of far reaching consequences. It is seldom that the desired standard of flavour is found in any one tobacco, and blending is done from the stand point of

(a) Economy.—A certain proportion of a perfect flavoured but high priced leaf is used to give quality and character to a cheaper tobacco with all the requirements except the flavour.

(b) Safety.—If but only one tobacco be used in the manufacture of a particular brand and at any time this particular tobacco does not become available, the substitution of an entirely different tobacco at such a time would ruin the established reputation of the brand by changing its character. Four or five or even more grades of leaf are

blended together and the substitution of a different grade for any one of them does not radically change the character of that blend.

In the event of the adoption of efficient blending the capabilities of the individual concerns in the production of high class cigarettes will depend on the usage of correctly aged leaf, expert knowledge of flavouring and usage of efficient machinery etc. These will stimulate healthy competition among manufacturing concerns in the adoption of the best methods of manufacturing cigarettes. This will naturally prevent newer concerns from the temptation of using insufficiently aged leaf so as to make quick turn overs in the capital. Those concerns already equipped with all the necessary requirements for the production of high class cigarettes will earn larger profits till the newer concerns equip themselves efficiently,

8. When the quantity to be purchased by the firms is limited. the acreage will also be limited and this will naturally lead the ryots to form co-operative organisations for fixing up the areas among themselves. This will bring in judicious rotation, which in its turn helps to check the pests and diseases of the crop.

(ii) *Development of considerable surplus for export.*— The foreign policy of any industry must be guided on well-judged lines. One of the indirect results of the grant of preference to the Empire countries is not only to increase the inter-Imperial exchange of commodities, but, by stimulating the total production of goods of high quality at an economic price within the Empire, to place the Empire as a whole in a more favourable position for trading with the rest of the world.

The growth of the exports of tobacco to the United Kingdom can be gauged from the following:

Year.	Quantity in million lbs	Average.	Quantity Used for Pipe Tobaccos.	Cigarette & Cigar.
1919	3·8	One-sixth rebate period.		
1920	9·6			
1921	1·4			
1922	3·9	5·6		
1923	4·6			
1924	8·4			
1925	7·8			
1926	11·9			
1927	8·4		7·7	1·2

This shows that most of the Indian tobacco is used for pipe tobaccos in the United Kingdom.

Further the following figures corroborate the fact that the colonial tobacco is coming into the cigarette market very recently, while a major portion is being utilised for the pipe tobacco.

Consumption in the United Kingdom.

Year.	Pipe tobacco.		Cigarette tobacco.	
	Colonial.	Foreign.	Colonial.	Foreign.
1924	22%	78%	...	100%
1927	37	63	1%	99
1932	65	35	10	90

These figures will mean that the colonial tobacco is being largely used in the pipe tobaccos, as the production of proper cigarette tobacco commenced only after sufficient researches, stimulated by the Imperial preference.

It is therefore clear that the production of tobacco suitable to the pipe is a safe policy, while a slow and steady policy must be pursued in the improvement and export of cigarette tobacco.

Having realised the position of India in the world markets we will proceed to study the requirements of the pipe tobacco trade.

Pipe tobacco trade.—For pipes a less bright leaf with less fine texture is required than for cigarettes. Some pipe mixtures contain a certain proportion of cigarette tobacco but a typical pipe tobacco is usually unsuited for cigarettes. In some kinds, however, it is possible to use certain of the leaves of the plant for cigarettes, while others are suitable for pipe tobacco.

However a distinction can be drawn broadly between cigarette and pipe tobaccos. Thus among American growths the brightest coloured tobaccos grown chiefly in the states of Georgia, north and south Carolina and to a lesser extent in Virginia are mainly used for cigarettes; while the darker tobaccos of the states as well as those of Kentucky and Tennesse are used for pipe and chewing.

Similarly the leaf of tracts like Saharanpur (U P.), Dalsingsarai (B. & O.), and Guntur may be used for cigarettes, while the darker shades of Guntur and other tracts e. g., Vizag and Coimbatore may be, for the present, used for pipe tobaccos.

The market for pipe tobacco is less fastidious than that for cigarette tobaccos. Moreover in the blending for pipe tobaccos a wider range of varieties and growths may be used than in blending for cigarettes. Thus it is easier for a tobacco from a new country to be tried in pipes than in cigarettes.

Cigarette tobacco trade.- Reviewing the position of cigarette tobacco it will be found that care of type and quality is of especial importance in cigarette tobacco, for in that section of the trade, American competition is likely to remain severe as the cigarette smokers appear to be more closely wedded to their favourite smokes than pipe smokers.

Indian growers of cigarette tobacco have not merely to meet the price competition from America but have also to persuade the British smoker that they can supply him with the type of leaf he likes. Given enterprise and a little time the distinctive flavour of the Indian

cigarette tobacco and the conservatism of the British smoker can be changed to some extent. There are several instances on record of considerable changes of prevalent tastes in relatively short periods. For example, in the United Kingdom there has been a large change from the cigarette of the Oriental to that of the Virginian type. In South Africa, cigarettes made of imported American leaf have been practically ousted by those made from the local leaf. A parallel change has taken place in United States of America where cigarettes of blended tobaccos of Virginian and Turkish types are gaining ground at the expense of those of pure American. "The prevalence of a taste for a particular tobacco is largely a matter of fashion and fashions are notoriously changeable."

It is none the less incumbent on the producer to endeavour to supply a tobacco to the British market by doing least violence to the established tastes, if only to shorten the distance through which the popular taste must travel in order to establish the new tobaccos in favour.

Having examined the requirements and positions of the pipe and cigarette tobacco trades, we shall proceed to discuss the organisation required for the guidance of the trade in proper channels leading to the best interests of India. As the tobacco trade is mainly concerned with fashions and tastes, quality of a high order in the produce is of the utmost importance. Further to sustain the interest of British firms in the Indian tobacco the quality must be kept up from year to year to certain standards of excellence. Such steady continuance of keeping up the quality must be entrusted to some agency which is not interested in the immediate profits of the business concerned, but in the slow and steady growth of trade of Indian tobacco in the world markets. That India, with her production of 1000 million lbs. (Table I.), second only to U. S. A. cannot possibly maintain a high rank in the world markets inspite of her vast resources of soils and climates reflects only on the lack of proper direction and organisation than to any of her inherent defects.

So to improve the position of the trade the purchase and sale of the leaf must be in the hands of some interested body ; *e. g.* Government, the Imperial Council of Agricultural Research, or some Trade Commission organisation. In the absence of efficient advertisement and backing up of the cause of the Empire products by the Empire Marketting Board, intervention of some such public body is absolutely essential. The purchase may be effected to their approved standards either by private bodies, co-operative agencies or the tobacco firms most conveniently on commission basis. The leaf after having been collected and pooled at a central place, proper grading, drying and packing shall have to be done under the supervision of the purchasing agency recommended. This agency can establish suitable

connections or similiar agencies in the world markets (e. g. United Kingdom to start with) to work up the interests of the trade.

1. By such an agency the tone of the markets can be correctly studied and the amounts of the exports can be properly restricted to the demands of the market consistent with ultimate larger profits. Heavy stocks in the market will lead to dullness of demand and the disfavour of the stuff.

2. This arrangement coupled with that for local consumption will prevent the practice of larger buyers purchasing the leaf in the country of production (India). The act of larger buyers in buying the leaf in India in favourable years and stopping away therefrom is not conducive for sustaining the interest of the British smoker in the Indian produce.

