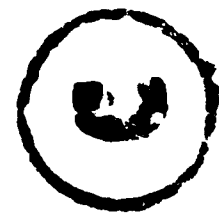


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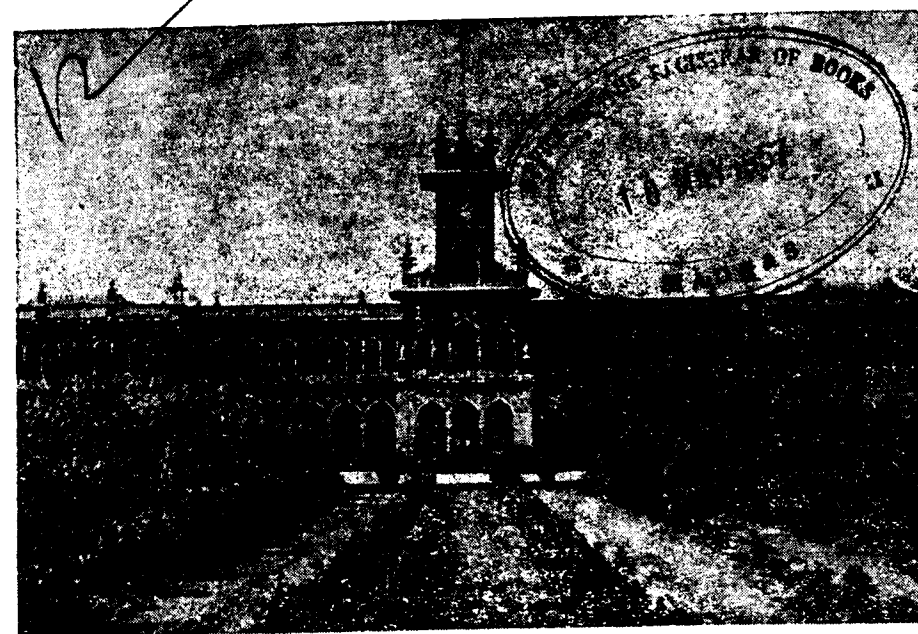


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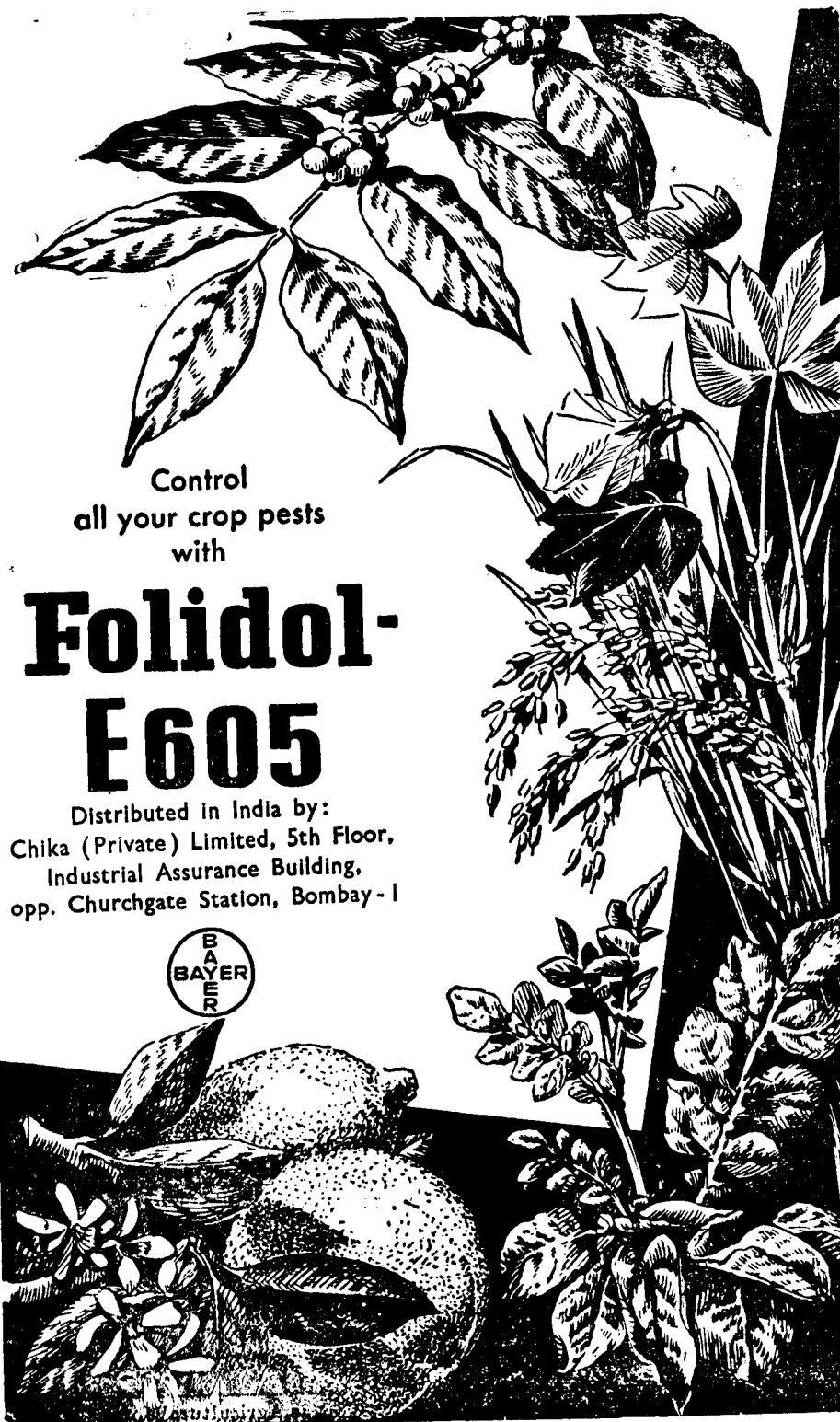
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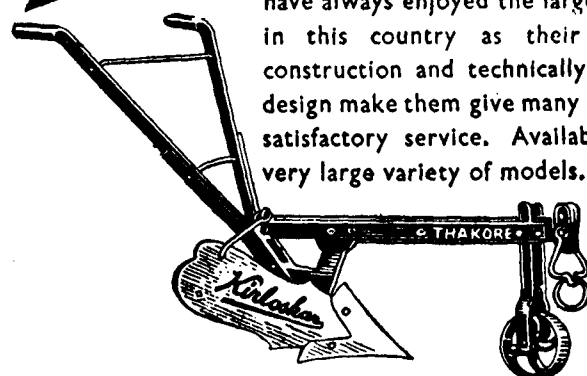
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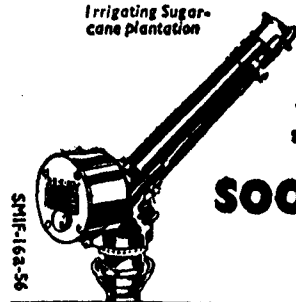
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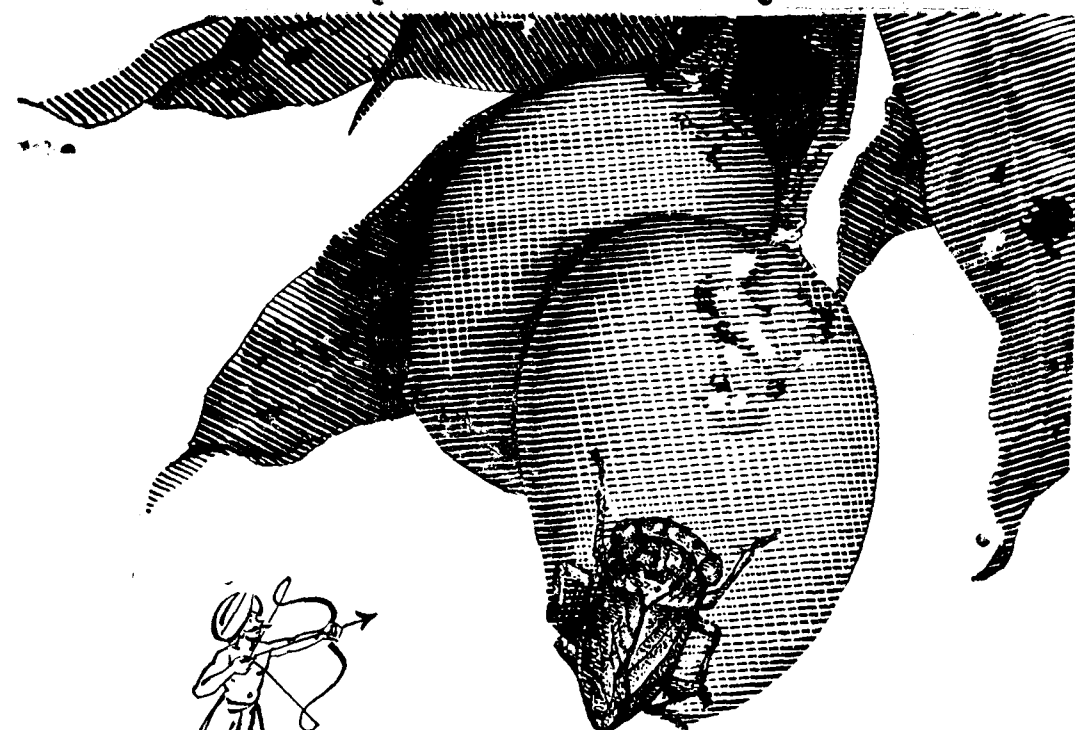


