



The Madras Agricultural
Journal

1948 - August

VOL. 35. NO. 8

JL
Jm 211, N13
N48-35.8
94655

No. M. 5155.



610

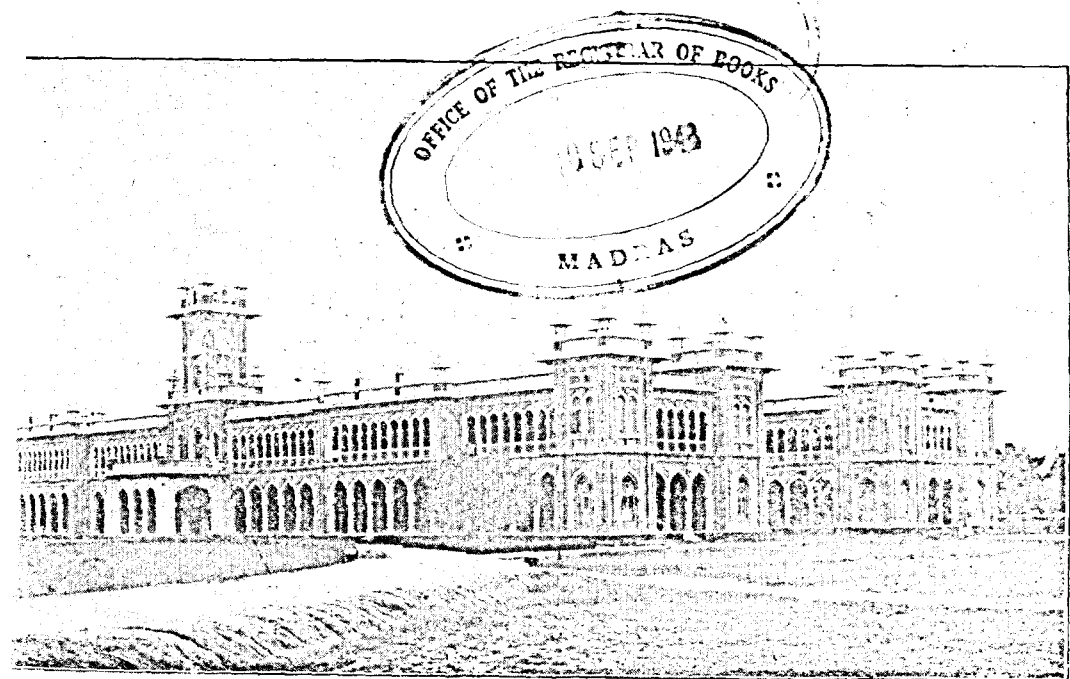
THE
Madras Agricultural Journal

47

XXXV

August 1948

No. 8



AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE.

Published by
THE MADRAS AGRICULTURAL STUDENTS' UNION,
AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,
COIMBATORE, S. INDIA.

Annual Subscription:

Inland Rs. 4-0-0
Foreign Rs. 4-8-0

Single Copy
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.

A Premier Agricultural Monthly in India.

EDITORIAL BOARD.

C. S. Krishnaswami Ayyar (Editor).

P. D. Karunakar.

K. Meenakshisundaram.

T. R. Narayana Ayyar.

T. V. Subramaniam.

Dr. N. Krishnaswami.

G. H. Vasudeva Rao, (Student).

U. K. Bhaskara Rao, 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. Review 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.

Rate 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 ...	15	0	0	Liberal discounts are allowed
For half page ...	8	0	0	for standing matter provided
For quarter page ...	4	0	0	space is booked ahead and
				prepayment 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.

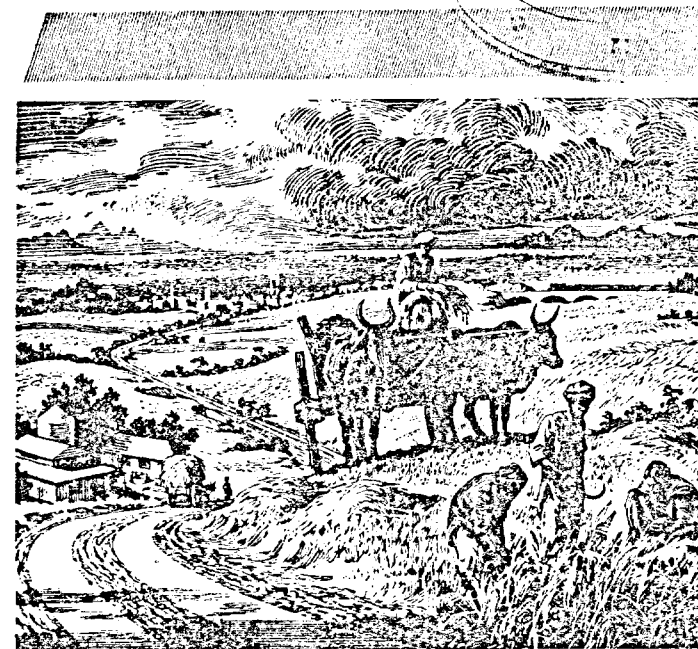
Twenty-five copies of reprints of contributions will be presented to authors. Extra copies and printed covers for reprints, if required can be supplied at actual cost if intimation is given when the manuscript is presented.

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

All communications should be addressed to:

The Secretary, M. A. S. Union,
Agricultural College, Lawley Road P. O., Coimbatore.

OFFICE OF THE SECRETARY OF BILLS
1943



Building Today

VILLAGE RODAS

A serviceable road is a necessary factor in village improvement. Creteways or concrete wheel tracks consisting of two parallel strips of concrete provide the villager with the most economical, weather-proof link with the nearest town or market-place. Creteways speed up the transport of commodities while reducing maintenance costs to an absolute minimum. In addition, creteways permit the use of bicycles, ensuring speedy medical relief, post and bank facilities; for children, schools are within easy reach.

Creteway design lends itself to a certain extent for progressive improvements to roads. During the first stage a set of tracks can be laid on one side of the road carrying the greater intensity of traffic to which another set of tracks may be added on the other side at a later date when traffic increases and funds permit. In the first stage an approaching vehicle can very easily get off the creteway to make room for one having the right of way. For further information write to the Concrete Association of India, 9, Mount Road, P. O. Box 312, Madras.



THE CEMENT MARKETING CO. OF INDIA LTD.

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

CONTENTS.

	PAGE.
Editorial	157
<i>Original Articles :</i>	
(1) Dormancy of the Seed in the Groundnut By C. M. John, C. R. Seshadri and M. Bhavani Shankar Rao	159
(2) The Use of Plain Bordeaux Mixture for the Control of Fruit rot (Mahali) of Arecauts caused by <i>Phytophthora</i> <i>Arecae</i> (P. <i>Palmivora</i>) By D. Marudarajan & S. Kalyanasubramanyam	169
(3) Effect of Heat and Cold Treatments on the Germination of <i>Leucaena Glauca</i> By L. Venkataratnam	179
Proceedings of the 31st College Day & Conference	185
College and Estate News	200
Weather Review	201
Departmental Notifications	204

The Madras Agricultural Journal

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

Vol. XXXV

August 1948

No. 8

Editorial

47

College Day and Conference: We are glad that at long last, the Madras Agricultural Students' Union has been able to revive the holding of the annual College Day and Conference this July after a lapse of seven years. It cannot be gainsaid, that Conferences of this kind serve a useful purpose in providing opportunities for the members of the Agricultural Department and others interested in the development of agriculture, to meet together, in order to exchange thoughts on the many problems that confront them, so that, the scientific worker in the laboratory on the one hand, and the worker in the district who comes in direct contact with the cultivator in the field on the other, may pool their knowledge and co-ordinate their efforts towards the common end they have both in view. The Hon'ble Mr. K. Madhava Menon, Minister for Agriculture, Madras, who presided over the Conference this year referred to the gulf that exists between what was achieved in the research laboratories and the Agricultural stations and what was practised by the cultivator in the field, and he rightly stressed the urgent need of directing our efforts in this direction. The main object of the Annual College Day Conference organised by the Union is to bridge this gulf.

Many things of great import have happened in India and the outside world since the Conference last met in 1941. The War has ended, but the stricken countries of the world are yet to recover from the destruction and damage caused by it. But, by far the most significant event during the period, was that on the 15th August 1947, India regained her freedom. Although the transference of power from the British to Indian hands was effected with grace and good will on both sides, the partition of the country which it involved, considerably upset the emotional and economic balance of the country. The communal frenzy which followed the wake of the partition, resulted in large masses of population being forced to leave their hearths and homes and flee the region of their birth, and the rehabilitation of these people is one of the major problems that faces the administrators of the Union

Government to-day. The tremendous pace at which production for war purposes was engineered without reference to cost, had its inevitable reaction of slackening of efforts when the war was over, and production levels were lowered both in the Industrial and the Agricultural fields, and the spiral of inflation rose to unprecedented heights.

The food situation in the country, acute as it was, during the war has considerably worsened, partly due to the failure of the rains during the last two years, and partly owing to other causes, political and economic, and a large quantity of food grains has to be imported every year from abroad at tremendous cost to feed the population even at the lowest possible nutrition level.

It was under such circumstances that the Thirty-first Agricultural Conference met in July 1948, and discussed the symposium on the present food crisis. The participants were grimly aware of the heavy responsibility that they have to shoulder in the coming years to avert the disaster of famine, and the proceedings were marked with a sincerity and earnestness of purpose which the critical situation in the country demanded. There was no attempt to aim at the merely spectacular and every paper that was presented had some practical suggestion to offer which when implemented would help to raise the level of production. A list of papers contributed to the symposium is found published elsewhere in this issue, and it will be seen that all aspects of Agricultural production were dealt with at the Conference.

Director of Agriculture, Madras. Consequent on his being transferred as Commissioner of Textiles, Madras, Mr. M. S. Sivaraman, I. C. S., relinquished his office as Director of Agriculture on 19-8-1948. In bidding farewell to Mr. Sivaraman, we wish to record our sense of gratitude for the encouragement given to the Madras Agricultural Journal and the help rendered to the Union during his tenure of office.

Mr. R. M. Sundaram, I. C. S., the newly appointed Director of Agriculture, Madras, is no stranger to the Department. Having been Secretary to Government for Development for a number of years, Mr. Sundaram is intimately acquainted with all aspects of the Department, and brings with him a ripe experience to guide him in his high office. We take this opportunity to send him our greetings and to extend a hearty welcome to our midst.

Dormancy of the Seed in the Groundnut

By

C. M. JOHN, C. R. SESHADRI & M. BHAVANI SHANKAR RAO
(Oil Seeds Section, Department of Agriculture Madras.)

1. Introduction. Dormancy is characteristic of seeds of certain Agricultural crops and refers to the resting period required by seeds to give complete germination on sowing from the time of maturity and harvest. Seeds of certain varieties of plants are dormant and require some resting period for germination while others are non-dormant and sprout if sown soon after harvest. Some seeds even germinate while on the plants themselves if conditions are favourable.

Two varieties of the groundnut are cultivated in Madras, viz., the spreading or runner variety, which occupies over 80 percent of the area under the crop in the province and the bunch or peanut variety. The seeds of the former have a dormancy period of two to two and a half months while those of the latter have no dormancy or resting period.

The main rainfed or winter crop of the groundnut is raised between June and December and the summer or irrigated crop between February and August. The spreading variety is largely sown for both these crops. Seed material for the summer crop usually sown in the second fortnight of February is taken from the preceeding rainfed crop harvested in December. The interval available for the seeds to complete their resting period is just sufficient in a normal cropping year. But when the season is abnormal, sowing and harvest of the rainfed crop may be delayed for over a month and the period available between the harvest of the rainfed crop and the sowing of the summer crop will not be sufficient to complete the resting period. This will affect the germination of the summer crop, resulting in defective stand and uneven growth of plants. The necessity, therefore, for a spreading variety of the groundnut with a shorter period of dormancy is obvious.

The bunch variety is exclusively cultivated in certain tracts like Pollachi in the Coimbatore district, Guntur and parts of Bellary and Kistna. On account of its short duration of three and half months, it fits in well as a first crop in dry lands where facilities exist for raising another short crop in a year. It has also the advantage of easy harvest and can be grown in tracts where only the south-west monsoon rains are predominant. Thus, though this variety is cultivated in a very limited area in this province, it cannot be replaced by the long duration spreading variety.

The groundnut crop by its very nature of fruiting underground cannot be harvested without sufficient moisture in the soil. Rains at the time of harvest are often either too low resulting in imperfect harvest at increased cost or excessive when harvests have to be delayed till the

fields come to a workable condition. In the latter circumstances, considerable loss by the sprouting of the seed occurs in the bunch varieties. The fully germinated seed is quite useless, while the partially sprouted one is of poor quality with low oil content and has a tendency for rapid deterioration. Loss by germination in the field is very considerable in certain years. In one year in the Pollachi tract about 80 percent of the produce was estimated to have germinated in the field. In the year 1938 at the Groundnut Research Station, Tindivanam (South Arcot district) due to heavy rains in November, the harvests of the bunch types had to be delayed by a few days. It was then found that in some varieties, as high as 80 percent of seeds had germinated. The need for a dormant, short duration bunch type is therefore great.

2. Review of previous work. No serious attempt appears to have been made so far to study the problem of dormancy in the groundnut. Stokes and Hull (1930) in their study of progenies of crosses between the Spanish and the runner types of groundnuts found the dormancy of the runner type to be incompletely dominant over the non-dormant nature of the Spanish type, and that the dormancy of the runner type is not due to the impervious seed coat as was originally supposed. They also pointed out that seed dormancy is essential in a satisfactory "hogging off" variety and also in varieties for market growing when frequent rains occur during the harvesting period.

The problem of seed dormancy has been thoroughly investigated in wheat and to a less extent in barley and oats. Scholez (1933) experimented with a large number of wheat varieties and reported the absence of any relationship between the length of dormancy and the winter or the spring habit or earliness of ripening. Dormancy was also found not associated with the moisture content of the grain. Freistedt (1935) conducted extensive tests over a number of years on the dormancy of both spring and winter barleys and found the characters to be recessive on the genetic analysis of F₂ progenies of four crosses. Harrington and Knowles (1940) have pointed out that "dormancy as a character has achieved a position of breeding significance". The limitations met with in the groundnut types also confirm this view.

3. Experimental work. Preliminary experiments on seed dormancy were conducted at the Groundnut Research Station, Tindivanam, (South Arcot district) with the material available in the bunch and the spreading varieties, numbering over 80 units in 1936—37 and 1937—38. The results showed that in the bunch types fairly high germination of 50 to 80 percent was obtained immediately after harvest. There is a gradual rise and maximum germination of over 90 percent was obtained in about a week to ten days after harvest, and slow increase was noted till about two to two and a half months after the harvest, when high percentage

of germination was obtained. Differences in the degree of presence or absence of dormancy were also noted among the different varieties.

Based on these findings systematic experiments were laid out during the years 1939—40 and 1940—41. Six representative types in each of the bunch and the spreading varieties with the following characters were selected for the study.

TABLE I.

