

Journal of the Madras Agricultural
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AUGUST—1924.

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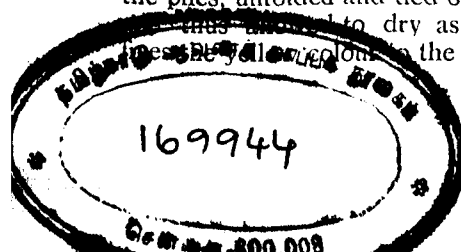
**Curing Virginian and Country Tobacco
in Guntur District.**

K. SANKARAN PILLAI.

Curing tobacco is one of the most important and delicate operations in the production of tobacco. The methods of curing depend on the types of tobacco grown and the object for which they are utilised. In general the object in curing must be to impart the desired state without sacrifice of its good qualities. In doing so care should be taken to get rid of bad qualities in the leaf taken up for curing. Curing is generally understood by the people as drying of tobacco; but it is not so. It is an elaborate and delicate work because it is a life process due mainly to the activity of the living cells of the leaf taken up for the purpose. Curing therefore is much influenced by the structure of the leaf and also by the atmospheric conditions. As stated above, different types of tobacco are differently cured and I describe below separately the curing methods of the different types. These results are arrived at after experimenting on the curing of tobacco of different types during a period of four years.

Curing process of Cigarette types of tobacco. Prior to 1860 A. D. cigarette smoking was unknown. Every one smoked only cigar. It is only after 1860 A. D. when cigarettes were introduced there was

Curing of Country tobacco yellow for making Cigarettes. For curing the local variety bright for cigarette purpose special care must be taken even from the very beginning to grow the tobacco on a light soil with judicious application of selected manures. Care should be taken to have early planting as this will give a long period of growth which will produce bright colour in the tobacco cured. Topping should be done as high as possible in this case so that the leaves may become thin and light coloured. The success in curing country tobacco bright depends partly on the careful observance of the above principles during the period of growth and mainly on the curing process itself. The time of harvesting is an important factor in the curing of yellow tobacco. Early cutting makes the leaves thin and the colour also will become light due to dilute juice in the leaf. For producing bright coloured leaf the proper time will be to cut the leaves a week or ten days after the first suckering. At this time the leaves will assume a slightly greenish yellow colour and that is the sign for harvesting the crop. The leaves from top to bottom are harvested with a small portion of the stem attached to it by means of a special curved knife generally from 4 to 6 p.m. and left in the field itself during the night. Early in the morning the leaves are collected and taken to a shady place and then stringed. Nearly 300 leaves are stringed in a 5 ply jute twine of nearly $7\frac{1}{2}$ ft. long. The tobacco ropes are then folded and arranged one in contact with the other in a big circular way with the top and the ends on the floor. This arrangement will commence at 6 p. m. when all the leaves cut the previous day will be stitched completely and kept ready. This pile will remain for the 12 hours of the night and early in the morning the pile is rearranged quickly in the same way and protected from the Sun by means of a mat covering during the hot portion of the day. Again at 6 p. m. the re-arranging of the pile is done and left for the night 12 hours in the same way. This completes 36 hours piling and after this period the leaves develop a far finer yellow colour. Early in the morning the ropes are removed from the piles, unfolded and tied 6" apart on racks fitted in the open field thus allowed to dry as quick as possible. This quick drying gives the yellow colour to the leaf. Though the leafy portion dries



Curing of bright Virginian tobacco for Cigarette purpose.—Variety white stem Orinoco. Though with certain amount of care country tobacco is cured bright, yet manufacturers are unable to blend and produce good cigarettes without adding a little of Virginian tobacco to the country tobacco. To import Virginian tobacco all the way from America paying Rs. 1-8-0 per lb. as cost and taking delivery by paying a heavy duty of Re. 1 per lb again is not a profitable job to the manufacturers. Hence Virginian tobacco is now grown and cured in Guntur which is admirably suited for its cultivation and utilised for cigarette manufacture. The same preliminary care as described above for yellow country tobacco is taken during the period of growth, as regards the selection of light soil, judicious application of selected manures, early planting and topping high. The time of harvesting the crop is carefully judged and invariably it will be some one month after the topping or immediately after second suckering. At this stage the leaves will attain a slightly yellowish green colour. That is the sign for harvesting and curing. Good judgment is required to cure yellow tobacco. There are many methods of curing. The flue curing is very costly and hence the next best system of Sun and Air curing combined in a modified form is being done and best results are obtained. In this system the natural flavour of the leaf is better preserved and the porous systems are greatly developed to absorb artificial flavourings with which the leaves are treated in the process of manufacture. Now I shall describe the actual curing process. All the ripe leaves are stripped from the plants leaving the unripe ones at the top and

brought immediately to the shade. The top leaves are harvested later on when they ripe. This system of harvesting as the leaves ripe is adopted so as to secure a uniform quality in the cured leaf. The leaves are stringed thinly say 150 leaves face to face in a three ply jute twine measuring about $2\frac{1}{2}$ yards long. If closely stitched the colour of the leaf is lost easily. The stringed leaves are tied well-stretched without hanging in the middle in a thin bamboo (tier pole) 9 feet long leaving some one foot on either side. These tier poles with the tobacco ropes on them are arranged on racks fairly closely inside the curing sheds. These sheds are slightly shut out from the Sun's light. In this manner the ropes are allowed to remain for nearly twenty four hours. After this period the leaf turns yellow. This process is called the "yellowing process." Now the tobacco ropes with the tier poles are removed and arranged 6" apart on racks in the open field exposed to the Sun's light and free ventilation, for 48 hours. This sudden exposure to the Sun fixes the yellow colour. If the leaves are exposed to the dew during nights the colour will be completely spoiled and hence the racks are covered during nights with mats or bamboo thatties.

