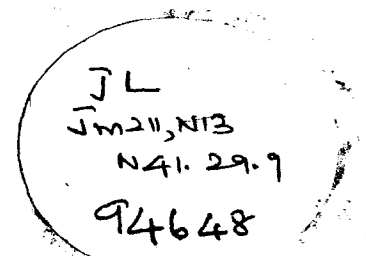
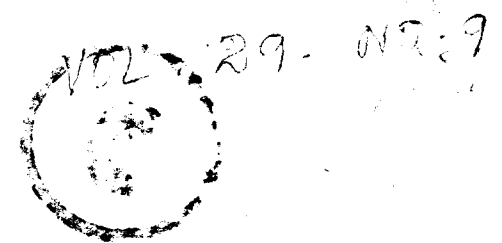


19

The Madras Agricultural
Journal

1941 - September

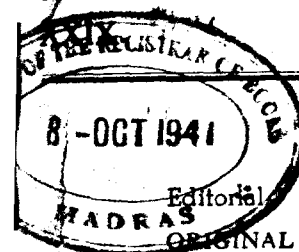


Regd. No. 1155.

THE MADRAS AGRICULTURAL JOURNAL

September 1941.

No. 9.



CONTENTS

19

Page.

Editorial	345
ORIGINAL ARTICLES:	
1. Nagari Oranges—Their past and present By A. Muhammad Ali.	347
2. Some Promising Fruit Products of South India By R. Shunmukhasundaram & D. Krishnaswami Naidu.	351
3. Preliminary Studies on the Cardamom Thrips (<i>Taeniothrips Cardamomi</i> Ramk), and its Control By M. C. Cherian & M. S. Kylasam.	355
4. A Short note on dry-land paddy in Udayarpalayam. By T. V. Ayyaswami Iyer.	359
Extracts	360
Abstracts	363
Gleanings	364
Crop & Trade Reports	367
Mofussil News and Notes	368
College & Estate News	370
Weather Review—July 1941	372
Weather Review—August 1941	374
Departmental Notifications	375

Published by

THE MADRAS AGRICULTURAL STUDENTS' UNION,
Agricultural College and Research Institute,
Coimbatore, S. India.

Annual Subscription Inland Rs. 4-0. Single Copy
Foreign Rs. 4-8. As. 6.

The Madras Agricultural Students' Union.

This is an association of the students, past and present, of the Madras Agricultural College, and of the officers of the Madras Agricultural Department, the Principal of the Agricultural College being the President, *ex officio*. The Union conducts this Journal and celebrates annually the College Day on which occasion it convenes an Agricultural Conference. The Association has Members, Associates, Honorary Members and Patrons. For detailed particulars apply to the Secretary.

The Madras Agricultural Journal

THE PREMIER AGRICULTURAL MONTHLY IN INDIA

EDITORIAL BOARD

S. N. Chandrasekhara Ayyar, M. A.

C. M. John, B. A. V. Gomathinayagam Pillai, B. Sc. Ag.
C. S. Krishnaswami, B. A., B. Sc. Ag. M. A. Sankara Ayyar, B. A., B. Sc. Ag.
N. Krishnaswami, B. Sc., Pb. D. C. L. Sundararajan (Student)
H. Gurubasavarsj, Secretary, Students' Club (*ex officio*.)

A monthly journal in English devoted to the study and development of Agricultural Science; contains articles of scientific as well as of general interest written in popular language. Reviews of agricultural publications and extracts from various journals—both Indian and foreign—a special feature. Commands a wide circulation and is an excellent medium, therefore, for advertisements.

Rates of Subscription.

Journal supplied *free* to Members, Associates and Patrons of the Union

Annual subscription rates for others:

	Rs.	A.	P.
India and Ceylon	4	0	0
Foreign	4	8	0
Single number	0	6	0

Rates of Advertisement.

For single insertion

	Rs.	A.	P.	
For full page	6	0	0	Liberal discounts are allowed
For half page	3	8	0	for standing matter provided
For quarter page	2	0	0	space is booked ahead and
				pre-payment made.

Inside cover pages 25 per cent. extra.

Outside cover pages 50 per cent. extra.

Preparation of blocks, unless supplied by advertisers, charged extra.

N. B. All advertisements are subject to the approval of the M. A. S. U. Managing Committee before insertion. The charges are strictly payable in advance.

Contributions to the Journal.

Contributions on subjects of agricultural interest or pertaining to rural economy and co-operation will be accepted for publication, subject to approval of the Editorial Board. Correspondence and queries on agricultural and allied subjects are invited. Manuscripts should be sent clearly written or typed on one side of the paper only.

Twenty-five copies of reprints of contributions will be presented to authors. Extra copies and printed covers for reprints, if required, can be supplied at actual cost if intimation is given when the manuscript is presented.

N. B. The Editorial Board does not hold itself responsible for the opinion expressed by the contributors.

All communications should be addressed to:

THE SECRETARY, M. A. S. UNION,
Agricultural College, Coimbatore, Lawley Road P. O.

FOR QUALITY INSIST ON STANES

Well balanced Manure Mixtures for all crops. We mix only the best ingredients, and our manures are sold on guarantee of analysis. Our War-time prices are very competitive and within the reach of every Ryot.—Suppliers to The Agricultural Departments of Madras, Travancore, Cochin etc., etc.

WE SOLICIT A TRIAL ORDER FROM YOU

STANES POULTRY FOODS

For more eggs give STANES LAYING MASH.

STANES CHICK FOODS, are well balanced, stimulate growth, and make the Chicks healthy.

STANES CONDITION MIXTURE for Dogs.

STANES Fine Fishmeal, Shell-grit and Bone Grit are specialities.

STANES MINERAL MIXTURE FOR CATTLE

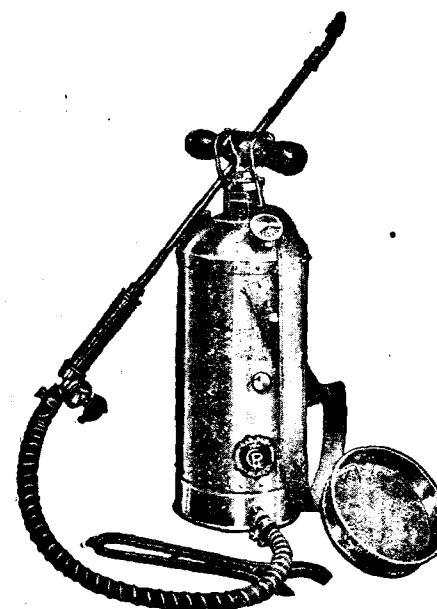
The only Tonic at low prices with high tonic value. Prevents diseases due to deficiency in CALCIUM and PHOSPHORUS. Largely used by all the Agricultural Research Stations, Dairy Farms, Live-Stock Stations in Madras, besides by the Travancore Royal Stables.

Sold in tins of 14 lbs., 28 lbs. and 56 lbs.

Agricultural Sprayers, Hose and Spraying Materials.

Calix No. 4. self-acting Knapsack Sprayer of 1¼ gallon capacity, made of best brass, Suitable for Copper and Sulphur mixtures, also for Health Departments.

Price very moderate.



For further particulars please apply to:—

MESSRS T. STANES & CO., LTD.,

RYOTS SALES DEPARTMENT,

COIMBATORE

When answering our advertisers, please mention 'The Madras Agricultural Journal.'

DO YOU KNOW?

That Bees can increase the yield of your Fruit trees?

And that they can better the quality of your fruits?

All progressive Modern Fruit Growers in the West find it profitable to keep bees in their orchards. Keep bees and be up-to-date.

Bee-keeping is a fascinating hobby.

The *Indian Bee Journal* will tell you all about this extremely fascinating subject. Yearly Rs. 3.

INDIAN BEE JOURNAL,

JEOLIKOTE DIST. NAINITAL U. P.

THE JOURNAL OF THE Mysore Agricultural and Experimental Union, BANGALORE

Published Quarterly by an Expert Board of Editors.

Chief Editor : M. J. Narasimhan, B. A.

SUBSCRIPTION : RS. 3 PER ANNUM

The Madras Journal of Co-operation

The Premier Monthly Co-operative Journal in India.
Voices forth the co-operative opinion of the Province

ANNUAL SUBSCRIPTION

Inland (including postage) Rs. 4—0

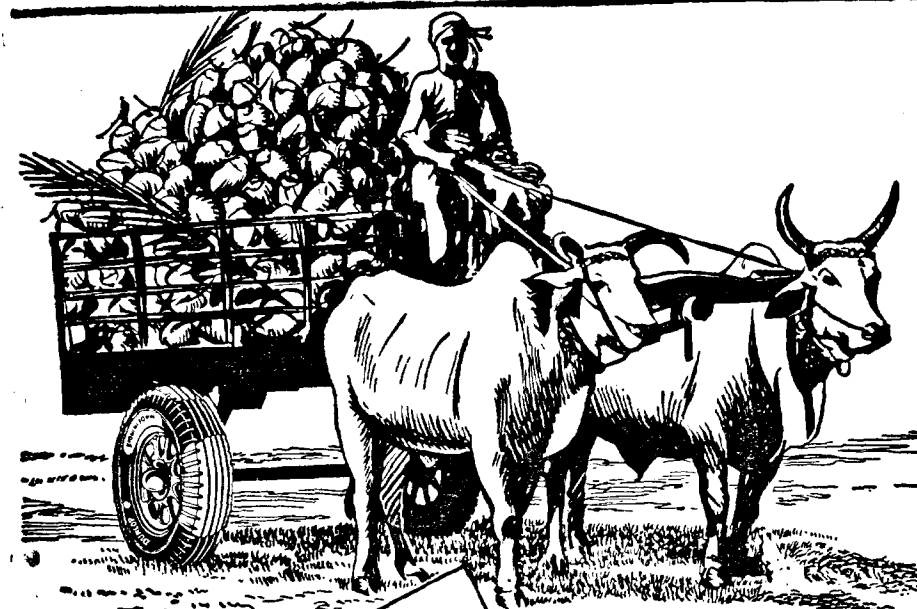
Foreign " " " 4-12

Please apply to: The Madras Provincial Co-operative Union,

Royapetta, MADRAS

When answering our advertisers, please mention 'The Madras Agricultural Journal.'

A word of advice ::
and This is how you save.



A WORD OF ADVICE
TO PLANTERS!

From the economical view point alone, the Dunlop pneumatic tyre pays for itself over and over again. The saving on haulage costs is possible as heavier loads can be carried thereby reducing the number of trips required.

DUNLOP EQUIPMENT FOR ANIMAL-DRAWN VEHICLES

For comprehensive booklet, apply to Sole Selling Agents:

IMPERIAL CHEMICAL INDUSTRIES (INDIA) LTD.

CALCUTTA
AHMEDABAD

BOMBAY
COCHIN

KARACHI
LAHORE

MADRAS
PATNA

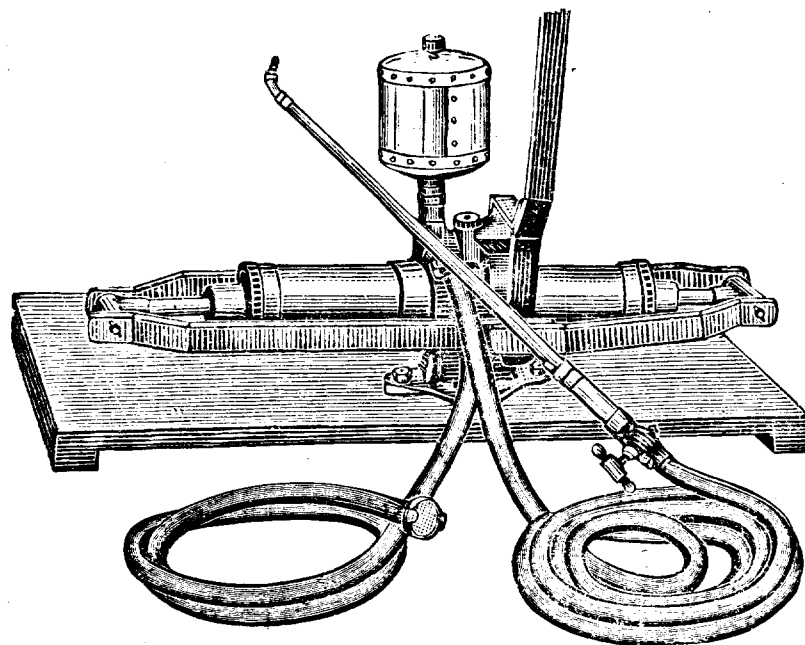
RANGOON
CALICUT

CAWNPORE
AMRITSAR

A.D.V. 24

When answering our advertisers, please mention 'The Madras Agricultural Journal.'

SPRAYERS FOR ESTATE USE
Powerful and Efficient



Manufactured by
THE STANDARD FURNITURE CO., LTD.,
KALLAI, Malabar.

*The finest gardens
in India grow on*

**POCHA'S
SEEDS!**

PESTONJEE P. POCHA & SONS,
8, NAPIER ROAD, POONA

Catalogue of Vegetable & Flower Seeds FREE.

When answering our advertisers, please mention 'The Madras Agricultural Journal'.

Kerala Shaving Soap



FOR ADORABLE SHAVES

Kerala Soap Institute, Calicut.

Stockists in Coimbatore.

1. S. Ottajee Branch, Big Bazaar. 2. S. Murugiah Gowder & Sons, Big Bazaar 3. N. Dasai Gownder and Co., Mill Road.
4. D. S. V. and Sons. 5. P. P. Raman Nambiar. 6. Coimbatore Swadeshi Ltd. 7. Noor Mohamed Latif Sait. 8. P. Sultan Branch.
9. N. B. Krishnamurthi Chettiar, Avanashi Road, 10. Sri. Kannikaparameswari Vilas Stores, Sullivan Street.

Agent: **R. C. Dalal, Calicut.**

TO LET

When answering our advertisers, please mention 'The Madras Agricultural Journal'.