Varieties.	Register Number.	Size of Pods.	Kernelled nature	Seed coat colour	Remarks.
A. BUNCH.					
1. Gudiatham	... A. H. 30	Small	1—2	Light Rose	Commonly cultivated bunch variety cultivated in Pollachi tract.
2. Small Japan	... 34	"	1—2	Dark Red	
3. Volete	... 35	Very small	1—2	Light Rose	
4. Valencia	... 60	Medium	1—4	Dark Red	
5. Improved Spanish	70	Medium	1—3 (3 occasional)	Light Rose	
6. Corientes I.	... 810	Small	1—4 (4 occasional)	Light Rose	
B. SPREADING.					
1. Local Mauritiws	... A. H. 1	Small	1—2	Rose	Commonly cultivated spreading variety.
2. Texas	... 10	Big	1—3	Rose	
3. West African	... 16	Medium	1—3	Rose	
4. Saloum	... 25	Medium	1—3 (3 occasional)	Rose	Improved variety under distribution.
5. Louga	... 26	Very Small	1—2	Rose	
6. Native Tanganyika.	73	Medium	1—3	Rose	

The lay out adopted was a split plot design replicated four times separately for the bunch and the spreading varieties. Intervals of sowing were randomised within blocks and the types within sub-blocks. Sowings were done in plots measuring 2' x 1½' laid out in the field at fifty seeds per plot, per sowing. The plots were regularly and uniformly watered and germination counts made every morning. For purposes of statistical analysis the total number of seeds that had germinated up to and inclusive of the tenth day after sowing was alone taken as non-dormant for the reason that groundnut sown in this field, germinates completely by the tenth day. In the first year's experiment there were ten sowings at two-day intervals after harvest, for the bunch series and seven sowings at ten-day intervals for the spreading. The experiment was repeated in the second year on the same lines with sowing for the spreading series continued at ten-day interval up to 100th day after the harvest.

4. Results. (i) *Varietal*.—The germination data were statistically analysed by the method of analysis of variance. Differences between varieties, sowings and interactions attained the level of significance in both the years. The results are presented below.

TABLE II.

Dormancy test of Bunch Varieties — Produce of 1939—40 Rainfed Crop.
Mean germination percentage.

Varieties.	Period in days from harvest to starting of the tests.											Mean
	2	4	6	8	10	12	14	16	18	20		
A. H. 32	64.0	94.0	97.0	98.5	96.5	98.5	97.5	98.0	97.5	97.5	93.9	
34	44.0	94.5	98.0	99.0	97.5	97.5	98.0	97.5	99.0	97.0	92.3	
55	93.0	95.0	96.5	97.5	97.5	98.5	97.5	97.5	98.0	99.0	94.0	
60	57.0	96.5	98.0	97.6	99.6	98.5	98.5	99.0	97.5	97.5	94.9	
70	72.0	98.0	99.0	98.0	98.5	99.5	100.0	99.0	98.5	99.0	96.2	
810	64.0	98.5	99.0	99.0	99.0	97.5	98.0	96.0	100.0	97.5	94.9	
Mean	62.4	96.1	97.9	98.2	98.1	98.3	98.3	97.9	98.4	97.9	...	
Standard error												
Sowings	1.10											3.18
Varieties	0.64											1.73
Body of the table	2.03											5.63
Conclusions.												
Sowings	18, 14, 12, 8, 10, 20, 16, 6, 4, 2											
Varieties	70, 60, 810, 55, 32, 34											

TABLE III.

Dormancy Tests of Bunch Varieties — Produce of 1940—41 Rainfed Crop.
Mean germination percentage.

Varieties.	Period in days from harvest to strating of the tests											Mean
	2	4	6	8	10	12	14	16	18	20		
A. H. 32	78.5	81.5	82.0	75.5	81.5	89.5	89.0	92.0	94.0	94.0	85.6	
34	64.0	69.0	85.0	83.5	80.5	81.0	86.0	93.5	91.0	92.0	82.6	
55	78.5	78.0	85.5	85.5	89.0	93.0	88.0	94.0	94.0	92.5	88.1	
60	86.5	82.0	88.5	89.5	91.0	92.0	88.0	87.5	90.0	95.5	89.1	
70	76.0	78.5	78.0	83.0	89.5	92.5	87.5	93.0	92.0	94.0	86.4	
810	80.0	73.0	86.0	79.5	83.5	84.5	86.5	92.0	92.5	95.0	85.2	
Mean	77.3	77.1	84.2	83.3	85.8	88.8	87.5	92.0	92.3	93.8	...	
Standard error												
Sowings	1.34											3.88
Varieties	0.96											2.66
Body of the table	3.02											8.38
Conclusions.												
Sowings	20, 18, 16, 12, 14, 10, 6, 8, 2, 4											
Varieties	60, 55, 70, 32, 810, 34											

TABLE IV.

Dormancy Test of Spreading Varieties — Produce of 1939—40 Rainfed Crop.
Mean germination percentage.

Varieties.	Period in days from harvest to starting of tests							Mean
	10	20	30	40	50	60	70	
A. H. 1	15.5	47.5	82.5	84.5	94.0	95.0	96.0	73.6
10	5.0	12.5	57.0	71.0	91.0	93.5	96.0	60.9
16	7.0	26.5	65.5	71.5	86.5	90.5	91.5	62.7
25	3.5	10.0	30.5	51.0	79.5	80.5	83.0	48.3
26	6.5	13.5	44.5	61.5	82.0	84.5	84.5	53.9
73	51.0	70.0	78.5	90.5	94.5	95.5	97.5	82.5
Mean	14.8	30.0	59.8	71.7	87.9	89.9	91.4	
Standard error								
Sowing	1.06							Critical difference
Varieties	0.26							3.15
Body of the table	2.62							0.72
5.12								

TABLE V.

Dormancy tests of Spreading Varieties Produce of 1940—41 Rainfed Crop.
Mean germination percentage

Varieties	20*	Period in days from harvest to starting of the tests								
		30	40	50	60	70	80	90	100	Mean
A. H. 1	11.5	28.0	50.0	58.0	70.0	73.0	74.0	75.0	82.5	58.0
10	3.5	23.5	28.0	38.0	56.0	65.0	68.5	68.5	78.0	47.7
16	4.0	21.5	33.0	44.5	66.5	72.0	75.5	77.0	76.0	52.8
25	9.5	25.0	63.0	60.0	67.0	69.5	73.0	75.5	82.0	58.3
26	6.0	19.0	33.5	54.0	65.0	69.0	72.5	72.0	78.5	52.2
73	54.5	75.5	72.0	75.5	80.0	85.5	83.0	85.5	89.0	77.8
Mean	15.0	32.1	47.5	55.0	67.4	72.3	74.4	75.6	81.0	
Standard error										
Sowings	2.44									Critical difference
Varieties	1.32									7.12
Body of the table	3.94									3.66
Conclusions.										
Sowings	100, 90, 80, 70, 60, 50, 40, 30, 20.									10.92
Varieties	73, 25, 1, 16, 25, 10.									

* The 10th day sowing did not give any germination and was therefore omitted from the analysis.

Bunch Varieties. In the first year of the experiment all sowings after the fourth day onwards gave germination of over 96 percent and were on par with each other. The freshly harvested seeds had high moisture content on the second day and a significantly low germination was noted in subsequent sowings till 93.8 percent was obtained for the 20th day sowing. Differences due to types though significant were of low magnitude. But A. H. 34 "Small Japan" recorded the longest period of dormancy among the bunch types. This, however, is not very popular with growers due to other considerations.

Spreading Varieties. In both the years of experiment a rapid increase in germination was noted for the first four sowings at ten-day intervals and the differences between the mean germination percentages for these four sowings were significant. In subsequent sowings the increase in the percentage of germination was much less. Unlike in the bunch series, marked differences between types were noted in this series and A. H. 73, "Native Tanganyika" gave over 50 percent germination for the first sowing and finally recorded the highest germination in both the years, showing thereby that it had shorter period of dormancy. But unfortunately this has certain undesirable characters as susceptibility to wilt etc. Types A. H. Nos. 10, 16, 25 and 26 gave the lowest germination both at start and at the end of the experiments in both the years indicating that these types required a longer resting period to give full germination. A. H. 1 "Local Mauritius" the commonly cultivated type was intermediate between these two groups.

It is seen that in the second year of the experiment the percentages of germination obtained for successive sowings were lower for the corresponding sowings of the first year. These variations are due to the seasonal effects on the groundnut crop.

To sum up, the bunch variety gives good germination in about a week after harvest (the harvested produce being well dried) while the spreading types require a resting period of two to two and a half months after harvest.

(ii) **Inheritance of seed dormancy.** It is evident from the above data that the bunch varieties can generally be classed as non-dormant and the spreading varieties as dormant, the variation in the dormancy period among them being not of much magnitude or of any great agricultural importance. Seed dormancy appears to be an inherited character in groundnut and the logical step to increase the dormancy period in the bunch varieties or reduce that in the spreading varieties for agricultural purposes will be to undertake cross breeding between desirable varieties and evolve suitable types to meet the needs of different

localities. Although no specific crosses were done to work out the inheritance of seed dormancy in groundnuts, the inheritance of seed dormancy was followed in crosses between the non-dormant bunch and the dormant spreading purelines made for studying the inheritance of certain other economic characters. The results pertaining to two crosses are tabulated below:—

TABLE VI.
Inheritance of Seed dormancy in Groundnut (1940—41 Rainfed Season.)
Germination percentages on 10th day of sowing.

Particulars.	Germination percentage of parents & F-1 Progeny 0-10 days.	Frequency distribution of F-2 families with germination percentages of									
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
A. H. 32 [♀] Parent											
in cross 283	94.0										
F-1 of Cross 283	55.0										
A. H. 29 [♂] Parent											
in cross 283	2.0										
F-2 of Cross 283					2	2	1	6	6	...	20
A. H. 34 [♀] in											
Cross 295	94.0										
F-1 of Cross 295	60.0										
A. H. 1 [♂] in											
Cross 295	3.0										
F-2 of Cross 295		1	...	1	...	...	2	5	5	6	10

It is observed from the above table that the dormancy of the seeds of F-1 progeny is intermediate between those of the parents and a wide range of variation is met with in the F-2 families with a large number of families resembling the more dormant parent. It is evident that multiple factors are responsible for the expression of dormancy. The presence of dormancy was studied in 110 bunch selections isolated from F-3 progenies of nine crosses. The results presented in the following table reveal that some of the selections possess a high degree of dormancy.

TABLE VII.
Frequency distribution of selections from crosses with germination percentage of

0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
19	18	15	13	8	10	9	6	4	8

These selections are under comparison for their yield, duration etc. Two or three extracts have been found to combine the bunch habit of growth and dormant nature of seeds. They are awaiting district trials in the tracts where the introduction of such a strain would be appreciated. The breeding work is being continued to isolate strains with the desired degree of dormancy.

Summary.

Two varieties of groundnuts are cultivated in Madras. They are the spreading or runner type known as Mauritius and the bunch or erect type known as Spanish or Peanut. Of these, the spreading variety occupies about 80 percent of the total area under groundnut in the Province, while the rest of the area is sown to the bunch variety. Seeds of the spreading variety are dormant and take about 2 to 2½ months (from harvest) to give good germination. The seeds of the bunch variety have no dormancy or resting period and sprout almost immediately after maturity.

In the tracts where the bunch variety is largely cultivated heavy rains are received at harvest time which results in the delay of the harvest. During such seasons the seeds of the bunch variety sprout in the field resulting in great loss to the cultivator. In the case of the spreading varieties which are used both for the main crop and the summer crop following it, the seed from the rainfed or winter crop cannot be used for the summer crop unless it is rested for a period of 2 to 2½ months.

The dormancy or resting period required by seeds has been tested in the case of six representative bunch and six spreading varieties of groundnuts by actual germination studies.

The seeds of the bunch varieties have been found to give a high percentage of germination in about 10 days after harvest showing that they are essentially nondormant forms. The seeds of the spreading varieties on the other hand required about 2 to 2½ months for giving good germination. They are in other words dormant. Dormancy therefore appears to be a varietal character.

The inheritance of seed dormancy in groundnut was observed in a few varieties and their hybrid progenies. The seeds of F-1 progenies were found to be intermediate in behaviour between the two parents while the F-2 segregation showed great variability and indicated that multiple factors are responsible.

References.

1. Freistedt, P. (1935) - Reference quoted by Harrington & Knowles (1940)
2. Harrington, J. B. & Knowles, P. F. (1940) - *Scientific Agriculturist*, Vol. XX Page No. 6.
3. John, C. M. (1936-37) *Agricultural Station Reports*, Dept. of Agriculture, Report of the Agricultural Research Station, Tindivanam, P. 325.

4. John C. M. (1937-38) *Agricultural Station Reports*, Dept. of Agriculture, Report of Agricultural Research Station, Tindivanam, P. 325.
5. Seshadri, C. R. and John, C. M. (1939-40) *Agricultural Station Reports*, Dept. of Agriculture, Report of the Agricultural Research Station, Tindivanam P. 299.
6. Seshadri, C. R. and John, C. M. (1940-41) *Agricultural Station Reports* - Dept. of Agriculture - Report of the Agricultural Research Station, Tindivanam P. 306.
7. Scholaz, J. (1933) Reference quoted by Harrington & Knowles (1940)
8. Stokes, W. E. & Hull W. H. (1930) *Journal of the American Society of Agronomy*, 22. II. P. 1,004.

Our Contribution

For

PLANT PROTECTION & PEST CONTROL

"ROOT" Hand and Power Operated
POWDER DUSTING MACHINES

Built by

NACO MANUFACTURING CO., SAN FRANCISCO.

Distributors:

ENSIGN ENGINEERING CORPORATION,
23, ERRABALU CHETTY STREET,
MADRAS 1.

Telegrams: "ENSENCO"

How expensive is MALARIA?

Absenteeism is an expensive problem facing the employer today.

More and more employers are realising that one tablet of 'Paludrine' taken every three days by their staff or labour force ensures complete protection from malaria.

'Paludrine' protection is a good investment! And costs only about 2½ annas per person monthly.



YOUR EMPLOYEES

LOOK TO 'PALUDRINE' FOR FREEDOM FROM MALARIA

Special prices for large employers of labour



IMPERIAL CHEMICAL INDUSTRIES (INDIA) LTD.
CALCUTTA BOMBAY MADRAS COCHIN NEW DELHI KANPUR KARACHI RANGOON COLOMBO

P. Com. 10

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

PERTINENT POINTS ABOUT 'PALUDRINE'

Prevents malaria with one tablet every three days

Absenteeism banished

Lessens risk of relapse, if taken regularly

Used successfully against all types of malaria

Does not harm expectant mothers

Regular dosage ensures complete protection

Is colourless—does not stain the skin

No unpleasant after-effects

Easy to take

The use of Plain Bordeaux Mixture for the successful control of fruit rot (*Mahali*) of Arecanuts caused by *Phytophthora Arecae* (*P. Palmivora*)

By

D. MARUDARAJAN,
Government Mycologist

and

S. KALYANASUBRAMANYAM
Fieldman

Introduction. In a previous paper Thomas and Marudarajan (1938) discussed the importance of the fruit rot (*mahali*) of arecanuts in the Malabar and South Canara districts of the Madras Province and the steps that led to the initiation of field experiments to assess the relative values of different spreaders and stickers then in vogue. The experiments conducted in 1937—38 and recorded in that paper showed that plain Bordeaux mixture prepared by the addition of dilute copper sulphate solution to the milk of lime without using any adhesive was as effective in controlling the disease as Bordeaux mixture to which adhesives were added and that the use of resin as an adhesive to Bordeaux mixture made the mixture less effective than the others. These results were very important because they showed the possibilities for breaking an established practice of using resin Bordeaux mixture for *mahali* control which owing to its prolonged usage through three decades had acquired a wide popularity among the cultivators.

The finding that adhesives which were invariably a source of additional expenditure and labour were unnecessary was of far-reaching importance to the areca growers in the *mahali* infected tract. Considering the importance of the problem, the experiments were continued up to 1941—42 to establish beyond all doubt the findings of 1937—38 experiments regarding plain Bordeaux mixture, so that, the change over from an age long practice may be safely and easily effected among the cultivators.