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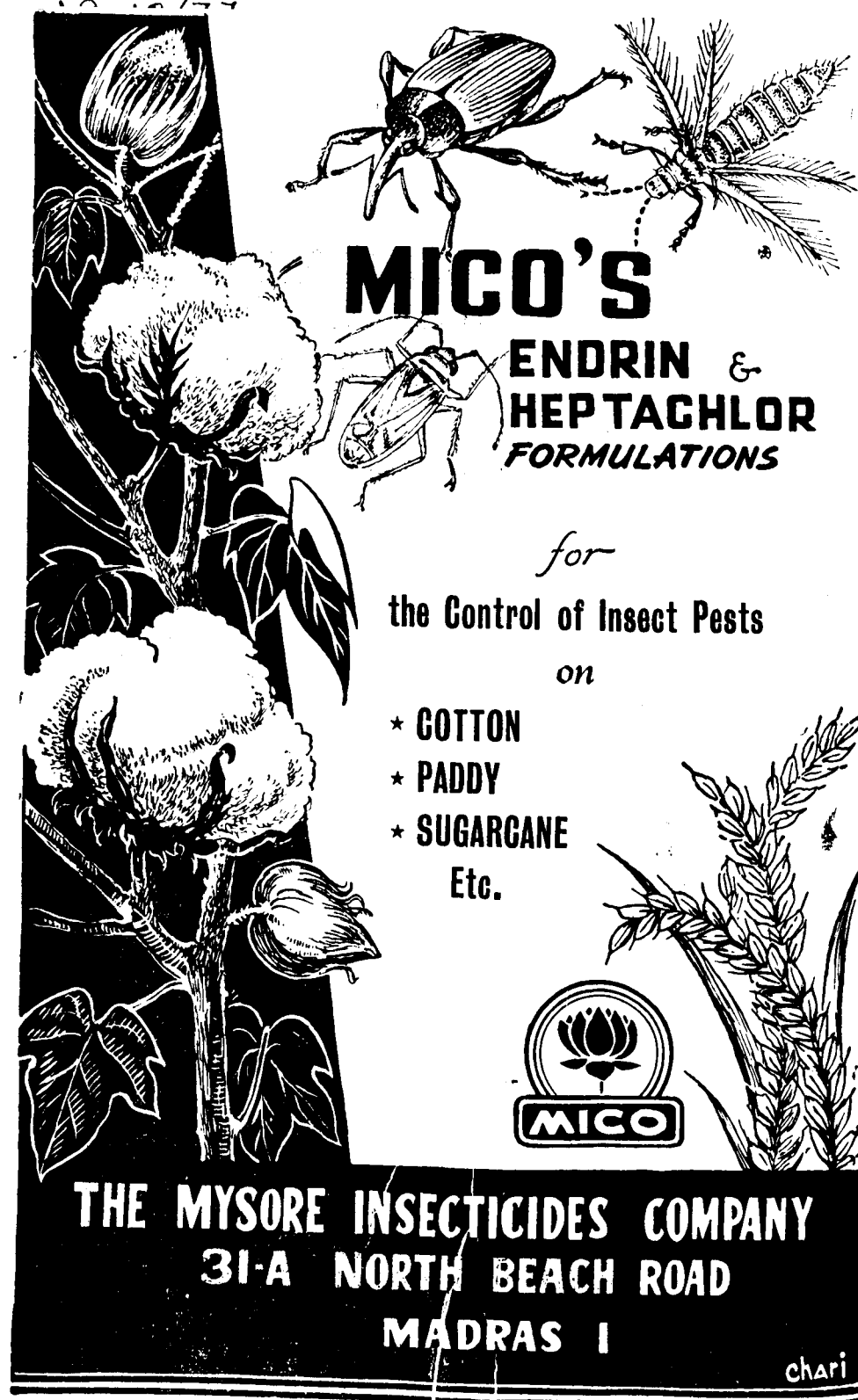
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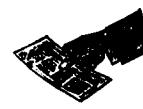
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Editorial

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The Madras University celebrates the Centenary of its founding this month, a great and significant event in the history of modern education in India. Founded one hundred years ago under the Act of Incorporation of 1857, on the pattern of the then London University merely as an affiliating and examining body, the University has progressed in various directions and established a great tradition and a glorious record as a centre of teaching and research. During these one hundred years of higher education, it has striven to promote the chief ideals of a University "to teach, to participate in the growth of knowledge and to foster a respect for values which transcends dimensions of time, place and political organisation" as epitomised by the Governor of Mysore while inaugurating the Centenary celebrations. During this period, the University has produced eminent scientists, great scholars and men and women who have manned with great distinction the highest positions in the various professions.

Our association with the University is only recent, just twentyfive years. A committee appointed by the Government in 1920 to examine ways and means for improving the standard of training imparted in the Agricultural College, Coimbatore, recommended the institution of the B. Sc. degree in Agriculture and the affiliation of the Agricultural College to the University of Madras. The Government accepted these recommendations and the Agricultural College was formally affiliated to the University in March 1922 and the first batch of students awarded the

degree in 1923 by the University. This coincided with the expansion already visualised in the University Act of 1923. Indeed, the developmental phase of the University could be said to have begun only then.

We pay our humble tribute to our great University for its glorious record of many-sided progress in scholarship and research — a record that has earned approbation from eminent men and great institutions all over the world. We express our felicitations on this occasion for its continued prosperity and progress, with the hope that the University would continue to uphold the high standards set in the last one hundred years.