3. To stimulate the demand for Indian tobacco it is possible only through such an agency to adopt any measures of striking a reduction in the price at which the goods are offered to the public. To meet any loss in the transaction any little cess raised on the Indian tobacco smoker will be able to keep such a central agency from any financial obligations.

4. It is through the medium of such an agency only, that sufficient scrutiny can be exercised on the proper usage of the Indian tobaccos in certain brands of cigarettes as opposed to the probable practice of the manufacturing concerns substituting high grade Indian tobaccos for Virginian leaf and put the lower grades into "Empire Brands" thereby indirectly discrediting the colonial stuff.

5. As the Indian tobacco will prove cheaper than the American on account of cheaper costs of production and preferential tariff it will be possible to sell the product from Indian leaf at a lower price, which during these days of economic depression must naturally attract the smoker if only the standards of excellence are kept up to those of the well established brands of cigarettes.

There are many such advantages in entrusting the purchase and sale of the Indian leaf in the hands of a central agency.

4. Conclusion. India with her large amount of production has been found to have relatively little surplus for export. The Guntur tract has been found to be the chief place of production of leaf which is largely consumed in manufacturing home-made cigarettes and in the export to the United Kingdom for the manufacture of pipe tobaccos. In discussing the internal position of the Industry some of the disabilities existing at present have been found to explain why India has not made much benefit from the Imperial preference of 1919 and 1926. The scope for the future expansion of the tobacco industry has been examined and tentative suggestions have been made for the organisation of the trade both for home and foreign markets.

Acknowledgments. I am very much indebted to Babu Kashi Ram, the Assistant Economic Botanist, Imperial Institute of Agricultural Research, Pusa, for his valuable criticisms in the preparation of this paper.

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Appendix.

	District.	Normal acreage.	Yield per acre (dry leaf) 1931—32.
1.	Guntur.	103,000	1313 lbs.
2.	Vizagapatam.	52,000	1119 ,,
3.	Coimbatore.	33,000	1128 ,,
4.	East Godavari.	14,500	1235 ,,
5.	Madura.	10,000	1152 ,,
6.	Kistna.	8,000	1404 ,,
7.	West Godavari.	7,000	1157 ,,
8.	Kurnool.	7,000	1090 ,,
9.	Anantapur.	5,000	860 ,,
10.	Salem.	5,000	1140 ,,
11.	Ganjam	3,000	960 ,,
12.	Trichinopoly.	3,000	1152 ,,
13.	Bellary.	3,000	890 ,,
14.	North Arcot.	3,000	970 ,,
15.	Ramnad.	3,000	1164 ,,
16.	Nellore.	2,600	1144 ,,
17.	Tanjore.	1,900	960 ,,
18.	South Arcot.	1,700	890 ,,
19.	Cuddapah.	1,500	940 ,,
20.	South Canara.	1 400	1164 ,,
21.	Tinnevelly.	1,300	1068 ,,
22.	Chittoor.	500	1070 ,,
23.	Chingelput.	50	1010 ,,
24.	Malabar.	50	720 ,,
25.	Nilgiris.	50	816 ,,

TOTAL. 27,550 acres.

YIELD. — Normal average for the Presidency — 1195 lbs. per acre. Ranging from 1,000 to 1,300 lbs.

THE PREPARATION OF TIRUPATTUR DHALL

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Introduction. Dhall is largely consumed by vegetarians in different forms either as such or in combination with vegetables etc. Red gram (*Cajanus indicus*) from which *dhall* is prepared occupied 28,88,98 acres in this presidency according to season and crop report for 1932–33. Out of this, North Arcot district had 21,958 acres, of which Tirupattur

taluk, alone had 6996 acres. Other important districts where red gram is cultivated on a large extent, are in order of rank, Trichinopoly, Bellary, Anantapur, Kurnool, Vizagapatam, Guntur, Ganjam, Salem and Coimbatore. North Arcot district comes fifth in the above list based on acreage. Commercially, Tirupattur produce has a good reputation for its quality. It is therefore proposed to give a short account of how it is prepared for the market.

Red gram is grown in this taluk purely as a rain-fed crop, in red loamy soils mixed either with *cumbu* or ground-nut. Sowing along with *cumbu* is the common practice and this mixture occupies 90% of the total area in the taluk. When raised along with *cumbu* it is dibbled behind a country plough in lines 3 to 6 ft. apart; while, with ground-nut the distance between the lines varies from 10 to 25 ft., the reason being that the ground nut crop should be free from the shade of this crop.

By way of after-cultivation nothing is done to the crop, but when grown along with ground nut, the soil is dug for harvesting ground nut and this serves as a sort of after-cultivation. In some places where it is sown with *cumbu*, the land is reploughed and horse gram sown in September. The ploughing up of the field serves as a sort of after-cultivation.

Red gram sown during July–August will be ready for harvest in January. The crop is harvested by cutting the stalks close to the ground; the stalks are then gathered and left in the field for a day or two till they are quite dry and then removed to the threshing floor in the early hours of the morning, to prevent shedding of pods. Threshing is done by beating stalks with pods against bamboo *thatties*. The gram fallen on the ground is winnowed and cleaned. The immature pods that still stick to the stalks are beaten with sticks and gram collected. In a good year with a fair average rainfall, well distributed, an acre of red gram raised along with *cumbu* will give about 200 Madras measures of gram.

Preparation of Dhall from gram. Generally merchants purchase gram and prepare *dhall*, but in a very few cases *dhall* is prepared by ryots themselves, either for the consumption or for sale. There are two methods of preparing dhall from gram; (a) Large scale or commercial method. (b) Small scale or ordinary method.

(a) *The Commercial method.* Red gram is put in vats constructed of brick and mortar or tubs and allowed to soak in water for about 6 hours. It is then removed and well mixed with wet red earth in the proportion of 20 : 1, i.e., 20 parts of gram to one part of earth. The mixture is heaped and allowed to remain overnight. In the morning the heap is disturbed and the stuff evenly spread on the ground for thorough drying. If a single drying is not sufficient it is

dried again. When it is completely dried it is again mixed with a thin solution of red earth, heaped up and left over-night. In the morning it is dried completely. The gram is then cleaned of stones, dirt etc., by sieving and winnowing and broken in stone mills generally of 18" in diameter and 4" thick. The husk is winnowed, broken pieces separated and marketable *dhall* is obtained.

(b) *Ordinary method.* This method is slightly different, usually adopted by ryots for preparing *dhall* for their home consumption. This process involves much labour and time and the *dhall* obtained is of better quality and tastes well compared with the stuff prepared by the previous method. Red earth is made into a thin paste and poured over the heaped up red gram in small quantities at intervals of 45 minutes to one hour for a full day, mixed well with the gram and allowed to remain overnight. The heap is disturbed next morning and the gram well dried. Further process is the same as detailed in the commercial method.

In the commercial method more water soaks into the gram, makes it bulge, and when dried, the gram shrinks, becomes light and assumes a boat shape with a depression in the middle. In the ordinary method just the required quantity of water is given and therefore the *dhall* does not shrink but weighs more. It is more known as *Getti paruppu* (ஒட்டிப் பருப்பு) while the commercially prepared one is known as *Thotti paruppu* (ஒத்தாட்டிப் பருப்பு).