The experiments were repeated in 1938—39 and in 1939—40 in Vittal village of Puttur taluk of the South Kanara district. These two years, however, proved to be very unfavourable for the spread of *Phytophthora* infection with the result that the experiment had to be abandoned by the month of September for lack of sufficient infection in the unsprayed controls.

With the experience of two disappointing seasons, the venue of the experiments was changed from Vittal to Mundaje, a village situated in the *malnad* of Puttur taluk, where the disease had been consistently reported to have been causing serious damage. The rainfall in this area ranges from 200 inches to 240 inches per year. During the monsoon

months of June, July and August the showers are heavy and almost continuous providing ideal conditions for the spread of the disease. The results of the experiments conducted at Mundaje are recorded in this paper.

Objects. The Mundaje experiments were carried out with the following objects in view :

1. To test the efficacy of plain Bordeaux mixture, i. e., Bordeaux mixture without adhesive, in comparison with Bordeaux mixture to which were added adhesives hitherto advocated by the Department of Agriculture for the control of *mahali* disease.

2. To find out whether one percent plain Bordeaux mixture, the cost of preparation of which is only a third of that of two percent resin Bordeaux mixture, would effectively control the disease in heavy rainfall areas like Mundaje where the annual rainfall exceeds 200 inches, and the number of sprayings which will result in optimum efficiency.

3. To compare the efficacy of the *Jet* method of spraying which is in vogue in certain parts of the South Canara district with the *fine* spray. In Malabar, Mysore and other areca growing areas the *fine* spray is usually adopted. The climbers reach the very top of the areca palm and pull towards them the neighbouring bunches with a bamboo hook and direct the *fine* spray to cover the entire bunch with the Bordeaux mixture. But in some parts of the South Canara district, especially in places where, owing to close planting, the stem of the areca palm does not attain its maximum girth and strength, there are risks involved in accidents due to breaking of the trunks. In such places it is customary to use the *jet* method of spraying wherein the climber gets up to about half or three fourths the height of the tree and directs a *jet* of Bordeaux mixture to the bunches all round.

Experimental methods. In May 1940 three gardens in different parts of Mundaje village were chosen for the experiments. In two of these gardens viz., *Anaikallu* (Garden A), and *Theppathagundi* (Garden B) 165 trees were selected in each and in the third garden *Kapinabagalu* (Garden C) 110 trees were selected. Ideal gardens with trees planted in lines and of uniform age and growth were not available in this tract; hence trees of roughly the same height were chosen. These selected groups of trees were divided into a number of linear blocks and the trees were numbered serially from one end. Individual trees were taken as units for treatments. Fifteen trees were taken for each treatment in Garden A and Garden B and ten trees in Garden C. Groups of eleven trees were marked from one end and the eleven treatments detailed below were randomised so that in each of these groups all the treatments including one control were obtained. Thus, the lay

out of the experiment was in randomised blocks, the groups serving as blocks. The details of treatments for the experiments conducted in 1940-41 are given in Table 1.

TABLE I.
Showing strength of fungicides and adhesives 1940-41 Experiments.

Treatment Number.	Fungicides		Adhesive used per 100 gallons of mixture.
	First spray.	Second spray.	
T-1	2% B. M.	2% B. M.	Resin 8 lb.
T-2	do.	do.	Resin 4 lb.
T-3	do.	do.	Resin 2 lb.
T-4	do.	do.	Casein 2 lb.
T-5	do.	do.	Niger oil 80 oz.
T-6	do.	do.	Niger oil 80 oz. <i>Jet</i> spray
T-7	do.	do.	No adhesive.
T-8	1% B. M.	do.	Resin 8 lb.
T-9	do.	do.	Casein 2 lb.
T-10	do.	do.	Niger oil 80 oz.
T-11	Control (unsprayed.)	do.	

In the following year (1941-42) the experiment was slightly modified and laid out in Garden B and Garden D (*Bathrabail*) of Mundaje village. The important modification effected was the inclusion of one percent plain Bordeaux mixture. The resin mixtures were omitted. The effect of three sprays as against two sprays was studied. Mixtures of weaker strength (1% mixtures) were included for trial in the monsoon also. The method adopted for the selection of trees and the lay out was on the same lines as in the previous year (1940-41). In Garden B 260 trees were selected and in Garden D, 65 trees. The treatments numbered thirteen as detailed below. There were thus twenty trees under each treatment in Garden B and five trees in Garden D. The details of treatments for the experiments conducted in 1941-42 are given in Table 2.

TABLE II.
Showing strength of fungicides and adhesives 1941-42 Experiments.

Treatment Number.	Fungicides			Adhesive used per 100 gallons of mixture.
	First spray	Second spray	Third spray	
T-1	2% B. M.	2% B. M.	...	Casein 2 lb.
T-2	1% B. M.	do.	...	do.
T-3	do.	1% B. M.	...	do.
T-4	do.	do.	1% B. M.	do.
T-5	2% B. M.	2% B. M.	...	Niger oil 80 oz.
T-6	1% B. M.	do.	...	do.
T-7	do.	1% B. M.	...	do.
T-8	do.	do.	1% B. M.	do.
T-9	2% B. M.	2% B. M.	...	No adhesive.
T-10	1% B. M.	do.	...	do.
T-11	do.	1% B. M.	...	do.
T-12	do.	do.	1% B. M.	do.
T-13	Control (unsprayed.)			

The pre-monsoon spraying in 1940—41 experiments was commenced on the 28th May 1940 and completed on the 2nd June. The monsoon spraying which was commenced on the 12th July 1940, about six weeks from the time of the first spraying, could not be completed till the 31st July on account of the unprecedentedly heavy rains which prevented spraying operations. In the subsequent year (1941—42) the pre-monsoon spraying of both the experimental plots (Gardens B and C) was conducted on the 1st and 2nd June and the second spraying between the 14th and 19th July, about six weeks after the first spraying. The third spraying for the series with three-spray treatment was given between the 1st and 3rd September, about six weeks later than the second spraying.

Observations. In all the experiments observations were recorded in the following manner. Weekly counts of nutfall were recorded from the time of the first appearance of disease till harvest for each individual experimental tree in all the plots and classified as nutfall due to *Phytophthora* infection and nutfall due to other causes. The degree of infection was expressed as percentage of nutfall on the total number of nuts comprising ripe fruit and diseased nut and nuts shedding due to physiological and other causes.

The first signs of the disease in 1940—41 were noted in the 1st week of July 1940 in Garden C and in the last week of July in Garden A and B. In 1941—42, the first signs of the disease were noted during the second week of July 1941 in Garden B and as late as in the second week of September in Garden D. For want of sufficient spread of natural infection, the Garden D experiment was abandoned during the progress of the experiment. In Garden B where there was wide-spread natural infection observations were recorded till harvest.

The amounts of rainfall recorded during the two years of experiments at Mundaje are given in Table 3.

TABLE III.
Showing record of rainfall in Mundaje from June 1940 to May 1942.

			Rainfall in inches.	
			1940—41	1941—42.
June	...	...	44.51	51.36
July	...	...	78.84	49.86
August	...	...	56.79	55.96
September to May			52.98	41.77
Total for 12 months.			233.12	198.95

Results. The results of these experiments and their statistical analyses are furnished below.

1. 1940—41 experiments — Garden A. The lay out of the experiment was in randomised block. Fifteen trees were made available for each of the eleven treatments including the control. The summary of the results is given in Table 4.

TABLE IV.
Showing summary of results — Garden A (1940—41.)

Treatment Number.	Fungicides		Adhesive per 100 gallons.		Mean percentage of infection.
	First spray	Second spray			
T-1	2% B. M.	2% B. M.	Resin	8 lb.	Nil.
T-2	do.	do.	Resin	4 lb.	Nil.
T-3	do.	do.	Resin	2 lb.	0.7
T-4	do.	do.	Casein	2 lb.	Nil.
T-5	do.	do.	Niger oil	80 oz.	Nil.
T-6	do.	do.	do.	Jet spray.	1.4
T-7	do.	do.	No adhesive.		Nil.
T-8	1% B. M.	2% B. M.	Resin	8 lb.	Nil.
T-9	do.	do.	Casein	2 lb.	1.1
T-10	do.	do.	Niger oil	80 oz.	Nil.
T-11	Control (unsprayed)				60.8
Standard Error		...	...	...	3.0
Critical difference		...	...	...	8.44
Significant		...	...	...	Yes.

Conclusion. $T_1 T_2 T_4 T_5 T_7 T_8 T_{10} T_3 T_9 T_6 T_{11}$

The analysis of variance was used to see whether or not there existed any treatment effect on percentage of infection. Testing the ratio of variance it was found that the treatment effect as a whole was highly significant. There was also no group to group variation. The critical difference showed that all the treatments were better than the control and that between the different treatments the variation was not significant, so far as the intensity of infection was concerned.

2. 1940—41 experiment — Garden B. In this experiment also fifteen trees were taken for each of the eleven treatments. The lay out was similar and the statistical analysis of the data worked out on the same lines as for Garden A. The summary of the results is given in Table 5.

TABLE V.
Showing summary of results - Garden B (1940-41.)

Treatment Number.	Fungicides.		Adhesive per 100 gallons.		Mean percentage of infection.
	First spray	Second spray			
T-1	2% B. M.	2% B. M.	Resin	8 lb.	Nil
T-2	do.	do.	Resin	4 lb.	5.0
T-3	do.	do.	Resin	2 lb.	Nil
T-4	do.	do.	Casein	2 lb.	Nil
T-5	do.	do.	Niger oil	80 oz.	Nil
T-6	do.	do.	do. Jet spray		Nil
T-7	do.	do.	No adhesive.		Nil
T-8	1% B. M.	2% B. M.	Resin	80 lb.	Nil
T-9	do.	do.	Casein	2 lb.	5.5
T-10	do.	do.	Niger oil	80 oz.	3.6
T-11	Control (unsprayed)				50.3
Standard Error		...	...	...	3.8
Critical difference		...	...	...	10.53
Significant		...	...	...	Yes

Conclusion. $T_1 T_3 T_4 T_5 T_6 T_7 T_8 T_{10} T_9 T_2 T_{11}$

The analysis of the figures showed exactly the same conclusions as arrived at in Garden A experiment viz., that all the treatments were better than the control and that between the different sprayings the variation was not significant in the intensity of infection.

3. 1940-41 experiments - Garden C. Ten trees were taken for each of the eleven treatments. A summary of the results and the statistical analysis are furnished in Table 6.

TABLE VI.
Showing summary of results - Garden C (1940-41.)

Treatment Number	Fungicides		Adhesive per 100 gallons		Mean percentage of infection.
	First spray	Second spray			
T-1	2% B. M.	2% B. M.	Resin	8 lb.	15.9
T-2	do.	do.	Resin	4 lb.	7.7
T-3	do.	do.	Resin	2 lb.	9.1
T-4	do.	do.	Casein	2 lb.	10.6
T-5	do.	do.	Niger oil	80 oz.	21.1
T-6	do.	do.	do. Jet spray		11.3
T-7	do.	do.	No adhesive		2.4
T-8	1% B. M.	2% B. M.	Resin	8 lb.	32.7
T-9	do.	do.	Casein	2 lb.	20.9
T-10	do.	do.	Niger oil	80 oz.	Nil
T-11	Control (unsprayed)				78.0
Standard Error		...	...	...	6.4
Critical difference		...	...	...	23.71
Significant		...	...	...	Yes

Conclusion. $T_{10} T_7 T_2 T_3 T_4 T_6 T_1 T_9 T_5 T_8 T_{11}$

The results of the analysis showed the same conclusions as in Gardens A and B except in the case of T-8 (one percent resin Bordeaux mixture) which was significantly superior to the control but inferior to all other treatments.

4. 1941-42 experiments - Garden B. There were 260 trees under the experiment. The treatments as detailed earlier numbered thirteen. There were thus twenty trees under each treatment. The summary of the results are given in Table 7.

TABLE VII.
Showing Summary of results - Garden B (1941-42.)

Treatment Number	Fungicides			Adhesive per 100 gallons	Mean percentage of infection
	First spray	Second spray	Third spray		
T-1	2% B. M.	2% B. M.	...	Casein 2 lbs.	2.72
T-2	1% B. M.	do.	...	do.	5.81
T-3	do.	1% B. M.	...	do.	4.92
T-4	do.	do.	1% B. M.	do.	7.86
T-5	2% B. M.	2% B. M.	...	Niger oil 80 oz.	4.12
T-6	1% B. M.	do.	...	do.	6.00
T-7	do.	1% B. M.	...	do.	17.32
T-8	do.	do.	1% B. M.	do.	6.94
T-9	2% B. M.	2% B. M.	...	No adhesive	0.93
T-10	1% B. M.	do.	...	do.	4.79
T-11	do.	1% B. M.	...	do.	3.87
T-12	do.	do.	1% B. M.	do.	9.57
T-13	Control	(unsprayed)	...		38.59
Standard Error		...	...	...	4.3
Critical difference		...	...	...	11.93
Significant		...	...	...	Yes.

Conclusion. $T T_1 T_{11} T_5 T_{10} T_3 T_2 T_8 T_8 T_4 T_{12} T_7 T_{13}$

From the analysis of the data it was found that the treatment effect as a whole was highly significant and that there was no group to group variation.

Discussion. As a result of the analysis of the data obtained from the three experiments conducted in 1940-41 the following conclusions are evident.

1. The control shows the heaviest infection.
2. All the spray treatments effectively control the disease.

3. There is no significant difference between the spray treatments except in the Garden C experiment where one percent resin Bordeaux mixture is significantly less effective than the other treatments.

These findings are of extreme economic importance, particularly with regard to the plain Bordeaux mixture, because the use of plain Bordeaux mixture effects a considerable saving in the cost of chemicals and labour.

The *Jet* method of spraying which has been compared with the *fine spray* in the case of oil Bordeaux mixture shows that it is equally effective in so far as disease control is concerned. But, although it is conceded that the use of *Jet* in spraying operations has some practical value in the *malnad* areas from the point of view of the climbers' risks, it is to be noted, however, that it is highly uneconomical. Secondly, the possibilities of Bordeaux injury to the trees cannot be overlooked when large quantities of the mixture are allowed to flow down the trunks by using the *Jet*.

The Garden B experiment of 1941—42 in addition to proving the findings of the previous year shows the following conclusions.

1. There is no significant difference within the spray treatments except T-7 (two sprays with one percent oil Bordeaux mixture).

2. The results of two sprays are not significantly different from those of three sprays; hence two sprays are enough to control the disease.

3. Spraying with one percent Bordeaux mixture excepting one percent oil Bordeaux mixture is not significantly different from two percent Bordeaux mixture.

4. Plain Bordeaux mixture both one percent and two percent are not significantly less effective than the corresponding strengths of the mixture with adhesives.

The above results confirm those obtained in 1937—38 regarding the unassailable position of plain Bordeaux mixture and that no adhesives of any kind are necessary for effective control of the disease even under conditions of heavy rainfall. In addition, it has also been proved that one percent Bordeaux mixture is quite efficient and is in no way inferior to the two percent mixture with or without adhesives.