THE VILLAGERS' CALENDAR

Published Annually
BY
THE MADRAS
AGRICULTURAL DEPARTMENT
IN

English, (Jan.)	Tamil, (April)	Telugu, (March)	Malayalam & Kanarese (Sept.) (March)
--------------------	-------------------	--------------------	---

It contains instructive and interesting articles on Agriculture and Veterinary Science and exhaustively deals with the work of the department including agricultural research stations, pumping and boring operations, state loans, etc.

Price 1 anna, Postage 2 annas.

For copies apply to the Deputy Director of Agriculture or the District Agricultural Officer or the Agricultural Demonstrator nearest to you with three annas stamps. Not sent by V. P. P.

The Indian Veterinary Journal.

(The Official Organ of the All-India Veterinary Association)

The Journal is the only English Veterinary Journal of its kind in India devoted to the cause of Veterinary Practice, containing standard articles on all branches of clinical Veterinary medicine, surgery and kindred subjects. It also contains a review of current Veterinary Literature, and is valuable alike to Veterinarians and Agriculturists.

AN EXCELLENT MEDIUM FOR ADVERTISEMENT

To members of the profession & students Rs. 4 per year.

To non-members & others Rs. 8 per year.

For rates of advertisement and other particulars apply to:

THE EDITOR,

36, Wallaja Road, Mount Road, P. O., MADRAS.

When answering our advertisers please mention 'The Madras Agricultural Journal.'

The Madras Agricultural Journal.

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

Vol. XXIX]

SEPTEMBER 1941

[No. 9

EDITORIAL

Vegetable Dyes. Time was when vegetable dyes played a very important part in human economics, but once the synthetic aniline dyes entered the market, they lost their value. The time is now opportune again for the resuscitation of the vegetable dyes for two reasons. Owing to the war the import of artificial aniline dyes are very irregular and inadequate, and consequently the stock is getting practically almost exhausted. Secondly, the little stock that is available is very prohibitively costly. Under these circumstances it behoves us to think of starting growing again such of those valuable plants which were, in the pre-aniline days, supplying the needs of this important industry. The first place must of course be given to the once familiar Indigo plant—*Indigofera anil* Linn. (*I. Sumatrana* Gaertn.), popularly known as *Neli* in Tamil and Telugu and as *Neelam* in Malayalam. There was a time when this crop was cultivated as largely as any other commercial crop of today. It is still grown in some parts, but often, only as a green manure and soil improving crop, belonging as it does to the family Papilionaceae whose members are of these values *I. tinctoria*, wild indigo, also yields very good dye like the former species. There are a number of other plants easy of cultivation which yield dyes. *Carthamus tinctorius* Linn., the safflower, wild or Bastard saffron, African or American saffron and carthamine dye is another familiarly cultivated plant grown more for the sake of its oil than for its dye. But the present situation in the dye industry calls for the use of its florets which yield a beautiful yellow dye which is used in colouring silk and wool. The well known turmeric plant *Curcuma longa* Roxb. yields an excellent yellow dye. *Bixa orellana* Linn. the Annatto, *Jaffra maram* (Tamil), *Jaffra chettu* (Telugu) is a small tree growing both wild and cultivated in the West Coast and Circars. This yields an orange dye which is used for colouring cheese, yarn, etc. Another very valuable dye yielder is *Mallotus philippensis* M. Arg. the Kamala dye plant. It is popularly known as the Monkey face tree in English, *Komela* in Tamil and *Kunkuma* in Telugu, a tree found in all forests of the Northern Circars, Deccan and Western ghats. The glandular pubescence of the fruit yields a rich orange red permanent dye known as Kamala dye. The extract prepared with soda imparts to silk a fine and durable fiery orange colour without further addition or the use of mordants. *Artocarpus integrifolia* Linn. the jak, yields an yellow dye obtained from its heart wood; the wild trees of Rubiaceae, *Morinda tinctoria* Roxb. and *M. citrifolia* Linn. are rich in a red dye easily obtained from their wood, bark and root bark.

In fact there is no dearth of material, as there are a number of plants of the plains as well as of the forests some of which are already in cultivation such as the safflower, the jak and the indigo for other needs, but which could be more largely cultivated now to meet the needs of the dye industry. One must be able to fit his local supply of dyes as almost all the indigenous dye plants are scattered all over the Province. The time is opportune for any enthusiast in the line to revive the industry of vegetable dyes, in which he is sure to have all the help he requires easily given to him as the case may be from the Agricultural, the Forest or the Industries Department.

Convocation Address. On the 15th of August 1941, the Rev. L. D. Murphy, S. J., M. A., Principal, Loyola College, Madras, delivered the Convocation Address to the graduates admitted to degrees at the 83rd Convocation of the Senate of the University of Madras. In the course of his very inspiring address, the learned professor remarked. "And here our educational system is at fault. The high school ends too early, and the system makes no provision for those who wish to continue their studies without entering a University. We need a great number of technical schools under Government management to round off the school course, so that when Matriculates go to the University, the others may go to a specialised course in book-keeping, type-writing and shorthand, or a specialised course in draughtsmanship or in electricity or automobile engineering. This kind of vocational training would go a long way to meet the case of those 20,000 students who annually pass the S. S. L. C. and do not enter the University. Above all we need more *Agricultural* and *Veterinary* Colleges. Tremendous strides have been made within the last few decades in the improvement of all manner of seeds, in the improvement of all manner of cattle stock, in the diagnosing and curing of plant and cattle disease; but as yet it is on all too small a scale. The riches of India lie here and over 100 millions of its people are engaged in agriculture, but things are only being slowly worked up, because the people will give themselves up to a cultural literary education instead of an agricultural and veterinary one." No one can gainsay the truth of the statements made here. Admittedly India is mainly an agricultural country and it is true over 100 millions of its people are engaged in agriculture. It is time more and more of these 100 millions, if not all the 100 millions, are trained in modern agricultural methods. Now that there is a cry everywhere that we must produce more food crops than ever before, and what is more, good quality crops also, the need for imparting agricultural education to the masses has never been so important as today. Agricultural and Veterinary schools should therefore be multiplied, and what is wanted is not colleges of the type of the Agricultural and Veterinary colleges run and maintained at rather heavy expense, but smaller schools where those who leave the schools and have no other avenues of life open to them except agriculture, can gather and learn actual farming on modern lines.

Nagari Oranges—Their past and present.*

By A. MUHAMMAD ALI, B. Sc. (Ag.),
Agricultural Demonstrator, Puttur.

Introduction. *Nagaram* and *nagari* orange, are other names for the *sathugudi* or the *chinee* orange. These names are derived from its original home—Karvetnagar town, popularly known as "Nagaram", the capital of the Karvetnagar zamindari. The famous *Khasa* (private) garden of the Rajah of Karvetnagar, was once reputed in the whole of the central districts, for the finest quality of *chinee* fruits it produced. All the trees, found in the original Karvetnagar zamindari, now comprising the revenue taluks of Tirutani and Puttur of the Chittoor district, are the descendants of those in the *khasa* garden. It is possible, that the *chinee* oranges found in the rest of the Chittoor district and the adjoining districts of Cuddapah and North Arcot, also claim their descent from the reputed original stock in the *Khasa* orchard. With the decline of the zamindari the *khasa* garden too gradually disappeared, and to-day not even a single *chinee* tree remains there to commemorate the origin, spread and history of the famous *sathugudi* orange of the Ceded districts. No record is also available to establish clearly, as to from where and how, this orange, first found its way to the *Khasa* garden. One theory has it, that, the fruit was first introduced into Palacole in N. Circars by the Dutch settlers and from there a few trees might have been introduced into Karvetnagar, by an enterprising zamindar.

Even after the disappearance of the *Khasa* garden, the Karvetnagar *chinee* fruits continued to enjoy a reputation for quality in the South Indian markets and they used to be sold at a premium in the Madras city. In spite of this encouragement, paradoxically enough, the area under this has gradually declined in and around Karvetnagar town during the last few years. In this note an attempt is made to summarise the several uneconomic and bad orchard practices, which are believed to have been primarily responsible for the present restriction of the area under this fruit, almost to a stage of its wholesale elimination.

Soil. Tempted by good returns in the past, the *ryots* undertook, for a time, to extend the area under *chinee* cultivation in all kinds of soil with disastrous consequences for themselves and to the future of the *sathugudi* industry itself in this tract. In places where the soils were shallow with a hard subsoil layer, the trees continued their normal growth for about 10 to 15 years. Just when the yield should be normal the hard sub-soil layer began to tell upon the growth of the plant adversely and gradually the trees weakened, diseases like 'the die-back', 'gummosis' etc. appeared and instead of the anticipated good yield, an unsightly and uneconomic orchard presented itself. In some places, the orchards were established in

* Paper read at the thirtieth College Day and Conference, of the M. A. S. Union, July, 1941.

low-lying lands with a high water table. Here again the result was equally disastrous and disappointing. The planting of the trees in loose soils with poor humus content was yet another defect which brought about the premature ruin of the *chinee* orange industry. In such soil, the growth was very poor, and after sometime the orchard had to be necessarily abandoned or grubbed out to make room for other agricultural crops.

Spacing. Normally orange plants are known to require an optimum spacing of about thirty feet for their full development and profitable performance. Strangely enough, the spacing adopted in most orchards in this tract was not more than eighteen feet, with the result the trees grew tall and lanky, with inadequate room for branch spread and consequent reduction of the bearing area to a considerable extent. In old orchards the roots had to crowd themselves in a limited zone. Thus cramped for space and artificially hindered in growth, the trees naturally declined in vigour and productivity at a very fast pace, becoming a liability to the owners.

Methods of propagation. Propagation by seedlings was the only method adopted in this tract. Whatever might be the care exercised in the selection of the parent tree, the seedling offsprings can never be relied upon to have the same character as the parent. Uneconomic bearing of an amazingly large number of trees and periodic crop failures are attributed to this method of propagation by seed. It is natural, therefore, that the interest of the grower very soon faded when most of his trees failed to produce profitable crops resulting in an increasing number of neglected orchards.

Orchard practices. Cultural: In the successful farming of fruits, careful cultural and pruning practices play a very important role. But the Nagaram grower of *sathugudi* rarely recognises or understands these essential principles. After the trees are planted they are left to themselves, except for an occasional ploughing to clear weeds during the flowering season and some irregular irrigation. Rank weed growth, in most orchards, shows that even the necessity for the removal of these do not engage the serious attention of the ryots.

Pruning. The trees are seldom pruned, and the presence of a mass of dead wood on the trees is a common sight in the majority of orchards. The neglect to prune off dead-wood in time often results in poor new growth and death of a greater number of twigs and the consequent lowering of yields. Too many orchards have been ruined by this neglect to attend to the needs of the trees in good time.

Root pruning. Root pruning is another injurious practice, that has brought ruin to a number of ryots. In a normal, but a shy bearing plantation root pruning usually forces yield for the first time. Encouraged by such visual results obtained in the first instance, the practice of root-pruning was widely adopted, as an annual orchard practice, with the result that the yield was gradually reduced to practically nothing. The worst effect of this evil practice was very markedly felt in the case of one ryot in the Tirumandram

village of the Puttur taluk. Innocently falling a victim to an evil advice, he resorted to root pruning. Very soon, his trees became affected in a severe form by gummosis and the die-back diseases, and his orchard of 50 trees presented such a bad appearance that in 1938 he resolved to cut them down and release the area for agricultural purposes. Just then, the Agricultural Department came to his aid and by a carefully planned programme of treatment, the diseases were brought under control and gradually the yield too increased. In the year 1940 he was offered Rs. 600 for his crop. Unfortunately, with the gradual increase in yields, he forgot the previous history of his plantation or failed to realise adequately the harmful effects of his forcing methods for increasing fruit crop. During August last he once again resorted to root pruning. He dug deep round the plants, removed earth, dumped in green leaves and other nitrogenous manures and covered them with earth. In a few days, the good looking trees suddenly turned pale, immature fruits began to fall and his entire orchard relapsed to its original miserable condition. The flowering was practically nil in January last and today, he has become a wiser man and has learnt fully the evil effects of root pruning, though at the expense of his trees.

Irrigation. Most of the gardeners do not seem to know the proper method of irrigating the trees. They form small shallow basins round the trees and irrigate them sparingly but rather constantly. And the bulk of the space between the plants, where tender functioning roots are present, is left unirrigated. So much so, the plant growth is very much restricted for want of adequate quantity of water and the yield is reduced. Further, owing to the water constantly touching the stem diseases of the bark have appeared.

Another common defect observed is the abnormal postponement of the first irrigation for the year. Normally, the *chinee* trees flower in the last week of January. If proper *angam* (local) flowering is to be ensured it is necessary that the orchard should be given the first irrigation almost at that time. Unfortunately, this is seldom done. It is not uncommon to find the trees being irrigated as late as the end of February. Once the timely irrigation is not given the vegetative and the flower bud formation get impeded and the result is poor flowering. This phenomena is very commonly observed in this tract, due to the failure to irrigate the plants in time.

Manuring. Except sheep penning, no other manure is applied to the *chinee* trees. As a result of inadequate manuring, growth is diminished and the number and the size of fruits are found to be rather small.

Delayed harvest. With a view to secure high prices, the ryots have a tendency to delay the harvest. In most cases, picking is postponed to even as late as, the beginning of January. When the crop is kept on for long, the period of rest that is so very essential is either lost, or minimised. Consequently the flowering in the next season is reduced. In their eagerness to obtain the best price for the crop the ryots forget the natural repercussions on the tree due to this delay and thereby help for a progressive deterioration in tree yields.

Diseases. The gardeners do not seem to have sufficiently understood the evil effects of gummosis. It is a common sight to see trees die suddenly in the orchards. When the gum exudation commences, they ignore its appearance and it is only when the whole bark has been separated and the plant is dead, that the gardeners are attracted. 'Die-back' is another serious disease, which levies a heavy toll in Nagaram town. No precautions or remedies are being taken to keep this scourge within bounds or to root it out.