In both the cases the process can be termed as a kind of malting. Red gram is allowed to absorb water, germination is encouraged and then suddenly cut off by drying the stuff. Though the method of preparation is the same in all the villages of the taluk yet the produce from Pallavalli, Elagiri, and Vellakuttai villages is preferred in spite of the fact that there is only one variety of gram that is grown all over the tract. That it gives different tastes if grown in different places shows that variations in soil conditions have a lot to do in determing the quality of *dhall*.

Economics of growing and preparing dhall. Since red gram is grown as a mixed crop, only a portion of the cost of prepratory cultivation should be debited (20% when grown with *cumbu* and 10% when grown with ground nut). The details are furnished in the table given below.

1. Cost of raising a crop of red gram and preparing dhall.

	Rs.	as.	ps.
A. *Cultivation Expenses.*			
(i) Ploughing the field 6 times with country plough at 6 as. per ploughing Rs. 2—4—0 (20% of this cost for preparatory cultivation).	0	7	3
(ii) Cost of 4 lbs. or 1½ m. m. of red gram and the labour charges for sowing 1 acre.	0	4	0

(iii) Cost of harvesting stocks, threshing and cleaning gram.	0	12	0
(iv) Kist per acre.	1	0	0
Total. ...	2	7	3

B. *Cost of preparing dhall from the produce of 1 acre.*

(i) Labour charges for steeping, (contract). and drying for two days, for 200 Madras Measures of gram. ...	0	8	0
(ii) Labour charges for breaking and cleaning dhall. ...	0	8	0
Total. ...	1	0	0

2. Gross receipts from the proceeds of an acre.

A. Cost of 200 Madras Measures of red gram @ Rs. 20 per *Putty* of 200 Madras Measures.	20	0	0
Cost of one cart load of stalks	1	8	0
Cost of refuse, pods, leaves etc., ...	2	0	0
Total. ...	23	8	0

B. (i) Cost of 175 Madras measures of dhall got from 200 Madras measures of gram at Rs. 30 per *Putty*.	26	4	0
(ii) Cost of 9 Madras measures of broken dhall.	0	8	0
Cost of one cart load of stalks	1	8	0
Cost of 100 Madras measures of husk	3	0	0
Cost of refuse	2	0	0
Total. ...	33	4	0

Net Profit.

A. *If sold as gram.*				B. *If sold as Dhall.*			
Expenses ...	2	7	3	Income ...	33	4	0
Income ...	23	8	0	Expenses ...	3	7	3
Total.	21	0	9	Total.	29	12	9

The author's thanks are due to Mr. M. Kanti Raj, Assistant Director of Agriculture for encouragement and suggestions given in preparing this note.

ABSTRACTS

Law relating to Rice Administration in Japan. By S. Nagai. (*Agri. Economic Literature, Vol. 8, No. 4.*—1934) The Japanese Government have been buying and selling rice to maintain and control the price, and necessary funds are provided for that purpose. In November last, a maximum and a minimum price was fixed and the Government are authorised to buy upon request from the producer, any quantity at the minimum price and sell to the public any quantity at the maximum price. Within these limits, the Government are also authorised to sell and buy rice with Current Market Price, in order to reduce the monthly fluctuations of the supply of rice. The "Rice Administration" has got a floating advance of 700,000,000 yen for the above purpose. The law also provides a tariff on foreign imported rice.

The major problems which confront the "Rice Administration" are to discover new uses for rice which will absorb some of the surplus, and also to increase exports to foreign countries.

The Administration incurs heavy charges for "storage" and for "administrative purposes" Besides, by selling 'old stock' which cannot stand storage for more than a year, at a depreciated price, it necessarily increases loss. Every year much rice must be bought and the "Rice Administration" will have to bear the loss. Of course one way of looking at the matter is to consider the expense as a grant to farmers in this time of agricultural depression. But no effort must be spared to find some new way of adjusting the supply and demand for rice and of maintaining its price without so much loss to the Government or to the public.

(S. R. S.)

Artificial Insemination. Moskovits, E. (*Monthly Bulletin of Agr. Sci and Practice Int. Rev. Agr. Rome* Year XXV. March 1934, pp. 103—110). Artificial insemination consists in the fertilisation through artificial means of the female ovum by male semen, without contact between the two animals. This method permits a more efficient utilisation of the males and is valuable not only in districts where the number and quantity of males is deficient, but in all regions, since it makes it possible to cut down maintenance costs of breeding stock and, at the same time, to obtain in a comparative short period a uniform breed of stock. Through artificial insemination, one can also breed from animals of different size and weight, as this cannot be done naturally. This method is particularly useful in the case of monogamous animals, e.g. several fur-bearing species, which are costly to breed. One can also breed from wild animals in captivity, which often do not breed naturally under such circumstances. Excellent results have been obtained in overcoming sterility in females particularly when due to pathological alterations in the reproductive organs caused by age or previous abnormal parturitions. When contact copulation is undesirable, e.g. as when there is danger of transmitting disease, artificial insemination is of value. *E. I. Ivanov's* experiments have demonstrated that semen infected by *Trypanosoma equiperdum*, which produces this disease, may be mixed with "salvarsan" or "neo-salvarsan" without any loss in the fertility of the semen, although the virus is killed (dosage 1: 10,000). He also proved for the first time that the secretion of the auxiliary glands is not indispensable to fecundation. The mixing of different seminal fluids from entirely different animals opens new perspectives to science in studying the functions of sexual life. *Yochem's* experiments showed that the uterus of an unrelated species affects to a notable degree the spermatozoa of other species.

The rapid and intensive spread of this process has been possible only because experiments have shown that the off-spring obtained in this manner in no way differ from those produced normally as regards either quality or number. The rate of fecundation is higher and, moreover, Ivanov's report that a single stallion sufficed for the artificial insemination of 400 mares reveals the extent to which the reproductivity of one animal can be utilised.

Artificial insemination may be made with natural semen, i. e., from semen naturally ejected or with artificial semen, i. e., semen obtained directly from the epididymis and mixed with various liquids. The latter method is obviously applicable only to a limited degree. Before the war, natural semen was obtained by the commonly known sponge method. This replaced the original condom method. But the sponge method has now been replaced by more modern methods. It had the disadvantage that too much of the vaginal fluid penetrated the sponge and the semen thus became impure, diminishing the resistance of the spermatozoa. According to *Dschaparidse*, there are two commonly used methods of collecting the semen. The first consists in applying a very narrow rubber tube, the open end of which is attached to a metal bag. At a height of about 12 cm. on the tube is fastened another elastic bag which contracts and expands easily. Before being used, the tube is washed with a 2% soda solution, then greased with vaseline and introduced into the vagina. After the semen has been ejected the

tube is removed and the contents are poured into a test-tube which is also greased with vaseline. The second method consists in using an artificial ebonite vagina, 20 cm. long and 4·5 cm. in diameter. This apparatus is provided with two lateral tube-shaped openings, one for the introduction of water and the other to permit the escape of air. This sort of ebonite cylinder contains a very slender and flexible rubber tube 2·5 cm. in diameter, the opening of which is attached to the cylinder. At the other end is attached a glass tube in which the semen is collected. The space between the tube and ebonite casing is filled with water at a temperature of 40° – 45° C. so that the rubber tube contracts somewhat and produces the same sensation on the male as in natural copulation. The elastic tube is greased with vaseline. The artificial vagina is fastened to a stuffed animal of the same species or to a live animal. These methods enable us to obtain semen easily without loss and without any injurious effect either to the male or to the viability of the spermatozoa.