The Effect of Environment on Yield and Quality of Cotton

by

P. V. MARAPPAN

Agricultural Research Station, Kovilpatti

Introduction: The yield of a crop and quality of the agricultural produce for which it is valued are highly complex characters which are governed by a large number of genetic factors. The expression of these characters is also influenced to a great extent by the environment and the appearance and behaviour of a genotype may therefore be taken to represent an interaction between heredity and environment. Chandrasekharan and Parthasarathy (1948) stated that earliness in crops like *Cholam* and rice is a Mendelian character but it is also governed by an environmental factor like light. Garner and Allard (1920) pointed out that the length of the day and night has pronounced effect on the onset of flowering. Thus, even genetically pure strains of crop plants are known to show developmental or fluctuating variations under the influence of different set of environmental conditions. These fluctuating variations are important to the plant breeders engaged in crop improvement work as they affect the proper evaluation of the desired genotype. Therefore, a detailed knowledge regarding the influence of environmental factors on economically important characters of crop plants is very essential.

In cotton, there are overwhelming evidences to show that, even well established pure strains, when grown in different places would show variations in their economic attributes. The prevalence of different market values for the same variety of cotton produced in different regions is an indirect recognition of this fact. Balasubramanian and Iyengar (1953) pointed out that in Madras Cambodia cotton grown in certain villages of Avanashi taluk, Karunganni cotton raised in portions of Tirunelveli district and westerns cotton produced in and around Guntakal area, are reputed for staple, quality, grade and ginning outturn. Experiments conducted elsewhere also by many cotton breeders have amply demonstrated the influence of environment on the expression of the economic attributes in cotton and established the peculiar features of the concerned regions. Bederker (1954) studying the peculiarities of the cotton growing regions of the Hyderabad State, has stressed

that such information regarding the peculiarities of the region for which cotton improvement work is in progress is very useful.

The study reported in this paper relates to the variations observed in the economic attributes of Karunganni cotton varieties (*G. arboreum*) grown in the Southern and Northern Zones of the Tinnies tract in Madras State which constitutes distinct ecological Zones.

Review of Previous Work: Nayak (1941) studied the economic characters of Jaywant cotton in seven localities in Southern and Northern Kumpta tract over three seasons and concluded that the yield, fibre length and ginning percent were higher in the former tract. This was attributed to the wide variation in rainfall and soil condition between the places of growth. Iyengar (1941) recorded the variation in fibre properties observed during five seasons in Cambodia strains as grown at Coimbatore and Srivilliputhur in the Winter and Summer seasons. He found that the cotton fibres were definitely longer, finer, and more mature in the Summer crop at Srivilliputhur than at Coimbatore. He also recorded that the number of fibres on the seed, lint weight and ginning percent were considerably lower at Srivilliputhur. Khadilkar (1941) has stated that spinning value of Jarila, Banilla, and N. R. 6 were higher at Jalgaon and Dhulia than at Bhadgaon. Patel (1949) found that there was a general tendency for cotton to give higher ginning percent at Viramgaon than at Jagudan. Balasubramaniam and Iyengar (1953) studying the performance of American cotton grown under irrigated and rainfed conditions in seven localities in the Madras State concluded that halo-length, seed and lint weight as also ginning percent were highly influenced due to differences in place and season. Boomination *et al* (1953) reviewing the place effect on the yield and quality on row inter specific American cotton strains grown in the four sub-zones of the Cambodia tract under irrigated Winter and Summer crops found that the fibre length was the lowest while the fibre weight and maturity were the highest at Coimbatore than at Srivilliputhur and Tiruchengode where the tendency for higher length was noticed. Bederkar (1954) studying the behaviour of the newly evolved improved gaorani varieties grown in the three sub-zones of Gaorani and Oomars tracts in Hyderabad concluded that (1) the environment in North-Eastern and Central Zones of Gaorani tract was very favourable for production of high quality cotton (2) while in the South-Western Zones the environmental conditions exerted an unfavourable effect on the quality of cotton

produced, at the same time favouring higher production of both seed cotton and lint due to better yields and higher ginning percent. Gulati and Ahmad (1935) had shown that change in soil conditions resulting from different localities of growth was capable of greatly altering the state of fibre maturity of Banilla cotton. According to Balls (1915) hair weight is affected by environment and conditions of growth. Ramachandran *et al* (1954) reported that the environmental differences at Palur were responsible for registering significantly lower halo-length, higher seed and lint index as also ginning percent in comparison with those at Srivilliputhur.

Material and Methods: The data considered in this paper deal with the results of co-ordinated varietal trials and district trials (Scattered Blocks) conducted with new improved varieties viz; 6186-9, 6188-8, 6312-4, 6874 and the standard strains K. 2 and K. 5 in the Southern and Northern Zones of Tinnies tract in Madras State to find out the range of adaptability of the new varieties. The co-ordinated varietal trials were conducted at the two breeding centres Kovilpatti and Coimbatore representing the Southern and Northern Zones of Tinnies tract for six seasons since 1949-50 and the district trials scattered in these two zones for three seasons since 1952-53. The lay out adopted at the two breeding centres consisted of similar pattern of randomised and replicated blocks. The district trials were of the Scattered Block pattern where each village of trial constituted a randomised block. Sowing materials of each variety for these trials were supplied afresh every year from a common source. The cultural treatments corresponded to the local practices.

Observations on yield of *kapas*, ginning percent and halo-length were recorded for these trials in all the years of trial. Besides, fibre properties like fibre length, fibre weight and fibre maturity were determined in the case of co-ordinated varietal trials.

The characters on which the environmental influence is reported in this paper relates to all the above characters recorded from the co-ordinated varietal trials and district trials separately.

The data on the mean values for the above attributes were studied statistically by using Fisher's 't' test and the level of significance indicated at 5 per cent probability ($p = 0.05$) to study the environmental effect on the performance of the above mentioned varieties.

Experimental Results: The mean data on yield of *kapas*, ginning percent, halo-length, fibre weight and fibre maturity per cent for the six arboreum varieties studied over six consecutive seasons in the co-ordinated varietal trials and for three seasons in the district trials are presented in Tables I and II respectively.

Data on mean monthly rainfall, maximum temperature, minimum temperature and humidity per cent (average of 6 years during 1950-'55) at Kovilpatti and Coimbatore are presented in table III and graphically represented in Figure 1.