Economics of Spraying. It will be seen from the results of the experiments conducted between 1937 and 1942 that the old assumption that some spray adhesive like resin or casein is necessary in places of heavy rainfall is not correct. It would appear that the natural adhesiveness of

Bordeaux mixture was thought insufficient to withstand the heavy rains. The very first experiment conducted in 1937—38 showed that two percent plain Bordeaux mixture was quite as efficient as Bordeaux mixture of the same strength with adhesive. The subsequent trial of the same mixture in a heavier rainfall area like Mundaje conclusively established its worth. It was thus clear that the cost of spraying could be considerably reduced by effecting a saving in the expenditure on adhesives and the labour involved in their preparation. In the experiments conducted in 1941—42 one percent plain Bordeaux mixture was included both for the pre-monsoon and monsoon sprayings in order to compare its efficacy with the two percent mixture. Very interesting results were obtained from this experiment. Two sprays with one percent plain Bordeaux mixture ranked equal in efficiency with two sprays with two percent mixture. In addition, it was also proved that two sprays with one percent plain Bordeaux mixture were enough to control the disease and that three sprays were unnecessary even in places of heavy rainfall. Table 8 gives the comparative costs of the treatments tried.

TABLE VIII.

Showing comparative costs of spray treatments.

Serial number.	Nature of mixture.	Chemicals required.	Rate per lb. Rs. as. ps.	Two per cent mixture		One per cent mixture.	
				Quantity. lb. oz.	Cost. Rs. as. ps.	Quantity lb. oz.	Cost. Rs. as. ps.
1. Resin B. M.	Copper sulphate	0-6-6	25	0	10-2-6	12 8	5-1-6
	Quick lime	... 0-0-6	25	0	0-12-6	12 8	0-6-3
	Resin	... 0-5-0	10	0	3-2-0	10 0	3-2-0
	Soda	... 0-3-0	5	0	0-15-0	5 0	0-15-0
	Total Rs.				15-0-0		9-8-6
2. Casein B. M.	Copper sulphate	0-6-6	25	0	10-2-6	12 8	5-1-6
	Quick lime	... 0-0-6	25	0	0-12-6	12 8	0-6-3
	Casein	... 0-6-0	2	8	0-15-0	2 3	0-15-0
	Total Rs.				11-14-0		6-6-9
3. Oil B. M.	Copper sulphate	0-6-6	25	0	10-2-6	12 8	5-1-6
	Quick lime	... 0-0-6	25	0	0-12-6	12 8	0-6-3
	Niger oil	... 0-4-0	6	4	1-9-0	6 4	1-9-0
	Total Rs.				12-8-0		7-0-9
4. Plain B. M.	Copper sulphate	0-6-6	25	0	10-2-6	12 8	5-1-6
	Quick lime	... 0-0-6	25	0	0-12-6	12 8	0-6-3
	Total Rs.				10-15-0		5-7-9

It will be seen from the above statement that the cost of one percent plain Bordeaux mixture is about only one third of the cost of two percent resin Bordeaux mixture which was in vogue in the Malabar and South Canara districts prior to the inception of these experiments.

Summary.

The use of plain Bordeaux mixture without any adhesive for the control of *mahali* disease of arecanuts was studied. The results of the experiments showed that one percent Bordeaux mixture without adhesives for both the pre-monsoon and monsoon spraying was as efficient as the two percent mixture with or without adhesives. A comparison between the results of two sprays and three sprays with one percent plain Bordeaux mixture showed that two sprays were quite enough for the control of the disease and that three sprays were unnecessary. The cost of the chemicals has been reduced by about two-thirds by substituting one percent plain Bordeaux mixture for the two percent resin Bordeaux mixture.

Acknowledgments. We are indebted to Dr. Panse of Indore and Prof. Mahalanobis of Calcutta for guiding us in the analysis of the data obtained during 1940—41. We are also indebted to the garden owners in South Canara especially to Sri. Narayana Bhat Bhide of Mundaje, Sri. Rama Krishna Varma Rajah of Vittal and Sri. Kandigai Mahalinga Bhat of Perdal for lending their gardens for our experiments and affording all facilities and help for the successful conduct of these experiments.

Reference.

Thomas, K. M. and Marudarajan, D., *Mad. Agri. Jour.* 1938. 26. 434.

EFFECT OF HEAT & COLD TREATMENTS ON THE GERMINATION OF *LEUCAENA GLAUCA*, BENTH

A method, of improving the germination of *Leucaena glauca*

By

L. VENKATARATNAM, M. Sc., PLANT PHYSIOLOGIST

(Agricultural College, Bapatla)

Leucaena glauca is a small tree belonging to *Mimisoideæ* having very wide distribution in the tropics. In this Province, it is largely found in the Circars growing in between hedges, fences and in waste lands in black clayey soils. The leaves and seeds form, good fodder and the thick stem and branches are used as fuel. The plant is quick growing and attains a highest of 10—12 feet within three years. It is deep rooted and spreads quickly and responds readily to pruning.

Recently the department of Agriculture, Madras has initiated a drive for raising this plant in all *poramboles*, waste lands, roadsides, fences etc., in view of its quick growth; and has advocated its use as a green manure plant to augment the manurial resources of this Province to increase the yield of paddy and exploit its use as fuel. At present large quantities of seed are being collected by the Agricultural Department for distribution to the ryots.

The plant fruits profusely and each fruit contains 15 to 25 seeds. The seeds are dark brown in colour and possess a shining hard testa or seed coat. It gets propagated around its immediate vicinity by self sown seeds in all uncultivated areas. But the seeds when collected and sown are found to germinate very slowly and the germination generally does not exceed over 10 per cent. Repeated trials carried out with different samples harvested and stored for different periods, have conclusively proved that the seeds are very poor germinators, when sown as such. This is mainly due to the impervious hard shining seed coat.

Several methods have been tried in the past by investigators to overcome impermeability and hardness of seed coat in lucerne, indigo, oats, millets etc. Among these scarification or wearing down the seed coat is a well known method Rees (1910) Harrington (1916) and Stewart (1926). Davies (1928) tested the effect of high pressure on impermeable seeds of lucerne and obtained increased percentage of germination. Midgley (1926) observed that hard seeds of alfalfa germinated, when kept in moist condition for several months. Alteration of temperature and liquid air etc., have been used by Busse (1933) and Harrington (1916) and Midgley (1926) to induce permeability. Chandra-sekhara Iyer (1940) has recommended sandpapering for scarifying koringi (*Tephrosia purpurea*) and tea. Nambiar (1944) found that germination could be improved by scarifying *Prosopis Juliflora* seeds by shaking them

with sand in metal containers. Amlong and Naundorf (1937) soaked seeds of different varieties of oats and radish, in β -indolyl acetic acid of 0.001 concentration and obtained better germination and larger plants. Grace (1938), Mc. Rostie and Hopkins (1938) and Templeman (1939) are some of the investigators who have used hormones for pre-treatment of seeds to induce better germination. The Government Agricultural Chemists, Coimbatore has indicated that boiling water is effective in inducing germination of *Leucæna glauca*. Chemical methods for inducing permeability without devitalizing the embryo have also been attempted by Hamley (1932) Rees (1910) etc. Chloroform ether, sulphuric acid, alcohol are a few of the reagents tried by many investigators. Yet, most of these methods were not practicable in view of the intricate technique, cost and time taken. In order to overcome these drawbacks, several machines have also been designed in other countries to minimize the labour involved and to obtain the optimum degree of scarification for uniform and proper germination.

Initially a few of the above methods were employed to test the germination of *Leucæna glauca* and judge their efficiency with the results of germination secured from all these treatments. Table I gives the germination obtained by employing five different methods to scarify the seed coat and induce permeability.

TABLE I.
Showing the Percentage Germination of Scarified *Leucæna glauca* Seeds.

Treatment.	% of germination.	Duration Watched.	Remarks.
1. Hydrochloric acid (5 Minutes) 40%	2	45 days	Initiated on 6-9-1947.
2. Sulphuric acid 98% (1 minute) ...	6	do	
3. Sand Pounding ...	3	do	
4. Shaking with sand ...	1	do	
5. Hot water at 60°C ...	41	10 days	
6. Untreated ...	2	45 days	

It will be seen that none of the treatments have given satisfactory germination excepting hot water. The germination as observed in all the other treatments clearly shows that these treatments had very little effect in scarifying the seed coat. None of the seeds treated with chemicals were found to germinate even after two months, indicating that they are detrimental to the vitality of the embryo and do not promote appreciable permeability without devitalising the embryo.

In view of the above results, all the other treatments were dropped and temperature treatment alone was taken up for further study and trial in order to test its effect on the germination of *Leucæna glauca*.

Moistened seeds of *Leucæna glauca* were kept in germination trays at laboratory temperature after pretreatment with hot water for five minutes in water raised to 40°, 50°, 60°, 70°, 80°, 90° and 100°C. and compared with untreated seeds were kept in Electrolux refrigerator for 10 days at 0°, 10° and 20°C to observe the effect of chilling on germination.

The following table illustrates the results obtained:—

TABLE II.
Effect of Temperature on the percentage of germination of *Leucæna glauca*.

No.	Treatment.	Number germinated per day.										Remarks.	
		1	2	3	4	5	6	7	8	9	10		Total.
1.	100°C. 5 Minutes	...	...	...	...	...	...	...	...	...	...	...	Seed coat bursts; over 40% of seeds got cooked.
2.	90°C. "	...	...	1	1	1	...	...	...	...	...	3	About 20% got cooked.
3.	80°C. "	...	...	37	16	6	7	3	1	2	2	74	None of the seeds had burst seed coats.
4.	70°C. "	...	...	45	18	7	3	1	1	2	1	78	do.
5.	60°C. "	...	...	43	7	...	1	1	2	1	1	56	do.
6.	50°C. "	...	...	26	6	2	1	...	1	...	1	37	do.
7.	40°C. "	...	...	20	...	8	2	...	...	...	...	30	do.
8.	30°C. "	...	...	16	...	7	...	...	...	...	...	23	do.
9.	20°C. "	...	...	...	...	...	...	...	...	...	...	...	Seed coats of a few were injured.
10.	10°C. "	...	...	...	...	...	...	...	...	...	...	...	do.
11.	0°C. "	...	...	...	...	...	...	...	...	...	...	...	Seed coat burst and over 30% were injured by chilling.

The above trials were repeated twice with different samples with a view to assess the effect of different temperatures and almost similar results were secured.

It was found that treatments at temperatures above 80°C as well as below 30°C have shown far lower percentage of germination than the others. Extremes are found not only to inhibit germination but also act detrimentally on the vitality of the seeds. A majority of the seeds treated beyond 90° and at 0°C showed bursting of the seed coat and at 100°C, a mealy fluid oozed out from burst seed coats indicating the cooked state of the cotyledons. This was subsequently confirmed after repeated trials even after pre-treatment with ceresan and mercuric chloride. Owing to the cooked effect at higher temperatures, the fungus found easy access through the broken seed coat despite all antiseptic

pre-treatment of the seed. From the above results it can be safely inferred that the extremes of temperature are detrimental to the germination of *Leucaena glauca* and that the seeds do not tolerate such degrees of extreme heat or cold.

In order to assess the effect of the length of time for inducing optimum permeability and germination, in subjecting the seed to heat and cold treatment, another trial was carried out. In this, the seeds were immersed in hot water of varying temperature immediately after removing the flame for varying lengths of time, viz. 5, 10, 15, and 30 minutes. At lower temperatures, the moistened seeds were kept continuously for 24 hours at 0°, 10°, and 20° C. and alternately at the same temperature for 12 hours and the results are illustrated in Table III.

TABLE III.

The percentage of Germination of *Leucaena glauca* subjected at different temperatures to varying lengths of time.

Serial number	Treatment.	Percentage of Germination.					
		5 Min.	10 Min.	15 Min.	30 Min.	12 Hrs	24 Hrs.
1.	100°C	33	36	6	6	Alternative.	Continuous.
2.	90°C	30	39	37	32	...	...
3.	80°C	75	71	74	69	...	...
4.	70°C	80	76	71	71	...	...
5.	60°C	55	31	20	19	...	...
6.	50°C	32	32	29	19	...	...
7.	40°C	30	23	21	25	...	...
8.	30°C	Laboratory temperature.				18	...
9.	20°C	...	...	...	...	27	21
10.	10°C	...	...	...	...	16	5
11.	0°C	...	...	...	...	3	...

From the above figures it will be noticed that beyond 80°C, at higher temperatures as well as with the increase in the duration of treatment beyond 5 minutes, generally the response in germination decreases. Temperature around 70—80°C., promotes over 75% germination against five min., pre-treatment. Soakings for further intervals do not give higher germination as the temperature of water goes down abruptly beyond the five minutes interval, once the flame is removed. A trial was made by field sowings to gather evidence regarding the range and extent of germination with heat treatment at 75°C over untreated ones to judge conclusively the efficiency of this method. Seeds of *Leucaena glauca* were immersed in hot water to 75°C for five minutes and were immediately sown in regular lines in the field along with untreated ones in alternate plots. The following table gives the results of germination.

TABLE IV.

	Treat at 75°C for five minutes.	Untreated seeds (control.)
First day	...	...
Second day	...	...
Third day	...	...
Fourth day	11	28
Fifth day	26	27
Sixth day	127	23
Seventh day	146	23
Eighth day	42	25
Ninth day	55	...
Tenth day	17	...
Total	424	126
Percentage of germination	70.2	21.0

Treated seeds have given nearly thrice as much germination as the untreated seeds and have shown maximum germination within a week of sowing against a meagre percentage of germination obtained from untreated ones.

The seedlings germinated from untreated and treated ones grew in the normal manner and there was very little difference in their growth. Nor any injurious residual effect or symptoms due to heat treatment were noticed. The growth measurements taken at weekly intervals are given below :—

TABLE V.

	Seedlings from	
	Treated seeds.	Untreated seeds.
	Mean growth extension in cms. of 100 seedlings.	
First week	3.4	3.6
Second week	1.8	1.4
Third week	2.9	2.5
Fourth week	3.1	3.1
Total	11.2 Cms.	10.6 Cms.

Summary and Conclusions. Poor and slow germination of *Leucaena glauca* is due to the or impermeable dark brown shining and glossy seed coat. In the several samples tested over 80 per cent failed to absorb water. It was found that this impermeability could be remedied by

soaking the seeds in hot water raised to about 75 to 80°C or by soaking the seeds in boiling water cooled to 75 to 80°C. Hence it is suggested that the seeds can be immersed in water for five minutes, by boiling and allowing it to cool down for sometime to get the optimum temperature for securing maximum germination, with least detriment to their vitality.

By the above procedure it is hoped that the entire quantity of seeds of *Leucaena glauca* collected can be utilised.

1. Of the several treatments attempted to scarify the seed coat, heat treatment alone was found effective.

2. Seeds of *Leucaena glauca* a valuable green leaf manure and quick growing plant possess a shining hard testa, which is impermeable to water.

3. Temperatures between 70—80°C were found to cause the seed coat to swell and increase permeability and thus facilitate over 75 percent germination.

4. Extremes of temperature beyond 80°C and less than 10°C cause bursting of the seed coat and these injure germination.

5. Immersing seed at longer intervals beyond 5 minutes in hot water of varying temperatures does not induce further permeability to any appreciable degree.

6. Heat treatment between 70 to 80°C for five minutes does not produce any injurious effect on the seeds.

Literature Cited.