Attempts were then made to find a favourable medium (diluent) in which the spermatozoa could be preserved long enough not only to permit their transportation over great distances but also to sufficiently dilute dense semen and thus utilise it more efficiently. According to *Dschaparidse*, the diluents have the following composition (in grams):—

Liquid No. 1	Ram.	Bull, Boar.	Stallion.
Glycophosphate	57·5	54·0	48·7
Water to make up	1000.	1000.	1000.
Liquid No. 2			
Mono-potassium phosphate	3·4	3·2	2·9
Di-sodium phosphate	17·8	16·8	15·2
Water to make up	1000.	1000.	1000.

For cows 1 cm. of diluted semen is required and for ewes from 0·1 – 0·2 cm.

The preservation and transportation of semen requires a temperature of 100°. Under these conditions the semen retains its fertility for 18 days. Temperature greatly affects the vitality of spermatozoa and consequently the success of artificial insemination. According to *Milavonow*, the temperature of the surroundings should not be under 15°C (max. 15° – 20°C). The diluent should be slowly heated to 15° or 20° at the time of using; at other times it should be kept at 10°C.

V. P. R.

Vegetable Oils as Lubricants. (Prof. George Ray. *Monthly Bulletin of Agri. Sci. and Practice, Int. Rev. of Agri. Rome. Year XXV, March 1934, Pp. 101—102).* Every mechanical installation includes metal parts which must be ensured against the least possible wear and tear from friction. This makes desirable the choice of appropriate lubricants and necessitates careful attention to the improvement of lubrication and the investigation of new lubricating media. To narrow down cost prices and generally reduce farming expenses the efforts of farming circles may well be directed towards substituting either wholly or partially mineral oils by vegetable oils in connection with the lubrication of internal combustion engines. At present the only oils of vegetable origin which can be used as lubricants are olive oil and castor oil. The use of castor oil for the lubrication of gas engines in aviation and in fact in a number of countries the Army Commissariat is directed to purchase castor oil seeds for this purpose. The qualities of olive oil, as machinery oil, have long been known in the navy but the producers have taken less interest in the question. The employment of olive oil for oiling internal combustion engines and, in particular, for the engines of motor cars, is much more recent. The utilisation of olive oil will be the salvation of a cultivation which at present lies under a severe menace, but another

consideration is that the effect of this in the trade balance of the countries importing petrol would not be altogether negligible. V. P. R.

Some aspects of Citrus Cultivation. *By H. C. Powell. (Nyasaland Agricultural Department Bull. 8 January '33).* Citrus can be cultivated in level alluvial tracts where the soil is deep and well drained. Transport facilities and incidental charges with reference to marketing the produce, determine the economic aspect of establishing orchards even though the soil and the locality may be best suited to fruit crops.

The choice of plants with reference to variety, age, vigour and shape contributes to the profitable establishment of a plantation. If one is careless it may result in the inadvertant propagation of inferior trees, and the undesirability of these trees will not be apparent for several years till they come to bearing. Hence the importance of a proper selection at the beginning. The planting of seedling-trees are not desirable because (1) the fruit produced is extremely variable and frequently is of poor quality, (2) contains large number of seeds which is not desirable, (3) the trees are tall, upright, and usually very thorny; (4) the seedling-trees take too long to come into bearing when compared with budded-trees; and (5) they are more subject to root diseases than trees budded on disease resistant stocks. On the other hand budded-trees of a given variety are uniform and produce uniform fruit of good quality. The trees are low and spreading, making the fruit picking and pest control economical. The selections of root stock with reference to disease resistance and vigorous growth are important. Further variations in citrus seedlings and their relation to root stock selections have established that small seedlings and small buddings tend to produce small low yielding orchards, and that large seedlings and large buddings tend to produce high yielding orchard trees Hence just before planting a final selection is necessary to reject the plants which are undersized for the age and also those that have deformed root systems. It will also be profitable to have 2 or 3 varieties which would come to maturity at different periods so that the harvesting and marketing may be spread over a long period.

Irrigation. Irrigation during dry months is essential, otherwise it will not bear heavily nor regularly. The trees are evergreen and transpire large quantities of water at all times particularly during the dry season when the atmospheric humidity is low. Besides, soil moisture is the most important factor governing the quantity and quality of fruit produced. The quantity of water to be applied will vary according to the type of soil, age of trees, season of the year, rainfall of the locality, etc., and should be sufficient to cover the entire land to a depth of 3 to 6 inches. One such good application will wet the soil to a depth of 3 to 4 feet. The succeeding irrigation must be given only after allowing the soil to dry out well when the plants show slight wilting. Generally an irrigation at intervals of 3 to 4 weeks would be sufficient. S. R. S.

Medicinal Value of the Pine Apple. *(The Agricultural Gazette of New South Wales, March 1934. Summary of Report by Dr. J. R. Killian).* Pine apple has been proved by Dr. Killian's Research at the University of Hawaii for two years, to be one of the most consistently reliable antiscorbutics available. It has also been established by Dr. Hanke of Chicago, that striking cures of pyorrhoea and dental decay have been effected by the consumption of large quantities of Anti-Scorbutics which are rich in vitamin C. With its high contents of vitamins, Pine-apple has a possibility of being extensively used not only by dentists in their fight against pyorrhoea, but will be valuable to doctors to combat the Indian disease. Beri—Beri, which is a nutritional disorder. Pine apple is also a good source of Iron, Copper and Manganese essential to a proper diet and thus its value is enhanced because these are in a readily assimilable form. M. R. B.

Gleanings.

A Useful Lick for Dairy Cattle. Where the dairy farmer has reason to suppose that his cows are suffering from a mineral deficiency in their diet commonly indicated by the habit of bone chewing he should lose no time in correcting the condition. In the case of hand-fed cows, the addition of two or three table-spoonful of sterilised bone meal to the feed daily will be found highly beneficial. Where the cattle are not hand-fed, a lick should be provided in troughs in the paddocks or in boxes in the milking sheds or feed stalls. This lick may be simply sterilised bone meal itself, or if it is desired to provide the animals with other ingredients as well, including salts, the following mixture will be found of value.

Salt	...	...	40 parts.
Sulphate of iron		...	1 part.