One ryot, a fairly important orange grower of the Keelampakkam village, who owns a garden of nearly 500 trees practised a very novel method in December 1940. He flooded the whole garden, ploughed it in puddle, spread indigo leaves, trampled them in and allowed the garden to dry up. At the end of February he commenced irrigation, with high hopes of getting a bumper crop. To his great distress neither there was adequate fresh growth nor flowering. In a few months, dead wood appeared and every tree was badly affected by gummosis and die-back. Having spoilt the condition of his trees he sought the help of the Agricultural Department when it was explained to him that his ploughing in puddle and trampling in of the green leaves, had not only disturbed the roots but had badly pruned them. Further the soil too had become hard. Hence the appearance of the diseases.

The General impressions in the tract. Owing to the several causes enumerated there are by far a greater number of uneconomic than economic orchards in this tract. A number of gardeners have wasted their fortune on raising, the up keep and the maintenance of orchards till they attained the bearing stage all the while hoping that after 10-12 years the orchard would become a paying proposition. Unfortunately, due to defective orcharding, the result was quite the reverse. Instead of good looking, well shaped, healthy trees, ill shaped, diseased plants presented themselves, and the return was far below their expectations. Once the orchard was found to be uneconomic, instead of trying to remedy the defects, the gardeners grew desperate and neglected them. Due to this a belief has been created in this tract, that 'one who goes in for *chinee* cultivation is sure to court ruin.'

Conclusion. As stated in the beginning itself, the idea in presenting this note is to place before the intending *chinee* growers the several major defects observed in the original home of this orange, so that they might guard themselves against practising the same either wittingly or unwittingly. The point naturally arises as to what are the best methods to be adopted if good orchards are to be raised and are to be kept in a profitable condition. Want of space limits the discussion of these obviously important points. For the present the growers are recommended to seek the aid of the nearest officer of the Agricultural Department and follow his advice. The writer is highly grateful to Sri. K. C. Naik, Superintendent, Fruit Research Station, Kodur, who gave valuable suggestions and criticisms.

Some Promising Fruit Products of South India.*

By R. SHUNMUKHASUNDARAM, B. Sc. (Ag.)

&

D. KRISHNASWAMI NAIDU, B. Sc. (Ag.),

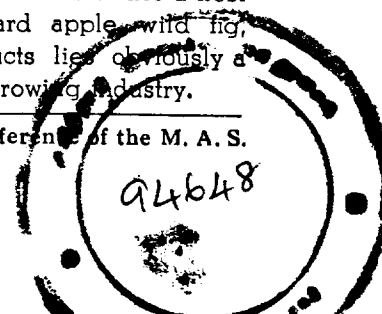
Fruit Research Station, Kodur (Cuddapah).

Owing to the spontaneous and unregulated fruit industry of this part of India, our commercial orchards produce an admixture of good, bad and indifferent quality fruits in varying proportions. In almost every season the problem of disposal of the inferior quality or cull fruits is one of major importance to the fruit growers. The stability and expansion of a profitable fruit farming industry is intimately connected with the profitable utilisation of a large part, if not all, of those fruits that have no value in our fresh fruit markets. It is true that preparation of home-made jams, dried mangoes and some kinds of pickles and chutneys are popular in several parts of the country, but these outlets cannot be expected to touch even the fringe of the problem of the utilisation of fruits.

Even in the matter of our superior quality fruits the development of a large-sized fruit-products industry is essential to off-set the uncertainties of price fluctuation in fresh fruit markets. The frequent occurrence of gluts and uneconomic price levels can only be relieved by either the extension or the improvement of market facilities, or by the conversion of a bulk of our fresh fruit produce into suitable by-products. The fruit products industry has contributed a very large share in the development of the fruit-growing industries in many parts of the world, and should, make a special appeal to fruit growers in this country also.

Marketing improvements can only be effective in the case of fruits of marketable value that are produced in abundance in a fairly compact area within easy access of transportation centres. In this country where orchards have sprung up at all odd corners, often in localities from where transport is difficult or very expensive and where production itself is extremely unstandardised, the extent of possible improvement through better marketing is but limited. The development of 'fruit products industry' is therefore of great importance in this country, if adequate returns for all the fruits produced are to reach the pockets of growers. Madras ranks very high among the fruit producing Provinces and States in India. We claim an area of about 250,000 acres under mangoes, about 150,000 under bananas, over 20,000 acres under citrus and a very large undetermined area under a host of cheaply and abundantly produced fruits like, custard apple, wild fig, etc. In the conversion of these fruits into fruit products lies obviously a profitable avenue for the future prosperity of our fruit-growing industry.

* Paper read at the thirtieth College Day and Conference of the M. A. S. Union, July 1941.



During the past six years some preliminary work on the conversion of a number of commercially grown fruits into a variety of products has been in progress at the Fruit Research Station, Kodur. It is naturally to be expected that with a work that is of such a complex and prolonged nature, much results of practical value cannot accrue from these preliminary trials. Nevertheless some of the products manufactured on the station have been certified by a large number of independent observers to be of high quality and full of promise. The following is an account of the work carried out on some of the products which may be of interest to those who may venture to develop a profitable opening for at least a part of their fruit produce.

Lime products. Limes form one of the most extensively grown fruits in this province and are exported in considerable quantities to North Indian markets. The high transportation costs and the heavy seasonal productions often result in only unremunerative returns to lime growers, as a result of which the necessity for the development of lime products is clearly indicated. Work on the preparation of lime cordials and squashes, lime-peel powder and pickles has given encouraging results at Kodur. The cost of preparation of good quality lime beverage of about 12 oz. (without container) works to only Rs. 0-2-3, as against the sale price of similar imported products at Rs. 1-12-0 per 24 oz. (including container). These figures amply indicate the scope for the extended manufacture of these products. The most suitable method for preparation of lime beverages consists of bottling the juice with 65° Brix, with 200 parts of sulphur dioxide per million parts by weight, in sterilised containers after five minutes of exhaustion.

Vadlapudi orange. Vadlapudi orange is a fruit of some commercial importance particularly in Guntur and Kistna districts. Owing to its reputed dietetic value, it has enjoyed a fairly good market in the Circars for some years past. But the production has now reached to such a proportion that the problem of marketing these fruits profitably in other parts of the Presidency or the country is found to be acute, as taste for this fruit is not easily developed except in some parts of Circars. A palatable squash with 60° Brix preserved in 150 parts of sulphur dioxide per million by weight, and exhausted in the same way as for lime beverages, has been prepared at a cost of Re. 0-2-9 per 12 oz. The preparation of essential oils from the peels of these orange has also been attempted with some success, while Messrs. The India Fruits, Ltd. have manufactured some excellent marmalades from these fruits.

Chinese orange. Squashes and cordials from inferior quality *chinee* oranges have been prepared by adopting the same methods as referred to above and with the addition of some amount of lime juice in order to bring the acidity in the final product to about 2% in terms of citric acid. Preserved orange beverages are, however, notorious for rapid deterioration in quality under storage conditions, for preventing which de-aeration has been reported to be essential. The latter method remains yet to be tried.

Lemon Beverages. In point of flavour, lemon beverages are decidedly superior to those of limes. Although lemons are not cultivated on a commercial scale in this Presidency, the high productive nature of a number of varieties so far tried at Kodur together with the precocious habit and ability to produce fruits almost throughout the year, appear to mark out these lemons as full of promise. Trials on the preparation of squashes and cordials with fruits of several varieties of lemons, adopting the same methods as those described under limes, have also given very encouraging results.

Pineapple. The West Coast provides some of the ideal conditions for cultivation of pineapple at a cost which can bear comparison with any other part of the world. Simhachalam and some parts of the Circars and also Lower Pulnies are other areas where this fruit is found to thrive very well. Excellent products of canned pineapple, pineapple jam, pineapple squashes and pineapple candy have been prepared by employing the wellknown methods. But the cost of manufacture of these products at Kodur, several hundreds of miles away from production centres, becomes too high so that the manufacture of these does not seem to be a profitable proposition. There seems to be some scope for the establishment of a pineapple cannery in West Coast provided the cannery can command an assured and regular supply of suitable varieties. This is one of the crops in which the extension of the area and the development of canning factories are closely inter-dependent and are bound to be mutually benefitted. Of all the varieties so far tried the Kew has been found to be the most suitable for canning.

A small hand-made pineapple extractor for the removal of eyes expeditiously and with least wastage of edible matter and juice has been devised at Kodur and is now being sold by the Metal Industries, Shoranur. A small dehydrating chamber which can be heated with a special home-made oven and in which control of heat can be effected has also been devised and this renders the dehydration of fruits and preparation of candy very simple.

Mango. Although mango forms the leading commercially produced fruit of this Province no encouraging result in the canning of this fruit has so far been achieved. Several of our varieties are believed to be deficient in acidity, and therefore are difficult to be processed by the ordinary methods. The presence of turpenes tend to give an oil-flavour to the product and therefore devices have to be evolved to eliminate these in the final pack. Trials on canning of several of our wellknown commercial varieties like *neelum* and *bangalora* have proved a failure from the point of view of quality, although the products remained in sound condition inside the cans for even two years. *Manoranjan* and *baneshan* have shown to can slightly better, but even these cannot be said to be up to the mark. Messrs. India Fruits Ltd. have however succeeded in obtaining some good packs with *chinnasuvarnarekha* and some *rasam* varieties, particularly with *kothapallekobbari*. With dehydration, however, good success has been

obtained with several varieties and mango "leather" of good palatability and attractive appearance have been prepared. There is also a good prospect for the manufacture of several types of pickles and chutneys both on a cottage industry and factory scale.

Banana flour. By dehydration in the specially improvised chamber referred to previously, it has been possible to prepare flour from several varieties of bananas, of which some have appealed greatly to a number of independent observers. Mixed with milk and sugar the flour of *virupakshi* has been considered by several to provide an excellent food, possibly of very high dietetic value also. The flour of banana may also lend itself for the manufacture of a variety of foodstuffs like biscuits, bread and some special types of breakfast and invalid foods.

Papaya. To many, a fresh ripe papaya is distasteful, but in the papaya conserve even the most fastidious taste will find a product at once cheap and of high palatability. Candied papaya is also a product with considerable appeal to children and adults, and which can be manufactured cheaply with no elaborate equipments. The manufacture of crude papain has also been attempted with success.

Jack fruit and custard apple. Manufacture of industrial products from these two fruits which are found almost in wild state in some parts of the Presidency is bound to be of great economic importance. Candied jack, jack syrup and custard apple jam, butter and chutney are some of the products attempted with a good deal of success.

Candied citron peel and kumquats. Of all the fruit products, candying is believed to offer the simplest process for any one to follow. Candied peel of citrons and the whole fruit of kumquat involve very simple methods of preparations consisting of the washing of the fruit, pricking, a gradual impregnation of sugar and final dehydration. Industrially, more complicated processes such as colouring, glazing and improvement of the flavour artificially may have to be employed. But as a cottage industry manufacture of these products from raw fruits which now goes almost entirely to waste merits earnest consideration.

Wild fig powder. Dehydrated sound fruits of *Ficus glomerata* Foxl. which is a tree found to thrive under the most neglected conditions, when ground, give a powder of great relish for eating with milk and sugar added to taste. The raw material costs almost nothing except for collection, but as a final product whether as a base for porridge or for the preparation of a variety of home-made sweets, the fig products deserve to be considered as of no mean dietetic or table value.

The brief account that is presented herewith of the work carried out at Kodur should, it is hoped, convince one of the immense potentialities for the development of our fruit canning and products industry. Up to the end of the last financial year, the total amount spent on manufacture of fruit products amounted to Rs. 2,026—8—10, while the receipts from the sale of

products and the value of stock on hand amounted to Rs. 1,421—14—4. The difference of Rs. 594—10—6 represents the total expenditure purely on research. This small amount expended on work on such a large variety of products over a period of over four years and with such encouraging results can never be said to have been disproportionate to the output or quality of work carried out. Much greater facilities and funds for the conduct and prosecution of research on this field of economic importance is considered most necessary, if the interests of fruit industry in all its bearings is to be properly safe-guarded, and its expansion and development adequately regulated and stimulated.

Preliminary Studies on the Cardamom Thrips (*Taeniothrips Cardamomi* Ramk), and its Control.

By M. C. CHERIAN, B.A., B.Sc., D.I.C., & M. S. KYLASAM, M.A.

Agricultural Research Institute, Coimbatore.

Introduction. The problem of cardamom thrips and their control is one of very recent investigation. Practically nothing was known of them till 1934, when they were first discovered by the junior author to be the sole agent concerned in causing unsightly scabs on the cardamom capsules. Ramakrishna Ayyar (1935) has described the thrips; Ramakrishna Ayyar and Kylasam (1935) have given a short account of the nature and the extent of damage caused by them. Since then the thrips situation has steadily worsened. The cardamom industry for which South India holds a monopoly has been steadily deteriorating as a result thereof. In view of the importance of the cardamom industry which is computed to give a turn over of nearly Rs. 10,000,000 per annum from a total production of 8,000,000 pounds of capsules, it was felt that the problem of thrips control required immediate attention. Experiments were started by the Entomologist in collaboration with Mr. K. M. Thomas, Government Mycologist, in 1939 at the Korangumudi Estate, Valparai (Anamalais Hills), where damage by thrips was reported to be very severe. The object of the experiment was to find out if it was possible to secure significant diminution of scab injury of the capsules by a reduction of thrips population with the aid of toxic sprays and dusts at a time when the thrips population was high.

Host and its Environment. The host plant is a herbaceous perennial and is cultivated under the shade of primary forests at elevations of 2,500 ft to 4,000 ft. Blossoming would appear to be governed by the extent of rains received in February—March; if for any reason the rains hold off at this critical period flowering is held back and a very poor crop finally results. In favourable seasons the blossoming would start by April and reach the peak by the end of May. The flush would wane thereafter but the plants will continue to produce scattered flowers till the end of December. Molegode (1938) and Subbiah (1940) have given detailed accounts of the

host and its habitat, from which it is possible to visualise the conditions under which the thrips thrive and assume pest proportions year after year.