During day time the mats or bamboo thatti covering will be removed and the leaves will be thus exposed to the Sun's light. Again in the night the covering will be on the racks. This covering during night and removing during day, will continue for nearly a fortnight during which period the midribs also will dry completely. At this stage the ropes are removed from the racks and then they are subjected to the "bleaching process." This is done by spreading the ropes on the floor in the open field and allowing the rays of the Sun to have full play on the leaves for nearly 36 hours. Then the ropes are turned and left for 36 hours again exposed to the Sun so that the other side of the leaves also may be fully exposed to the rays of the sun. During this process even green spots turn completely yellow and the action of the Sun's rays is very well seen in the leaves. This process being completed, on a fine morning when the ropes are soft enough, they are removed folded and bulked in an ill-ventilated room. This process is called the "Bulking process." The bulks are shifted very often according to the moisture contents of the leaves, say once in two days for nearly a month and then once a week for nearly two months and then occasionally say once a month and so on. It is only during this process the tobacco develops its maximum colour and aroma and all the other good qualities chiefly due to the action of Bacteria. Only experts should attend to the bulking. If the shifting of bulks is delayed it may bring on disastrous results. The time that should be allowed between one shifting and the other

must be carefully judged. When about a dozen shifting of bulks are made, while rebulking one day 2 % citric acid is sprayed with a fine sprayer. This not only acts as a preservative but adds considerably to the aroma also. When this process is completed the leaves are removed from the strings and graded. Grading is done according to colour and size of leaves. The graded leaves are then pressed into bales weighing 200 lbs. net in hand presses inlaid with mats. These bales are then sent to the cigarette factories for the manufacture of cigarettes, with their grades marked on them. They use it for nearly two or three years. Even in pressed bales slow bacterial action continues and so much so even after two years when the bales are opened the tobacco is found in a matured condition with good aroma developed in it.

Curing process of Cigar types of tobacco. Before the introduction of cigarettes in 1860 A.D. people used to smoke only cigars. The cigar industry was started by about 1800 i. e. some 60 years before the cigarettes were introduced. The young generation took to the smoking of the fashionable and mild cigarette. Yet elders have continued to like the strong smoke of Cigars. Hence curing tobacco for cigar is as important as curing tobacco for cigarettes. I hereunder describe the best method of curing cigar tobacco.

Curing country tobacco dark-brown for making cigars. For curing successfully tobacco for cigar purposes care should be taken from the beginning to select rich heavy soils for growing tobacco. Even in such rich lands, a heavy application of manure is essential. Heavy dose of manure gives a luxuriant growth to the crop and the result is the production of a very thick dark red tobacco with strong nicotine contents and flavour. The topping also should be done very low leaving only a very few leaves to a plant, say from 8 to 10 leaves each so that all the plant food may pass into a few leaves and feed them well in order they may be thick and strong scented for cigar purposes. The harvesting should only be done when all the leaves are fully ripe. Late cutting always produces dark brown colour. Red and yellow spots will appear on the leaves and that is the time for harvesting. The harvesting is done throughout the day and the harvested leaves are left in the Sun. The leaves being thick will not be affected by the Sun. The leaves are stitched closely say some 450 leaves in a 5 ply jute twine $7\frac{1}{2}$ feet long and tied in racks closely in the open field. This close tying does not allow the leaves to dry quick and this slow drying is considered good as it allows more time for the fermentative changes in the leaves during the drying period and moreover it kills the bright colour during the slow drying and the desired dark red colour is produced. Complete drying takes nearly 40

days and after that on a dewy morning the tobacco ropes are removed from the racks folded and bulked. The bulks are shifted rarely say once in a fortnight or in many cases once a month, say three or four times. To develop the dark colour and produce some strong aroma in the leaf generally a very thin solution of jaggery and myrobalan powder (say a viss of jaggery and 4 oz. of myrobalan powder mixed in about 4 gallons of water) will be sprayed when the bulks are changed layer after layer. The above four gallons of solution will be enough to spray a bulk of nearly ten caudies of tobacco of 500 lbs. each after spraying, the bulks are often changed and the tobacco gradually changes to a dark colour and with it the leaves become very strong for smoking which is essential for a cigar leaf. This completes the curing. In a cigar leaf the mid-rib will be of no use as it will be very hard and hence these midribs are removed and the leafy portions are known as "Strips". These strips are packed in pressed bales inlaid with mats and exported to the foreign market for sale to the cigar manufacturers.

Curing White Burley Tobacco (American Variety) for Cigars. This White Burley tobacco is being tried in the Guntur District for the past 5 years. This tobacco grows wild when once we establish the seedling in the field. The raising of the seedling of this type is a very difficult affair. But when once we establish the plants in the soil it grows wild like a weed. This is due to the presence of a large proportion of lime in the soil of Guntur and the immense liking of the White Burley for lime for its good growth. The plant grows well with very long leaves measuring nearly 36" long and 18" broad with a golden yellow coloured leaf, from the early period of growth till the time of harvest. The plants are topped very low leaving some 8 to 10 leaves to a plant. The leaves become thick and assume a brownish yellow colour. The leaves are completely stripped from plants and removed to the shed immediately. If exposed to the sun after harvesting even for few minutes, the leaves will be spoiled. The leaves are stringed fairly closely, say some 400 leaves in the jute twine 7½" long, and tied in the racks closely, inside a shed. The first point to avoid in curing white burley tobacco is too rapid drying of the leaf and hence shade curing is adopted. Drying is not curing. The change of colour and the condition of the leaves is mainly due to a process of fermentation which takes place in the hanging of tobacco. If the leaves are allowed to dry too quickly this fermentation is altogether prevented or checked to some extent, thereby disastrously affecting the results. As far as possible light should be excluded during the later stage of curing cigar tobacco as it is observed that strong light has an injurious effect upon the colour of the leaf cured. The changes in colour of the tobacco leaves during the curing process are not the result of drying but