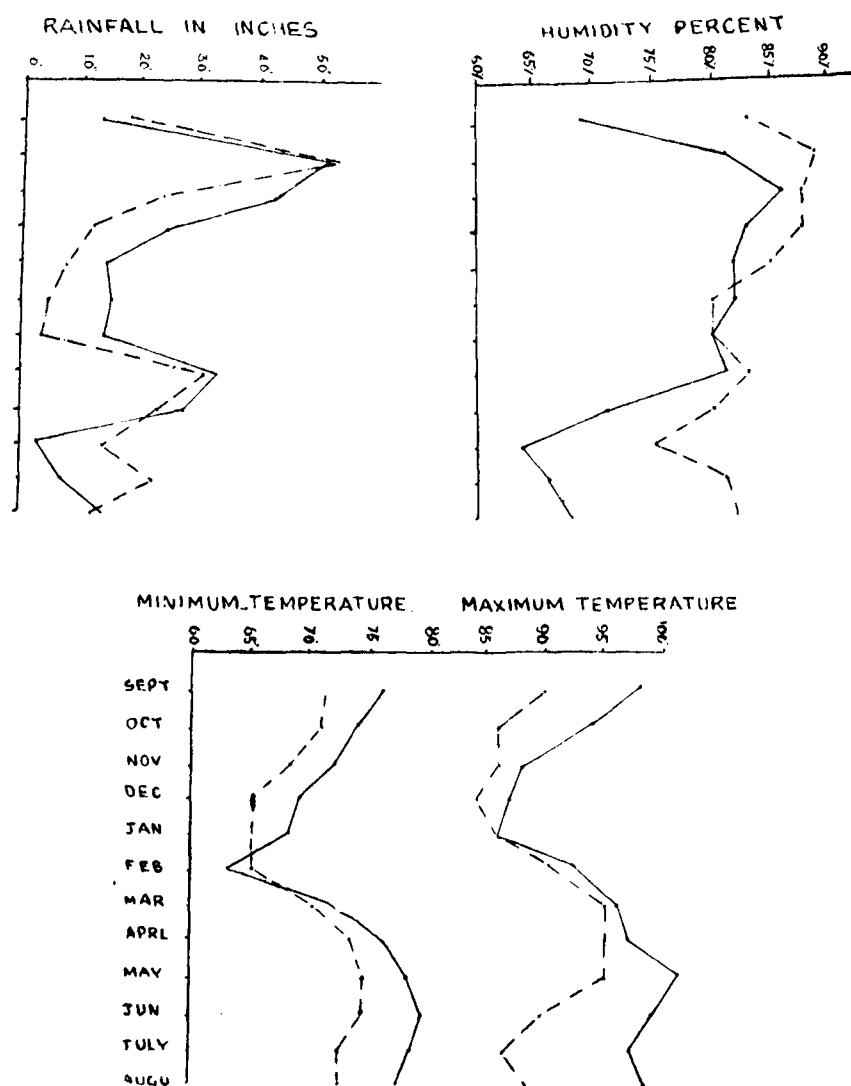


TABLE I
Mean performance over six seasons (1949 - '50 to 1954 - '55) in the co-ordinated varietal trials at Kovilpatti and Coimbatore

S. No.	Varieties				Yield of kapas in lb. / acre	Ginning percent		Halo-length in (mms)		Fibre length in (inch)		Fibre weight / cm (x10 ⁻⁶ gms)		Fibre maturity %			
	Kovil-patti	Coim-batore	Kovil-patti	Coim-batore		Kovil-patti	Coim-batore	Kovil-patti	Coim-batore	Kovil-patti	Coim-batore	Kovil-patti	Coim-batore	Kovil-patti	Coim-batore		
1. 6186 - 9	492	314	32.4	33.5	25.3	24.4	0.98	0.94	1.86	2.06	72	78					
2. 6188 - 8	452	316	32.1	33.6	25.7	24.4	0.98	0.94	1.83	1.99	75	79					
3. 6312 - 4	453	297	31.8	33.5	25.6	24.8	0.97	0.95	1.65	1.84	73	79					
4. 6874	475	300	32.1	33.4	25.0	23.9	0.96	0.94	1.91	1.97	75	81					
5. K. 2	426	257	31.9	32.0	23.0	22.3	0.90	0.87	1.93	2.13	72	83					
6. K. 5	403	278	31.0	31.1	23.1	22.6	0.90	0.87	2.09	2.20	79	79					
Mean	450	294	31.9	32.9	24.6	23.7	0.95	0.92	1.88	2.03	74	80					
Significant by 'z' test													Yes	Yes			
S. E.	11.3												0.31	0.09	0.003	0.02	0.96
C. D.	36												0.7	0.2	0.1	0.06	3

TABLE II
Mean performance over three seasons (1952-'53 to 1954-'55) in the district trials

S. No.	Cultures	Yield of kapas in lb. / acre		Ginning percent		Halo-length in (mms)	
		South Zone	North Zone	South Zone	North Zone	South Zone	North Zone
1.	6186 - 9	409	350	31.8	32.9	24.8	24.2
2.	6188 - 8	378	349	32.3	32.3	25.1	24.1
3.	6312 - 4	246	315	31.4	32.1	25.0	24.4
4.	6874	364	376	32.3	32.9	24.0	23.9
5.	K. 2	340	288	30.6	32.4	22.8	22.5
6.	K. 5	477	333	30.8	31.7	23.3	22.7
Mean		369	335	31.5	32.5	24.2	23.6
Significance by 'z' test		No		Yes		Yes	
S. E.		29.3		0.13		0.03	
C. D.		..		0.3		0.1	

TABLE III
Mean monthly rainfall, maximum temperature, minimum temperature and humidity over six years (1950-55) at the Agricultural Research Station, Kovilpatti and Agricultural College and Research Institute, Coimbatore

S. No.	Details	Jan-uary	Feb.-ruary	Mar.-ch	April	May	June	July	Aug-ust	Sept.-ember	Octo-ber	Nov-e-ber	Dec-e-ber	Total	Range
1.	Maximum rainfall Kovilpatti	1.37	1.48	1.40	3.30	2.65	0.19	0.84	1.37	1.26	4.82	4.33	2.48	25.3	..
"	" Coimbatore	0.65	0.41	0.25	3.11	2.25	1.31	2.13	1.15	1.79	5.19	2.38	1.18	21.8	..
2.	Maximum temperature Kovilpatti	86.2	91.8	95.9	97.1	100.6	98.5	97.0	97.9	98.0	98.6	87.8	87.0	..	86.2 to 100.6
"	" Coimbatore	86.0	90.4	94.8	94.7	94.9	89.0	88.4	88.0	89.6	86.2	88.0	84.0	..	84.0 to 94.9
3.	Minimum temperature Kovilpatti	68.3	63.3	72.3	75.6	78.4	79.0	77.5	77.2	76.0	74.0	71.8	69.2	..	63.3 to 79.0
"	" Coimbatore	64.7	65.1	69.8	72.7	74.0	73.6	71.9	72.2	70.9	70.5	67.9	64.5	..	64.5 to 74.0
4.	Relative humidity Kovilpatti	82.2	81.8	79.6	80.5	70.9	63.6	65.9	67.5	69.0	81.0	86.3	83.2	..	63.6 to 86.3
"	" Coimbatore	84.9	79.7	79.7	83.2	79.9	75.3	80.8	81.7	82.6	88.9	88.0	88.4	..	75.0 to 88.9

It would be seen from the data presented in table I that at Kovilpatti the mean yield of *kapas* by 56 lb. halo-length by 0.9 mm and fibre length by 3.03 inch are significantly higher than those at Coimbatore where the mean values for ginning by 1 per cent, fibre weight by 0.15×106 gms per cm and fibre maturity 6 per cent are significantly higher. The individual performance of the varieties is also found to be on the similar trend as the mean performance.

As regards the performance in the district trials (Vide Table II) the differences between the two Zones are not significant for yield. However, the mean yield at the South Zone is numerically higher by 34 lb. than at the North Zone. In the matter of ginning per cent and halo-length, the two Zones differ significantly, the South Zone recording higher mean halo-length of 0.6 mm than the North where the ginning by 1 per cent is higher confirming the findings indicated in the co-ordinated varietal trials at Kovilpatti and Coimbatore which represent the South and North Zones respectively.

From the data presented in Table III, it can be seen that at Kovilpatti the annual rainfall, monthly mean maximum and minimum temperatures are higher than those at Coimbatore in a general nature. As regards humidity per cent, it is higher at Coimbatore than at Kovilpatti. It is to be noted here, the ranges of temperature as well as humidity per cent are wider at Kovilpatti and narrower at Coimbatore.