Bone meal 10 to 40 parts according to the requirements of cattle. (*Queensland Agri. Jour. May 1934.*)

Pigeon's Milk. In his volume of collected works Buffon refers to the life and habits of the pigeon, and does not fail to record the active participation of the male in all the business of family life. "The male likes to partake of and busy himself in maternal cares, and regularly takes his turn in sitting on the eggs and young." To-day we know he does more than this. In pigeons the male and female each secrete a kind of "milk" in their crop which suffices for the nourishment of newly-hatched pigeons. J. Hunter (1785) seems to have been the first man to note this phenomenon. Claude Bernard (1859) in one of his lessons enlarges on this curious point of comparative physiology. "The secretion of the crop of pigeons is analagous to the lacteal secretion of the mammiferae. This secretion commences in the cock and hen-pigeon before hatching, and lasts for some days after. At this time a true glandular organ is formed in the crop of the pigeon :- whilst the external muscular part does not react, the mucuous membrane of the two lateral pouches of the crop undergoes a considerable hypertrophy, and presents a convoluted surface similar to that on the outside surface of the brain. The vessels of the crop themselves increase in volume. It is in the lateral pouches of the crop, at the surface of the hypertrophied mucosa that one finds a kind of white substance, analagous to coagulated milk. Father and mother pigeons regurgitate this substance, and allow a beakful of it to be absorbed by their young during the first days following hatching." Since the fundamental researches of Hunter and Bernard, many biologists have called attention to the matter of pigeon's milk. The secretion of the milk takes place longer than Bernard thought, (i. e.) for eight days. Carbonelle, Salle and Phisalix observe that it commences on the eighteenth day of sitting, and finishes the twentieth day after hatching. The product elaborated by the crop is a whitish mass, a true "milky pap'. Chemists have published an analysis of it. Fats and proteins are present in large quantities. Mineral salts are present, and some ferments, amylose and saccharose in periods of repose. Histophysiology shows that a process of desquamation of the epithelial cells of the hypertrophied mucosa of the crop takes place, and that these cells contain large quantities of fat. The fat globules are secreted by these cells in the period of inoculation of the egg, just like fat globules in the epithelial cells of the mammary gland. The pigeon doubles its weight at birth in forty-eight hours. In twenty days it may increase in weight from 20 grammes to 435 grammes (three-quarters of an ounce to fourteen and a half ounces). Pigeon's milk much resembles the milk of the rabbit in its contents of proteins and fats The pigeon and rabbit have the quickest growth in their respective spheres. (*Veterinary Journal, Vol. 90, No. 5— Abstracts of Current Literature, pp. 218 & 219).*

Soil Erosion—A Cause of Enormous Loss. From every conceivable angle, erosion is a devastating agency. It is the greatest thief of soil fertility. It steals not only the plant food contained in the soil, but the whole body of the soil, plant food and all. When this productive material that requires centuries in the building is wasted out of fields it cannot be economically hauled back, even where it is washed no farther than from the upper to the lower slopes of the fields. That which passes down into the beds of streams and on out to the ocean is lost as irretrievably as if consumed by fire. It has been estimated that erosion steals twentyone times as much plant food as crops take out of the land.

Surveys and soil-loss measurements indicate that at least 3,000,000,000 tons of soil are washed out of the fields and pastures of the United States every year. The value of the plant food contained in this amounts to more than two billion dollars, on the basis of the cheapest fertilizer. Of this almost inconceivable wastage, the direct loss to the farmers of the United States of America is not less than 400,000,000 dollars every year. This is paid for in reduced acreage yields, increased cost of cultivation, fertilization, and the growing of crops for sole purposes of building up impoverished fields, in land—abandoned highways, damaged reservoirs, irrigation ditches and culverts choked with erosional debris, and accumulated thinning of the surface soil, the staggering cost of which is postponed until the last inch of soil is washed off. (*Queensland Agri. Jour 1st May 1934*).

Chemical Composition of the Mango. The chemical composition of the fresh pulp of mango fruit has been determined by R. Yamamoto, Y. Osima and T. Goma (Tokyo Institute Scientific papers, 1932, Vol. 19, p. 122), who have reported the following data. The water content of the pulp is 81·7 per cent., and the sugars consist of sucrose (5·5), fructose (4·9), and glucose (1·5). The acidic taste is due to citric acid (0·5), and the yellow colour, to xanthophyll (0·9) and carotene (0·1). The last-named substance, isolated from mango fruits, was found to cure avitaminosis-A in rats, and therefore confers a valuable food property on the fruits. (British Chemical Abstracts, (A), Nov., 1932, p. 1178). *Tropical Agriculture, Vol. XI, No. 5. May 1934. Chemical Notes, p. 127.*

Objective in Agricultural Research Office. As in practically every other type of human endeavour, the depression has left in its wake some difficult administrative problems for those responsible for the successful performance of agricultural research. While State legislatures were being forced to make often drastic curtailments in supporting funds, the nation-wide effort to restore prosperity was creating the strongest and most diversified demand for those types of technical, economic, and social guidance which come from research ever made upon agricultural institutions.

* * * * * *

Rural sociology has been rather slow to receive public recognition and support, in part because of its name, in part because of its newness, in part because of a lack of research talent until recent years, and in part because it deals with less tangible though no less vitally important problems than those under the older types of research. The future of this field of research is very promising because of recent advances in methodology and a growing appreciation on the part of the nation of the social importance of subordinating prices and profits to human values and social well-being. Hereafter, therefore, the problems of rural life as a part of the pattern of national life will undoubtedly receive greater emphasis both in public esteem and in programs of Agricultural research.

* * * * * *

In the past this nation, along with the rest of the world, has doubtless overemphasized production to the relative neglect of consumption problems. This is, natural, since through the ages mankind has had real experience with the difficulties involved in producing enough, one year with another, to provide the

necessities and some of the comforts of life. With great emergencies the need may suddenly change. For example, less than twenty years ago the great national demand was for production research. Science was called upon to help produce foodstuffs and fibres with which to win the World War. The present emphasis upon economic and social research arose out of a breach in human relations throughout the world as a result of that war. Surpluses on the one hand and under-consumption on the other brought agriculture and rural life to the cross-roads, and the nation is confronted with a new set of agricultural problems requiring a better vision of objectives, new emphasis, and new approaches to their solution.

A more complete body of knowledge pertaining to agriculture and rural life and their relative position in the national picture will be required. More information concerning marketing, exchange, distribution, and consumption will be demanded. Consumption will be studied from physical, biological, economic, and sociological viewpoints, and production will be studied relative to the requirements of consumption. Studies of both production and consumption will be conditioned upon their contribution towards the attainment of human objectives.

Out of this more adequate body of agricultural knowledge should come a better balanced national economy—a better balance between agriculture and industry, between self-sufficing and commercialized agriculture, and between earning and living. (*Experiment Station Record, Vol. 70 No. 4, April 1934*).

Copper Containers for Cut Flowers. The life span of cut flowers can be lengthened by keeping them in copper containers. This is the discovery reported by John Ratsek, floriculturist on the staff of the New York State College of Agriculture. Mr. Ratsek used in his experiments containers which are copper-plated with a recently invented electroplating finish. He found that the copper added from one to three days to the life of roses, snapdragons, stocks, delphinium, primroses, carnations and other popular varieties of cut flowers. In one test, poinsettias in the copper container lasted sixteen days, as compared to eight days for poinsettias in a tin container. In accounting for the copper having this effect, Mr. Ratsek explained that tests showed some of the copper from the plated containers dissolved in the water. The copper thus kept the water purer by hindering growth of bacteria and other organisms which cause flowers to decay. (*Science Supplement, Vol. 79, No. 2053, May 4, 1934, page 9*).

Research Notes.

Heterosis in Tomatoes.

As far as the writer is aware, the study of Heterosis in tomatoes has been pursued by Wellington (1912) at the Geneva (New York) station and Hayes and Jones (1916) at the Connecticut Station, the varieties used by them being

Dwarf Aristocrat	×	Livingston. Stone.
Stone	×	Dwarf Champion.
Lorillard	×	Best of All.

In the present investigation the following varieties of tomatoes were used as parents.

Ponderosa	×	Earliana.
Potato leaf	×	Ponderosa.