Nature and Extent of Damage due to thrips. The scabbed patches seen on the affected pods are the result of the injury caused by the thrips feeding on the ovary in the tender stages of the blossoms. Both the adults and the nymphs get access to the deep-seated ovary long before the outer, closely adpressed bract opens out, and cause severe injury to the tender tissue through extensive feeding before the flower normally opens. Minute droplets of sap exudations could be seen oozing out from the ovary at the spots where thrips had lacerated the tissue and sucked the sap. The injured portions of the ovary gradually develop corky encrustations which persist as scabs on the outer skin of the capsules long after the actual damage is done. In cases of severe infestation, the scabs on the capsules are numerous and extensive. Roughly 75% to 80% of the fruits were found scabbed in varying degrees in the samples examined from Korangumudi Estate in 1939. About half the damaged fruits showed very severe scabbing, the scabs extending all over the outer skin of the capsules. The loss caused by way of shedding of flowers and tender fruits due to thrips is estimated by Mr. E. N. House to be about 30%. No further damage to the capsule is caused by the thrips after it has attained the size of about 6 mm. No appreciable damage is done to the shoots. The scabbed capsules are not commercially favoured and fetch a low price.

Seasonal Incidence. As the host plant is a perennial, the pest finds it easy to breed right through the year on the same host. But its incidence varies with the season; it is lowest in the months of November, December and January; a sharp rise is noticeable from February onwards. Thereafter it reaches the peak in May and June after which it appreciably drops. The downward trend noted in its population after July may be due to the heavy monsoon rains which would seem to bring it down. The peak period of the pest unfortunately synchronizes with the heavy flowering noticeable in May, and the fruits that set at this period, therefore, show invariably a high percentage of scabs. All the stages of the insect, i. e., nymphs, prepupae, pupae and adults are passed on the plant itself.

Distribution of the thrips on the plant. Adults and nymphs are found in various protected situations; they are found in the inner-most leaf of the spindle, inside the basal sheaths of the old leaves, on the flowering branches, and inside the perianth and round the ovaries. The massing of nymphs and adults is particularly confined to the gaping sheaths of old leaves. Prepupae and pupae are seen only within the perianth and the leaf sheaths.

Regional Distribution. The thrips are well distributed in all the cardamom growing areas such as Anamalais Hills, Mysore, Travancore and Nelliampathy Hills; in the last mentioned place, however, the capsules are exceptionally free from scabs and the pest does not occur on a scale like what is seen in the Anamalais area.

Control Experiments. Experiments were laid out in randomized blocks in a twenty-five year old estate in Korangumudi; each block consisted of five treatments including the control and there were six replications. Each plot consisted of twenty clumps distributed in four rows. The capsules borne on the ten clumps of the two inner rows of each plot were separately harvested and cured after each picking; the produce of each plot of each picking was examined for scabs later on. There were four pickings for each treatment. The effectiveness of the treatments was judged by the presence or absence of scabs on the capsules. For this purpose four random samples were drawn from the material of each plot and each sample was graded as 'good', 'light' and 'bad' depending on the total freedom or otherwise from scabs. 'Good' indicates total absence of scabs; 'light' indicates slight scabbing and included capsules having only two streaks of 2 mm and less in width and the 'heavy' the rest. Percentages for the three grades were determined on the basis of the sum totals of the four samples of each treatment.

The treatments consisted of spraying with (1) tobacco decoction extracted from the tobacco stems and soft soap; the decoction tested 0.028% nicotine after dilution with an equal volume of water; (2) potash fish oil soap of the Kerala Soap Institute at dilutions of 1 lb. in 6 gallons of water; (3) Bordeaux mixture (0.5%) with coconut oil for improving the adhesiveness; (4) dusting with Cooper's special spreading sulphur of 300 fineness and (5) the control, in which no treatment was given. The first round of treatment was given to the blossoms in the last week of May 1939, with a view to reduce the heavy population of thrips that was then prevalent in them. The first three treatments were carried out with the aid of an "Eclipse" sprayer and the fourth with the help of a "Pfeizgraf" bellows hand duster. Since two gallons of spraying fluid were required for each clump, about 1,400 gallons of the spraying fluid is required for one round of spraying for an acre. Difficulty was experienced in securing easy penetration of the spray fluid even under high pressure into the region of the ovary owing to the presence of the closely fitting bract surrounding the flower which obstructed the passage of the fluid. A higher mortality of thrips could not be secured in view of this handicap. Thrips lodged in the ovary region were therefore found less affected.

The data collected were analysed statistically, and the results are presented in Table I.

It will seen that the treatment differences are significant at 5% level for 'good' pods in the third picking and for all the pickings put together. Significance is not established in the case of treatment differences for the first two and the fourth pickings. Amongst the treatments tobacco decoction spraying alone has given a mean difference well above the critical difference. The absence of significance in the first two pickings is explained by the fact that the material of the two pickings chiefly consisted of capsules

TABLE I.
Statement showing the percentages of "Good", "Light" and "Bad" capsules for all the pickings.

Nature of treatment.	1st picking. 13-10-1939.		2nd picking. 10-11-1939.		3rd picking. 15-1-1940.		4th picking. 15-2-1940.		Total for all the pickings.						
	Good.	Light. Bad.	Good.	Light. Bad.	Good.	Light. Bad.	Good.	Light. Bad.	Good.	Light. Bad.					
1. Sulphur dusting.	61.4	19.8	18.8	52.4	17.1	30.5	55.6	24.8	19.6	65.1	18.8	16.1	58.5	20.2	21.2
2. Tobacco decoction spraying.	56.9	16.9	26.2	59.4	28.4	11.9	80.1	11.5	8.4	77.9	12.9	9.2	70.6	17.3	12.1
3. Potash fish oil soap spraying.	49.3	24.9	25.8	48.5	33.5	18.0	64.0	21.9	14.1	67.3	19.0	13.7	58.6	24.3	17.1
4. Bordeaux mixture spraying.	47.6	26.4	38.0	44.5	26.0	29.5	62.9	22.3	13.8	59.8	20.8	19.4	56.0	24.2	19.7
5. Control.	45.3	18.2	36.5	43.4	13.5	43.1	64.8	18.0	16.6	60.6	18.6	20.8	55.3	16.9	28.6
Critical difference for significance $P=0.05$.	...	...	...	...	12.9%	9.9%	3.9%	...	...	...	...	...	3.6%	...	9.5%
Whether the treatment differences are signi- ficant or not.	no.	no.	no.	no.	yes.	yes.	no.	no.	no.	no.	no.	no.	yes.	no.	yes.

that had set a couple of months before the spraying was given and as such could not have had the benefit of the treatment.

Conclusions. (1) Reduction of scab injury due to thrips attack is possible through insecticidal treatment.

(2) Tobacco decoction spraying alone has been found to give statistically a higher percentage of good pods totally free from scabs.

(3) Early and later rounds of sprayings are indicated to be necessary if effective control of scab injury in capsules is desired in the first two and later pickings.

Acknowledgements. The authors are greatly indebted to the Anamalais Planters' Association and to Mr. K. M. Thomas, Government Mycologist, Coimbatore, for their active assistance in the initial stages of the experiments. Our special thanks are due in a great measure to Mr. E. N. House, Manager, Pudutottam Estate, for placing the field and bungalow on Korangumudi Estate at our disposal and for sparing no pains in giving continued help right through. The arduous task of harvesting and curing the capsules from the experimental plots was solely done by Mr. Thomas, the field assistant to Mr. House, to whom our thanks are also due.

References.

1. Molegode, W. (1938). *The Tropical Agriculturist*, 91 : 325.
2. Ramakrishna Ayyar, T. V. (1935). *Bull. Ent. Res.*, 26 : 357.
3. Ramakrishna Ayyar and M. S. Kylasam (1935). *Bull. Ent. Res.*, 26 : 359.
4. Subbiah, M. S. (1940). *Madras Agricultural Journal*, 28 : 379.

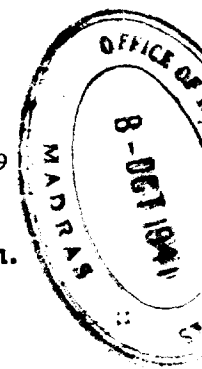
A Short note on dry-land paddy in Udayarpalayam.

By T. V. AYYASWAMI IYER,

Agricultural Demonstrator, Ariyajur.

The Udayarpalayam taluk of the Trichinopoly district is noted for the cultivation of dry (purely rain-fed) paddy. This occupies about 30,000 acres of red sandy soils. The average rainfall of the tract for the preceding five years is 13.9 inches in the South-West Monsoon (June to September) and 23.4 inches in the North-East Monsoon (October to December). The important dry paddy varieties are (1) *Perunel*, (2) *Kaivirai samba*, (3) *Kalian samba*, (4) *Kattaiakar* and (5) *Motta kuruvai*, and all these varieties are invariably sown broadcast. Taking advantage of the summer showers, the lands are ploughed 4 or 5 times, cattle manure at the rate of about 12 cart-loads per acre applied and the fields kept ready for sowing on the receipt of the first rain.

Perunel is a coarse variety of about 8 months' duration and is confined to low lying lands where water stagnates till January. This is, therefore, sown early before the land gets too wet for sowing. *Kaivirai samba*, *kalian samba* and *kattaiakar* are also coarse varieties but 6 months in duration.



They are sown between 15th July to 31st August. Of these *kalian samba* is more drought resistant than the other two. *Mottakuruvai* is also a coarse but short duration variety of 3 months. This is sown in August–September in high level lands. Generally two weedings are given before the crop is harvested.

The rainfall during the North-East Monsoon period was above average in 1937, 1939 and 1940 and in these years the yield of dry paddy crop was fair. It is, therefore, felt that in places where the rainfall is about 14 inches during the South-West Monsoon period and above 24 inches during the North-East Monsoon period, dry paddy can be tried. As the varieties mentioned above are not fastidious about soil and are doing well in sandy soils where groundnut is grown, it is suggested that these can either replace groundnut or be rotated with it.

EXTRACTS

Importance of the Fruit Products Industry in India. By *Kr. Birendra Narain Singh, M. Sc.* Fresh fruits preserved temporarily are imported into India at an average of thirty lacs of rupees per year, as follows:—1931-Rs. 33,66,661, 1932-Rs. 26,63,242, 1933-Rs. 32,17,543; 1934-Rs. 28,25,884. Canned and bottled fruits and vegetables worth eleven to twelve lacs of rupees per year are imported:—1931-Rs. 8,35,610; 1932-Rs. 6,96,339; 1933-Rs. 9,50,102; 1934-Rs. 10,66,985; 1935-Rs. 11,02,793; 1936-Rs. 11,23,025; 1937-Rs. 10,06,393 and 1938-Rs. 12,11,598. Fruit products in the form of jams and jellies are imported as follows:—1931-Rs. 4,34,808; 1932-Rs. 3,86,025 1933-Rs. 6,40,577; 1934-Rs. 6,28,948; 1935-Rs. 6,89,192; 1936-Rs. 6,74,289; 1937-Rs. 7,31,887 and 1938-Rs. 6,54,847. Besides the above, preserved fruits in the form of pickles, chutneys, sauces and other condiments are annually imported as follows:—1931-Rs. 4,24,941; 1932-Rs. 3,87,829; 1933-Rs. 6,27,910; 1934-Rs. 7,05,295; 1935-Rs. 6,78,835; 1936-Rs. 6,48,872; 1937-Rs. 7,19,882 and 1938-Rs. 6,21,675.

Besides, it has come to the notice of the present author that a few commercial concerns, constituted to manufacture fruit products on a large scale, failed; not for want of capital, machinery or organization, but for want of accurate and scientific information about the behaviour of different Indian fruits when preserved. Therefore, a systematic study was needed and consequently the author thought it advisable to undertake this kind of investigation particularly with a view to the most satisfactory utilization of the tremendous fruit resources in this country.

As a matter of fact all the Indian fruits can be converted successfully into some form of preserve. But none of this product is being made on a large scale in our country and as a result there is a tremendous waste of fruits and vegetables. Fruit products in the form of canned and bottled fruit jams, jellies, pickles and sauces are imported in our country at an average of about sixty lacs of rupees per year. Such a huge problem which faces us at the present time has attracted but little attention from Government or the public.

Let us examine the fruit gardens of some other lands, where every blade of grass is taken into account and people have made their fortunes out of fruit cultivation; e. g. the Hawaiian Islands, California and the Malay Peninsula. The fruit industry there is very prosperous; they export huge quantities of fresh and preserved fruits, to all parts of the world every year. In the course of the

last few years, almost all the sixteen concerns in Malaya have rebuilt their factories according to modern designs fitted up with up-to-date machinery. The average capacity of a factory is between 1,500 and 2,000 cases or about a lack of tins per day. Every factory is equipped with a semi-automatic can-making plant and makes its own cans. Peeling, coring and slicing is done by hand, employing about 200 to 300 labourers in each of the factories. In all, nearly five thousand men are engaged in Malaya in the canning industry.

Malaya is the second largest producer of canned pineapple, Hawaii taking the premier position. The export value of the pineapples in the Hawaiian Islands amounts to about twenty crores of rupees as compared to the export value of the Malayan Peninsula, which is about a crore and a half of rupees. Surplus fruits are bottled and canned in huge factories, the capacity of the smallest of them being a lac of tins per hour. Every portion of the fruit is employed to advantage, not a single fruit can be found rotting anywhere. Every plantation, every plant and every fruit is properly kept and protected against damage from insect pests, wind and frosts. Several lacs of pineapples are canned in a day.