of certain chemical changes within the cells of the leaves themselves. From six to seven weeks are required to cure White Burley under shade in sheds. When the leaves are completely dried, on a dewy morning the tobacco ropes are removed when soft, folded and bulked in an ill-ventilated room. White Burley possesses an exceptionally large absorptive capacity for liquid flavourings used in the manufacture. The bulks are changed once a week in the beginning and occasionally say once a fortnight or a month according to the moisture contents of the leaves. As the changing of bulks are done the tobacco develops a good honey smell and colour and that is the time for handling and packing. As this tobacco is mostly used for cigar purposes the leaves are stripped, (midribs removed) and the strips are packed in export bales of 200 lbs net inlaid with mats and sent to the factories for the manufacture of high class cigars.

Action of Bacteria in Tobacco curing. Bacteria play an important part in the last stages of curing (i. e. during bulking). Due to the action of Bacteria while bulking it is understood that there is a large decrease in the dry matter of the leaf and that the starch in the leaf is turned first into glucose and finally destroyed there. The change that takes place in the bulking of tobacco is similar to that observed in the process of ensilage. Mere drying or slow oxidation does not suffice to explain these changes and hence curing is a complicated life process. If the leaves are simply dried, we get non-burning leaves with hard surface, brittle web, black ash, dark or tarry colour, ill smelling smoke, and bitter taste. But if properly cured we get leaves with a beautiful yellow or brown colour, silky texture, elastic web, light blue and pleasantly aromatic smell, a white or grey ash. These good qualities are due to slow curing, bacterial action while bulking and slow fermentative changes during the process. To successfully cure and market, cigar and cigarette leaves of the finest quality involves constant attention to every detail of management at different stages. The importance of attention to the details is of greater consequence in tobacco than in almost any other crop that is generally grown. The success of curing a tobacco crop depends not only on the curing process but also on the growing of the crop. A thorough knowledge of culture and curing is necessary to produce good tobacco. More importance should be paid to the culture because a poorly grown leaf with all skill in curing cannot be cured successfully. It is only a man with a thorough knowledge of tobacco culture and a good training in tobacco curing, that should attempt curing of tobacco on a commercial scale and if he will conduct the curing process with the maximum care and skill, he will be crowned with success.

' NICOTIANA.'

The Economics of a Coimbatore Village—(Continued)

P. V. HANUMANIHA RAO.

In my article on the above subject in the Madras Agricultural Students' Union Journal Vol. XI, Nos. 11 and 12, I have pointed out a few of the defects in the economics of the village, and propose to note down here what the Department has done to remedy them and how far have they been successful till now. Any casual reader of the article would correctly surmise that the village is typical of the Coimbatore tract and that the art of Agriculture is well understood and practised empirically as tradition has taught them.

With the increase of population along with the desire to possess more lands every bit of useful land has been brought under cultivation and no piece of land is now available on pattah. The world's progress is very rapid, and the greater the communication facilities, the closer the relation of the village with the world market. This has stimulated a desire to work for the future. The ryot has begun to be more business-like and anxious to dispose of his produce at the highest rate.

Efforts are made to secure the objects in three directions:

- i. By imparting education to the Agricultural folk.
- ii. By demonstration and propaganda work.
- iii. By trade facilities.

1. By imparting education to the Agricultural Folk.

(a) With frequent allusions to the stories of the Ramayana and the Mahabharata, the mental vision of many a ryot has been broadened and many minor disputes have been settled in the village Panchayet, and many are now above the temptations of sensual pleasure and drink.

By engaging them for an hour or two in the evening, after they have returned home from their daily toil with a Tamil News-paper and the departmental monthly digest, they are being acquainted with the Agricultural activities of their brethren elsewhere in America, and East Africa.

There is no gainsaying the fact that the night school conducted has been of utmost utility. By regular course of lessons in civics they have understood the system of administration, the function of the different departments and their duty as citizens. Advantage of the opportunity is not however availed of.

(b) The subject of consolidation of holdings has been engaging their attention for the past two years. The evils and the disadvantages of the system of fragmentation of holdings and the benefits of consolidation have been impressed on the ryots as occasions arose and as the result of propaganda work a few cases noted as follows of such holdings which otherwise would have become fragmented have been successfully consolidated. (Statement No. 1.)

Last year, a rural credit co-operative society was formed and has shown some progress.

II. *By demonstration and propaganda work.* It is a pity that in our country a large percentage of owners of extensive areas do not care to give a trial to our improved methods of cultivation. Most of them do not yet perceive the rapid and wonderful progress made in other countries.

The defect of the system of leasing out lands to tenants for short periods and the extent of damage to the land in the absentee landlordism has been preached to the ryots and as the result of such preaching, of the 464 pattadars of the village only 38 are tenant farmers, and even there the tenancy holds for long periods, as for example, S. F. 288 for 5 years, S. F. 341 for 5 years, S. F. 240 for 9 years, S. F. 250 for 9 years.

Manure. There is much to be spoken in favour of the Coimbatore ryot. If the purse and weather be favourable, he leaves no stone unturned to make the best out of the worst. He is aware of the value of manure in every shape and has made it a point to restore to the land what all he has taken out of it. Full use of cattle manure, green manure, tank silt, and decomposed organic matter is made. Of late, manures like groundnut cake, neem cake, human excreta and fish manure, are made use of. An account of the trial of and demonstration of the manurial value of fish manure in the vicinity is appended (Statement No. 2.)