The seeds of the crossed fruits were sown in August 1933, the most suitable month for sowing the crop at the Aduturai station. The seedlings were found to be undoubted crosses, as they exhibited the dominant characters of the male parents. After six weeks the seedlings were pulled from the nursery and

transplanted three feet apart either way. The F_1s exhibited their hybrid vigour right from the start with their luxuriant vegetation and vigorous growth.

The first wave of flowers appeared in the hybrids at the end of October, 5 days earlier than the earlier parent. Fruits were gathered as they ripened from individual plants and were weighed separately. A record was maintained for each plant for the total yield, the number of fruits, the weight of each fruit, and its length, breadth and thickness. The first ripe fruit in the F_1 of Earliana × Ponderosa cross was gathered on 15—11—33, while that from Earliana parent was gathered on 20—11—33. The Ponderosa parent produced its first ripe fruit on 13—12—33, definitely a month later than the hybrid. In the other cross (Potato leaf × Ponderosa), the first ripe fruit was collected on 27—11—33 while Potato leaf gave it on 3—12—33 and Ponderosa parent on 13—12—33. In both sets of crosses the same plant was used as the Ponderosa parent. But unfortunately, it was not possible to gauge the maximum productive period and capacity of the crosses and their parents, as the terrible cyclone that passed over this district on 15—12—33 nearly destroyed all the plants. The Ponderosa parent was just beginning to bear when the cyclone occurred. So the yield figure given against the Ponderosa parent has to be judged by the above limitation.

The total yield and the measurements so far recorded are tabulated below.

Name of variety.	No. of plants.	Date of first collection of fruits.	Total No. of fruits	Total wt. of fruits grms.	Av. wt. of fruit in grms.	Av. length in cms.	Av. breadth in cms.	Av. thickness in cms.
Earliana	8	20—11—33	117	11481	98	6·33	5·62	4·22
F_1	8	15—11—33	88	13777	157	7·57	6·63	5·00
Ponderosa		13—12—33	10	1984	198	8·40	7·32	5·40
Potato leaf	10	3—12—33	148	13822	93	5·86	5·24	4·37
F_1	15	27—11—33	175	27200	155	7·73	6·43	5·10
				1984				

The figures given above cannot be subjected to any strict statistical scrutiny as the plants compared are not sufficiently large in number. None the less, the figures are noted for the sake of comparison to show how the hybrids stand in striking contrast to the other parents used in the cross.

The figures disclose the following salient points.

1. The F_1s mature somewhat earlier than the earlier parent.
2. The size of the fruits is intermediate between those of the parents.
3. The hybrids yield 20 to 30 per cent. more than the ovule parents.

To confirm the results of the last season, the same sets of crosses were effected and about a dozen fruits were gathered. More first generation plants will be raised in the ensuing season and their performance noted.

The results of the preliminary trials indicate that the varieties chosen as parents were the right ones for showing the advantageous effect of Heterosis to get increased yields and earliness in tomato crops. The crossing of tomatoes is a simple operation which an intelligent cultivator can easily carry out for himself, and the seeds are numerous. We can thus considerably increase the yield of his crop by using seeds of crossed fruits each year. Attempts are being made on this station to make available to the cultivators such crossed seeds and it is hoped that they would take advantage of such facilities in coming years.

I acknowledge with thanks my indebtedness to Mr. M. Anandan, the Superintendent, for facilities offered and for valuable suggestions given.

Agricultural Research Station,
Aduturai.

M. Subbiah Pillai, B.Sc. Ag.

Correspondence.

Flue Curing of Tobacco.

Mr. P. Parthasarathy, B.Sc., Ag., writes from Whitefield. As one who is very much interested in the future of the Flue Cured Tobacco for Cigarette, I am desirous of knowing through the columns of your magazine, expert opinion regarding the following problems confronting me.

1. Has Flue Curing been done by electricity, instead of coal as is in vogue now in India, where, and with what success? 2. What is the proportion of Nitrogen, Phosphoric acid and Potash found best as Tobacco fertiliser for Flue Cured Tobacco without affecting the quality (colour) of the leaf? 3. What are the effective prophylactic measures against tobacco stem borer both in the seed bed and the field? 4. The analysis of tobacco stalk, and whether it could be converted into Synthetic Farm Yard manure with the usual treatment done to organic waste. 5. Has any study been made regarding the root system of tobacco, if so the nature of it? 6. Has the Imperial Council of Agricultural Research any suggestion towards the improvement of the present methods of Flue Curing as is done in India? 7. Green leaves affected with *Cercospora personata* at the initial temperature of 90°F. to 100°F. have a tendency to fructify, spot the healthy leaves and spoil the outturn Could *cercospora* by any treatment be killed and the spotting stopped in the barn?

Messrs. K. S. Sankaram Pillai, L Ag., tobacco exporter, and *P. Gopalratnam L.Ag.*, Guntur, have kindly supplied answers to the above querries from which the following have been compiled

1. It is possible to cure tobacco by use of electric power, but in India the present conditions are not in favour of electricity being more economical than coal.

2. The presence of potash in the fertiliser greatly improves the burning quality of the leaf. When applied in the form of carbonates it gives best results. It can also be applied as the sulphate but never as the chloride. Phosphorus hastens maturity and increases the tendency of the plant to ripen and yellow, which are factors of importance in producing a good quality of flue cured tobacco. Nitrogen is not entirely necessary, except in soils very poor in this element. Excess of nitrogen in the fertiliser tends to make the leaf coarse and thick—an undesirable character. For average soils, the following proportion of the three ingredients will be the most suitable:—Nitrogen 75 to 80 lbs., Phosphorus 50 to 80 lbs., Potash 200 to 250 lbs., per acre.

3. The tobacco stemborer is not known to be a major pest at present. The remedial measure will be, that the infested plants should be eliminated in the seedbed itself and destroyed by burning.

4. Analysis of tobacco stalk, is as follows:—Moisture 6·18%, Nitrogen 3·17%, Potash 5·02%, Lime 2·22%, Magnesia 0·59%, Potash 0·65%. Insolubles 0·66%. Other substances 81·51%.

Tobacco stalks can be converted into synthetic farmyard manure as usual.

5. No systematic study has been made regarding the root system of tobacco but experiences at Guntur go to show that it is a deep rooted crop and that the roots contain air cells which are so delicate that they cannot withstand even moderate continuous rains.

6. The Imperial Agricultural Research Council has proposed to hold a conference of tobacco specialists to discuss about the ways and means of improving the present conditions of tobacco culture and curing.

7. *Cercospora* has not been noticed to any appreciable degree in Guntur and it is therefore not possible to give any opinions on the remedial measures regarding this.

Crop & Trade Reports.

Jute Crop—Bengal—Preliminary forecast—area in 1934. The estimated area of jute in the three provinces is 2,491,500 acres, a decrease of 26,000 acres, or about 1·03 per cent. as compared with the revised total for 1933. The consolidated figures are as follows:—

Name of province.	Estimated area under jute.			Difference between the preliminary forecast, 1934, and final forecast, 1933.	
	1933.		1934.	Increase.	Decrease.
	Preliminary.	Final.	Preliminary		
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Acres.	Acres.
Bengal (including Cooch Behar and Tripura State).	2,168,700	2,168,700	2,186,100	17.400	...
Bihar and Orissa.	190,300	192,100	163,800	...	28,300
Assam.	120,800	156,700*	141,600	...	15,100
Total ...	2,479,800	2,517,500*	2,491,500	17 400	43,400

* Revised.