1. Amlong, H. U. & G. Naundorf, 1937 quoted in *I. A. B. Tech. Comm.* No. 12 Sep.
2. Bussee, W. F. 1930. *Bot. Gaz.* Vol. 39. Pp. 169—179.
3. Chandrasekhar Iyer, S. N. 1940-*Mad. Agri Jour.* Vol. 28. Pp. 342—345.
4. Davies, P. A. 1928. *Am. Jour. Bot.* Vol. 15-Pp. 433—436.
5. Govt. Agricultural Chemist 1947 (Unpublished) Circulated to the officers of the Agri. Department in October.
6. Grace, H. H. 1938. *Canad Jour. Res* Vol. 15. Pp. 538—546.
7. Harrington, G. J. 1916. *Jour. Agri. Res.* Vol. 6. Pp. 761—796.
8. Mc. Rostie, G. P., J. W. J. Hopkins and N. H. Grace-1928. *Canad. Jour. Res.* Vol. 16. Pp. 510—515.
9. Midgley, A. R. 1926. *Jour. of Am. Soc. of Agron.*-No. 18; 1087.
10. Nambiar, K. 1944-*Mad. Agri. Jour.* Vol. 37. Pp. 293—306.
11. Rees, B. 1910. *Jour. of Dept. Agri. Victoria.* Vol. 8. Pp. 770—773.
12. Stewart, G. 1926. *Jour. of Am. Soc. of Agron.* Vol. 18. Pp. 743—760.
13. Templeman, W. G. 1939. *Emp. Jour. Expt. Agri.* Vol. 7. Pp. 76—88.

Thirty-first College Day and Conference

*

The Thirty-first College Day and Conference organised by the Madras Agricultural Students' Union was held this year after an interval of seven long years at the Research Institute, Coimbatore, from 29th to 31st July 1948 under the distinguished presidency of the Honourable Sri K. Madhava Menon, B. A., B. L., M. L. C., Minister for Agriculture, Government of Madras. Sri M. S. Sivaraman, I. C. S., Director of Agriculture, Madras, the regional Deputy Directors of Agriculture and the District Agricultural Officers, of some districts were present and took part in the Conference. Sri T. A. Ramalingam Chettiar, Member, Indian Constituent Assembly, Sri V. C. Vellingiri Gounder and Sri V. C. Palaniswami Gounder, M. L. A. were among the distinguished visitors who attended the Conference, and participated in its proceedings.

The Conference commenced at 12 Noon on 29th July 1948 with a prayer by Sri M. B. V. Narasinga Rao, the Paddy Specialist. After prayer and singing of the National Song by the college chorus, Srimathi A. V. Kuttimalu Amma, M. L. A., unveiled the portrait of Mahatma Gandhi. Srimathi A. V. Kuttimalu Amma, in her short speech, exhorted the people to work for the ideals set before them by the Father of the Nation and for which he worked to the last of his days and died a martyr.

The Honourable Minister for Agriculture, then on behalf of the Madras Agricultural Students' Union, moved the following resolution:—

"The Madras Agricultural Students' Union, Coimbatore, places on record its profound and deep sense of sorrow at the tragic end of Mahatma Gandhi, the Father of the Indian Nation and Apostle of Truth and Non-violence". The resolution was passed, all those assembled standing in silence for two minutes.

The Principal, Mr. M. C. Cherian, then welcomed the Honourable Minister for Agriculture, Srimathi A. V. Kuttimalu Amma, M. L. A., and other distinguished visitors to the Conference in a short speech.

The Secretary, Sri C. Balasubramania Mudaliar, read the messages received by the Union from many of its well wishers and

followed it by reading of the annual report of the Managing Committee. Srimathi A. V. Kuttimalu Amma, M. L. A., then distributed the prizes to the various successful candidates for the academic year ending June 1947.

The President, then in a short speech declared the Symposium open for discussion. Sri M. S. Sivaraman, I. C. S., opened the discussions and seven interesting papers were read at the first day session of the Conference and at the end, Srimathi A. V. Kuttimalu Amma, declaring open the Agricultural Exhibition, organised by the Department of Agriculture, laid stress on the importance of such exhibitions and appealed to women to take more interest in such exhibitions and contribute their share in solving the present food problem. During the next day, the session commenced at 9 A. M. and eight more interesting papers were read and discussions on these followed. A number of Officers of the Department, and Rao Bahadur V. Ramanatha Ayyar, Retired Cotton Specialist, took part in the discussions and gave their valuable suggestions. The Honourable Minister for Agriculture wound up the Conference after short speech with his concluding remarks on the evening of the 30th July. On the 29th July 1948 the Union arranged for a variety entertainment followed by Tea and Sports on the 31st July 1948.

Exhibition. An Exhibition was arranged in the Research Institute, Central Farm and other Breeding Stations, from 29th July 1948 to 1st August 1948, which attracted a number of visitors from the town and adjoining villages.

Central Farm. Green manure plants and green leaf producing shrubs and trees were exhibited. Various types of perennial and annual fodder grasses and crops formed the main exhibits. The Horticultural section attracted a number of visitors. A number of plants and fruits from the hills formed the main feature. Seeds and plants were also made available for sale to the visitors. The propaganda sections of the Department exhibited produce of the ryots who followed the recommendations of the Agricultural Department.

Chemistry. Four noteworthy items in the Agricultural Chemistry Section were, (1) The preparation of Town Waste Compost, (2) The Inoculation legume, nodules, (3) Values and importance of green manures to crops, and (4) Vernalisation of seeds.

Paddy. The work of the Section dealing with the several improvements of rice in the Province with suitable charts, posters, live specimens and samples of the several important strains, was exhibited.

The evolution of *Piricularia* resistant strains, and saline and flood resistant strains of rice, were specially interesting. The collection of the chromosome deficient, polysomics and some of the wild paddies were also on show. A few interesting charts relating to Agricultural Meteorology were also exhibited.

Oil Seeds. Important improved strains of groundnut, gingelly and castor with self explanatory notes were shown. Hybrid coconut seedlings of Tall x Dwarf cross, an achievement in coconut breeding, was prominently exhibited. The nuts and seedlings of a few of important world varieties of the coconut with an array of posters designed to bring home to the visitors the various aspects of research work done in the section formed high light of the show.

Mycology. Impressive posters and educative charts showing the various easy methods of combating the diseases of plants were exhibited. Charts relating to Methods of Food Yeast Manufacture, Mushroom growing, Ergot production and its importance, Agri Tree Killer were on show. The latest methods of combating diseases and pests by the use of power sprayers and dusters were demonstrated.

Entomology. The exhibits comprised the major pests of crops and their control. The important pests of the food and vegetable crops were given special prominence augmented by attractive coloured posters and live specimens wherever possible. Biological methods of control, indigenous insecticides, rats damaging crops, and agro-industries like beekeeping, Lac culture were some of the other objects of interest.

Pulses. Strains of various pulses and kitchen garden vegetable seeds were exhibited along with educative charts, posters etc., pertaining to Pulses in the Province.

Botany. Mounted specimens of plants comprising Indigenous dye yielders, (2) Tannin producers, (3) Industrially important plants like Timber, Oil, Green manure, Medicinal etc., (4) Drug plants made up of roots, seeds, bark etc., (5) other miscellaneous economic plants such as *Gracilaria* for agar-agar etc., and; (6) All varieties of Bananas and their products were exhibited. Besides, fresh collections of fodder grasses, green manure plants, anti-soil erosion plants were also shown.

Millets. Among other interesting exhibits charts showing food values of Millets, their role in relieving the economic pressure of the province, their importance as food to man and fodder to cattle, were noteworthy.

The application of Cytogenetical methods in plant breeding, effects and methods of applications of chemicals like colchicine, sulfa drugs etc., formed an interesting study by itself.

Principal's Welcome Speech. Mr. President, Ladies and Gentlemen, On behalf of the Madras Agricultural Students Union, I have great pleasure in according to you all, a hearty welcome to this, the thirty first College Day and conference. We are particularly thankful to the Hon'ble Sri. K. Madhava Menon, Minister for Agriculture, for presiding over this function. His presence here shows the great interest he has in matters affecting the welfare of the ryot. We are also glad to have Sreemathi Kuttimalu Amma in our midst and thank her for accepting our invitation to declare the Exhibition open. We would also thank Mr. Sivaraman, our Director of Agriculture, for the interest he is taking in the affairs of the Union and for making it possible for us to meet here.

The last College Day and Conference was held in 1941. So we are meeting again after seven long years. This period has been a momentous one in the history of India. War has been won; independence has been gained but, the Father of the Nation who made freedom possible has been removed from our midst under tragic circumstances. Though Gandhiji is no more with us, yet his spirit is guiding us. Let us all emulate his noble example.

It is true that war has been won but we have yet to win the peace. The food problem has been one of the most acute of the problems all these years. Under the lead of our Director of Agriculture, the Department is trying its best to help in the solution of this problem. In this connection I would draw the attention of this gathering to the recommendations of the Crop and Soils Wing of the Board of Agriculture which met recently in Madras. Their recommendations to maximise food production in this country is well worth consideration.

The Symposium, on "the Present Food Crisis and Its Solution", is an attempt to take stock of the situation to note what has been done so far and to suggest measures for future. It is hoped that many will take part in the discussions and give us the benefit of their valuable experience.

An Exhibition has also been arranged in connection with the Conference. It is our desire that as many visitors as possible take advantage of the opportunity of seeing the activities of the Department.

The results of the B. Sc. (Ag) Degree examinations have been satisfactory. Eighty one students out of ninetyfive qualified for the degree. I congratulate them on their success and particularly Mr. Appa Rao for having secured a First Class — the only First Class of the year. To obtain a First Class in the Madras University, in the B. Sc. (Ag.) degree examination a student has to obtain 60 percent of the marks and above, in both the second and final years. The Board of studies have accepted the syllabus for a new subject — Propaganda in

Agriculture — as a part of our Degree Course. This is to train the students in the method of propaganda. Well, Sir, this College is one of the best Agricultural Colleges in India and the products of this College deserve all encouragement at the hands of the Government.

Before I conclude I have to make one or two requests to the Government. On previous occasions larger numbers of officers of the Department were deputed to attend the Conference. I do not think there is any need for me to emphasise here the advantages of Conference like these. I appeal to the Hon'ble Minister to allow more of our officers to take part in such Conferences. I would also make another appeal to you, Sir, "The Government have themselves recognised" — I am quoting their own words — "that the Madras Agricultural Journal has been serving as the medium for publishing results of research that have a bearing on South Indian Agriculture". The present Government subsidy of Rs. 400/- per year for publishing the journal is very inadequate nowadays when the cost of printing the journal has increased 3 or 4 fold. We hope that as a result of your sympathetic consideration we will be able to hear shortly that the subsidy has been increased.

Ladies and Gentlemen, I welcome you once more and hope that as a result of our deliberations we will be able to devise better ways of serving our agriculturists and thus help to bring about peace and plenty in our country.

Report by the Secretary. The Hon'ble Minister for Agriculture, Sreemathi A. V. Kuttimalu Amma, Director of Agriculture, Ladies and Gentlemen,

The Committee take this opportunity to express their sense of deep gratitude to the Hon'ble Minister for Agriculture, Sri K. Madhava Menon, B. A., B. L., M. L. C., for graciously consenting to be in their midst to-day on this most happy occasion when the Madras Agricultural Students' Union is reviving its celebration of College Day and Conference after a lapse of nearly seven years.

For the Union it is a matter of no small pleasure to see Sreemathi A. V. Kuttimalu Amma, M. L. A., in their gathering to-day. With the kind permission of the ladies assembled here, let me say, that the ladies are the best fitted persons for arranging any exhibition since an æsthetic taste is an in-born element in them. In keeping with the glory of the sex, Sreemathi Kuttimalu Amma, has willingly consented, amidst her multifarious national avocations, to declare open the Exhibition organised by the Madras Agricultural Department.

The Madras Agricultural Students' Union: It is appropriate on an occasion like this to give a brief account of the birth and growth of the Union and recall with gratitude the labours of the early founders of this institution

whose devoted attention in laying its solid foundations has enabled successive committees to build the superstructure that has withstood all the vicissitudes of weather brought about in the last two Great Wars.

The Union was founded in the year 1911 as a result of a resolution passed at an informal meeting of the Officers and Students of the College on 14th July 1910. It was primarily intended as an organisation to bring together in a common bond of interest the past students of the Saidapet Institution and the past and present students of the Coimbatore Agricultural College. With a sense of pride the Union adds to this list the old and new students of the Bapatla Agricultural College.

Since that time, the Union has had to pass through very difficult times, particularly during the recent World Great War. Due to the selfless and sustaining efforts of the successive committees it has been able to widen its scope of usefulness, and stands to-day in its adolescence, proud of itself as an organisation which serves not merely as Old Boys' Association, but as a link between the Department and the public. This utility of the Union, the Committee is sure, will meet in its entirety the approval and patronage of the present popular Government of Madras, as their sole and laudable aim is to serve the public.

Conferences: The Union has so far organised thirty Annual College Day and Conferences. Only during the past seven years holding of conferences was not possible due to the difficult conditions created by war.

In these Annual Conferences besides the distinguished officials and non-officials who adorned the Presidential Chair, Officers of the Department and a few leading non-officials of the Presidency always took an abiding interest and thus enriched knowledge through mutual exchange of experiences. Our appeal to all those who have a real interest in Agriculture will be to attend these conferences in large numbers and make the deliberations highly interesting and useful.

With the kind permission of the Hon'ble Minister for Agriculture, the Committee take this opportunity to reiterate the Union's request to the Madras Government to kindly grant a contribution of at least Rs. 1000/- to meet a portion of the expenses of this conference. The Union is hopeful that the Government will certainly pass favourable orders if not with retrospective effect.

Journals: Besides the holding of the Annual College Day and Conference, the most important activity of the Union has been the conducting of the Journal. The Journal was first published as a year Book in 1911, and then as a quarterly till the year 1915 when it was converted into a monthly. The publication of a regular monthly was no easy task

specially under the present difficulties. In fact, the difficulty to procure printing paper became practically insurmountable during the years 1946 and 1947 in spite of the strenuous efforts taken by the then committees with the net result that the publication had to be stopped for a period of about fifteen months in these two years. The paper difficulty still continues, even under the present decontrolled Conditions though not with the same severity. In this connection, the Committee once again beg leave to avail the opportunity to make an appeal to the Hon'ble Minister for Agriculture not only for a protected supply of printing paper but for an enhanced subsidy in view of the fact that the Union is now supplying Journals to nearly six hundred students of the Agricultural Colleges, Coimbatore and Bapatla at the same concessional rate of two rupees per student as it used to supply about one hundred and twenty students in the year 1942 when the present subsidy of Rs. 400/- was kindly sanctioned by the Madras Government.

1947-48: Coming to the activities of the Union during the year 1947-48, the Committee, have firstly to record the memorable event indeed of the attainment of Independence by India on the 15th August 1947. The Union stands most loyally by the side of the Tri-colour Flag of the Indian Dominion. Even greater in significance than the attainment of Independence is the tragic end of Mahatma Gandhi, the Apostle of Truth and Non-Violence on the 30th January 1948. The revered memory of our great leader will be worthily cherished only with the change of heart in every individual and not by any lip service. Though not in our midst, his life will still be the noble ideal for us to follow in life getting inspiration from his sublime teachings.

Committees: The present Managing Council, Managing Committee and Editorial Board were elected in January 1948.

The Editorial Board is to be congratulated specially for reviving the publication of the Madras Agricultural Journal as a regular monthly issue not minding the strain involved therein.

The Managing Committee is highly thankful to Rao Bahadur Sri P. V. Ramiah, Principal, Agricultural College, Bapatla for his having enrolled practically all the students and members of the staff of the Agricultural College, Bapatla, as subscribers for the journal.