Discussion: The experimental results presented in the foregoing indicated that the economic attributes of rainfed Karunganni cotton varieties grown in the South and North Zones of Tinnies tract are influenced in a marked degree by environmental factors. The main findings that would emanate from this study are (i) that at the South Zone, the environmental effects is to increase the yield of seed cotton per acre, fibre length, and halo-length while reducing the weight and maturity of the fibres, all these contributing for the high production of seed cotton per acre with better quality lint and (ii) that at the North Zone, to increase ginning percent, fibre weight and maturity of lint leading to slightly coarser type of cotton. The coarseness of fibre appears to be due to higher maturity as according to Koshal, Gulati and Ahmad (1940) mature fibres are generally coarse.

The higher level of seed cotton per acre and increasing fibre length at the South Zone may be due to higher fertility level of the

soil here with good drainage as also due to good amount of well distributed rainfall during the growing period of the crop. Young blood (1929) who undertook the study of the correlation between lint length and soil types came to the conclusion that longer lint was generally produced on more fertile soils. Ramiah and Panse (1941) observed that longer fibre are produced on fertile *Adhan* land. Bederkar (1954) observed that higher yields and better quality of cotton recorded at Nanded and Bhir were due to the higher fertility of soil.

As regards the ginning per cent which is lower in the South and higher in the North, it is attributable for the lower and higher fibre weights recorded in these two Zones respectively. Bederkar (1954) observed that the tendency towards increase in ginning percent at Mahdol as compared to that at Nanded is due to higher fibre weight. Patel and Patel (1951) has stated that the ginning per cent in the Virangam locality appears to be in higher fibre weight. The lower ginning per cent at the South may also be due to lesser number of fibres on the seed associated with higher temperature. Iyengar (1941) has stated that environment influences the production of fibre on the seed, the reduction in number being associated with higher temperature.

In the case of fibre weight and fibre maturity per cent, they are lower at Kovilpatti than those at Coimbatore. Gulati and Ahmad (1935) contributed data show that where the fibre maturity was very low the fibre weight was also low. The fibre maturity at Kovilpatti is only comparatively lower than at Coimbatore but it is fairly well above the required minimum for the rainfed cottons. As such, therefore, it does not lower the quality of lint. Besides, at Kovilpatti congenial conditions of solar activity and adequate soil moisture coupled with the onset of "Uppam breeze" during the boll development period are found to promote fineness (low fibre weight) of lint attaining a maturity per cent of 75 which is well above the minimum required for these cottons.

As between the trials at the breeding stations and the districts, the mean values for ginning outturn and halo-length (Vide Table I and II) are almost equal in the respective Zones. It can therefore, be safely concluded that these two breeding stations at Kovilpatti and Coimbatore represent typically the South and North Zones respectively and the performance of the newly evolved

improved varieties when grown in these Zones, can easily be predicted from the results obtained in the breeding stations.

Summary: A detailed knowledge regarding the influence of environmental factors on economically important characters of crop plants is very essential to the plant breeders as they affect the proper evaluation of the desired genotype. Such information gathered and studied with particular reference to the Karunganni cotton varieties (*G. arboreum*) grown under rainfed conditions in the Southern and Northern Zones of Tinnies tract helped to establish the peculiar features of the two Zones. The main findings are as follows:

(i) There is perceptible variation in the economic attributes of the rainfed Karunganni cotton varieties grown in these two Zones on account of the influence of the environmental factors.

(ii) The environmental influence is to increase the yield of *kapas* per acre, halo-length, fibre length but to reduce the fibre weight and fibre maturity per cent at the South, while to increase the ginning percent, fibre weight and fibre maturity at the North.

(iii) The environmental factors responsible for these differences are found to be due to higher fertility of the soil, higher rainfall, higher temperature and low humidity per cent at Kovilpatti as against the medium type of soil, low temperature, low rain fall and higher humidity per cent at Coimbatore representing Southern and Northern Zones respectively.

(iv) The two breeding stations at Kovilpatti and Coimbatore typically represent the South and North Zones of the Tinnies tract respectively and performance of newly evolved improved cotton varieties when grown in these Zones, can easily be predicted from the results obtained in the breeding stations.

Acknowledgements: My grateful thanks are due to Sri N. Kesava Iyengar, Cotton Specialist for his valuable suggestions in the preparation of the paper. I wish to thank Sri C. Balasubramania Mudaliar Agricultural Meteorologist for supplying the meteorological data. The technological properties of the lint samples were kindly determined by Sri K. Marar to whom I wish to express my sincere thanks.

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Agricultural Progress*

by

M. S. RANDHAWA, D. Sc., I. C. S., F. N. I.,
Vice-President, Indian Council of Agricultural Research

I have great pleasure in welcoming you to the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research. A number of significant changes in our organisation have taken place since our last meeting. Co-ordination between the commodity committees and the I. C. A. R. has been stressed for long. This has now been achieved by the enlarged Board of Research and Extension which apart from containing the specialists of the I. C. A. R. has also as members the Directors of Central Research Institutes, the Directors of Commodity Research Institutes as well as the Secretaries of the Commodity Committees. The utility of this Board on the extension side would also be greatly increased when the representatives of the Ministry of the Community Development are also included. The newly constituted Board has already made a list of results of research schemes which have been completed and which can be passed on to extension workers for general adoption. It has also indicated the items on which work may be intensified and has further indicated the problems on which research schemes should be initiated. It has further recommended that the results of research schemes of the Centre as well as of the States should be classified under two categories, viz. (i) those which can be passed on to research workers and (ii) which can be passed on to Village Level Workers and farmers.

Gap between Research and Extension : The gap between research and extension is pointedly indicated by a number of facts. Though it has been known since 1955 that paddy straw washed with water and reinforced with lime becomes a palatable and nutritious food for cattle, no effort has been made to disseminate this finding in practice. Breeding of wheat which is resistant to all the three rusts is one of the major achievements of the Indian Agricultural Research Institute. If the hill areas are saturated with rust resistant wheat, the incidence of rust on wheat in the plains would decrease which will result in a very large increase in the production of wheat. Similarly, saturation of other areas with high incidence of rust with rust resistant wheat seed would also be of great value. It is unfortunate that no steps have been taken by the States to multiply rust resistant wheat seed

their requirements. The facts which I have mentioned above. There are a number of findings of research are of practical value and which have not reached the sufficiently large scale. If we apply the finding of our research on a large scale there will be a sizeable increase in production. This indicates the need of closer liaison between research and extension organisations.

Research and Extension : It is very necessary that research should be built up with the staff of the N. E. S. from Development workers down to the Village Level Workers on one side and the staff of the Indian Council of Agricultural Research, and also of the Commodity Committees. It was with the Development Commissioners of some States have attended the meeting of the Commodity Committees and also of the Central Jute, Coconut and Lac Cess Committees. It is recommended by the Board that the results of research on agriculture as well as on animal husbandry, should be compiled by the Indian Council of Agricultural Research or the Commodity Committees, should be compiled subject-wise, crop-wise, and published in the form of booklets and distributed among the extension staff as well as agricultural staff of the States.

Research Station : Another field in which co-ordination between the Indian Council of Agricultural Research and the Commodity Committees is necessary is that of research. I am glad that a scheme for regional research Stations and sub-stations on cotton, millets and oilseeds has been drawn. These are rotation crops and as such an arrangement of this nature is possible. This will not only enable us to tackle agricultural problems relating to those commodities on a regional basis but at the same time will ensure efficiency and economy in expenditure. Moreover, research on cross-commodity problems would also be carried out on a rational basis. These regional stations would also provide coverage for fundamental research applicable to wide range of agro-climatic conditions.