Groundnut Crop—Madras 1934—early crop condition.—Sowings of the summer crop of groundnut and of the early crop in the districts of Salem and Coimbatore are generally restricted owing to the fall in the price of groundnut.

2. Harvest of the summer crop of groundnut has commenced in parts of South Arcot. The yield is expected to be below normal in Chingleput, South Arcot and Trichinopoly due to the absence of timely summer rains, and normal in the other districts. The condition of the early crop is good.

3. The wholesale price of groundnut per imperial maund of $82\frac{2}{7}$ lb. as reported from important market centres towards the close of June was Rs. 3-8-0 in Vellore, Rs. 3-5-0 in Vizagapatam and Vizianagaram, Rs. 3 in Cuddalore and ranged from Rs. 2-6-0 to Rs 2-13-0 in the other centres. When compared with the prices in March 1934, these prices reveal a fall of three per cent. in Cuddalore and a rise of four per cent. in Salem, 12 to 14 per cent. in Vizagapatam, Guntur and Nandyal, 27 per cent. in Vizianagaram, 30 per cent. in Cuddapah and 35 per cent. in Vellore.

College News & Notes.

Students' Corner. With the first year students starting their term athletic activities were in full swing during the month and it was pleasing to note that all the games were well patronised and the *maidan* and Tennis courts were very lively during evenings. There were a number of practice games between pick up elevens amongst the students themselves and in addition the following matches were also played.

Cricket. The Students' Club began the cricket season with a match against an Officers' Eleven on the 2nd July 1934. The latter batting first, scored 120 runs, Messrs. Shiva Rao and Thomas contributing 52 and 21. For the students, Lakshmanan (5 for 30), Ramanatha Rao (2 for 26) and A. M. Kulandai (2 for 19) shared the bowling honours. The students replied with 167 runs for 2 wickets, Ramanatha Rao 22, David 19, Albuquerque 19 not out, and Lakshmanan 100 not out, being the chief scorers. Lakshmanan's effort was very praise-worthy as this is the second occasion when a student of the College scored a century in any match, the first to have this honour being C. N. S. Mani, who passed out of the College two years ago. On the 15th the College, fielding entirely a Students' eleven, met and defeated the New Mysore Sports Club, the holders of the Rondy shield, by 57 runs. Narasinga Rao was the hero of the match, contributing 54 out of 110 runs scored by the College and bagging 6 wickets for 16 runs. Lakshmanan also bowled well, taking 4 wickets for 22 runs. On the 22nd the B. team of the students club played the Estates Scouts eleven who were beaten by 71 runs making only 59 as against the 130 scored by the students, Muthuswami contributing an invaluable 83; for the scouts, Anantan bowled well with 5 for 43 and with a better field would have returned a still better analysis.

The fourth fixture for the month was on the 24th against the Southern Provinces Mounted Rifles, who are camping at the Forest College, and the match although to suit the convenience of the visitors had to be a half-day affair, attracted much attention on account of the fact that the visiting team had a number of good cricketeers including Colerige, the Presidency player. The College bating first started disastrously losing 4 wickets for 20 runs but then Rajagopalan and Albuquerque made a delightful stand, scoring a vigorous 38 and a stubborn 29 respectively. The College ultimately declared at 132 for 6, leaving an hour and a half for the visitors, to do or die. The match ended in a draw, the visitors having made 66 for 8 at close of play, Lakshmanan bagging 6 wickets for 33 runs and Narasinga Rao 2 for 19.

Hockey. There were three matches during the month. On the 9th, the 11th and the 17th, all against an officers' eleven. The first was won by the students by 5 goals to 3, the second lost by 2 goals to love, and the third won again by 1 goal to love.

Football. Two matches were played on the 5th and on the 12th against an officers' eleven and against the Lilly Rose—a strong combination from Coimbatore. Both were lost, the first by 2 goals to 3 and the second by 2 goals to love.

Volley ball. On the 18th the students' club lost a match against an officers' eleven, the scores being 15:9, 11:15, and 15:3 for the officers. Tobias of the first year played a very good game indeed, and with more practice the team should be able to render a better account of themselves.

Students' Club Elections. The following office-bearers were elected at a meeting of the students club held early in the month.

Club Secretary: K. R. Sundaresan. *Games Secretary*: M. Kulandai. *Cricket Captain:* K. Lakshmanan. *Hockey Captain*. R. Krishnamurti. *Football Captain*: S. Sivaraman. *Tennis Repres ntative*: Moncy Joseph. *Third year Representative*: M. Balakrishna Nair. *Second year Representative*. K. Kannayan.

Board of Studies in Agriculture. A meeting of the Board was held on the 16th, under the chairmanship of Rao Bahadur D. An nda Rao, Rao Bahadur M R. Ramaswami Sivan, Rao Bahadur C. Tadulinga Mudaliar, Rao Sahib T. V. Rajagopalachariar, Rao Bahadur G. Nagaratnam Iyer, and Mr. V. Krishnamurthi Iyer, attended the meeting from outside, while those on the staff of the College and the Institute who attended the meeting were, Rao Bahadur B. Viswa Nath, Rao Sahib V. Muthuswami Iyer and Messrs. S. Sundararaman, M. C. Cherian, P. S. Jeevanna Rao and K. Ramiah.

Public lecture. Under the auspices of the Madras Agricultural Students' Union, a meeting was held on 9th, when Mr S V. Ramamurti, M. A. I. C. S., Director of Agriculture, Madras, delivered a very interesting lecture on "Agriculture under the Fascists," Mr. R. C. Broadfoot, President of the Union, presiding. At the end of the lecture Dewan Bahadur Sir T. Vijayaraghavachariar, Kt. K. B. E. at the invitation of the chairman, made a few remarks.

Scout Rally. On the 21st the Estate Boys Scouts and Cubs gave a farewell Rally to Rao Bahadur B. Viswa Nath, President of the local Boys Scouts Association. Mrs. D. Ananda Rao very kindly gave away the prizes for the Inter-Petrol competitions on the occasion.

Association of Economic Biologists. Under the auspices of the above association Dr. (Miss.) E. K. Janaki, gave a very interesting lecture on "Polyploidy in Genus Solanum."

Personal. Rao Bahadur B. Viswa Nath who is under orders of transfer to Pusa was the recipient of a number of teas and dinners in his honour from his friends and the admirers of the Estate during the month.