An Appeal: The Union respectfully submits to the Hon'ble Minister for Agriculture and through him to Madras Government for bettering the lot of the Agricultural Graduates. In a country where almost the entire population is dependent on Agriculture and that too, at a time when the whole atmosphere, so to speak, is surcharged with the need and enthusiasm for agricultural improvements and production of more food, the Agricultural Department with the Agricultural Graduates as its back bone

is striving its utmost to further the needs of the country, as it will be soon evidenced to-day in this hall itself. It is unfortunate that while revising the scales of pay for the several technical departments, a great injustice has been done to the Agricultural Graduates in that the revised scales fixed for them in G. O. No. 78, Finance, dated 6th February 1947, even as subsequently amended, are the lowest when compared to those fixed for the sister departments like Animal Husbandry, Medical, Co-operative, Engineering and Fisheries subordinate services. This anomaly and injustice need immediate redress at the hands of the popular Government of Madras. The Union fervently hopes and, once again, requests that the present popular Government of Madras will find their way to do all that can possibly be done in the matter to remove the inferiority complex imposed on our Agricultural Graduate and ensure justice in the matter.

Acknowledgements: With great pleasure we record our grateful thanks to the esteemed Director of Agriculture, Sri M. S. Sivaraman, I. C. S., for the able guidance and help he gave the Union during the period under report. The present conference is entirely the fruit of his untiring efforts.

The Union is highly indebted to Rao Bahadur Sri. P. V. Ramiah, M. A., B. Sc. (Edin.), for his valuable help in the management of the Union affairs when he was the Principal, Agricultural College and Research Institute, Coimbatore and ex-officio President of the Union.

To our present Principal, Agricultural College and Research Institute, Coimbatore and ex-officio President of the Union, Mr. M. C. Cherian, B. A., B. Sc. (Agri.) (Edin.), D. I. C., our thanks are specially due. He had to bear the brunt of the heavy work involved in arranging this College Day and Conference. For all the valuable suggestions and practical guidance that he gave the various Committees in the discharge of their duties, the Union is highly indebted to him.

The Union concludes this report with its sincere thanks to all the Ladies and Gentlemen who have kindly responded to its humble invitation and graced the occasion with their august presence.

Mr. Madhava Menon, Minister for Agriculture in declaring the Conference open said:-

The Principal stated that the products of the College deserved encouragement at the hands of the Government. The annual report also said that the condition of the Agricultural graduates should be improved.

About 160 graduates had been produced in both the Agricultural Colleges in the province. It would be difficult for them to ask the

Government to prepare schemes for the purpose of employing so many Agricultural graduates. He hoped that they would be able to absorb a good number this year. He did not think that they could expect this, year after year, if they went on producing graduates at the present rate.

It should be understood that the Agricultural Colleges catered to students not for the purpose of absorbing them in the vacancies of the Agricultural Department but for the development of agriculture in the province. He had already taken the matter with the Public Service Commission and had stated that Agricultural graduates should be treated as qualified men for the purpose of Government appointment as many other graduates. Agricultural schemes could not be prepared taking into account the number of graduates available for appointment. With this idea in mind this time, the Selection Committee had perhaps asked the candidates to state whether they possessed considerable lands for cultivation. He knew that the College and the Research Institute had been praised as the best. The result had not been translated into the field. The result might be good. The average man in the land must get the benefit out of the results obtained in the Institute. Results obtained in the Institute should be taken to the fields. That would be an end itself even though they might not have absorbed all Agricultural graduates.

The speaker knew that what he said just now would not be a consolation to many students. The demands for Agricultural graduates to Government service might not be more than 50 or 60 per year in future. They had already got a large number of candidates. Steps were being taken to treat agricultural graduates on a par with other graduates for employment.

Referring to the scale of pay recommended to Agricultural graduates, they should look into other cases also besides taking their own into consideration. "If the Retrenchment Committee found out any injustice, then it would be remedied; but, personally, I feel that no injustice had been done to Agricultural graduates. There were some other departments which were not giving the same scale of pay to their employees as was given to the Agricultural graduates".

Nobody imposed any inferiority complex on Agricultural graduates. It was not correct to say that they had been treated unfairly in the matter of revision of scale of pay.

If the Government decided to help those who were helping themselves, a sort of inertia came in and they ceased to help themselves. Sometimes the help of the Government killed the private energy. Whenever the need arose they could rely upon the assistance of Government.

Regarding the subsidy for the journal, if articles were translated into regional languages and distributed to ryots, they would be more useful and helpful. If they placed necessary data with regard to the cost of the printing of the journal and other incidental charges, Government would consider increasing the subsidy.

Referring to the work of the Agricultural Department, it was wrong to have used the scientific knowledge of Agricultural Officers for selling groundnut cakes etc. Demands were so much that it was not possible to satisfy every one. For the last four or five years their lot had been very miserable. He was trying his best to take away the trading part of work from Agricultural Officers and to entrust the business part of the work to the Co-operative Societies. There were some obstructions in the way. In Salem district, the business part of the work of the Agricultural Department had been handed over to Co-operative Societies.

The Agricultural Department should improve the method of agriculture by giving proper suggestion to the ryots. There were people who thought that the sale of seeds should be in the hands of the Agricultural Department, as that department alone would be in a position to distribute the proper variety of seeds to the ryots. The Officers had borne their burden well though there might have been slackness here and there. They had acquitted themselves well on the whole. If people realised that Agricultural Officers were useful and helpful to them, no Government could stand in the way of giving increased scale of pay.

Mr. M. S. Sivaraman, Director of Agriculture, referred to the present food crisis and said that India had been importing from Burma for the past so many years. The Conference should consider various aspects of food problem and find out proper solution permanently. The population of the country was increasing but the area for cultivation was limited. They had rain for three months in some parts. How to conserve water, etc., should also to be considered by the

Minister's Concluding Remarks. The Minister in conclusion of the Conference said that the recommendations of the Conference would be considered by the Government. There should be abundant supply of manure. Ordinarily, it was not possible for ryots to go in for chemical manure which was very costly. They could try co-operative farming. The Government had restricted the cultivation of commercial crops to some extent. But that had not helped to increase food production. Regarding the Bijapur experiment, the Minister said that the Madras Government were in correspondence with the Bombay Government.

Mr. M. C. Cherian, Principal proposed a vote of thanks.

List of Prize Winners for Academic year ending June 1947.

Name of Prize.	Subjects.	Recipients.
Robertson Medal	For Agriculture	D. V. Narasimha Rao.
Clogstoun Medal	For General Proficiency	M. S. Swaminathan.
Kees Medal	For Agricultural Chemistry	M. S. Swaminathan.
Diwan Bahadur Ragunatha Rao Medal	For Practical Agriculture	R. Gopalakrishnan.
D'Silva Memorial Prize	For Animal Hygiene	P. Ramani.
Goshen Medal	For Agricultural Zoology	S. M. Sankara Rao.
Anstead Medal	For Plot Cultivation	S. Durga Prasad.
Sampson Memorial Medal	For Agricultural Botany	M. S. Swaminathan.
Swamikanu Pillai Medal	Highest in all the three examinations	M. S. Swaminathan.
Rao Bahadur K. S. Venkatrama Ayyar	For highest number of marks in the First examination	R. Appadorai Ayyamperumal.
M. K. Nambiar's Prize	For highest marks in the Second examination	A. Appa Rao.
Gupta Memorial	For Agricultural Engineering	V. Srinivasan.

Symposium on "Present Food Crisis and its Solution"

PAPERS.

1. The Present Food Crisis and Its Solution — M. Kanti Raj.
2. Rice Deficit in Madras and Its Solution — M. B. V. Narasinga Rao.
3. The Role of Millets in Increasing Food Production in Madras — P. Krishna Rao.
4. The Use of Agricultural Machinery in South India — B. M. Lakshmipathy Mudaliar.
5. Manuring in relation to maintenance of soil fertility and increased crop production with special reference to Rice in Madras Presidency — P. D. Karunakar & T. Rajagopalan.
6. Plant diseases and their control in relation to increased crop production — D. Marudarajan.
7. The food crisis and its solution — Role of the Entomologist — S. Ramachandran.
8. The role of the Meteorologist in a scheme of Grow More Food crops — C. Balasubramaniam & M. B. V. Narasinga Rao.
9. How best the Botanist can help in solving the food crisis — S. N. Chandrasekhara Iyer.
10. More Land for Food Crops — G. Venkatanarayana.
11. Cotton Seed — R. Balasubramaniam.
12. Role of potato in the solution of the present food crisis — P. Narayanan Nair.
13. Increase in Pulses — An imperative necessity — T. K. Balaji Rao.
14. Present Food Crisis and Its Solution — V. N. Subbanacharya.
15. The place of minor elements in growing food crops with special reference to Rice — T. R. Narayanan.
16. Plea for intensive survey of resources for maximising production — S. V. Doraiswamy Iyer.
17. Improving crop estimation to combat the food crisis and an organisation to check the present food crisis — M. Satyanarayana.
18. Soil and water conservation — N. Sankaranarayanan.
19. Present food crisis and its solution — N. C. Thirumalacharya.
20. Role and responsibility of Agricultural Department in the solution of the food problem — Sanjeevi Shetty.
21. Legumes for increased crop production — S. Varadarajan.
22. More sugar per acre — M. V. Mohan Rao & S. V. Parthasarathy.
23. The Groundnut and the food crisis — M. M. Krishna Marar.
24. Grow More Food Campaign — Causes of Limited Success — K. C. Ramakrishnan.
25. Potential Resources for Increased Food Production in Vizagapatam — B. L. Narasimhamurthy.

Proceedings of the General Body meeting of the Madras
Agricultural Students' Union, held on Sunday, 1st August 1948.

The Annual General Body Meeting of the Madras Agricultural Students' Union was held at 8.30 A. M. on Sunday 1—8—1948 in the Freeman Hall with Mr. M. C. Cherian, Principal and the ex-officio President, in the chair. Seventy-eight members were present including fifty student members. The minutes of the previous general body meeting were read and adopted. The report of the Managing Committee for the period 1—1—1948 to 31—7—1948 was read and adopted. Sri. Rao Bahadur V. Ramanatha Ayyer's suggestion of presenting the report in the regional language was not accepted by the house. The auditors' report and the budget were passed with the following amendments passed at the meeting.

1. From the next year onwards the accounts may be audited by the registered auditors.

2. Provision should be made in the budget for the auditors' fees.

The election of office bearers for the year 1948—49 was then conducted. The list of office bearers elected during the year, is found on the last inside cover page. A vote of thanks to the retiring committee was proposed by Sri. R. Balasubramania Iyer. The newly elected Editor, Sri. C. S. Krishnaswami Iyer, thanked the General Body for their having elected him as Editor and assured the house that he would do his best in the running of the journal. The meeting then came to an end.

Report of the Managing Committee for the year 1947—48.

(Presented to the General Body)

The Managing Committee of the Madras Agricultural Students' Union present the following report of the activities of the Union for the period January to July 1948.

Membership. The strength of the Union as it stood on 31st July was 731 as against 510 when the present committee was constituted by the General Body. The marked increase in the membership is mainly due to the joining of the staff and students of the Agricultural College, Bapatla as members of the Union. In this connection the Union thanks Rao Bahadur Sri. P. V. Ramiah, the Principal, Agricultural College, Bapatla and Sri. T. Nataraj for the abiding interest evinced by them in the welfare of the Union. There are yet many officers of the Department who have not yet become the members of the Union. We take this opportunity to make an earnest appeal to one and all of them not only to enlist themselves but also to help the Union in securing some more patrons for the Union.

Office Bearers. Consequent on the transfer of Rao Bahadur Sri. P. V. Ramiah as Principal, Agricultural College, Bapatla, Sri. M. C. Cherian assumed charge as Principal, Agricultural College and Research Institute, Coimbatore and consequently became the ex-officio President of the Union. The Editor Sri. D. Viswanatha Reddy has also been transferred only very recently. Due to the transfer of Sri. L. Krishnan, Sri. K. Meenakshisundaram was coopted as Manager.

Meetings of the Managing Committee. Twelve meetings of the committee were held during the year.

The Madras Agricultural Journal We regret much for not getting up the journal earlier than 1947 as this was due to various unavoidable reasons and we request all the members to bear with us in our difficulties. The regular publication of the journal has been revived though the paper difficulty still continues. Our thanks are due to the Director of Agriculture for the sustaining interest he evinces in the regular publication of the journal. His view that all departmental contributions are first to be published in the Madras Agricultural Journal is really a laudable one. As a result of the keen interest taken by the Head of the Department, articles are pouring in and infact the Editorial Board has got a wide scope to make good choice of articles. We also thank the various authors for contributing useful articles for publication. We record our appreciation of the promptness and neatness of execution of our printers, The Coimbatore Co-operative Printing works, Coimbatore.

Editorial Board. Eleven meetings of the Editorial Board were held during the period under report. We have great pleasure in recording our thanks to Sri. D. V. Reddy, Editor, and to the other members of the Editorial Board for the able and efficient conduct of the journal during the year.

Subscribers. The number of non-member subscribers to the journal during the year was 593 as against 230 in the previous year when the present committee took up the Management of the Union. We appeal to the mufusil members to enlist more subscribers and make the journal more popular in the Presidency.

Exchange list. Twenty journals (Indian and foreign) were on the exchange list during the year as against 32 of last year.

Finance. The auditors' report and the financial statement are now placed before you. Our finances have maintained good progress. In spite of the efforts taken by the Union there is yet a lot to be collected as arrears. We appeal to the members, resident and moffusil, to be prompt in the payment of their subscriptions.

Ramasastrulu Munagala Prize. The two papers received for the year 1947—48, were found to be not up to the mark by the judges appointed by the Union. In response to this year's notification no paper has been received. In this connection also an appeal is made to all the members of the Union to kindly take part in this competition by contributing papers either on original research or original enquiry conducted by them.

Acknowledgement. Now it is our pleasant duty to thank the various members of the Union, who helped and Co-operated with its activities during the year. We have great pleasure in recording our grateful thanks to the conveners and members of the various sub-committees who whole heartedly helped us in celebrating the College Day and Conference in the year 1941. Our thanks are due to the Principal of the Forest College for loaning us tents and chairs. We particularly thank Mrs. Cherian and Mrs. John for arranging the tea on the sports day in 1941. The Union is greatly indebted to Mr. M. C. Cherian for the keen interest he has evinced in the welfare of the Union.

Before concluding this report, with the kind permission of the Ladies and Gentlemen assembled here, I as Secretary would like to thank personally Sri M. B. V. Narasinga Rao, the Vice-President of the Union for the ungrudging help that he has been always readily extending to me in the management of the Union affairs, without which my task as Secretary would have been too much for me to shoulder. My grateful thanks are also due to Sri D. V. Reddy, the Editor and the Managers, Sri L. Krishnan and Sri K. Meenakshisundaram, for the able guidance and assistance that they have willingly given me in the discharge of my duties connected with the running of the journal. My thanks are to a very great extent due to Sri G. Rangaswami, the Treasurer, who has willingly shouldered many responsibilities other than those pertaining to his post as Treasurer. Thanking the resident members, both officers and students, for their kind co-operation in the management of the Union, I conclude this report.

COLLEGE AND ESTATE NEWS

Independence Day Celebrations:— At 5-30 a. m. on the 15th August 1948 Mr. M. C. Cherian, the Principal, hoisted the Union Flag with the singing of the National Song in the Research Institute. Residents of the estate and the students of the college were present. The whole function was a solemn one in keeping with the occasion.

Officers Club:— Dr. K. Narayanan, the Vice-President of the Officers' Club hoisted the National Flag to the accompaniment of the National Song. After light breakfast, distribution of sweets to the children and some indoor games the function came to a close.

Students' Corner:— Mr. R. N. K. Sundaram, the Senior Lecturer in Agriculture and Superintendent, Central Farm, hoisted the Union Flag in the Students' Club to the accompaniment of the National Song by the students. After the distribution of sweets to children the gathering dispersed.

In the evening Mr. M. C. Cherian, declared open "The College Canteen" for the students. A number of the teaching staff were present on the occasion, and a number of trees and flower plants were planted in the hostel compound.