The growing and the canning of pine apples has increased to such an extent in the Hawaiian Islands that in a few years the annual tonnage has grown from few hundred tons to the tremendous total of over two lacs of tons of this delicious fruit. The factories are fitted with automatic peeling and coring 'Ginaca' machines, dealing with forty to sixty pineapples per minute. Each canning unit consists of one 'Ginaca' machine, trimming table, a slicing and a packing table. The two largest canneries have nineteen and twenty such units. On each side of the table fourteen to eighteen women are employed, for hand trimming one of the most carefully supervised operations. 'The Pittaluga' syruper is in general use, filling sixty to a hundred cans per minute. Nearly 1,500 workers are employed in each of the larger plants. The rate at which the tin cans are manufactured in Honolulu, is about ten lacs per day. In summer hundreds of school boys and girls work in the these huge factories to earn school fees. Trades are usually under Government control and only the best fruit can be marketed. Besides giving subsidies to the fruit preserving factories the Government imparts education and training in fruit culture and preservation to the growers, so much so that the subject of fruit preservation has been included in the curriculum of the school and University.

Compare this with the state of affairs in our country. During harvest time we can witness heaps of fruits, fancy or contaminated, all heaped together on the road side or in front of a shabby orchard, being rendered unmarketable.

All these crude methods of handling and preserving fruits are responsible for the heavy import of both fresh and preserved fruits into our country. Besides, there is also much scope for Indian specialities like canned mangoes, and mango preserves, jams and pickle in the foreign market, in view of the fact that they were much appreciated at the British Empire Exhibition. Guava jelly has already gained a good reputation in India.

Fruit preserving factories on modern lines can be started with a capital of fifty to sixty thousand rupees which would be capable of canning and bottling goods worth nearly two lacs of rupees per year, yielding a net profit of twenty per cent. on the goods sold. The establishment of half a dozen such factories all over India would stop the wastage of huge quantities of surplus fruits and the drainage of enormous wealth to foreign countries. Besides, it would open a new industry for Indian capital utilizing sugar, tin cans, glass bottle and other utensils produced by Indian factories. It would increase the growth of fruits by improved methods, and solve the problem of marketing fruits and vegetables, giving relief to cultivators.

The fruit industry can also be started on a semi-commercial scale, with a nominal capital of five thousands of rupees only, producing goods worth over one hundred rupees per day which can easily be consumed in a few adjoining districts. Such works are running at certain places in India, with the result that some amount of preserved fruits in the form of pickles and chutneys are exported from India, as the following figures indicate, which are decreasing amounts:—1931—Rs. 82,166, 1932—Rs. 8,26,794, 1933—Rs. 8,57,022, 1934—Rs. 6,55,555, 1935—Rs. 4,91,008. But fresh and preserved fruits and vegetables in various forms are annually imported to our country amounting to over fifty-five lacs of rupees, as follows:—Fresh fruit and vegetables Rs. 30,86,589, Canned and bottled fruits Rs. 10,58,065, jams, jellies, pickles, sauces Rs. 13,64,195, average total Rs. 55,08,849.

Thus the necessity of establishing this industry on a much larger scale can be fully realised. Of course, the success of such enterprises will to a great extent depend on the support of the government. It is a matter of satisfaction that the central and local governments have accepted some of the suggestions of the Royal Commission on Agriculture in India, by appointing the central marketing board and creating cold storage facilities. The Imperial Council of Agricultural Research is taking keen interest in the fruit industry.—*The Planters Gazette*, Vol. 2, page 13, August 1941.

Carbonated Citrus fruit Beverages. By Roshan Lal Tandon. Carbonation which consists of impregnating a beverage with carbon dioxide gas, besides giving a sparkling appearance, imparts a sharp, piquant taste which is very much relished. Carbonated fruit beverages promote the growth of yeast, spoiling the product by fermentation. For this reason it is necessary to pasteurize the finished product or preserve it by means of sodium benzoate. The bottler dislikes to go to the expense of installing pasteurizing equipment in view of the large expenditure involved in it and the consumer is suspicious of benzoated products. Therefore, the ordinary trade practice is to store the citrus juices when the fruits are in season and preserve it by potassium metabisulphite for use during summer for the preparation of carbonated fruit beverages. Instead of carbonating a large quantity of bottles at a time it is always preferred to prepare just a sufficient quantity that may be consumed in about a week's time.

In foreign countries fruit juice concentrates are used for the preparation of carbonated beverages, the object being to use small doses of these which when diluted with carbonated water will approximately contain the same food value as the original real fruit juice from which the concentrate is obtained. But in India the manufacturers of carbonated fruit beverages do not want to undergo an extra expense of concentrating the fruit juices. They would, therefore, always prefer to use the fruit juices as such.

Preparation of the Syrup. For the purpose of preparing a syrup the required amount of water is boiled in an aluminium kettle and saccharine added to it which readily dissolves in hot water. Sugar is then added, the solution is well stirred and boiled again to give it a syrupy consistency. Since the syrup and juice get diluted during carbonation, the addition of citric acid is desired to build up the acidity and this is added at the last stage when saccharine and sugar have both gone into solution. All the dirty matter of the sugar comes to the surface and can be filtered off through a piece of muslin cloth. In preparing a syrup, hot filtration is always preferred to facilitate the process. The use of saccharine may be economical to the dealers from trade point of view but the author is of the opinion that the use of pure cane sugar alone should be encouraged as far as possible.

For Carbonated Lemon Juice—sugar 84 lb. and water 40 lb.

For Carbonated Orange Juice. Since the acidity in pure orange juice is very low, the addition of citric acid is desirable,—sugar 84 lb. water 40 lb. and citric acid 8 oz.

Carbonating and Bottling the Beverage. The finished beverage, for low price trade should not contain less than 10 per cent. by volume of actual juice and for better class trade not less than 25 per cent. of actual fruit juice. A typical formula for 12 oz. soda water bottle is, fruit juice 1–2 oz., syrup 2 oz., flavouring essence mixture 6 drops ($\frac{1}{4}$ fluid drachm) and colour sufficient. This is to be carbonated at 100 lb. pressure. Before serving the drink it is customary to add a pinch of powdered common salt and black pepper to bring forth the latent taste. The carbonated fruit beverage prepared as above does not require any dilution and is taken as such served with ice or plain.

Preservation. Carbonated fruit beverages can be preserved successfully by use of only 0.05 per cent. of sodium benzoate. This may be added to the syrup in such amounts that the finished beverage contains 0.05 per cent. of benzoate. It has been found by experience that the carbonated fruit beverages remain in excellent condition for about a fortnight even without the addition of any preservative and thereafter a flat taste begins to develop. Since the ordinary trade practice is to prepare fresh stock every day, the question of preservation does not offer a serious problem to the manufacturers. A 12 oz. carbonated lemon or orange beverage prepared as above costs only 2 pice and is sold at 0–1–6 each, thus leaving a net profit of 200 per cent.—*The Punjab Fruit Journal*, Vol. 5, P. 990, July 1941.

ABSTRACTS

The effects of fertilizing both the seed bed and the field upon the yield of Elon-elon rice. Celso C. Songcuya. *The Philippine Agriculturist*. 30 (1941):107–119.—One of the best commercial fertilizers tried with Elon-elon rice has been Corona Arroz. The yield of rice and the profit and loss of (1) fertilizing the seed bed alone with different amounts of the fertilizer (2) fertilizing the field alone with 150 kgm. per hectare and (3) fertilizing the seed bed with different amounts of the fertilizer and the field with 150 kgm. per hectare of the same fertilizer was a piece of interesting study undertaken in the latter half of 1940 by the author in the low land rice fields. The following conclusions had been arrived at:—

The different amounts of Corona Arroz used as fertilizer at the rate 50, 100, 150 and 200 kgm. per hectare in seed bed alone, in both seed bed and the field or in the field alone did not materially influence the flowering and maturity periods and the number of bearing culms (tillers) per hill of Elon-elon rice remained uniform. The plants of different treatment and control began to flower 139 days after the seeds were sown and matured 37 days after flowering. As far as yield was concerned, fertilizing the field in any way was advantageous whether the seed bed had already been fertilized or not. Of course, fertilized seedlings gave a higher yield than the unfertilized. Maximum yield was obtained by fertilizing both the seed bed and the field at the rate of 100 kgm. and 150 kgm. per hectare respectively. The application of 150 kgm. of Corona Arroz fertilizer in the field gave an increase of 23.5 per cent. yield over that of the control.

With regard to profits resulting from the different treatments the author had considered the cost of fertilizer and the cost of application and the current price of Elon-elon rice at the time of harvest. The plants fertilized with 100 kgm. per hectare in the seed bed alone gave a profit greater than those obtained for plants fertilized with 200 kgm. per hectare and also 150 kgm. per hectare in the field. The highest profit of 32.7 Pesos per cent was recorded in the treatment where the seedlings were fertilized in the seed bed at the rate of 100 kgm. per hectare

followed by 150 kgm. per hectare in the field. 100 kgm. of the fertilizer per hectare in the seed bed alone gave 18.56 Pesos per hectare while 50 kgm. per hectare in the seed bed gave a profit of 13.38 Pesos per hectare. K. I. C.

India's cashewnut trade in America. *Indian Information*, Vol. 9, No. 78, August 15 1941, pp. 163-169. The cashewnut which was unknown in America a generation ago is now a familiar article of food stuff due to the rapid development of the market for this product brought about by its cheapness and delectable taste and the popularisation campaign carried on by one of the largest foodstuff concerns in the country. The United States import almost all their supplies from India, only a nominal quantity being taken from elsewhere. The imports in 1939 reached a figure of over 29 million pounds of the nut and it is reported that there is further scope for expansion of trade in this commodity. There are, however, certain factors which must be considered if fullest expansion of trade in Indian cashewnuts is to be brought about.

The question of price and price fluctuation is of peculiar importance in the cashewnut trade. The importers and merchants guarantee their sale price against decline and as they usually make contracts on the basis of prices on forward purchase, a subsequent decline in price results in loss. This loss is aggravated in the case of the large scale importer who cannot afford to gamble on prices and it is therefore considered that the trade in cashewnuts is more profitable and satisfactory to the comparatively small importers than to the largest. It is also suggested that the situation is made worse by the existence of speculation in Bombay both in the African and Indian cashewnut crops. Such speculation, if it is proved to exist, will not only bring about an unsettling factor in Indo-American trade but also hinder the Indian producer from obtaining a legitimate price for his product. The possibility of making pre-season crop surveys and the establishment of price control by the Government as means of rectifying the difficulties in the cashewnut trade might be considered.

The other important factor is quality. Lack of grading and shipment at times, of goods too poor in quality for the American market for which the importers have to make allowances, coupled with the narrow margin of profit on which the importer works, is a real hindrance to the furtherance of Indian export trade in cashewnuts. This might be overcome by the adoption of a system of Government grading.

Cashewnut trade is in a sound position today because of the general acceptance of this product as part of the American diet but the factors detailed above are serious impediments to trade. There will also be competition from other nuts such as Brazil nuts and pecans and the indigenous peanuts, if cashewnuts do not maintain their price advantage and quality. Although the cashewnut trade in the United States has continued to increase, such unsatisfactory features as now exist need to be rectified as far as possible to guarantee the preservation and further development of the American market, which is by far India's largest market for her cashewnut exports (U. N. R.)

C. M. J.

Gleanings.

Seed treatment and crop outturn. There is now no doubt the beneficial effects of seed treatment for the control of certain seed-borne diseases; but the question is if the seed treatment has any stimulating effect on the yield if healthy seeds are treated. In other words, from the farmer's point of view the question is: Is it a paying proposition to treat seeds even if they are known to be free from disease, or should the seed be treated only when it cannot be guaranteed to be free from disease? The experience gained during the last four years in the

Central Provinces shows that at least in the case of cotton and *jowar* seed treatment increases the yield even when the seed is free from disease.

Need for treatment. Cotton anthracnose in certain years causes considerable damage to bolls. Seeds from infected bolls are also usually diseased but may not be so badly infected as to be incapable of germination. Therefore the danger is that seeds, even though diseased, may be used the following season as externally they do not look much different from healthy seeds. From such infected seeds the seedlings will be diseased and will damp off and the infection may spread to the neighbouring healthy seedlings. The result is a heavy loss of seedlings, and often resowing has to be done, and still the result will once again be the same. If the seeds are treated before sowing not only is the disease checked when diseased seed is used but the yield is increased even when healthy seeds are sown.

For seed treatment, copper carbonate, finely powdered sulphur, commercial sulphuric acid and four proprietary fungicides have been used. The following table shows the percentage of increase in yield per acre when healthy seeds are treated:

		1936-37	1937-38	1938-39	1939-40
Seed treated with proprietary fungicide A	A	14.4	27.0	38.3	19.0
do.	B	9.1	20.6	44.6	21.1
do.	C	8.0	13.9	40.3	17.5
do.	D	16.3	25.9	25.9	...
Seed treated with copper carbonate	...	25.3	24.9	38.9	8.2
Seed treated with sulphur	...	15.2	29.2	33.7	19.5
Seed delinted with sulphuric acid	...	8.7	9.9	10.4	...
Control	...	0	0	0	0

The last four results show that the increase in yield from treated cotton seed is substantial though the percentage of increase varies from season to season. The proprietary fungicides, copper carbonate and sulphur, are each added to the cowdung solution locally used for dressing the seed to enable it to pass through drills. One ounce of each of these fungicides and chemicals is used for treating 28 lb. of seed.

Treatment of healthy seed. *Jowar* seed is usually treated for the control of grain smut and loose smut diseases. *Jowar* seed free from smut infection when dusted either with copper carbonate or finely powdered sulphur or two proprietary fungicides has given better yield than untreated healthy seed. The following table shows the percentage of increase in yield per acre when healthy seeds are treated:

		1936-37		1937-38	
		Grain.	Fodder.	Grain.	Fodder.
Seed dusted with proprietary fungicide A	A	19.4	9.9	8.1	5.1
do.	D	12.6	9.7	11.3	7.5
Seed dusted with copper carbonate	...	5.3	6.3	3.2	3.2
Seed dusted with sulphur	...	11.5	8.3	7.3	4.6
Control	...	0	0	0	0

The proprietary fungicides were used at the rate of 1 oz. for 20 lb. of seed and copper carbonate and sulphur at the rate of 1 oz. for 48 lb. of *jowar* seed.

These results show the necessity for further trials with other crops. (*Ind. Farm*, 2:425, August 1941.)