Research Workers and Farmers : It is unfortunate that some of our research workers still live in ivory towers. It is very necessary that the research workers should no longer remain isolated from farmers. In China I am told, the research worker occasionally spends a part of his time in the villages and stays with the farmers

* Address at the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research.

so that he can have a better appreciation of the field problems. His whole outlook and mind get attuned to the difficulties of the farmer and this guides his attitude towards research. Our research workers should also visit the villages and see the cultivation practices of progressive farmers. Only by watching the work in the field that they would be able to improve the farmers' agronomic practices. Thus they would be in more intimate touch with the farmers and problems. It is also necessary that the research workers instead of depending upon farm assistants also handle some of the agricultural operations personally.

Agronomy: Although extensive research has been carried out in the past, there are still great deficiencies in our knowledge of correct agronomic practices which can be recommended to growers. Dr. A. B. Stewart, in his report on Soil Fertility Investigations in India, had particularly made a reference to these deficiencies, and had suggested that an attempt should be made to translate the results of agronomic experiments conducted on Government farms into cultivators' practices. The Indian Council of Agricultural Research prepared a scheme for simple manurial trials on cultivators' fields, but as these trials did not have a wide coverage, the results did not come up to our expectations. A revised plan has now been prepared in which provision has been made to carry out simple fertiliser trials on cultivators' fields on the basis of the existing information. The object of these trials is to prepare manurial schedules suitable for different agro-climatic regions of the country. The scheme will also help in demonstrating to the farmers the suitability of new fertilisers, namely, urea, ammonium, sulphate nitrate, calcium ammonium nitrate, etc. to be manufactured in the country.

The council has also prepared a plan of model agronomic experiments to be conducted in different parts of the country. This scheme envisages investigations on irrigation cum-manuring, the residual effects of fertilizers, rotation-cum-manuring, phosphatic manuring of legumes, fertiliser placement, seed rate, spacing, etc. and will deal with six major crops, namely, paddy, wheat, jowar, maize, an oilseed crop and cotton. Thirty four centres have been selected on the basis of soil-climate complex with special reference to the requirements of the river valley and other irrigation projects. The results of these experiments will enable us to make the best use of irrigation water in combination with fertilisers and other agronomic practices.

Planting Distance: It is desirable that the optimum distance between plants and between rows in respect of each crop is worked out by the Agronomists. The square and rectangular system of planting has been found useful in crops such as paddy, jowar, etc. In small holdings much work is largely done by manual labour and this system of planting can be very paying. In any case this is an item which should figure prominently in agronomical research programmes in respect of various crops.

Fertilizers and Organic Manures: During the 1st Five Year Plan period the consumption of sulphate of ammonia rose from 2.8 lakh tons in 1951 to 6 lakh tons in 1955. By the end of 2nd Five Year Plan period, it is proposed to raise the consumption of nitrogenous fertilizers to 18.5 lakh tons in terms of sulphate of ammonia. No doubt the application of nitrogen in the form of chemicals is useful but it is desirable if the chemical fertilizers are used in conjunction with organic manure. The practice of green manuring should be increasingly popularised. Cultivation of green manure shrubs such as *Sesbania* and *Glyricidia* along the boundaries of fields, in suitable areas should be widely popularised. Prejudice against the use of human organic waste as manure should be conquered. It is estimated that one person yields 1 kilogram of nitrogen per annum. From this source alone 36 crore kilograms of nitrogen would be available which is equivalent to about 30 million tons. For effective utilisation of human organic waste it is desirable that a large scale programme of trench latrines is carried out in villages in the community projects and N. E. S. areas. The sewage of the town which in the case of a town like Bombay goes to the ocean should be utilized for agriculture. Unless man returns to the soil what he has taken from it, soil fertility would certainly go down.

Deep Water Paddy for Pits along Railway Lines: I am glad to note that there are some schemes on deep water paddy. There are a large number of pits along the Railway lines in a number of states which can be used for cultivating deep water paddy. Already useful work in this direction has been done in Assam and West Bengal, and in other States also it is desirable that deep water paddy is developed. This alone will give a measurable increase in our food production.

Regional Research Station for Horticulture: The Indian Council of Agricultural Research have accepted the recommendations of the Horticulture Committee for intensification of research on the more

important fruits grown in the country. According to this recommendation, the country has been divided into five agro-climatic regions so that the problems of basic research would be dealt with at the fruit research station to be developed in each region. In view of the varied nature of the problems and the number of fruits to be investigated in the different regions, a number of sub-stations will also be set up in each region in co-operation with the States concerned. The chief officer of each regional station will be primarily responsible for framing the research programme of the region in consultation with the State horticulturists and will also provide higher technical guidance. The following Five Regional Research Stations will be developed.

1. *Southern Tropical Zone*: Main Station at Kodur (Andhara Pradesh) with a sub-station each in Mysore and Madras;

2. *Central Tropical Zone*: Main Station at Poona with a sub-station at Nagpur;

3. *North - Eastern Sub-tropical Zone*: Main Station at Sabour (Bihar State) with a sub-station each in Assam and West Bengal;

4. *North - Western Sub-tropical Zone*: Main Station at Saharanpur—Rishikesh with three sub-stations—one each in eastern Uttar Pradesh, Punjab and Rajasthan;

5. *Northern Temperate Zone*: Main Station at Mashobra (Himachal Pradesh) with a sub-station each in the Punjab and Kashmir.

All India Fruit Shows: All India Fruit Shows are now being held under the auspices of the Indian Council of Agricultural Research. An Exhibition Officer (Hort) has been appointed for this work. During the current year, two Shows have been held. The first All India Grape Show was held at Hyderabad and the first All India Citrus Show has recently been held at Bangalore. Another Citrus Show will be held in New Delhi about the end of the December this year. These Shows are very popular with the growers, attract a large number of visitors, and have provided stimulus to horticulture.

Awards for Horticulture: To encourage proficiency in fruit growing the Indian Council of Agricultural Research has formulated a fruit crop competition scheme for judging the best orchards in the country. Judging would be done not only on the assessment of the crop yield but also on the standard of fruit growing practised by the

fruit grower. A uniform procedure of judging would be adopted both at the State and the All India levels. Growers of Important fruits like mango, sweet orange (Malta, Mosambi, etc.), santra orange, banana and apple will participate in these competitions. The best grower will be given a certificate of 'Udyaan Pandit' each year like the certificate of 'Krishi Pandit' awarded in crop competitions. He will also be awarded a cash prize of Rs. 5,000/- for this distinction.

Floriculture Committee: The subject of ornamental gardening which has been very much neglected has at last been given its due place in Horticulture by the organisation of the Floriculture Committee for which step credit is mainly due to our Minister for Food and Agriculture, Shri A. P. Jain who comes from the garden growing district of Saharanpur and takes deep interest in horticulture as well as to Dr. P. S. Deshmukh, Minister for Agriculture who has also appreciated the necessity of giving due recognition to this subject. The Indian Council of Agricultural Education at their last meeting held at Lucknow in August, 1956, recommended that landscape gardening should be introduced in the syllabi of Agricultural Colleges. As the Floriculture Committee has only recently been organised and a number of States were busy with their reorganisation plans, the number of schemes which were received for consideration were comparatively few. However, a start has been made and I believe other States will take interest in this subjects as well. In the State of Assam with its plentiful rain fall and wide and varied flora, there is considerable scope for building up an ornamental garden with an orchid house in which collections of orchids from Sikkim, Bhutan and Assam can be placed. Apart from these, plants like azaleas, rhododendrons and camelias, exotic as well as indigenous, can also be collected in the garden. Such a collection would become very important in a few years and the place where it is housed will become Mecca of botanists as well as lovers of flowers.