An experiment to test the manurial value of cattle manure collected under dry earth system was conducted in one Kallappa Goundan's garden at Rayerpalayam and the manure thus collected was applied to Ragi and the result was very favourable. Further such demonstrations are worth the trial.

(b) *Introduction of crops.* The Bellary Ragi, that has been on trial in this tract during the last three years, has done fairly well. It is a heavier yielder both in grain and straw. It is a longer duration variety and has to stand for a fortnight more on the land

and hence requires two irrigations more than the local Karimathan or Gulgundu, and in the opinion of the ryot it is worth cultivation, for the value of the excess grain and straw more than compensates the cost of irrigation.

Paddy. It is the practice here to raise paddy under wells. Alpal a very good variety is sown both in June-July and in August-September. The garden paddy generally yields heavily and alpal as much as 20 salagais. Of the Economic Botanist's strains No. G. E. B. 24 is in popular favour in the locality. This is only a four months crop and matures a month earlier than the local peria samba, and thus saves the trouble of baling water for one month. The yield too is just the same as Alpal. About 1,000 lbs. of seed paddy were distributed to the ryots.

Cholam Smut disease. At the suggestion of the Dy. Director of Agriculture, an investigation as to extent of damage by smut disease was made in Ramachampalayam, K. Madappur and seven other villages. 200 acres of seed cholam owned by 56 ryots were treated with the chemical. In Ravathur the ryots report as follows: "Every year about 25 to 33 per cent of our October sowing dry land Peria Manjal cholam crop used to be attacked by smut disease and we thought that we must suffer from it as there is no remedy for it. But last season about 100 packets of a chemical—a preventive against smut—was offered to us and we took it very reluctantly and applied the same as advised and are glad to report that we were immensely benefited as no trace of the smut disease was found, wherever seeds were steeped in copper sulphate solution". It can be noted that even at a modest estimate of Rs. 2½, being the value of the increased yield of grain, there has been a net gain of Rs. 500 to the ryots by these 200 acres alone by spending only Rs. 12-8-0.

Cotton. Considerable improvement work has been done under cotton. 300 acres are under cambodia under seed-farm conditions.

For the last 4 seasons the department purchased the produce of these seed-farms from the ryots, ginned them separate, stocked the clean seeds and distributed them to the ryots during the sowing season. This was a great strain on the Department, for after all for the sake of seeds the Department was obliged to purchase the kappas from the ryots. This year a new System was introduced in 3 villages, Tekkalur, Kaniyur and Elachipalayam, whereby the ryots concerned 13, 11 and 20 respectively co-operatively ginned their kappas together in the prescribed factory under departmental supervision and the department purchased only the seeds from them instead of the kappas. By so doing, a large quantity of good seed for sowing was obtained at a small out put.

Trials of Onion and Tobacco have been noted under trade facilities.

The cattle are very well-looked after and their condition is quite good, the fodder scarcity is of late being solved as follows :—

1. Every ryot has made it a point to reserve a few cents of his land near the well for fodder cholam or fodder cumbu.
2. There being no regular season for Ragi, the straw is made available all round the year generally.
3. Introduction of fodder crops like guinea grass and lucerne by the ryots.

III. **Trade facilities.** Tobacco, cotton, onion, and pulses are all grown. The quality and the quantity show that even the trade demand brings in only a partial success and that improvement is possible by a sound technical and general teaching. During 1923, a trial was given to the Bellary Onion seeds in about 5 cents of garden land. The crop did exceedingly well yielding 30 maunds of bulbs or 1500 lbs. per acre. But a considerable difficulty was experienced in finding out a market for these and they were taken over to Podanur railway quarters where they found a ready sale @ Re. 1 a maund. This year the crop was planted in ¾ acres by 5 ryots and attempts are made to rail them to Coonoor. A trial is being given to the 'Vellodu' Tobacco variety. This is a cigar variety from Dindigul and was tried in 5 cents. The stand is fairly good but the leaves are not so broad and stout as the local variety. In the opinion of the Muhammadan Merchants who have come here from Gudiyatham to purchase the tobacco wholesale, the crop is fair.

These are a few of the improvements effected recently with the experience gained by a study of the local conditions.

Statement No. I.

No.	Village.	Father's name.	Partner's name.	Total area to be partitioned.	Extent of claim.	The area now partitioned.
† 1	Attupalayam	Karuppa Gn.	Karuppa Goundan	12 acres (garden) and 5 acres (dry)	equal share of the 3 sons	Garden. 3 Acres 4½ Dry. 2½ A 1 acre
† 2	Attupalayam	Kaliappa Goundan	Palni Goundan	8 acres (garden) and 6 acres (dry)	1 share	4½ 1½ 3 acres
§ 3	Elachipalayam.	Sinna Goundan	Amasai Goundan	10 acres (garden)	1 share	2 2 0 3
* 4	Rayar-palayam.	Appaji Goundan	Marappa Goundan	23 acres (dry)	1 share	4 4 9 7 7 5 2½ 2½

REMARKS:— † The 4½ acres garden of Nanjappa Goundan formed a separate plot. The partition was effected by a committee of four leading members of the village with due difference to the quality of the land.

‡ Raya Goundan sold his dry lands 3 acres to Sinnia Goundan for Rs. 500.

§ The quality of the land given to the eldest son is of inferior quality. Notwithstanding the increase in area each of the brothers gave Rs. 1500 to the eldest brother.

* The division has been accepted by the parties concerned but not yet ratified in writing.

Statement No. II.