Amla—a rich source of vitamin C. *Amla* is very rich in vitamin C, the vitamin which prevents scurvy. It contains only traces of other vitamins. It is the best natural source of vitamin C so far discovered, containing from 5 to 7 mgm. of the vitamin per gramme of fresh pulp. A medium-sized *amla* fruit yields as much vitamin C as two oranges. The fresh juice contains ten times more vitamin C than orange juice, lime juice, or tomato juice. When *amla* fruits are pickled in concentrated salt solution they retain a good deal of their vitamin C even after storage for several months.

Nearly all fruits and vegetables lose their power to prevent scurvy when dried. Of all the vitamins, vitamin C is the most easily destroyed by drying or heating. *Amla* can, however, be dried and yet remain a rich source of this vitamin. There are two reasons for this. First it contains certain tannins which have a protective effect on the vitamin, and secondly, its juice is very strongly acid. As acid medium tends to prevent destruction of vitamin C, these factors do not completely prevent loss of vitamin C when *amla* pulp is dried, but they minimise it. It is, however, essential that the pulp should be dried quickly; otherwise there is considerable destruction. *Amla* powder dried under proper conditions is so rich in vitamin C that one gramme can furnish an adult with his daily requirements of the vitamin. The amount of the vitamin present in the powder is slowly reduced if the powder is exposed to air, particularly in a hot atmosphere, but even after storage for several months it remains a very rich source of vitamin C. (*Ind. Farm*, 2: 374 and 427; 1941.)

[*Emblica officinalis* Gaertn. (*Phyllanthus emblica* Linn.); Tamil—*Nellikai*; Telugu—*Usiriki*. Editor.]

Edible syrups from Molasses. Little success has attended the many attempts made for the utilization of exhaust molasses in the manufacture of confectionery and other articles of human diet, chiefly due to difficulty in the removal of undesirable substances like bitter inorganic salts, large quantities of caramel and other organic impurities present in molasses. Although cane molasses is being used for the manufacture of cattle-feeds, it has not been possible to make it sufficiently pure and palatable for human consumption.

While the consumption of table syrup is very large in other countries, especially in the U. S. A., in India it is limited at present, the chief reason being probably the high price of the imported product. If a cheap and palatable syrup could be placed on the market, its use would become more extensive. Work done at the Imperial Institute of Sugar Technology by Dr. K. A. N. Rao has shown that such a product can be prepared by precipitating all the sugars in molasses as lime compounds from which they are subsequently recovered by carbonisation. By this method, it has been possible to recover 80 per cent. of the sugars originally present in the molasses. The sugar solution filtered from calcium carbonate is treated with phosphoric acid and lime, or activated vegetable carbons, and concentrated to a syrup of 75° Brix. The syrup obtained has a good taste and is pleasing to the eye. No crystals are deposited even after standing for more than a year.

The results obtained indicate that table-syrups can be profitably manufactured from molasses. The price of the syrup manufactured will depend on the quality required. By concentrating sufficiently, a part of the sucrose can be recovered and the residual syrup will still be suitable for table use. The cost of the syrup after recovery of sucrose will be only a fraction of the price at which it is sold in the market and hence its use could be made popular. It could also be used for other purposes such as preparation of jams and sweetmeats—in fact for any purpose for which a sugar solution is required. Supplies of syrup could be made to the army in barrels and will be a cheap and valuable article of diet.

This syrup can be used for most of the table purposes in place of sugar itself. It is as wholesome and as nutritious as cane sugar itself, perhaps even more so, and an important advantage of this syrup over cane sugar is that its sale is not liable to levy of excise duty. (*Ind. Farm*, 2: 426, August 1941.)

Trees on the Farm. Trees serve many important purposes on farming and pastoral country. Trees are valuable as—

1. Windbreaks and shelter belts.
2. For isolated or scattered shade and shelter.
3. A reserve supply of fodder for periods of drought.
4. Timber and fuel supplies.
5. Screens around dams and tanks to prevent silting up by dust, and undue evaporation of the water.
6. For the prevention of erosion on slopes and along the banks of creeks and rivers.
7. For ornamental plantations in improving the appearance of the home.

(*Queensland Agri. Jour.* 55: 489, June 1941.)

Advertising by Wisconsin Department of Agriculture. Milk and Honey is being featured in outdoor advertising as a co-operative project between the Wisconsin Beekeepers' Association and the Wisconsin Department of Agriculture.

Three hundred and fifty posters, 7×9 feet in size, were prepared in color by the Department of Agriculture. One hundred and fifty-six of these were put up on boards controlled by the Department of Agriculture throughout the State, while 40 were sent to beekeepers who wished to co-operate by putting them on their honey houses, barns etc. The signs will be left for a period of six weeks—during the last half of March and all of April. The rest of the signs will be kept and used again next fall for another campaign. (*Gleanings in Bee Culture*, May 1941, page 311.)

Crop & Trade Reports.

Statistics—Crpp—Sugarcane—1941—Intermediate condition report. The condition of the sugarcane crop is satisfactory in all the districts outside Kistna, Cuddapah, Chingleput, Chittoor and North Arcot, the uplands of East Godavari and parts of West Godavari, where the crop suffered from drought to some extent. A normal yield can be expected in the other districts if the season continues to be favourable.

The wholesale price of jaggery per Imperial maund of 82½ lb. (equivalent to 3,200 tolas) as reported from important markets on 8th September 1941 was Rs. 6-1-0 in Mangalore, Rs. 4-15-0 in Adoni, Rs. 4-7-0 in Vellore, Rs. 4-6-0 in Cuddalore, Rs. 4-2-0 in Vizagapatam, Cocanada, Rajahmundry, Chittoor and Trichinopoly, Rs. 3-11-0 in Vizianagaram, Rs. 3-7-0 in Coimbatore, Rs. 3-5-0 in Salem and Rs. 3-4-0 in Bellary. When compared with the prices published in the last report, i. e., those which prevailed on 4th August 1941, these prices reveal a rise of approximately 12 per cent. in Vizagapatam, 7 per cent. in Vizianagaram, 4 per cent. in Coimbatore and 3 per cent. in Cuddalore and a fall of approximately 12 per cent. in Trichinopoly and 8 per cent. in Mangalore, the prices remaining stationary in Cocanada, Rajahmundry, Adoni, Bellary, Chittoor, Vellore and Salem.

Statistics—Cotton—1941-42—Intermediate forecast report. Last year's crop. The yield of the second or summer pickings of the 1940-41 crop is estimated to be generally fair.

Current year's crop. The main season for sowing is not yet over in most parts of the Province. Sowings of the crop are in progress in parts of Circars and the

Deccan. The early sown crop in parts of the districts of West Godavari, Kistna, Nuntur and the Deccan is reported to have been affected by drought to some extent.

The average wholesale price of cotton lint per Imperial maund of 82½ lb. equivalent to 3,200 tolas as reported from important markets on 8th September 1941 was Rs. 17-5-0 for Cocanadas, Rs. 18-2-0 for red Northerns, Rs. 20-9-0 for white Northerns, Rs. 16-8-0 for Westerns (Mungari crop), Rs. 22-0-0 for Northerns (Jowari crop), Rs. 40-10-0 for Coimbatore Cambodia, Rs. 29-10-0 for Southern Cambodia, Rs. 36-10-0 for Coimbatore Karunganni, Rs. 27-15-0 for Tinnevelles and Rs. 28-10-0 for Nadam Cotton. When compared with the prices published in the last report, these prices reveal a fall of 5 per cent. in the case of Southern Cambodia and Nadam Cotton, 4 per cent. in the case of Coimbatore Cambodia and Tinnevelles and a rise of 5 per cent. in the case of Cocanadas, the prices remaining practically stationary in the case of Northerns (red and white), Westerns (Mungari and Jowari), and Coimbatore Karunganni.

Statistics—Ginger—1941—First forecast Report. The area under ginger up to 25th August 1941 is estimated at 10,900 acres in Malabar and at 600 acres in South Kanara as against 12,000 acres in Malabar and 800 acres in South Kanara estimated for the corresponding period of the previous year. The condition of the crop is satisfactory and a normal yield is expected.

Statistics—1941—Pepper—First forecast Report. The area under pepper up to 25th August 1941 in the districts of Malabar and South Kanara is estimated at 105,900 acres, (97,000 acres in Malabar and 8,900 acres in South Kanara) as against 102,500 acres, (94,000 acres in Malabar and 8,500 acres in South Kanara) estimated for the corresponding period of the previous year. The yield is expected to be normal.

The wholesale prices of pepper per Imperial maund of 82½ lb. equivalent to 3,200 tolas as reported from important markets on 8th September 1941 was Rs. 11-13-0 at Calicut, Rs. 11-5-0 at Tellicherry, and Rs. 12-2-0 at Mangalore. When compared with the prices which prevailed on 6th January 1941, these prices reveal a rise of about 20 per cent at Mangalore, 24 per cent at Tellicherry and 33 per cent at Calicut. (*Director of Industries and Commerce*).

Cotton Raw in the Madras Presidency. The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February to 12th September 1941 amounted to 547,447 bales of 400 lb. lint as against an estimate of 503,500 bales of the total crop of 1940-41. The receipts in the corresponding period of the previous year were 425,020 bales. 480,963 bales mainly of pressed cotton were received at spinning mills and 59,324 bales were exported by sea while 94,299 bales were imported by sea mainly from Karachi and Bombay.

(*Director of Agriculture*.)

Mofussil News and Notes.

Nilgiris District—Agricultural Shows in Model Villages of Ootacamund and Coonoor Taluks. The villages of Anikorai and Tuneri in Ootacamund taluk and Edapalli and Illithorai in Coonoor taluk were selected in the year 1937 as model villages for intensive rural reconstruction work and it was decided at the District Periodical Conference to award a shield in rotation to the best village where rural reconstruction work is carried on with enthusiasm with reference to agriculture, sanitation and livestock, beginning from this year. For this purpose, agricultural shows were held in the above villages during the 2nd and 3rd week of August 1941. The villagers had exhibited all kinds of produce grown in

the village such as potato, cereals, vegetables, fruits, etc. Products out of sidelines such as honey, eucalyptus oil, eggs and milk products were also exhibited. The Agricultural Department had put up improved ploughs, samples of seeds of cereals, vegetables, green manure, insecticides, beehives and appliances, cattle shed models, posters on agricultural subjects, etc. Officers of the Agricultural, Veterinary, Public Health and Revenue Departments co-operated in the successful conduct of the shows. The agricultural aspect of the villages was judged by the Curator and District Agricultural Officer, Ootacamund, assisted by the Agricultural Demonstrators, Ootacamund and Coonoor, the sanitation by the officers of the Public Health Department and the livestock by the officers of the Veterinary Department, and marks were allotted. In judging the agricultural standard of the villages, soil erosion, control measures, manure preservation work, introduction of pasture grasses, sidelines to agriculture and, above all, general interest evinced by the villagers were taken into consideration besides the kinds of crops grown and the methods of cultivation adopted.

The exhibitions held at Edapalli and Illithorai deserve special mention. At Edapalli, the exhibitions were of a higher standard and the village sanitation better than others. The village is very advanced in the cultivation of vegetables and fruits, in cattle manure preservation and in apiculture. The storage and care of Farm Yard Manure is equally satisfactory at Illithorai. But the most noteworthy feature of the latter village is the interest evinced by the villagers in cleaning the village, arranging the show, exhibiting their produce and in competing for the trophy. Sri H. B. Ari Gowder, M. L. A., President, District Board, Nilgiris, and Mrs. Cousins of the All India Women's Uplift Association were among the prominent visitors to the Illithorai show and they addressed the large gathering of villagers on rural reconstruction work. The Curator and District Agricultural Officer, Ootacamund and the Agricultural Demonstrator, Coonoor, addressed the gathering on improvements in Agriculture. The School girls entertained the audience by songs and dialogues on agricultural subjects.

At the District Periodical Conference held on 19th August 1941 the villages were ranked in order of merit as Edapalli, Illithorai, Tuneri and Anikkorai and it was decided to award the shield to Edapalli village this year. P. A. N.

All India Industrial Swadeshi Exhibition, Salem. The Salem Municipality conducted the third All India Swadeshi Industrial Exhibition at the Victoria Market Maidan from 3-8-41 to 18-8-41, during the local Mariamman festival. Various industrial products like ivory works, metal works, perfumeries, silverware, medicines, biscuits, coir mats, furniture, foot wear, electrical lamps and soaps, besides hand woven silk and cotton cloths were exhibited by various manufacturers. The nurserymen exhibited their seeds and seedlings and the forest products were displayed by the Forest Department. The Agricultural Department exhibited improved strains of paddy, millets, oil seeds and cotton and specimens of clarified oils, malts and malt biscuits, with numerous attractive posters detailing the various departmental activities. Improved ploughs, cultivators, chaff cutters, horticultural tools, specimens of various crop pests and diseases with insecticides and fungicides and a live colony of bees with bee-keeping appliances were on the show. Besides these, live specimens of green manure crops were arranged. Specimens of agricultural products obtained from the farmers of the district made the show more attractive. Seeds of paddy, coconuts, sugarcane and jaggery produced by cultivators were shown. Specimens of fruits grown on the Kolli Hills, coconut seedlings, fruit plants and fruit products were put on the show. The Exhibition was opened by T. G. Rutherford Esq., I. C. S., Advisor to His Excellency the Governor of Madras on 3-8-41. Large crowds numbering thousands went round the show every day. Music perfor-

mance was arranged by the Municipality every evening and War Fund Raffle tickets were also on sale. Ploughing demonstrations were done on two days and large crowds witnessed the operations. On the closing day the Collector of Salem R. M. Sundaram Esq., I. C. S., distributed prizes and a Certificate of Gold Medal was awarded to the Agricultural Department for the show of agricultural products. The net proceeds of the exhibition amounting to over Rs. 4,000 were given over to the War Fund.