A general body meeting of the students' of the 2nd and 3rd year classes was held on 22-6-1948, when Sri D. V. Reddy, Vice-President, was in chair and the following members were elected as Executive Committee members of the Agricultural College Students' Club for the year 1948-49.

Sri U. K. Bhaskar Rao,	Club Secretary.
" J. B. Joseph,	Games Secretary.
" K. S. Ranganathan,	Cricket Captain.
" K. Venkataraman,	Hockey Captain.
" Sahasranaman,	Tennis Captain.
" Narayanakutty Nair,	Fool Ball Captain.
" K. R. Balasubramanyam,	Tatler Editor.
" N. V. Raman,	III year Class Representative.
" S. Ramasubramanyam,	II " "
" K. S. Soundararajan,	I " "

Sri D. V. Reddy, Vice-President of Students' Club having been transferred to Cudappah, Dr. F. Joseph was unanimously elected as Vice-President.

The members were taken aback at the sad news of the sudden demise of their two friends, Sri G. M. Narasimhamoorthy and G. Balakrishnan. Two condolence resolutions, directing the Secretary to send them to the bereaved parents, were passed by the members of the Club. The inaugural address of the Students' Club was delivered by Sri N. L. Dutt, M.Sc., Assoc., I.A.R.I., Government Sugarcane Expert, on 20th August 1948 at 5 p. m., in Freeman Hall. Sri M. B. V. Narasinga Rao, Paddy Specialist, presided over the function.

Upper Subordinates Association:— The Annual General Body meeting of the Association was held on the 15th August 1948, in the Freeman Hall, at 4-30 p. m. with Sri C. Raghavendrachar, in the chair. The annual and audit reports of the Association were adopted. The following were elected as Office Bearers for the year 1948-49.

President: Sri K. Ramaswami Ayyer.	Members:
Secretary: Mr. F. L. Daniel.	Sri A. Raghavan.
Treasurer: Sri M. M. Marar.	Sri K. Meenakshisundaram.

Weather Review—For July, 1948

RAINFALL DATA.

Division	Station	Actuals for month in inches	Departure from normal in inches	Total since January 1st in inches	Division	Station	Actuals for month in inches	Departure from normal in inches	Total since January 1st in inches
Orissa					South.				
Circars.	Gopalpore	4.4	-2.8	12.7		Negapatam	0.7	-1.0	12.0
	Calingapatam	10.4	+4.9	14.4		Aduturai*	1.7	+0.4	6.1
	Vizagapatam	3.1	-1.3	9.0		Pattukottai*	4.2	+1.5	9.6
	Anakapalle*	2.2	-3.2	8.4		Madura	2.5	+0.5	8.9
	Samalkota*	5.7	+0.2	18.0		Pamban	0.2	-0.3	4.3
	Cocanada	11.2	+4.6	17.2		Koipatti*	0.3	-0.2	8.8
	Maruteru*	7.2	+0.1	11.9		Palamkottah	Nil	-0.3	11.7
	Masulipatam	8.3	+1.9	9.8		Amba-			
	Guntur*	5.9	+0.7	11.5		samudram*	0.1	-0.9	12.0
	Agri. College, Bapatla*	6.3	+1.5	11.6	West Coast.	Trivandrum	7.9	+0.1	43.1
	College Farm, Veeravanam	10.7	...	15.0		Cochin	18.5	-4.8	78.6
ded						Calicut	27.9	...	88.3
Dists.	Kurnool	3.8	-0.6	6.4		Pattambi*	20.8	-4.5	64.9
	Nandyal*	10.6	+5.8	12.6		Taliparamba*	42.9	-0.4	93.4
	Hagari*	0.7	-0.6	4.6		Nileshwar*	39.3	-2.3	98.8
	Siruguppa*	1.5	-1.1§	6.3		Pilicode*	38.4	-4.9‡	103.1
	Bellary	0.5	-1.1	5.4		Mangalore	30.5	-8.9	69.5
	Rentichintala	5.4	...	10.4		Kankanady*	31.9	-7.5	70.0
	Cuddapah	3.1	-1.0	6.7	Mysore & Coorg.	Chitaldrug	4.5	+1.6	15.9
	Anantharajpet*	4.1	+0.5‡	7.9		Bangalore	6.4	+2.5	18.6
Carnatic.	Nellore	1.8	-1.0	4.8		Mysore	1.5	-1.2	16.5
	Buchiredi-				Hills.				
	palam*	2.8	+0.9	7.8		Mercara	33.9	-9.2	69.7
	Madras	3.4	-0.2	7.0		Kodaikanal	4.5	-0.2	28.4
	Tirurkuppam*	4.7	-0.4‡	8.8		Coonoor*	2.1	-0.7	21.9
	Palur*	5.8	+2.8	12.9		Ootacamund*	6.2	+0.5	24.8
	Tindivanam*	3.7	+1.1	7.8		Nanjanad*	8.8	+0.3	44.4
	Cuddalore	2.8	+0.2	7.5					
Central.	Vellore	2.0	-2.6	7.9					
	Gudiyattam*	4.5	+2.0	10.8					
	Salem	4.1	+0.3	14.1					
	Coimbatore (A. C. R. I.)*	1.0	-0.4	9.3					
	Coimbatore (C. B. S.)*	1.4	-0.1	10.6					
	Coimbatore	0.9	-0.8	7.2					
	Tiruchirapalli	1.5	+0.4	11.2					

- Note:— (1) * Meteorological stations of the Madras Agricultural Department.
 (2) Average of ten years data is taken as the normal
 (3) ‡ Average of five years in Tirurkuppam, and Anantharajpet and six years in Pilicode.
 (4) § Taluk office rainfall being 2.01".
 (5) ... Figures not available.

WEATHER REVIEW FOR JULY 1948

Towards the end of first week of July, 48 conditions became markedly unsettled in the Bay of Bengal off Orissa Coast where a depression formed with Central Region within half a degree of Lat. 20°N , Long. $88\frac{1}{2}^{\circ}\text{E}$. Just about that period the monsoon also strengthened in Malabar and the South Konkan. Finally in about five days the depression weakened gradually and ended as a shallow "low" over the southern districts of the West United Provinces and the neighbourhood.

By about the middle of the month the monsoon developed along the West Coast of the Peninsula and the Chittagong Coast and extended into the east and north-west Punjab.

The depression formed during the latter half of the third week of July became diffused in the neighbourhood of Central India, four days after its formation.

As a result of the shallow depression formed in the north Bay of Bengal centered at 0800 hours I. S. T. within a degree of Lat. 21°N , Long. 89°E , on the 27th day of the month under review, the monsoon became very vigorous two days later in the central parts of the country and south and east Rajputana. The monsoon extended even into Sind.

Rains: The monsoonic showers were widespread along the west coast of the Peninsula practically throughout the first ten days of the month, except for one day during this period, on which they were fairly widespread. In the middle of the month, the monsoon became again active and remained so practically till the end of the month. Towards the end of the month it became weak along the West Coast.

Thunder showers were fairly widespread throughout the Presidency. The noteworthy falls were in the places and on the dates as detailed below:—

S. No.	Place.	Date.	Rainfall in inches.
1.	Calingapatam	6—7—48	4.2
2.	Alleppey	6—7—48	3.4
3.	Mangalore	7—7—48	5.9
4.	Mercara	10—7—48	3.1
5.	Masulipattam	25—7—48	2.8
6.	Calicut	28—7—48	4.0

		Average of 10 years	Average of 9 years
		A. C. & R. I. 0822 Hrs.	C. B. S. 0722 Hrs.
1.	Absolute Maximum in shade ...	90.0° F.	92.8° F.
2.	Absolute Minimum ...	68.4° F.	67.5° F.
3.	Mean Maximum in shade ...	86.1° F.	87.8° F.
4.	Departure from normal ...	+ 0.1° F.	+ 0.2° F.
5.	Mean Minimum in shade ...	72.3° F.	72.4° F.
6.	Departure from normal ...	+ 0.2° F.	+ 0.2° F.
7.	Total rainfall for the month ...	0.95"	1.41"
8.	Departure from normal ...	- 0.45"	- 0.08"
9.	Heaviest fall in 24 hours ...	0.48"	0.48"
10.	Total number of rainy days ...	3	3

		Average of 10 years	Average of 9 years
		A. C. & R. I. 0822 Hrs.	C. B. S. 0722 Hrs.
11.	Mean daily wind velocity ...	5.4 Mls. per hr.	5.9 Mls. per hr.
12.	Departure from normal ...	Nil.	- 1.3 "
13.	Mean Humidity at 8 hours ...	73%	77%
14.	Departure from normal ...	+ 2%	+ 2%
15.	Mean grass Minimum ...	...	68.7° F.
16.	Departure from normal ...	...	+ 0.3° F.
17.	Mean wet minimum ...	...	66.6° F.
18.	Departure from normal ...	...	- 2.0° F.
19.	Mean solar Maximum ...	...	95.9° F.
20.	Departure from normal ...	...	- 13.1° F.
21.	Mean soil temperature 5 cms. ...	...	75.3 Evening. 89.3
22.	Departure from normal ...	...	+ 0.01° F. + 10.7° F.
23.	Mean soil temperature 10 cms. ...	...	77.6° F. 86.5° F.
24.	Departure from normal ...	...	+ 0.4° F. + 2.6° F.
25.	Soil temperature 30 cms. ...	...	82.2° F.** 82.1° F.
26.	Departure from normal ...	...	+ 1.2° F. + 1.6° F.
27.	U. S. A. Open Pan Evaporimeter Mean Evaporation 9.40 m. m † Departure from normal	...	+ 0.54 mm.

Note: — * — 9 years average.

† — 8 years average.

** — 5 years average.

Summary.

The weather throughout the month was cloudy and windy. On the whole it was pleasant.

M. B. V. N. and C. B. M.

CROP AND TRADE REPORTS

Crop — Groundnut 1948 — Summer and early crops — Condition report.

Sowings of the summer crop of groundnut are reported to be below normal in Cuddapah, South Arcot and continued drought conditions. The area sown with the summer crop in the other districts is reported to be normal. Sowings of the early crops are in progress in Salem and Coimbatore and the area is expected to be normal in both the districts. The summer crop groundnut has been harvested in most of the districts. The yield per acre is expected to be normal in Cuddapah, Trichinopoly, and Madura and below normal in the other districts due to drought.

The wholesale price of groundnut (shelled) per Imperial Maund of 82 2/7 lbs. (equivalent to 3,200 totals) as reported from important market centres on 10th July 1948 was Rs. 24—4—0 in Coimbatore, Rs. 23—8—0 in Erode, Rs. 23—4—0 in Salem, Rs. 22—5—0 in Tadpatri, Rs. 22—3—0 in Adoni, Rs. 22—2—0 in Guddalore and Nandyal, Rs. 21—14—0 in Vellore, Rs. 20—15—0 in Cuddapah, and Rs. 20—7—0 in Bellary. When compared with the prices published in the last report i.e. those which prevailed on 10—4—48, these prices reveal a rise of 11 percent in Salem, 10 percent in Coimbatore, 6 percent in Erode and Nandyal, 5 percent in Guddalore, Vellore and Bellary, 4 percent in Tadpatri and 2 percent in Adoni and Cuddapah. (From Economic Adviser to the Govt of Madras.)

COTTON RAW IN THE MADRAS PROVINCE

The receipts of loose cotton at presses and spinning mills in the Madras Province from 1st February 1948 to 30-7-1948 amount to 2,88,087 bales of 400 lb. lint as against an estimate of bales of the total crop of 1947-48. The receipts in the corresponding period of the previous year were 2,10,499 bales. 2,69,181 bales mainly of pressed cotton are received at spinning mills and 23,438 bales were exported by sea while 59,998 bales were imported by sea mainly from Karachi and Bombay. (From the Director of Agriculture, Madras.)

DEPARTMENTAL NOTIFICATIONS.

GAZETTED SERVICE—POSTING AND TRANSFERS.

Name of Officers	From	To
Sri Gopalakrishnaiah Naidu, A.	On leave,	Dy. D. A., Vizagapatam.
„ Covindaramiah, R.	D. A. O., Sattur	Special D. A. O., Pattukottai.
Janab Md. Obedulla Shah	Special D. A. O.,	
Sahib Bahadur,	Pattukottai,	D. A. O., Ramnad District.
Janab A. Abdul Sammad	Superintendent,	Superintendent, A. R. S.,
Sahib Bahadur,	A. R. S., Aduthurai,	Tirurkuppam.
Sri Krishnan, B. S.	Prob. D. A. O.,	
	Nellore (U. T.)	A. D., Narasapatam.
„ Kalyanaraman, S. M.	On leave	Superintendent A. R. S.,
		Koilkpatti.
„ Mukundan, M.	Prob. D. A. O.,	
	Tanjore (U. T.)	A. D., Shiyali.
„ Ramaswami, K.	Asst. Paddy Specialist	Superintendent,
	A. R. S., Pattambi,	A. R. S., Aduturai.
„ Santanam, K.	Prob. D. A. O.,	
	Madura (U. T.)	A. D., Musiri.
„ Venkatasubramanyam,	Superintendent	Asst. Paddy Specialist,
M. K.	A. R. S., Tirurkuppam,	A. R. S., Pattambi.

LEAVE.

Name of Officers	Period of leave
Sri K. Govindan Nair, Asst. Agricultural Chemist, Coimbatore.	L. A. P. for 4 months from 4-8-1948.
„ Sundaram, M—Asst. Agricultural Chemist.	L. A. P. for 34 days from 1-7-1948 (on reversion).

PROMOTIONS.

Name of Officers	From	To
Sri John, C. M.	Oil Seeds Specialist, Coimbatore.	Services lent to Indian Oil Seeds Committee.
„ Venkatanarayana, G.	Superintendent, A. R. S., Nileshtar.	Oil Seeds Specialist, Coimbatore.
„ Bhavani Sanker Rao, M.	Asst. in Oil Seeds, Nileshtar.	Superintendent, A. R. S., Nileshtar.

SUBORDINATE SERVICES.

POSTINGS AND TRANSFERS.