Village.	Ryot's name.	Crop to which applied.	Area applied in acres.	Quantity applied in bags.	Effect of application.
Ravathur	Viyapuri Goundan	Chitral-Cholam	1	7	Heavy yield.
Neelikolam-palayam	Rangappa Naicker	Tobacco	1	6	Not good
Ondiputhur	Rangaswamy Naicker	Ragi	1	2	Not good
Irugur	Bagavathi Thevan	Sugarcane & Paddy	—	—	Not good
Ravathur	Muthu Goundan	Tobacco	3	30	Very fair
Rayathur	Viyapuri Goundan	"	—	20	Very good
Sinnappa Chetty-pudur	...	Sugarcane	—	—	—
Naranapuram	...	Tobacco	—	8	—
Sedapalayam	Ramaswamy Goundan	"	4	30	Same as cattle manure
Unjapalayam	...	"	1	15	Fairly good
Senkoda Goundan puthur	...	"	1	15	Same as cattle manure
Karnampalayam	Pongah Goundan	"	1	15	Same as cattle manure

EXTRACTS.

Vetiver Oil. (By C. D. V. GEORGI)

Vetiver oil, an essential oil, is obtained by the distillation of the roots of the vetiver plant. This plant is a perennial grass, belonging to the same Natural Order-Graminaceae-as citronella grass and lemon-grass, in which the leaves contain the essential oil. In the case of vetiver it is interesting to note that the leaves are odourless, the roots being the only part of this plant which yield an oil on distillation.

It is thought that the publication of the results of an investigation carried out recently at the Department of Agriculture (S. S. L. F. M. S.) will be of interest in spite of the fact that there is only a very limited demand of this oil.

The supply of roots for the experiments was obtained from the Government Experimental Plantation, Serdang, where small areas of this crop are under cultivation.

The roots have been distilled to determine the yield of oil and samples of the oil have also been forwarded to the Malay States Information Agency, London for valuation.

Name of grass: Vetiver grass is known botanically as *Vetiveria zizanioides* Stapf.

This grass is but little known in this country; in India, where it is found widely distributed and where the dried roots are used for a variety of purposes, it is known as Cus-Cus or Khas-Khas. The dried roots are made into baskets and mats (chicks), the latter being hung on verandahs and moistened with water in hot weather thus perfuming the atmosphere. Bundles of the roots are also placed between clothes stored in wardrobes or boxes, imparting to the clothes the odour of the essential oil, which in its diluted state resembles sandal wood.

In Java there is also a trade in the dried roots, which are known as *akar wangi*, signifying aromatic root.

Vetiver is also cultivated in Reunion; the root is distilled locally, and the oil exported to Europe.

Cultivation of Grass: is propagated by root division and appears to flourish best in a light soil, which favours root development. In India, where this plant occurs wild, it is found principally along the banks of rivers and in rich marsh land.

The plant will not thrive under shade, while it is said that root development is stimulated by frequent cutting of the grass.

It has been found that the oil content increases up to the time of flowering, so that if the roots are required for distillation they should be harvested just before this time.

Extraction of oil: The roots are dug up, separated from the stems and washed in running water to remove adhering stones and soil, and then steam-distilled. On account of the low volatility of this oil the distillation is lengthy, requiring several hours to complete. In the investigations carried out in the Department it was found that a period of about 10 hours was required to complete the distillation of a batch of roots.

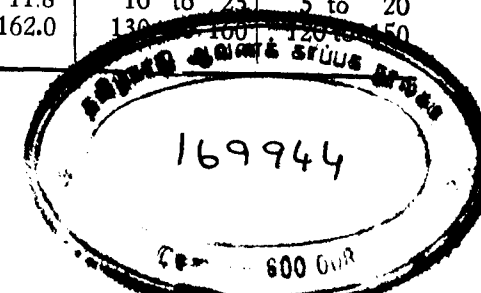
Yield of Oil: The yield of oil obtained from fresh air-dried roots varied between 0.50 and 0.65 percent by weight, that is to say, 1 ton of roots will give 12 to 14 lbs of oil. The weight of roots obtained from the experimental areas was at the rate of about half a ton per acre, corresponding therefore to a yield of 6 to 7 lbs of oil per acre per crop. Under normal conditions two crops of roots can be obtained per annum, equivalent on the above figures to a yield of 12 to 14 lbs of oil per acre per annum.

Value of oil: The sample of oil despatched to the Malay States Information Agency for valuation was forwarded to the Imperial Institute for report.

The following is an extract from their report:

"The sample consisted of a viscid, dark greenish brown vetiver oil of good aroma. It was examined with the following results, which are shown in comparison with corresponding figures recorded for (a) oil distilled in Europe from dry improved roots and (b) oil distilled in Reunion.

	Present sample.	European distilled oil.	Oil distilled in Reunion.
Specific Gravity at 15/15 C.	1.032	1.014 to 1.042	0.982 to 1.020
Optical Rotation	Too dark to permit reading	25 to 40	20 to 28
Refractive Index 20 C.	1.524	1.520 to 1.523	1.515 to 1.528
Acid value	35.5	25 to 65	4 to 20
Ester value before acetylation	11.8	10 to 25	5 to 20
Ester value after acetylation	162.0	130 to 160	120 to 150



These results show that the present sample of oil is of normal character.

Commercial Valuation: The chemically dried oil was regarded by experts as of good aroma, resembling in this respect Reunion vetiver oil rather than Indian. They consider that it would be worth 30sh. per lb. ex wharf London (January 1924) but were of opinion that the price of vetiver oil might fall in the near future."

Uses of oil: Vetiver oil is used exclusively in the preparation of compound perfumes, in which the oil, on account of its low volatility, acts as a valuable "fixer" for more volatile essential oils.

As in the case of other essential oils the utilisation of which is restricted to similar purposes, it is unlikely that the demand for this oil will ever be extensive.

(*The Malayan Agl. Journal* Vol. XII Nos. 6 & 7 Page 197.)

GLEANINGS.