R. C.

The Kodur Orange Grading Station was opened on the 5th of this month by S. Ranganathan Esq., O. B. E., I. C. S., Collector of Cuddapah in the presence of a large gathering. The Collector in opening this station congratulated the Kodur Fruit Growers' Co-operative Society in adopting this method of standardising the oranges and expressed his opinion that this splendid idea would inspire confidence in the public. He stressed the importance of all the orchard owners of the taluk getting into the folds of the society. Unless the whole produce passed through the society the real object of supplying graded and standardised oranges throughout the Province would be difficult. After light refreshments the function came to a close.

T. K. V.

College & Estate News.

Students' Corner. A parliamentary debate was held under the auspices of the Students' Club on 20-8-'41 with Sri Adivi Reddy (B. Sc., III year class) as the Speaker, Sri. K. M. Thomas, Government Mycologist acting as the observer. The subject was "That in the opinion of the house the expansion of the Viceroy's Executive Council is a real constitutional advancement". The proposition was voted down by the whole house except the 'Government' benches. The observer remarked that the standard of debate was very good. Another debate was held under the auspices of the Students' parliament on 27-8-'41 with Sri. C. Shankara Rao (B. Sc., III year class) as the Speaker, Sri. R. M. Savoor, Divisional Inspector of Schools, Coimbatore, acted as the observer. The House debated on "That in the opinion of the house English education has done more harm than good to Indians" and voted down the proposition. The observer narrated his experiences in the field of education in a very interesting way.

Games. Tennis. There was a friendly Tennis match between the Agricultural College Students and Engineering College Students (Electrical) on 6-9-'41. The Agricultural College representatives Messrs. P. S. Chintamani and A. Subba Raju won the match by 6 games to 5.

Badminton. There was also a badminton match between the Agricultural College students and the Engineering College students on the same day. The Agricultural College won the match by 2 games to 1.

Football. There were two matches, one on the 4th of August and the other on the 21st of August between the Agricultural College students and the R. R. Club on the first occasion and with the local Arts College on the second occasion; the first match ended in a draw and in the second the College lost the game by 3 to 1.

Refresher Course. The officers of the Department deputed for the Refresher Course have reported, and the course has commenced on the 15th of the month. A list of the officers deputed for the course is printed elsewhere in this number.

Association of the Economic Biologists. Under the auspices of the above association Dr. Panse of the Institute of Plant Industry, Indore, delivered a series of lectures on the technique of layout of agricultural experiments and statistics in relation to plant genetics. The lectures which were very instructive were

attended by the entire staff and students, and were greatly appreciated. The lectures were delivered on 27th, 28th and 29th and the lecturer was entertained at a tea on the 30th of August, by the members of the Association.

Scouting. A public meeting of the residents of the Agricultural College Estate was held on 29th August 1941 with Mr. R. C. Broadfoot, Principal presiding. The question of reviving scouting activity on the College Estate was discussed and it was resolved that a committee consisting of 12 members be constituted to manage the affairs of the Ramakrishna Scout Group. The Principal, Agricultural College, was nominated as the ex-officio President, and Mr. C. M. John as the Vice-President. The following committee members were also nominated: Messrs. P. D. Karunakar, C. Rajasekhara Mudaliar, C. S. Krishnaswami, C. V. Nagaraja Rao, D. Devasirvatham, D. Natarajan, T. S. Lakshmanan, K. K. Nambiar and T. Sadagopa Ayyangar. Mr. R. Ratnam was nominated as the Honorary Secretary. The question of repairs to the existing building of the Boy Scout Association was discussed, and it was resolved that to finance the repairs for the building and also to provide necessary equipment for the Scout Troop, donations from parents be solicited. The Scout Troop now consists of 38 boys in all, of the ages of from 11 to 18, and it commenced work on 31st August 1941.

Agricultural College Officers' Club. The Annual Club Day celebrations were held on Saturday, the 20th September, 1941. The annual dinner was on the 19th night. The events on Saturday commenced with the usual *Chota Hazari* given by the President of the Club. The final matches in tennis and tenekoit, which had to be postponed on account of inclement weather, were then played out. Punctually at 8 A.M. the field sports started, every item of which was keenly contested with the result, that it was 12 o'clock before they could be finished. The afternoon session started at 2-30 P. M. with the blow ball competition. The elders' and children's races followed, after light tea.

The President then distributed the prizes to the winners in the various events. The Club Day entertainment was held at 9 P. M.

The following is the list of prize winners in the major events:—

Items.	Winners.	Runner-up.
1. Tennis (singles) (C. Ramaswami's cup)	C. N. Babu.	K. Ramaswami.
2. Tennis (doubles) (Rao Bahadur G. N. Ranga-swami Ayyangar's cup)	C. N. Babu and C. T. Ittyachan.	K. M. Thomas and K. M. Krishna Menon.
3. Contract Bridge (open) (Padmanabha shield)	G. K. Chidambara Iyer and R. K. Iyengar.	V. S. Sankaran and P. S. Narayanaswami.
4. Contract Bridge (Partners by lots) K. Ramiah's Cup and Mr. Dutt's Cup)	V. S. Sankaran and K. Santhanam.	M. S. Kylasam and V. Gomathinayagam.
5. Table Tennis (singles) (M. C. Cherian's Cup)	N. M. Naidu.	C. H. Krishnan.
6. Table Tennis (doubles)	C. H. Krishnan and T. S. Francis.	C. N. Babu and M. M. Krishna Marar.
7. Tenekoit (Dr. K. Narayanan's Cup)	N. M. Naidu and K. M. Kulandai.	A. K. Nambiar and P. A. Venkateswara Iyer.
8. Carrom (singles) (K. Krishnamurthi Rao's Cup)	C. H. Krishnan.	E. G. Sivaswami.
9. Carrom (Doubles) (H. Shiva Rao's Cup)	C. S. Rajaratna Mudi- liar and K. Santhanam.	P. K. Menon and T. N. Ananthanarayanan.

10. Chess (M. U. Vellodi's Cup) E. J. Verghese. S. Majid Ali.
11. Duplicate Bridge L. S. Mani. R. K. P. K. Menon, S. R. Raju, Ayyangar, P. S. Narayanaswami and T. V. Krishna Iyer.
12. Progressive Bridge North-South M. Mukundan and E. J. Sivaswami and East-West K. Santhanam E. J. Verghese. A. K. Nambiar and M. S. Kylasam and B. Rangiah Pillai. K. Venkataswami.

Visitors Mr. H. M. Hood, I. C. S. Second Adviser to H. E. the Governor of Madras, Mr. P. H. Rama Reddy, the Director of Agriculture, and Sri K. C. Naik, Fruits Specialist visited the Agricultural College and Research Institute during the month.

Weather Review—JULY 1941.

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	5.1	-1.8	14.1	South	Negapatam	1.1	-0.8	5.8
	Calingapatam	3.7	-1.6	10.3		Aduthurai *	1.3	0.0	6.5
	Vizagapatam	1.7	-2.8	14.4		Madura	0.7	-1.2	12.1
	Anakapalli *	2.5	-2.5	13.3		Pamban	0.0	-0.6	8.9
	Samalkota *					Koilpatti *	0.1	-0.6	5.9
	Maruteru *	3.6	-4.5	15.1		Palamkottah	0.1	-0.3	7.5
	Cocanada	3.6	-2.2	33.7	West Coast	Trivandrum	10.3	0.0	46.1
	Masulipatam	1.9	-4.5	7.5		Cochin	15.0	-7.8	72.2
	Guntur *	1.1	-4.7	6.3		Calicut	18.5	-11.7	86.6
Ceded Dist.	Kurnool	0.9	-3.9	2.9		Pattambi *	18.2	-8.3	85.8
	Nandyal *	0.6	-4.4	5.0		Taliparamba *	20.5	-24.3	74.2
	Hagari *	0.5	-1.4	4.0		Kasargode *	16.8	-25.2	72.3
	Siruguppa *	2.3	-0.8	9.2		Nileshwar *	15.4	-27.6	79.0
	Bellary	0.7	-1.1	7.4		Mangalore	16.4	-20.7	51.4
	Cuddapah	1.8	-2.1	8.4	Mysore and Coorg	Chitaldrug	1.8	-1.3	6.3
	Anantapur	2.1	-1.3	4.8		Bangalore	3.4	-0.8	14.2
	Rentachintala	2.5		5.7		Mysore	2.1	-0.5	18.2
	Anantharajupet *	0.1	-2.8	0.0		Mercara	31.9	-15.0	80.1
Carnatic	Nellore	1.6	-1.2	4.7	Hills	Kodaikanal	5.3	+0.3	2.0
	Madras	1.1	-2.8	5.8		Coonoor			
	Palur *	4.3	+1.3	9.4		Ootacamund *	4.8	+1.3	21.6
	Tindivanam *	1.7	0.0	4.3		Nanjanaid *	11.4	+0.9	32.3
	Cuddalore	3.3	+0.2	10.1					
Central	Vellore	0.7	-4.6	5.6					
	Gudiyattam *	1.1	-2.4	4.9					
	Salem	2.6	-1.2	12.3					
	Coimbatore	1.3	-0.2	13.2					
	Coimbatore								
	A. C. & R. I. *	1.3	-0.8	14.2					
	Trichinopoly	0.4	-1.2	3.9					

Meteorological Stations of the Madras Agricultural Department.

From average rainfall for the month calculated up to 1937 (published in Fort St. George Gazette).

The monsoon was fairly active over the peninsula during the first half of the month under the influence of depressions which formed in the north of the Bay, but which moved in a more northerly direction than usual and failed to affect the weather over the peninsula to any marked extent.

A break in the monsoon set in about the middle of the month and continued for the rest of the month.

Rainfall was in large defect nearly over the whole area, with the exception of the Hills.

Day and night temperatures were generally above normal the highest temperature recorded being 104° at Rentichintala and Nellore on the 21st.

Weather Report for the Agricultural College and Research Institute Observatory.

Report No. 741.

Absolute maximum in shade	...	91.6°F
Absolute minimum in shade	...	68.7°F
Mean maximum in shade	...	87.5°F
Departure from normal	...	+1.0°F
Mean minimum in shade	...	71.7°F
Departure from normal	...	-0.6°F
Total rainfall for the month	...	1.27"
Departure from normal	...	-0.81"
Heaviest fall in 24 hours	...	0.34" on the 6th.
Total number of rainy days	...	5
Mean daily wind velocity	...	2.7 m. p. h.
Departure from normal	...	-5.9 m. p. h.
Mean humidity at 8 hours	...	73.0%
Departure from normal	...	+1.1%

Summary: The monsoon was active in the first half of the month. The rainfall was 1.27" which was 0.8" below normal. Skies were heavily clouded and the humidity was in excess. The day temperatures were above normal while the night temperatures were slightly below normal. The wind velocity was far below normal.

P. V. R. & S. V. K.

Weather Review—AUGUST 1941.

RAINFALL DATA

Division	Station.	Actual for month	Departure from normal @	Total since January 1st	Division	Station	Actual for month	Departure from normal @	Total since 1st January
Circars	Gopalpore	3.7	-4.1	17.8	South	Negapatam	0.7	-2.9	6.5
	Calingapatam	3.3	-4.6	13.5		Aduthurai *	1.1	-2.0	7.6
	Vizagapatam	1.8	-3.6	16.2		Madura	5.0	+0.7	17.1
	Anakapalli *	4.1	-1.2	17.4		Pamban	0.0	-0.7	8.9
	Samalkota *	2.9	-3.5	22.0		Koilpatti *	0.4	-1.3	6.3
	Maruteru *	4.5	-3.0	19.6		Palamkottah	0.0	-0.6	7.5
	Cocanada	1.6	-3.9	35.3	West Coast	Trivandrum	8.0	-0.0	54.1
	Masulipatam	5.2	-1.7	12.7		Cochin	14.8	+1.9	87.0
	Guntur *	2.3	-3.0	8.5		Calicut	18.0	+2.4	104.6
Ceded Dists.	Kurnool	2.0	-3.0	4.9		Pattambi *	19.0	+4.2	104.7
	Nandyal *	3.2	-2.3	8.2		Taliparamba *	15.0	-8.6	89.3
	Hagari *	2.0	-2.0	6.0		Kasargode *	15.0	-14.6	87.3
	Siruguppa *	2.5	-1.1	11.7		Nileshwar *	11.4	-14.6	90.4
	Cuddapah	2.6	-3.2	11.0		Mangalore	23.2	+0.4	74.6
	Bellary	5.0	+2.7	12.4	Mysore and Coorg	Chitaldrug	4.6	+1.6	10.9
	Anantapur	2.5	+0.3	7.3		Bangalore	3.1	-2.3	17.3
	Rentachintala	5.1		10.8		Mysore	6.2	+2.9	24.4
	Anantharajupet *	1.8	0.0	0.0		Mercara	27.5	+2.0	107.6
Carnatic	Nellore	1.5	-1.8	6.2	Hills	Kodaikanal	5.1	-1.9	26.1
	Madras	2.1	-2.5	7.9		Coonoor			
	Palur *	2.5	-1.9	11.9		Ootacamund *	3.9	+0.4	28.5
	Tindivanam *	2.5	-2.4	6.8		Nanjanad *	6.4	-0.5	38.7
	Cuddalore	3.9	-1.1	14.0					
Central	Vellore	1.1	-5.2	6.7					
	Gudiyattam *	4.0	0.6	8.9					
	Salem	4.7	-2.1	17.0					
	Coimbatore	1.5	+0.4	14.7					
	Coimbatore								
	A. C. & R. I. *	2.5	+1.3	16.7					
	Trichinopoly	2.7	-1.1	6.6					

* Meteorological Stations of the Madras Agricultural Department.

@ From average rainfall for the month calculated up to 1937 (published in Fort St. George Gazette).

The monsoon continued to be very weak over the peninsula almost throughout the month. The depressions which formed in the Bay were once again formed too far north and traversed a northerly path and failed to affect weather to any appreciable degree over the peninsula.

Towards the end of the month, conditions became unsettled off the Malabar Coast and thunderstorm activity increased over south east of the peninsula and south Deccan.

Rainfall was again in large defect over the whole area, the defect being most marked in the Circars, Ceded Districts and parts of the West Coast.