Name of Officers	From	To
Sri Annaswami Iyer, A. K.	On leave,	A. D., Dharapuram.
„ Bangarappa, M.	A. D., Narasapur,	F. M., A. R. S., Anakapalli.
„ Chellam Vincent, E. R.	On leave,	A. D., Mangalore.
„ Gajapathi, V.	A. D., Thiruvannamalai,	A. D., Omalur.
„ Jagannatha Rao, V. V.	P. A. to D. A. O.,	P. A. to D. A. O., Chicacole.
	Anakapali,	
„ K. Govindan Nair, K. V.	F. M., A. R. S.,	
	Nileshtar, 3.	F. M., A. R. S., Nileshtar. 2.
„ Jeevanna Rao, M.	On leave	P. A. to D. A. O., Bellary.
„ Kalimuthu, M.	Teaching Asst. in	
	Agri. Coimbatore,	A. D., Bhavani.
Janab Habubulla,	Teaching Asst. in	
	Chemistry, Bapatla,	A. D., Chicacole.
Sri Kolandaswami, M. S.	On leave,	A. D., Thiruvannamalai.
„ Krishna Naik, S.	F. M. A. R. S.,	F. M. A. R. S.,
	Nileshtar, 2.	Nileshtar 3.
„ Krishnamurthi, K.	A. D., Chicacole,	F. M. A. R. S., Samalkot.
„ Krishnan, K.	F. M. A. R. S.,	
	Taliparamba,	A. D., Calicut,
„ Krishnaswami Rao, T. D.	A. D., Mudakur,	Asst. in Entomology,
		Coimbatore.
„ Krishnamurthi Rao, S.	P. A. to D. A. O.,	
	Bellary,	A. D., Bellary.
„ Lakshminarayana, P.	On leave,	A. D., Bezwada.
„ Muthuswami, T. D.	Botany Asst. S. R. S.,	
	Gudiyattam,	A. D., Villupuram.
„ Meenakshisundaram, D.	Asst. in Paddy,	Asst. in Paddy,
	A. R. S., Aduturai,	Coimbatore.
„ Meenakshisundaram, M. N.	F. M. A. R. S.,	
	Tindivanam,	A. D., Tinnevely.
„ Narasimha Rao, G.	On leave,	A. D., Nandyal.
„ Narasimha Rao, K. C.	A. D., Tirutani,	A. D., Hospet.
„ Narasimham, S.	Asst. in Cotton	
	Coimbatore,	Resigned.
„ Narasimha Rao, I. L.	A. D., Vijayanagaram.	Marketing Asst.
		Vijayanagaram.
„ Narasimhamurthi, V.	Marketing Asst.	
	Vijayanagaram,	A. D., Vijayanagaram.
„ Nagaraja Rao, K. R.	Asst. in Entomology,	Asst. in Entomology,
	Coimbatore,	A. R. S., Siruguppa.
„ Purnachandra Rao, V.	A. D., Anakapalli,	A. D., Chodavaram.
„ Rajagopalan, K.	A. D., Adirampatnam	Asst. in Oilseeds A. R. S.,
		Nileshtar.
„ Ramamohan Rao, R. M. V.	Asst. in Millets	Asst. for Chillies A. R. S.,
	Coimbatore,	Guntur.
„ Raghavulu, R. V.	On leave,	A. D., Gudivada.
„ Ramakrishna Reddy, B.	On leave,	Special A. D., Nandyal.

Name of Officers	From	To
Sri Radhakrishnan, T. V.	A. D., Sankarankoil,	Asst. in Cotton, Coimbatore.
„ Sriramasomayajulu,	Reappointed as A. D.,	Anakapalli.
„ Rajaratnam Chetti, S.	A. D., Tirupur,	F. M. Central Farm,
		Coimbatore.
„ Ramunna, Kidavu, U. M.	F. M. Wynad Coloniza-	F. M. A. R. S.
	tion Scheme,	Taliparamba.
„ Rajarao G.	Teaching Asst. in	Chemical Asst. in Malt
	Chemistry, Bapala,	Factory, Coimbatore.
„ Rama Rao, S.	A. D., Kavali,	P. A. to D. A. O., Anakapalle.
„ Raghavan, K.	A. D., Rasipuram,	A. D., Madura.
„ Radhakrishnan, C.	War Service Candidate	Asst. in Chemistry,
		Coimbatore.
„ Raghunatha Rao, N.	Asst. in Chemistry,	F. M. Agricultural College,
	Coimbatore,	Bapatla.
„ Saptharishi, K.	Asst. in Paddy,	Paddy Asst. A. R. S.,
	Coimbatore,	Aduthurai.
„ Subramania Iyer, K. H.	Dairy Manager C. F.	Teaching Asst. in Agriculture
	Coimbatore,	Coimbatore.
„ Sethuraman, M. S.	On leave	A. D., Tanjore.
„ Shenappa, K.	A. D., Dharapuram,	F. M. Central Farm,
		Coimbatore.
„ Sambandam, R.	F. M. C. F., Coimbatore,	A. D., Tirupur.
„ Sundaresan, K. R.	On leave,	Special A. D., Attur.
„ Srinivasan, K.	Central Farm,	
	Coimbatore,	A. D., Cuddapah.
„ Vaidyanatham, S.	A. D., Villupuram,	Botany Asst. S. R. S.
		Gudyattam,
„ Venkatesan, C.	F. M. A. R. S.	Asst. in Fruits, F. R. S.,
	Anakapalli,	Kodur.
„ Vengal Rao, K. C.	Reappointed as A. D.,	Tiruttani.
„ Appaji Rao, B.	Asst. in Physiology,	Teaching Asst. in Chemistry,
	S. R. S. Anakapalli,	Bapatla.
„ Natarajan, C. P.	Chemistry Asst.,	Chemistry Asst. A. R. S.,
	Siruguppa,	Koilpatti.
„ Sankara Reddi, G. H.	Chemistry Asst.	
	Siruguppa,	A. D., Rappur.
„ Seshagiri Rao, T.	Chemistry Asst.	Teaching Asst. in Chemistry,
	Siruguppa,	Bapatla.
„ Thirumala Rao, W.	Chemistry Asst.	Asst. in Physiology, S. R. S.,
	Siruguppa,	Anakapalle.

The following are appointed as upper subordinates under emergency provisions:—

Names	From
Sri Ernest, R. S.,	F. M., A. R. S., Nanjanad.
„ Srinivasan, P. R.,	A. D., Tiruchendur.
„ Vasudeva Sing, B.,	A. D., Mudukur.
Janab Koyamu, K.,	F. M., A. R. S., Taliparamba.

Names	From
Sri. Ramachandran, M.,	Marketing Asst., Coimbatore.
„ Subramanian, K.,	A. D., Sriperumpudur.
„ Raman, A.,	A. D., Avanashi.
Mr. Thomas, M.,	F. M., Wynad Colonization Scheme.
Sri. Mohan Rao, N. V. K.,	A. D., Narasaraopet.
„ Ananthakrishnan, V.	A. D., Koilguntla.
Janab Abdul Baseer	A. D., Kalyandrug.
„ Syed Shriff,	A. D., Adirampatanam.
Miss. Kunjamma, V. K.	Dairy Manager, Central Farm, Coimbatore.
Sri. Sitaraman, S.	A. D., Sankarankoil.
Dr. Krishnamurthi, K. V.,	Asst. to Cytogeneticist, Coimbatore.
Sri. Chandrasekharan, N. R.,	A. D., Arni.
„ Muthukrishnan, C. R.,	A. D., Wandiwash.
„ Ratnakal Bhatkal,	A. D., Kollegal.
„ Somalingam, R.,	A. D., Sattur.
„ Sundaram, V. P.,	A. D., Srivilliputhur.
„ Satyabalan, S.	A. D., Tinnevely.
„ Balasubramaniam, M.,	A. D., Musiri.
„ Lingannan, N.,	A. D., Rasipuram.

The following Upper Subordinates of this Department have been selected to undergo the Diploma Course in Horticulture at Madras from the 14th August, 1948 for a period of one year.

Names	From
Telugu Area	
Sri. Adivi Reddi, A.	Ento-Mycology training, Coimbatore.
„ Bhupathi Padmanabharaju,	A. D., Koilkuntla.
„ Dhasarathi, T. B.	A. D., Nuzvid.
„ Narasimhan, B.,	A. D., Koilkuntla.
„ Narasimhamurthi, D.,	A. D., Chodavaram.
„ Piabakara Reddi, G.,	Special A. D., Nandayal.
„ Subramaniyan, J.,	A. D., Guduvada.
Tamil Area	
Sri. Kothandaraman, S. E.,	A. D., Musiri.
„ Kuppuswami, B. S.,	A. D., Omalur.
„ Krishnamurthi, P. A.,	A. D., Arni.
„ Raman, K. R.,	A. D., Srivilliputhur.
„ Ramachandran, T. K.,	A. D., Wandiwash.
„ Ramalingam, V.,	A. D., Kollegal.
„ Sankarasubramanyam, T. K.,	A. D., Sattur.
„ Venkataraman, T. M.,	A. D., Tinnevely.
West Coast	
Sri. Mudanna Shetty, H.,	A. D., Hospet.
„ Tejappa Shetty, K.,	A. D., Mangalore.
Private Candidates	
Sri. Bakthavathsalu, C. M.,	Madras.
„ Dasaratharamayya, V.,	West Godavari.
„ Sampath, V.,	Chingleput.

LEAVE.

Names	Period of leave
Sri. Krishnamurthi, K. S. P. A. to D. A. O., Pattukottai,	L. A. P. for 1 month from 2-7-48.
„ Kunhunni Nambiar, F. M., A. R. S., Taliparamba,	L. A. P. for 2 months from the date of relief.
Janab Alli Hyder, F. M., Agricultural College, Bapatla,	Earned leave for 46 days and unearned leave on M. C. for 35 days from 11-6-48.
Mr. Ponniah, B. W. X., Asst. in Millets,	Extension of leave on loss of pay for 3 months and 21 days from 11-10-48.
Sri. Ramaswami Mudaliar, Cotton Asst. Cocanada Scheme,	Extension of leave for 2 months on loss of pay from 5-8-48 to 3-10-48.
„ Rajagopal Reddy, V. F. M., A. R. S., Pattukottai,	Earned leave from 18-7-48 to 6-8-48
„ Samu Iyer, P. V., Agricultural Instructor, B. School (Borstal) Palamcottah,	Leave on average pay for 1½ month from the date of relief.
„ Somayajulu, P. P. A., to D. A. O., Chicacole,	Earned leave for 30 days from the date of relief.
„ Subramaniam, R., A. A. D., Tiruchendur,	L. A. P. for 4 months from the date of relief.
„ Venkataramanappa, S., Marketing Asst. Nagpur (Civil Supplies),	Earned leave for 30 days from 21-7-48 to 19-8-48.

THE MADRAS AGRICULTURAL STUDENTS' UNION.

PATRONS.

1. Sri V. Arumugam Pillai, Sundaikamuthur, Coimbatore District.
2. Dewan Bahadur C. Arunachala Mudaliar, Zamindar of Chunampet,
Chingleput District.
3. Sri Lodd Govindoss, Madras.
4. Raja Sri Krishnachandra Gajapathi Narayana Dev, Maharaja of Parlakimidi,
Ganjam District.
5. Raja V. Madhava Rajah of Kollengode, Malabar District.
6. Sri T. A. Ramalingam Chettiar, Coimbatore.
7. Sir C. P. Ramaswami Ayyar, Trivandrum.
8. Dewan Bahadur C. S. Ratnasabhpathi Mudaliar, Coimbatore.
9. Sri V. C. Vellingiri Gounder, Coimbatore.
10. Sri R. Jeevandass, Varnasi, Parlakimidi.
1. G. R. Hilson Esq., Norwich, England.
2. Sri Ramachandra Ananga Bhima Dev, Kesart Gajapathy,
Rajah Saheb of Budokhemidi, Berhampore, Ganjam.
3. Rao Bahadur K. T. Alwa, Mangalore.
4. Sri Gurdial Singh Sidhu, c/o Sri S. Sant Singh Sidhu, Algom Khurd,
Lahore, Panjab.
5. R. K. Kandaswamy, "Brindavan" Trichy Road, Coimbatore.
6. G. D. Naidu, "Gopal Bagh" Avanashi Road, Coimbatore.
7. K. Tiruvenkata Mudaliar, Munniyur, Andankarai Post, Via Alattambadi, S. I. R.
8. S. Ramamurthy Iyer of Kunnam, Land-Holder and Secretary,
South Rajan Mirasdars' Association, "Vibrajee", Alangad.

OFFICE BEARERS FOR 1948-49.

M. C. Cherian, Principal, President (ex-officio).
D. M. Marudaraja Pillai, Vice-President.
C. S. Krishnaswami Ayyar, Editor.
K. Meenakshisundaram, Secretary.

Council (16 Members)

President.
Resident Vice-President.
Editor.
Secretary.
Mofussil Vice-Presidents.
3. R. Srinivasa Ayyangar.
Rao Bahadur V. Ramanatha Ayyar.
Rao Bahadur P. V. Ramaiah.

Mofussil Members.

✓ N. Subbannachary.
✓ L. Narasimham.
✓ Nataraj.
✓ Thirumala Rao.

Resident Members.

3. N. K. Sundaram.
3. D. Karunakar.
3. B. V. Narasinga Rao.
3. Venugopal (Student).
J. K. Bhaskara Rao, Secretary,
Students' Club (ex-officio).

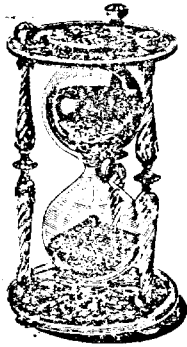
Managing Committee (10 Members)

Resident Vice-President.
Editor.
Secretary.
T. V. Subramaniam, Manager.
G. Rangaswami, Treasurer.
C. Balasubramania Mudaliar, Member.
A. Mariakulandai, "
S. Kanakaraj David, "
K. S. Soundararajan (Student), "
U. K. Bhaskara Rao, Secretary,
Students' Club (ex-officio).

Editorial Board (8 Members)

Editor.
Secretary.
Manager.
P. D. Karunakar.
T. R. Narayanan.
Dr. N. Krishnaswami
G. H. Vasudeva Rao (Student).
U. K. Bhaskara Rao, Secretary,
Students' Club (ex-officio).



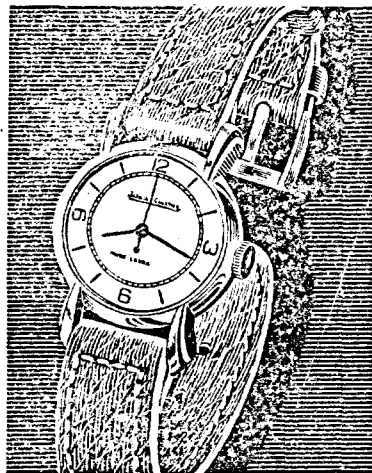
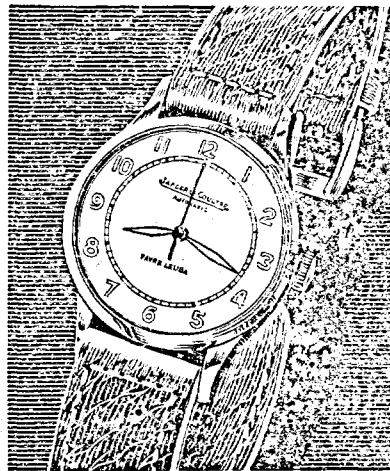


Symbols of Accuracy

. Of elegance and fine craftsmanship. Here illustrated are three watches made by Jaeger LeCoultre for the discriminating man or woman who wants a watch that is good to look at, and will give many years of faithful service.

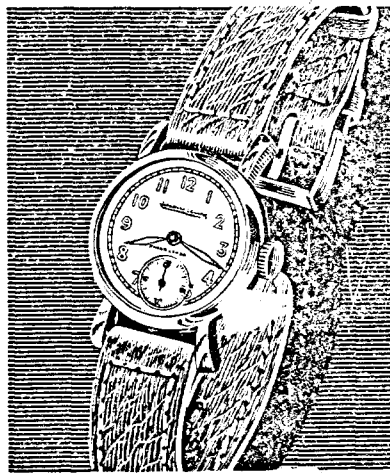
* No. 2323

Jaeger LeCoultre's elegant *self-winding* model with all-steel case, sweep second hand and luminous dial. **Rs. 300**



* No. 2233. Jaeger LeCoultre with staybrite steel case and second hand as illustrated. **Rs. 297**

No. 2483. Same as above but with small second hand. **Rs. 275**



No. 2543. Jaeger LeCoultre's staybrite steel dustproof and shock protected case with small second hand. **Rs. 288**

No. 2393: Same as above, with centre second hand. **Rs. 300**

[illegible]

FAVRE-LEUBA

AND COMPANY LIMITED, BOMBAY AND CALCUTTA

Edited and Published by C. S. Krishnaswami Ayyar for The Madras Agricultural Students' Union and Printed by A. Subramaniam, at The Coimbatore Co-operative Printing Works, Limited, Coimbatore.