British Association. This year's meeting of the Association is being held at Toronto this month. The Agricultural section will be presided over by Sir John Russel. The subject of his address is "Combination in attacking farmers' problems." This section will discuss the question of diminishing returns in agriculture with the section Economics, and Canadian Forestry problems with Section Botany.

A. U. M.

Cotton in the Empire. 500 million £ is invested in the Cotton Industry. 10 million people are either directly or indirectly dependent on the trade for their livelihood. Average consumption of raw cotton is 3 million bales four-fifth of which come from the United States of America.—Charles C. H. Horden — *Mysore Economic Journal* for April.

A. U. M.

Extraordinary yields of sugar Some sugar plantations in Ewa (Hawaii) are reported to have produced as much as 15.78 tons or 31,560 lb., of sugar to the acre. This is more than 10 times the average yield of India. This shows what Science coupled with Capital and enterprise can do.

K. K. R.

Water requirements of plants. E. C. Millar working in Kansas on the relative water requirement of corn and sorghums with a view to find if a definite relationship exists between the water requirements of these plants and their drought resistance, comes to the conclusion that little or no relationship is indicated between the water requirements of plants and their ability to produce a yield of grain in Agricultural practice under conditions of limited and uncertain rainfall.

G. N. R.

Foot and mouth disease. The total number of outbreaks from 27th August 1923 to 20th July 1924 is 3,198 involving 42 countries in England, 2 in Wales and 12 in Scotland. The number of animals slaughtered amount to 106,707 cattle, 45,475 sheep, 49,061 pigs and 129 goats, the gross compensation being £3,401,000 and the estimated salvage £ 509,750. (*Journal of the Ministry of Agriculture, August 1924*).

Dr. H. Martin Leake has been appointed Principal of the Imperial College of Tropical Agriculture West Indies in succession to Sir Francis Watts, who will retire next November. Dr. Martin Leake was formerly Director of the Department of Agriculture and a member of the Legislative Council of the United Provinces, India. In 1919 his services were lent to the Egyptian Government, which he advised on cotton, and last year he was a member of a joint commission with Sir John Russell to advise the Sudan Government on the organisation of agricultural research. (*Extract from Nature* No. 2852 Vol. 113 of 28th June 1924.)

To destroy weeds on paths. To destroy weeds on grass or gravel paths or on chip tennis courts an arsenic mixture (1 lb. of white arsenic with $\frac{1}{4}$ lb. of caustic soda dissolved in 4 gallons of water) is frequently used, being both cheap and effective. A fairly concentrated solution of common salt applied hot is also effective, and so too is spraying with crude residual oil, such as is obtainable from gas companies. Both of these treatments would be rather more expensive, however, than the first mentioned.—A. A. Ramsay Chemist.

Agr. Gazette of New South Wales—June 1924.

ESTATE NEWS.

In honour of their retiring Farm Office Manager, Mr. T. V. Narayana Rao, the coolies of the Central Farm enacted two plays, "Alli-Arjuna" and "Savitri-Satyavan," on the night of the 9th August and performed "Bhajana" at the Farm office on the 10th evening.

On the 16th of August, the residents of the estate entertained Mr. T. V. Narayana Rao at tea on the eve of his retirement from service. Three of his old students Messrs: Rao Sahib Ramaswami Sivan, Rajagopalachari and Balakrishnamurti spoke in English, Tamil and Telugu respectively in appreciation of Mr. Narayana Rao as a man, teacher, and officer and wished him complete enjoyment of his well earned rest. Mr. Narayana Rao replied in suitable terms.

Mr. H. Shiva Rao, Assistant to the Government Lecturing Chemist, left for England on the 16th for higher studies. He was given a tea by the members of chemical section.

In aid of the flood relief the coolies of the Central Farm enacted "Satharam" on the 23rd and we understand that a sum of about Rs. 60 was collected.

The Officers' Club at its General Body Meeting held on the 30th voted Rs. 100 for the flood relief fund.

Visitors:—Mr. G. R. Hilson, Secretary, Central Indian Cotton Committee, Dr. W. H. Harrison, Officiating Agricultural Adviser to the Government of India, Mr. E. J. Bruen Imperial Dairy Expert, visited the Cotton Station, Sugarcane Breeding Station and the Dairy respectively during the month and were the guests of Mr. R. C. Broadfoot.

Khan Sahib Ahmad Ali Soofee, Agricultural Circle Officer, Iraq, now on leave in India, visited the College and Research Institute. He was the guest of Rao Sahib Y. Ramachandra Rao.

Mr. S. Subrahmanya Ayyar took charge of the office of the Farm Office Manager on 5-9-1924.

DEPARTMENTAL NEWS.

Hosur Farm: We understand that the Government of Madras have acquired from the Government of India, the Hosur Military Dairy Farm for the establishment of a Cattle Breeding Station and that the head-quarters of the Deputy Director of Agriculture, Live Stock, will be transferred to Hosur from about the beginning of October.

Mr. D. G. Munro, Deputy Director of Agriculture, Planting Districts, left for Assam on the 30th, to acquaint himself with the conditions of tea cultivation in the tea estates of Northern India.

HONORARY VISITORS TO THE AGRICULTURAL COLLEGE.