Weather Review (JUNE—1934)

RAINFALL DATA

Division	Station	Actual for month	Departure from normal	Total since January 1st	Division	Station	Actual for month	Departure from normal	Total since January 1st
Circars	Gopalpore	4·9	−0·9	5·2	South	Negapatam	1·4	+0·1	10·9
	Berhampore	4·7	+0·9	4·9		Aduthurai *	0·1	−0·2	9 0
	Calingapatam	3·1	−1·6	3·5		Madura	1·4	0	3·7
	Vizagapatam	3·0	−1·9	3·4		Pamban	0·1	−0·1	11 6
	Anakapalli *					Palamkottah	0·4	−0·2	12·8
	Samalkota *	1·9	−2·6	1·9		Koilpatti *	0·6	+0·1	12·8
	Cocanada	3·2	−1·6	3·9					
	Maruteru *	1·7	−2·7	2·3					
	Masulipatam	2·6	−1·9	3·2	West Coast	Trivandrum	16·5	+3·1	32·5
						Cochin	43 5	+14·1	57·4
						Pattambi *	34·1	+9·2	43 8
Ceded Dists.	Kurnool	5·3	+2·4	7·7		Calicut	45·1	+11·3	56·4
	Nandyal *	6·1	+2·0	8·3		Taliparamba *	51·8	+11·8	54·9
	Hagari *	2·2	+0·6	5 2		Kasargode *	46·8	+6·9	51·6
	Bellary	1·7	−0·2	3 1		Nileshwar *	52·0	+10·3	54 9
	Cuddapah	3·3	+0·4	4·7		Mangalore	46·2	+9·5	49 6
	Anantapur	1·0	...	2·3					
Carnatic	Nellore	0 8	−0·5	1·9	Mysore and Coorg	Chitaldrug	2·9	+0 1	10·7
	Madras	1 8	−0·1	4·6		Bangalore	3·3	+0·3	10·0
	Cuddalore	0·6	−0 9	2·5		Mysore	2·7	−0·2	10·2
	Palur *					Mercara	23·3	−3·0	27·6
	Palakuppam *	2·8	+0·3	6·7					
Central	Vellore	5·3	+2·9	8·6	Hills.	Kodaikanal	8·1	+4·0	33·1
	Salem	3·3	+0·3	9·5		Coonoor	3·7	...	23·6
	Coimbatore	2·3	+0·7	9 2		Kallar *			
	Coimbatore Res. Inst. *	2·9	...	9·6		Ootacamund *	4·7	+0·1	17·7
	Hosur cattle farm *	0·3	...	8·0		Nanjanad *	6·6	−1·6	18·8
	Trichinopoly	1·0	−0·4	7·9					

* Meteorological Stations of the Agricultural Department.

Summary of General Weather Conditions. The monsoon current which appeared in the south of the bay at the end of May remained very shallow at the beginning of the month, and the pressure distribution over the peninsula was not favourable for its spread. On the 6th thunderstorm rain appeared on the west coast, and by the 8th an advance of the monsoon appeared on that coast. A depression formed off the Kanara-Konkan coast on the 11th and induced a flow of monsoon winds into the central parts of the country. The monsoon from the Arabian Sea had established itself over the greater part of the peninsula by the middle of the month. The bay branch also strengthened about the 11th and extending northwards established itself in Bengal by the 13th. Conditions became unsettled off the Orissa-Circars coast on the 25th and on the 27th a depression developed and crossing the Orissa coast on the next day disappeared over the Central provinces by the 30th after weakening. On the 30th another depression appeared in the northwest angle of the Bay. These two depressions extended the monsoon into the Circars and adjacent regions and gave rise to moderately heavy and widespread rainfall.

The rainfall for the month was in moderate excess in the west coast and in slight excess in the Central districts, in large defect in the South, and was nearly normal elsewhere. The chief falls reported were: Mangalore 6·0″ (12th), Calicut 5·7″ and Trichur 6·4″ (26th); and Mangalore 5·6″ (27th).

Day temperature were markedly above normal on the Coromandel coast at the beginning of the month and were generally above normal over the eastern half of the presidency till about the 12th of the month. Nellore reported the highest maximum temperature of 113° on the 1st.

Weather Report for the Research Institute Observatory:

Report No. 6/'34.

Absolute Maximum in shade	96·0
Absolute Minimum in shade	70·5
Mean Maximum in shade	88·5
Departure from normal	−0·7
Mean Minimum in shade	72·5
Departure from normal	−0·4
Total rainfall during month	2·89 inches.
Departure from normal	+1·12 ,,
Heaviest fall in 24 hours	0·52 ,,
Total number of rainy days	12
Mean daily wind velocity	5·7 M. P. H.
Departure from normal	−2·7 ,,
Mean humidity at 8 hours	72·0 %
Departure from normal	+1·7 %

General Weather Conditions. The weather at the beginning of the month was of the hot weather type with thunderstorms and local showers. About the 10th monsoon winds set in accompanied by a fall in temperature and cloudy skies, and from that date the monsoon was generally normally active.

The total rainfall during the month was 2·89 inches which was 1·12 inches above normal, and it was well distributed throughout the month. Day temperature was above normal during the first week of the month, and then fell to normal, and the mean maximum for the month was slightly below normal. Night temperature was also slightly below normal. Other climatic elements were not far from normal.

P. V. R. & D. V. K.

Departmental Notifications.

Appointments, Postings and transfers. Mr. Muhamad Basheer, B. Sc, Ag. appointed to officiate as Upper subordinate, Science section III grade, in the scale of Rs. 75—7½ 2—105 from 12—6—34. till further orders vice Mr. V. Tirumala Rao on leave. Mr. Muhamad Obaidullah Shah officiating subordinate Agricultural Section, will be considered to be officiating from 1—7—34 till 18th August 1934 vice Mr. P. L. Narasimhan, on leave. Mr. C. K. Ramachandran, officiating Assistant, Cotton section, to act vice Mr. S. Mayandi Pillai, on leave. Mr. Annaswami, A. D. Kadiri, to be A. D. Chittor. Mr. S. Rama Rao, A. D. Chittor, to be A. D. Chandragiri with headquarters at Tirupathi. Mr. Achyuthan Nair, A. A. D. Tellichery to be A. A. D. Tiruvannamalai. Mr. K E. Viswam Iyer, A. A. D. Tiruvannamalai, to be A. A. D. Tiruttani. Mr. V. Kumaraswami A. D. Tiruttani, to be A. D. Madanapalle. Mr K. Raghunatha Reddi, B. Sc. Ag under training in the office of the Assistant Director of Agriculture, Kurnool posted as Farm Manager, A. R. S. Hagari. Mr. A. Gulam Ahmad B. Sc. Ag. posted

to Allagadda, and will be in charge of Siruvel sub circle from the date of taking charge. Mr. N. S. Rajagopal Iyer, A. D. Salem, to be A. D. Omalur. Mr. P. Seshadri Sarma, Millet Assistant, Coimbatore is transfered to A. R. S. Hagari. Mr. T. Venkataramana Reddi, offg. Millet Assistant, to Coimbatore. Mr. P. Kannan Nambiar, A. A. D. Manjeri, to the V circle. Mr. V. Achyutha Pantulu, A. A. D. Tenali, to I circle, for work on Cocanada sub circle Mr. N. Ramdass, A. D. Cocanada, to Vijianagaram. Mr. G. Sitharama Sastri, A. D. Vijianagaram to II circle, Guntur. Mr. M. Jeevanna Rao, A. D. Giddalore to Nandyal sub circle.

Leave. Mr. S. Mayandi Pillai, l. a. p. for two months from 28—5—34, Mr. K. W. Chakrapani Marar, extension of l. a. p for two months from 17—6—34. Mr. M. V. Kondala Rao A. A. D. Vijagapatam, l. a. p. on m. c. for two months from 21—6—34. Mr. P. L. Narasimhan, A D. Narasapatam, l. a. p. on m. c. for two months from 19—6—34. Mr. K. Hanumantha Rao, A. A. D. on special duty, l. a. p. on M. C. for two months and 10 days from 5—6—34. Mr. P. V. Subbarao A. A. D. Nandyal extension of l. a. p. for two months in continuation of leave already granted.