Temperatures were generally above normal, the highest maximum being 103° at Rentachintala on the 26th and Nellore on the 22nd and 28th.

Weather Report for the Agricultural College and Research Institute Observatory.

Report No. 8/41.

Absolute maximum in shade	...	91.5°F (27th)
Absolute minimum in shade	...	69.5°F (25th)
Mean maximum in shade	...	87.6°F
Departure from normal	...	+0.7°F
Mean minimum in shade	...	73.0°F
Departure from normal	...	+1.9°F
Total rainfall for the month	...	2.49"
Departure from normal	...	+1.30"
Heaviest fall in 24 hours	...	0.53" (29th)
Total number of rainy days	...	7
Mean daily wind velocity	...	4.2 m. p. h.
Departure from normal	...	-2.7 m. p. h.
Mean humidity at 8 hours	...	72.5%
Departure from normal	...	-1.5%

Summary: Rainfall was in excess of normal due to thunderstorm activity towards the end of the month. Skies were generally heavily clouded. Temperatures were above normal and markedly so during the nights. P. V. R. & S. V. K.

Departmental Notifications.

Gazetted Service.

Appointments.

Sri. C. Ramaswami Nayudu, Junior Lecturer in Agriculture and Assistant Superintendent, Central Farm, officiating as Provincial Marketing Officer, will continue to officiate, during the absence of Sri. Rao Bahadur K. Gopalakrishna Raju on leave.

Sri. M. Chinnaswami Nayudu, Upper Subordinate, IV Grade, to act as District Agricultural Officer, Guntur, in Category 5, class I of the Madras Agricultural Service.

Sri. N. Subrahmanya Ayyar, Subordinate, IV Grade, to act as District Agricultural Officer, Sattur, in Category 5 of Class I of the Madras Agricultural Service.

Transfers.

Sri. P. Subrahmanyam, D. A. O., Saidapet, on relief by Sri. M. Subrahmanya Pillai to officiate as D. A. O., Cuddapah.

Sri. K. Venkatarama Ayyar, D. A. O., Cuddalore on relief by Sri. T. G. Muthuswami Ayyar to be D. A. O., Ellore.

Leave.

Sri. Y. G. Krishna Rao Nayudu, Acting Dy. Director of Agriculture, Cocanada, l. a. p. for 3 months from the date of relief.

Sri. S. Sitharama Patrudu, D. A. O., Cocanada, l. a. p. for 3 months from the date of relief.

Subordinate Service.

Transfers.

Name of officers.	From	To
Sri. K. C. Thomas,	F. M. A. R. S., Nandyal;	A. D., Tirupur.
„ Ch. Venkata Saravayya Chetty,	Marketing section under Govt. of India;	Rice Sub-Station, Buchireddipalem.
„ S. Ramachandra Rao,	Rice Sub-Station, Buchireddipalem;	A. R. S., Maruteru.
„ B. V. Ramana,	A. A. D., Tuni (on leave)	A. A. D., Itchapuram.
„ V. G. Venkataramana Rao,	Offg. A. D., Kalahasti;	Offg. A. D., Wallajah.
„ N. Sobhanadri,	Foreign Service under Tobacco Market Committee, Guntur;	A. D., Kavali.
„ M. Srinivasa Rao,	A. D., Kavali;	Foreign Service under Tobacco Market Committee, Guntur.
„ S. Kuppuswami Ayyangar,	A. D., Tindivanam;	A. D., Trichinopoly.
„ L. Krishnan,	A. D., Tanjore;	A. D., Tindivanam.
„ N. Krishna Menon,	Sub-Asst. in Entomology, Coimbatore;	For special duty at Vadavanur (Palghat).
„ S. Venkatarama Ayyar,	A. D., Sriperambudur;	F. M. A. R. S., Palur.
„ Y. Venkataswami,	Offg. F. M., Samalkota;	A. D., Vizagapatam.
„ G. Venkatakrishna Ayyar,	A. D., Srivilliputhur;	F. M., Botanic Gardens, Coimbatore.

Leave.

Name of officers.	Period of leave.
Sri. S. Rangabrahmarao Nayudu, A. D., on Foreign Service under Vuyyur Sugarcane Growers' Co-operative Union,	L. a. p. for 2 months from 26-7-41.
„ M. Narasimham, A. D., Tenali,	L. a. p. for 1 month from 8-9-41.
„ K. S. Ramanna Rai, A. D., Harapanahalli,	L. a. p. for 1 month from 12-9-41.
„ V. Chidambaram Pillai, A. D., Sankarankoil,	Extension of l. a. p. on m. c. for 1 month from 29-8-41.
„ E. K. Govindan Nambiar, F. M., Horticulture, Coimbatore,	L. a. p. for 3½ months from 4-9-41.
„ N. Ramadoss, A. D., Ongole,	L. a. p. for 1 month from 28-8-41.
„ S. Mayandi Pillai, Asst. in Cotton, A. R. S. Nandyal,	L. a. p. for 3 months and 9 days from 15-9-41.
„ M. S. Purnalingem Pillai, Sub-Asst. Cotton Breeding Station, Coimbatore,	L. a. p. for 3 months and 14 days from 10-9-41.
„ K. Sitarama Ayyar, F. M. A. R. S. Pattukottai,	Further extension of l. a. p. on m. c. for 1 month and leave on half average pay for 3 months from 23-8-41.
„ Ch. Venkata Saravayya Chetty, Asst. in Paddy Section,	L. a. p. for 2 months from 1-9-41.

Sri. K. Krishna Hegde, A. F. M.

A. R. S. Nanjanad,

L. a. p. for 1 month from 18-9-41.

„ S. Ramachandran, A. D.,

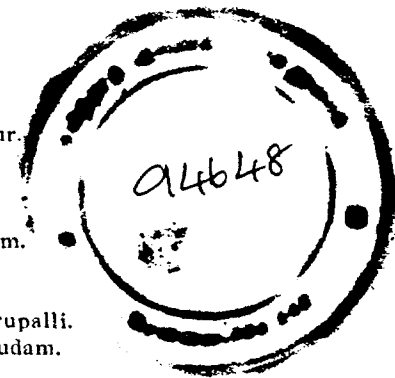
Koilpatti,

L. a. p. on m. c. for 2 months from

5-9-41.

List of officers deputed for the refresher course.

Names.	Designation.
Abdulla Haji, P.	A. D. Ponnani.
Annaswami Ayyar, A. K.	A. D. Sivaganga.
Antony, J. S.	A. A. D. Srivaikuntam.
Ayyaswamy Ayyar, T. V.	A. A. D. Ariyalur.
Bhima Raju, S.	A. D. Chandragiri.
Devasikhamani, T.	A. D. Jammalamadugu.
Gopal Chetti, M.	A. D. Shiyali.
Gopala Rao M.	A. A. D. Vizianagaram.
Gopala Unnithan, M.	A. D. Tirupattur.
Gourisankara Ayyar, M. P.	A. D. Lalgudi.
Hanumantha Rao, D.	A. D. Pithapuram.
Kannan Nambiar, P.	A. A. D. Tellicherry.
Krishna Naik, S.	A. D. Kasaragod.
Krishnaswami Ayyar, C. S.	A. D. Chidambaram.
Krishna Reddy, T.	A. D. Nandyal.
Kunhiraman Nambiar, P. A.	A. A. D. Dindigul.
Lakshmipathi Rao, T.	A. D. Bimavaram.
Muthuswami Ayyar, S.	A. D. Tirukoilur.
Narasimham, P. L.	A. D. Bezavada.
Narayanan Nair, K.	A. D. Namakal.
Narayana Reddy, M. L.	A. A. D. Anakapalli.
Rajagopala Ayyar, N. S.	A. D. Krishnagiri.
Rama Rao, K.	A. D. Rayadrug.
Raman Menon, K.	A. D. Coonoor.
Rajarathnam Chetty, S.	A. D. Palladam.
Sambasiva Rao, P. V.	A. D. Kothapeta.
Sankarakumar Pillai, L.	A. D. Nanguneri.
Sakharama Rao, G.	A. D. Karkal.
Sesbagiri Rao, K. V.	A. A. D. Hindupur.
Sitharama Sastri, G.	A. D. Gudivada.
Srinivasa Rao, N.	A. D. Kollegal.
Subramania Ayyar, D. S.	A. D. Devakotta.
Subramania Ayyar, K. K.	A. D. Conjeevaram.
Subramania Ayyar, P. R.	A. D. Tirutani.
Suryanarayana, J.	A. D. Gurzala.
Suryanarayana, K.	A. A. D. Chapparupalli.
Suryanarayana, V.	A. D. Tadepalligudam.
Varadachari, K.	A. D. Gooty.
Varadarajulu Naidu, S.	A. D. Dhone.
Venkataramam, A.	A. D. Rapur.



The Madras Agricultural Students' Union.

PATRONS

Sri. V. Arumugam Pillai, Sundaikamuthur, Coimbatore District.
 Dewan Bahadur C. Arunachala Mudaliar, Zamindar of Chunampet, Chingleput [District].
 Sri. Lodd Govindoss, Madras.
 Sri. A. M. Kalinga Rayar, Zamindar of Uttukuli, Coimbatore District.
 Raja Sri. Krishnachandra Gajapati Narayana Deo, Maharaja of Parlakimidi, Ganjam District.
 Raja V. Madhava Rajah, Rajah of Kollengode, Malabar District.
 Sir A. P. Patro, Berhampur.
 Sri. T. A. Ramalingam Chettiar, Coimbatore.
 Sir C. P. Ramaswami Ayyar, Trivandrum.
 Dewan Bahadur C. S. Ratnasabhpathi Mudaliar, Coimbatore.
 Sri. Veerarayan Thirumalpad, Nilambur, Malabar District.
 „ V. C. Vellingiri Gounder, Coimbatore.
 Dewan Bahadur C. V. Venkataramana Ayyangar, Coimbatore.
 Sri. R. Jeevaadas, Varnasi, Parakimidi.
 G. R. Hilson, Esq., Norwich, England.
 Sri. Ramachandra Ananga Bhima Dev, Kesari Gajapathy, Rajah Saheb of Budokhemidi, Berhampore, Ganjam
 Rao Bahadur K. T. Alwa, Madras.

OFFICE BEARERS FOR 1941—42.

R. C. Broadfoot, *President, (ex officio).*
 C. R. Srinivasa Ayyangar, *Resident Vice-President.*
 S. N. Chandrasekhara Ayyar, *Editor.*
 V. Gomathinayagam Pillai, *Secretary.*

COUNCIL (16 members).

President.
 Resident Vice President.
 Editor.
 Secretary.

Mofussil Vice Presidents.

R. Swami Rao.
 Dr. A. Subba Rao.
 K. C. Naik.

Mofussil Members.

K. Sriraman.
 K. Raman Menon.
 M. Rama Reddi.
 C. Venkatachalam

Resident Members.

K. Raghavachari.
 T. Venkataramana Reddi.
 Rao Sahib V. Muthuswami Ayyar.
 P. K. Sivasubramaniam (Student).
 H. Gurubasavaraj, Secretary,
 Students' Club (*ex officio*).

MANAGING COMMITTEE (10 members).

Resident Vice-President.
 Editor.
 Secretary.
 M. A. Sankara Ayyar, *Manager.*
 M. S. Purnalingam Pillai, *Treasurer.*
 T. Nataraj, *Member.*
 S. V. Doraiswami, „
 C. Balasubramanian, „
 K. V. S. Suryanarayanamurthi, (Student).

H. Gurubasavaraj, Secretary,
 Students' Club (*ex officio*).

EDITORIAL BOARD (8 members).

Editor.
 Secretary.
 Manager.
 Dr. N. Krishnaswamy (Sub-Editor).
 C. M. John.
 C. S. Krishnaswamy.
 C. L. Sundararajan (Student).
 H. Gurubasavaraj, Secretary,
 Students' Club (*ex officio*).

Editor and Publisher: S. N. Chandrasekhara Ayyar, M. A.
 Printed at The Scholar Press, Palghat.

**JUST
ARRIVED**

**THE LATEST
FAVRE-LEUBA
SWISS MADE**

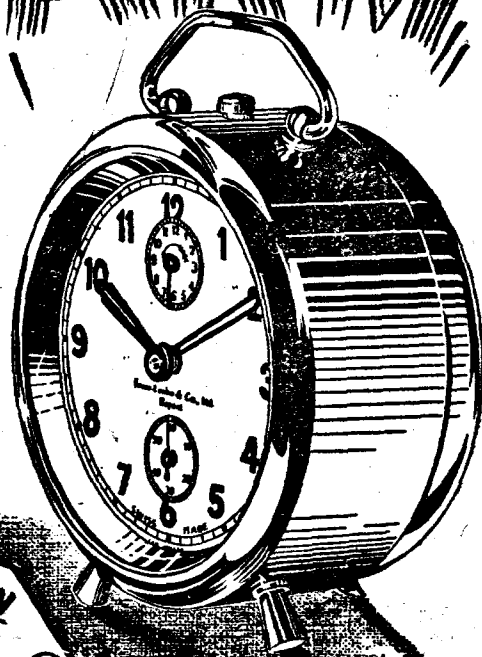
Direct from the Swiss factory to Favre-Leuba has come the very latest in alarm time-pieces. Conveniently small, not one of the latest improvements has been missed, and the high Favre-Leuba standard has been maintained throughout. This is definitely the alarm you have been looking for!

ALARM

TIME-PIECE!

Height 4 3/4". Dial 3".
30-hour movement.

- 8381 Nickel-plated case, steady alarm, without seconds Rs. 10-0
- 8382 Coloured (red or blue) case, steady alarm, without seconds Rs. 8-8
- 8383 Nickel-plated case, steady alarm, with seconds Rs. 10-8
- 8384 Nickel-plated case, repeat alarm, with seconds Rs. 11-8
Radium dial Rs. 1/8 extra.



**BUY YOURS NOW
WHILE STOCKS
LAST**

Favre-Leuba
CQ. LTD.
BOMBAY CALCUTTA