Animal Husbandry: Animal husbandry development, by its very nature, is a more complicated and much slower process, and the results are often difficult to achieve and seldom so spectacular as in plant husbandry. Consequently, great amount of strenuous labour and patience are required not only in the planning and execution of research in animal husbandry problems but also in the application of the results of researches. Nevertheless, we must gear up our machinery for research as well as development so as to ensure that one is not divorced from the other. Thus, our research programme should be realistic enough to quickly provide the answers and the

techniques for the efficient implementation of our development plans, and the latter should be based on sound lines and yet be sufficiently elastic to permit of maximum advantage being taken of the knowledge and results obtained through the researches.

The ultimate goal of animal husbandry research and development is preservation of our livestock and livestock resources and their progressively increasing improvement and exploitation for the benefit of mankind. We have, accordingly, to devise ways and means of not only maintaining our animals in a state of sound health and protection from diseases but also of increasing their productive capacity as quickly as possible.

Disease Control: Some decades ago the toll taken by diseases was so heavy that it had become impossible to even think of planning any concerted programmes of improving our livestock breeds. Naturally, therefore, veterinary research in earlier years was directed chiefly towards acquiring a better understanding of animal epizootics and developing efficient methods for combating them. We may well be proud of our many achievements in that field when we recall such noteworthy examples as the progressive improvement in the methods of immunization against our livestock enemy no. 1 — rinderpest — culminating in the production of the goat tissue vaccine, and the visualisation of its complete eradication from the country with the help of that vaccine, and the development of an efficient vaccine for immunizing poultry against Ranikhet disease, which had once threatened to annihilate organised poultry farming in particular and our poultry industry in general. During recent years we have seen the development of more efficacious vaccines for many other diseases, like haemorrhagic septicaemia, fowl pox, fowl spirochaetosis which are only a little less important than rinderpest and Ranikhet disease. You have now before you a number of schemes pertaining to disease problems, and I am sure you will agree that most of these problems deserve our immediate attention.

Rinderpest Eradication Scheme: Our 'pilot' scheme for the eradication of rinderpest, which was in operation in Southern India, has now given place to the All India Scheme for eradicating the disease from the country. The 'pilot' scheme has given us much valuable experience, and we are now confident of achieving our objective during the course of next 2 or 3 years in all the States. It is, however, important that no State should lag behind, and I trust every State Government will attend to this task with the priority that it deserves. Eradication of rinderpest from India is a

project of very great magnitude, the like of which has probably not been undertaken before in any field of human endeavour. The invaluable economical and other benefits that are likely to accrue from a successful attainment of the objective, for all times to come, cannot be measured.

Animal Nutrition: In the field of animal nutrition we have already acquired a considerable amount of useful knowledge about the food requirements of our animals for maintenance of health and for the various items of production, such as work, milk, eggs, wool etc. Researches conducted in India have taught us that the standards prescribed in western countries do not strictly apply to India, and we shall have to study all aspects of animal nutrition under the conditions obtaining in the different parts of the country and under varying conditions of climate and agricultural practices. Under a co-ordinated scheme financed by the I. C. A. R. three Regional Nutrition Research Stations have already been set up, and it is hoped a fourth station will start functioning soon. The proposals of the Second Five Year Plan also include the setting up of four Regional Livestock Research Institutes for conducting research on breeding, diseases and nutritional problems of regional importance. I believe the States are also taking necessary steps to strengthen and expand their existing research nuclei for tackling problems of strictly local importance and for introducing the application of results of researches conducted at the Central and Regional Research Institutes.

Cattle Breeding: The most noteworthy step that has been taken in recent years in the fields of animal breeding is the comparative study of selective breeding and cross-breeding or grading up with better foreign or indigenous breeds, for the improvement of our non-descript and unproductive breeds of cattle, especially in hilly and heavy rainfall areas. The results of this investigation should provide a definite answer to the question: what breeding policy should be adopted in such areas?

You are also aware that some years ago, in consultation with the FAO experts, we had sanctioned a co-ordinated scheme on cattle sterility, primarily with the object of improving the teaching of animal gynaecology and obstetrics in our veterinary colleges and conducting investigations in diverse problems concerning infertility in cattle. The existing scheme provides for one central station and 6 regional stations located in the veterinary colleges. The officers-in-charge of the respective centres have undergone advanced training

in the subject at Stockholm. There are 14 veterinary colleges in India, and it is highly desirable that the cattle sterility scheme be extended to the remaining veterinary colleges also. Consequently, we have invited the remaining States to submit their schemes on sterility, and we are also persuading the FAO to arrange another course at Stockholm. There is some hope that the FAO would be in a position to organise a fresh course at Stockholm in 1957-58.

Surplus Cattle Problem: Out of the world population of 800 million bovines, India has as many as 203 million or slightly more than a quarter of the world's total. Other big countries like the U. S. S. R. or the U. S. A. have only a fraction of this number. The U. S. S. R. has only 63 million bovines and the U. S. A. 84. China has only 18 millions. India has in addition 38 million sheep and 56 million goats. Though there are as many as 26 breeds of cattle and 6 breeds of buffaloes in India, the high class animals in these breeds form only a small proportion, estimated to be roughly 10 per cent. The owners of these animals are poor and resourceless and the fodder position is extremely difficult. The available resources in feeds cannot maintain even a half of the existing population in an optimum condition of health and production.

Two main purposes for which cattle are maintained in India are the production of milk and production of work bullocks. The cultivable area in India is 295 million acres. The number required to cultivate this area, assuming that their capacity is 12 acres per pair, is 24.6 million pairs. The actual number of bullocks available is 33.7 million pairs. Including the number required for carting, irrigation, etc. it is estimated that the number of bullocks is much in excess of requirements. With the introduction of Co-operative farming the number of bullocks required would also decrease. Mechanisation of agriculture would also in due course greatly reduce the number of bullocks required for agricultural operations. It has been estimated that about one lakh bullocks have already been replaced in agricultural operations by tractors and oil engines in the last five years. With increasing mechanisation of agriculture this process would gather momentum. The economy of the country is severely strained by the burden of useless cattle and it is time that we face this problem in a realistic manner so that the competition between man and animal for the limited food resources is reduced to the minimum. With the increasing population we will have to decide whether to feed the man or the unrequired animals.

Ideal Types of Cattle: A valuable suggestion that has been made to us is that for each breed of cattle and buffaloes we should lay down definite standards of an 'ideal' from the point of view of conformation and that our breeding policies should aim at achieving that ideal. A Special Committee has been constituted to examine the suggestion in detail and make its recommendations to the Council in due course.

From West Bengal has come a very interesting scheme, which aims to work out the economics of specialized dairy farming through exploitation of land for milk production rather than food-crop or cash-crop production. The nutritive value of milk needs no emphasis, and we shall watch the progress and results of this scheme with interest.

Poultry: I expect you are all familiar with our poultry development plan. Commercial hatcheries should be set up in all the States so that the development of poultry may be expedited. At present only in Madras and Travancore-Cochin States some work is being done under the schemes sanctioned by the I. C. A. R. This work should be extended in all the States. Incubators should be purchased and distributed to the Extension workers so that the people in the villages may be made to take interest in poultry development. Subject of standardised poultry feeds also require our attention. Meat of unrequired animals such as Pariah dogs, cats, flying-foxes, etc. can be suitably converted into poultry feed of highly nutritious nature. Not only this will increase egg production but at the same time these unwanted pests would be eliminated.