- | | | |
|-----|---------------|--|
| 1. | From Ganjam | The Raja of Parlakimedi. |
| 2. | „ Vizagapatam | M.R.Ry. P. Bangar Raju Garu, Moida. |
| 3. | „ Godavari | „ Rao Bahadur Sir K. Venkata Reddi Nayudu, Kt., M.L.C. |
| 4. | „ Kistna | „ |
| 5. | „ Guntur | „ Dewan Bahadur P. C. Ettirajulu Nayudu Garu, M.L.C. |
| 6. | „ Cuddapah | „ Rao Sahib N. S. Rangaswami Ayyangar Avl., B.A., B.L., |
| 7. | „ Kurnool | „ Rao Bahadur C. V. Ranga Reddi Garu, B.A., B.L., M.L.C. |
| 8. | „ Bellary | „ Tandava Mudaliyar Avl. |
| 9. | „ Anantapur | „ C. Pedda Ranga Reddi Garu. |
| 10. | „ Nellore | „ B. Ramachandra Reddi Garu, B.A., M.L.C. |
| 11. | „ Chittoor | „ P. Muniswami Nayudu Garu B.A., B.L., M.L.C. |

12. From Chingleput M.R.Ry. C. Muthia Mudaliyar Avl., B. A.
M.L.C.
13. „ North Arcot „ Dewan Bahadur W. Vijiaraghava
Mudaliar Avl., M.L.C.,
14. „ South Arcot „ Rao Sahib Kolandaivelu Odayar,
Avl.,
15. „ Tanjore „
16. „ Trichinopoly „ N. Paramasivam Pillai Avl.,
17. „ Madura „ Muthu K. R. V. Alagappa Chettiar,
18. „ Ramnad The Raja of Ramnad.
19. „ Tinnevelly M.R.Ry. Gnanar Avl.
20. „ Salem „ S. K. I. Abdul Rahiman Sahib.
21. „ Coimbatore „ Rao Bahadur Nellathambi
Sarkarai Munradiyar Avl.,
Pattagar of Palyakottai.
22. „ Nilgiris Lieut.-Col. J. C. Dennistoun, D. S. O.
23. „ Malabar M.R.Ry. Krishna Menon Avl., B. A.,
24. „ South Kanara Khan Bahadur Haji Abdullah Haji Kasim
Sahib Bahadur, M.L.C.

(The term of appointment is for three years and commences on 1-7-1924.)

CORRESPONDENCE.

The following extract * from a letter from the Director of Agriculture, Sarawak, to the Director of Agriculture Madras, is published for information.

* I should be greatly obliged if you would help me in the matter of procuring a manager for the Dairy Farm here. I should like a married man with good experience of dairying, and the terms for this type would be.

3 years agreement on \$200 (normally Rs. 350) per month, free quarters on farm, passage 2nd class paid from Madras to Kuching and return passage on completion of agreement. Subject to dismissal within the first six months, if unsatisfactory, with forfeiture of passage money.

At the expiration of three years if both parties are agreeable a permanent engagement can be arranged on gradually increasing salary.

To

The Principal of the Agricultural College, Coimbatore, Madras.

I understand that it is not now the intention of the Agricultural Department of this Territory to recruit Indian Overseers, as they have found it possible to fill their requirements from South Africa with natives of this Continent. In the circumstances, therefore, will you kindly let this information be spread about the students, from whom I am receiving letters asking me about the chances of work out here.

R. CECIL WOOD,

Cotton Specialist

Empire Cotton Growing Corporation.

Tanganyika.

EDITORIAL NOTES.

On the 16th of October 1924 Mr. T. V. Narayana Rao retires from service in our Department after a long and spotless career of three decades and a half. Even on the eve of his leaving Coimbatore, he left on leave preliminary to retirement on the 17th August 1924, he appeared so full of energy, that one was inclined to think that, but for the fifty five year rule, he could have continued in service some time longer with benefit to the department.

Mr. Rao entered service under Government at Saidapet as second clerk to the Principal, Agricultural College—a post much coveted in those days even though it carried only a salary of Rs.15. During his long career in the department he served in various capacities both at Saidapet and at Coimbatore and as a teacher there is hardly any subject in the agricultural curriculum which he had not taught to the

students some time or other and taught them with credit. He was the teacher of many of the teachers now at Coimbatore—some of them themselves senior members of the Department—and every one of them has a high regard for Mr. Rao's abilities and talents.

Conscientious almost to a fault and strict almost to rudeness, he easily came to possess the full confidence of his superiors and he was widely recognized as an Expert in Book-keeping. The duties of the Farm Office Manager at the Central Farm were, till recently, of a very arduous nature and he stood continuously at this post, except for occasional absence on privilege leave in the later years of his service. His knowledge was both accurate and detailed and many of the junior members of the estate, both ministerial and executive, frequently resorted to him either to get an interpretation of a ruling or to clear up some intricate point.

That he was equally popular among all classes on the estate was evident during the few days preceding his retirement. The farm coolies put on boards dramatic pieces and composed poems in honour of their trusted and sympathetic Office Manager. There were, besides, two very well attended functions, one at the Central Farm Office and a second at the college quadrangle, to do honour and wish 'GodSpeed' to one who had so intimately worked himself into the life on the estate during the rather long period of fourteen years. Two bromide enlargements were executed, one to be presented to Mr. Rao and the other to be placed at the farm office over the Cash chest and very near the place where Mr. Rao was working. In according his kind permission for both, the Director of Agriculture, Mr. R. D. Anstead, expressed himself in the following terms "I wish Narayana Rao long peaceful retired life."

It will be some while before Father Time effaces from the memory of the estate the genial personality of Mr. Rao; and it is to be hoped that his life like picture at the very centre of the activities of the Central Farm will help the junior members to tread boldly and steadfastly in the path of duty. We wish Mr. T. V. Narayana Rao a long lease of life to enjoy his well earned pension.

People in South India are apt to be aghast at the Government's action in enforcing legislation however leniently against the spread of various pests and diseases. For instance, in earlier days serious objections were raised against the cutting down of Palms dead of Bud-rot though it was evident that they could never revive. Similarly, fronds of coconut attacked by the

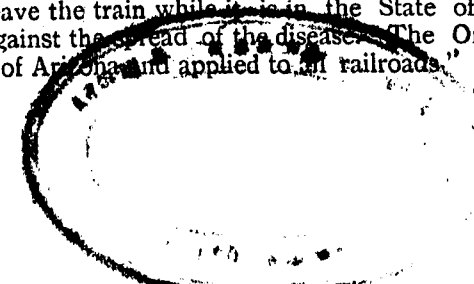
coconut caterpillar could not be cut down without protests from the owners and again in the case of Cambodia cotton plants, the owners are loth to pull them out even in cases where two pickings have been complete. The following extract, taken from the journal of the Jamaica Agricultural Society, Vol. XXIII. No. 6—June 1924, will perhaps give an idea as to what length rigorous enforcement of the law may go in the West, for the sake of the good of the general public.

"Foot and mouth Disease. A most serious outbreak has taken place in California, U. S. A. necessitating all neighbouring States imposing the strictest quarantine. So strict and immediate was the quarantine, that visitors returning back via the State of Arizona, per motor cars, were held up, and when they tried to break through found a barricade of rifles to enforce the quarantine.

Slaughter is the policy, and one of the highest priced cows in the world was one of the victims.

It may be of interest to your readers to know how drastically the United States undertakes to handle an outbreak of foot-and-mouth disease. At the present time foot-and-mouth disease has broken out in California. So far, it is entirely confined to that State, and all infected animals are immediately slaughtered, and animals having had an opportunity to become exposed are continuously under observation. In addition to this, the veterinary officers of the different States surrounding California, and even as far away from California as the State of Montana, which is some 700 miles distant, have adopted restrictions and regulations regarding not only the movement of live stock but the movement of all classes of agricultural products, even including agricultural labourers and sheep-shearers. The State of Utah has, on the five roads coming into it from Arizona, which roads lead to California, established disinfecting stations for all motor-cars and contents of same, which are run into specially constructed buildings and disinfected, as are the garments of the passengers. When it is realised that there are approximately 200 miles of desert as a barrier between California and most of the other States adopting these regulations, which are crossed only by a few auto roads, and five lines of railroad, it will be seen that certainly every effort which it is humanly possible to make in a precautionary way is being exercised.

No passengers on trains entering Arizona from California are allowed to leave the train while it is in the State of Arizona as a precaution against the spread of the disease. The Order was issued by the State of Arizona and applied to all railroads."

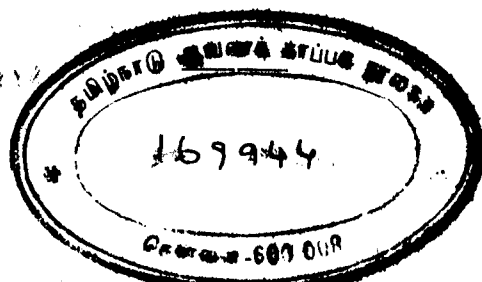


Appointments, transfers etc.

1. Mr. P. Krishna Rao, upper subordinate, V grade, confirmed with effect from the date of his appointment on probation.
2. Mr. K. K. Subrahmanya Ayyar, Agricultural Demonstrator, VIII Circle transferred to VI circle for district work in Rajapalayam.
3. Mr. K. Avadanayakam Pillai, Agricultural Demonstrator, IV Circle, transferred to VIII Circle, to join on the expiry of the leave for 2½ months from 30-5-24.

Leave.

1. Mr. P. H. Rama Reddi Dy. Dir. of Agri. Ill Circle leave for six weeks from date of relief.
2. Mr. T. S. Ramsubrahmanya Ayyar, Assistant in Chemistry, leave on average pay for 15 days from or after the 6th September 1924.
3. Mr. M. U. Vellodi, Teaching Assistant, leave on full average pay from 2nd to 13th August 1924.
4. Mr. J. A. Muliyl, Assistant in Entomology, leave on average pay for one month from 15-8-24.
5. Mr. K. S. Ramana Rai, Agricultural Demonstrator, leave on average pay for one month from 5-8-24.
6. Mr. M. V. Kondala Rao, Assistant Agricultural Demonstrator, leave on average pay for three months on medical certificate from 18-7-24.
7. Mr. K. Ramanujacharya, Dairy Manager, leave on average pay for two months from or after 15-8-24.
8. Mr. A. M. Muthayya Nattan, leave on average pay for 9 days on medical certificate from 4-8-24.
9. Mr. G. Sakkarama Rao, Farm Manager, leave on average pay from 19-7-24 to 10-8-24.
10. Mr. T. S. Venkatarama Ayyar, Agricultural Demonstrator, leave on average pay on medical certificate for one month and seven days from 10-7-24.
11. Mr. S. P. Fernando, Asst. Farm Manager, leave on average pay on medical certificate for one month and ten days from 19-7-24.
12. Mr. A. Moses, Sub Assistant, leave on average pay for one month from 1-8-24.
13. Mr. Y. G. Krishna Rao Nayudu Asst. Director I Circle leave for one month.



(iv)

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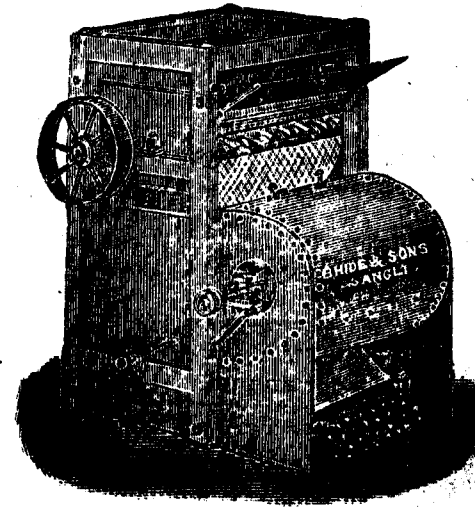
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(vii)

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