Literature on poultry finds an important place in our publication programme. I am glad to inform you that an excellent book dealing with all aspects of poultry husbandry has recently been prepared, and printed copies will soon be available. Moreover, our Poultry Committee, which met last month, has drawn up a fairly exhaustive list of subjects on which we hope to produce a series of small bulletins in due course.

Sheep: As you know, the proposals of the Second Five Year Plan also include a comprehensive scheme for the development of Sheep and improvement of wool in the sheep-raising tracts of the country. Our Sheep and Wool Committee this year had under consideration a scheme for the definition, commercial evaluation and manufacturing trials of graded wools of the principal breeds of sheep. An *ad hoc* Committee has been set up to closely examine this important scheme and make its recommendations to the Council.

Technical Personnel: For a satisfactory execution of our various research and development programmes we shall require the services of a large number of suitably trained personnel. We have during the last two years or so taken adequate measures to cope with the greatly increased demand in numbers of veterinary personnel, and we are now marching ahead with our programmes of improving the quality of our personnel. As a first step, we are arranging special training seminars in anatomy and bacteriology in Calcutta and at Izatnagar during the next summer vacation for acquainting our veterinary teachers with advanced knowledge and latest coaching techniques in these subjects, and we hope to make similar arrangements for other subjects in the summer vacation of 1958. In the case of anatomy particularly we are lucky to have been favoured under the inter-institutional arrangement with U. S. land-grant colleges with the services of an expert of Dr. Grossman's eminence, and in fact he has already revolutionised the techniques of embalming etc. in his work at Bikaner. We have decided to take immediate advantage of the techniques introduced by him and we have asked the States to depute their anatomy teachers immediately to Bikaner to learn those techniques. I trust the States concerned will take the maximum advantage of these special courses which we are arranging for the benefit of their veterinary teachers.

Veterinary Education: Some of the other measures of veterinary education and research under contemplation are (a) setting up of a post-graduate college at Izatnagar for providing within the country the highest possible training in certain animal husbandry subjects, (b) raising selected veterinary colleges to the post-graduate level, so that they may serve as regional centres for advanced study, and (c) setting up of regional livestock research institutes. We have already taken up correspondence with the States on these subjects, and we expect all the States will make the best use of these programmes.

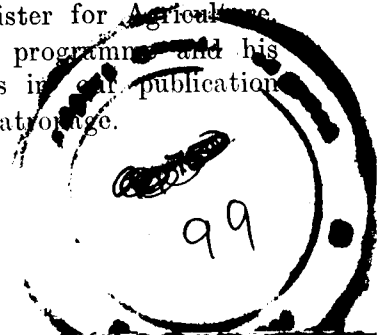
Tribute to Dr. P. N. Nanda: As members are aware, Shri P. N. Nanda our Animal Husbandry Commissioner has proceeded on leave preparatory to retirement. When he joined the Council in 1947, he had behind him a wide and varied experience of several years as a Divisional Officer, as Superintendent of the largest livestock farm in the East and as Director of Veterinary Services in two major States. He brought this rich knowledge and experience to bear on the work of the Council and on the deliberations of this Board and its various Committees. His services to the Council and the country at large have been invaluable, and we all deeply appreciate the good work he

He was a pleasant colleague, and a good worker, who eloped an All-India view of animal husbandry problems of and his departure on retirement is a very severe loss indeed to Council. Let us hope his knowledge and experience would be available to the country in some other capacity.

Publications: I am glad to note that the Indian Council of Agricultural Research have made considerable progress in their publication programme. An excellent monograph on Rice has just been printed. A monograph on Mangoes, a book on Ornamental Flowering Trees are in the press. Books on Poultry and Horticulture will be sent to the press by the end of next month. Monographs on Cotton, Jute, Coconut, Tobacco and various Oilseeds would be ready by the close of next year. A series of monographs on Algae and Fungi have been planned and I hope these would also be available by the end of next year. A new magazine on Horticulture has been started and has been greatly appreciated by those who are interested in gardening. The quality and lay-out of books and journals has been improved and I hope when the publication programme of the I. C. A. R. is successfully implemented, a great step in agricultural education would have been taken. In fact, by providing a series of books on agriculture and animal husbandry, the I. C. A. R. will be laying the foundation of a sound agricultural education based on local material and talent. These books are not only required in India but would also be of use in other countries of far-Eastern region where the problems of agriculture are similar.

Very creditable work has been done in giving a push to our publication programme by Dr. B. N. Uppal, our Agricultural Commissioner, and Shri P. N. Nanda, our late Animal Husbandry Commissioner. I also appreciate the interest which has been taken by Dr. B. L. Sethi, Secretary, Indian Central Cotton Committee, Dr. P. J. Gregory, Secretary, Indian Central Coconut Committee, and Dr. R. Sankaran, Secretary, Indian Central Oilseeds Committee, in the publication programme of their Committees. I also appreciate the good work done by Shri M. G. Kamath, Editor, Indian Farming, and Shri Prem Nath, Editor, Books, who ably edited our books and publications. I also appreciate the work done by the Art Section under the direction of Shri N. S. Bisht in providing artistic layouts for our publications. Dr. P. S. Deshmukh, Minister for Agriculture, has taken keen interest in our publication programme and his encouragement has provided stimulus to us in our publication programme; and I thank him cordially for his patronage.

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A Note on the Occurrence of Precocious Stigma in Cotton

In the course of breeding observations made during 1956, at the Cotton Research Farm, Srivilliputhur, the author observed a floral abnormality in the progeny of the second generation of an inter-specific hybrid between *Gossypium hirsutum* and *Gossypium barbadense*.

Unlike the normal flower bud, the stigma on the plants bearing the abnormal flower-buds protruded outside the bud even from the very early stage. Stages in the growth of this abnormal stigma from square to flower are photographed in the accompanying plate together with the corresponding stages in a normal bud for comparison. The protrusion was visible to the naked eye four to six days after squaring (Figure 5, Plate I). Even prior to this stage such a square could be distinguished by the characteristic truncated tip with a dimpled centre as against the pointed tip of the normal. Of a total population of 41 plants in the Progeny as many as 13 plants exhibited this abnormality. It was strange that none of these set fruit. The failure to set may be due to lack of self-pollination, which is usual in cotton. Further observations are in progress. The object of the present note is just to report the abnormality and a fuller detail of the observations will be published in due course.

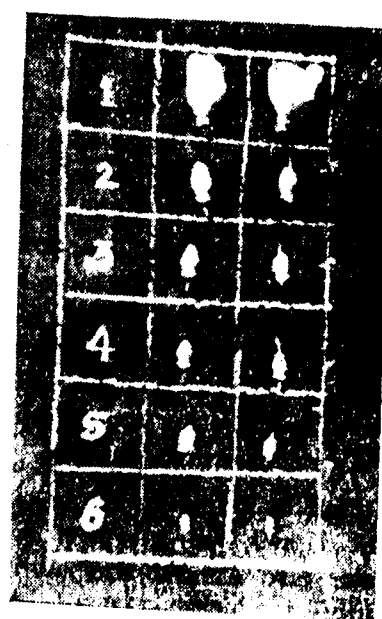


PLATE — I
PRECOCIOUS STIGMA IN COTTON
Figures 1 to 6 showing stages of growth of stigma from square to flower in normal (left) and abnormal (right).

Cotton Research Farm,
Srivilliputhur.

V. SIVASUBRAMANIAM.

Yellow Spot Disease of Sugarcane

Leaf spot diseases caused by *Leptosphaeria sacchari* Breda de Hann., *Helminthosporium* sp. and *Cercospora longipes* Butl., are common in the sugarcane crops of this State, but they are all of minor importance. In recent years, the leaf spot caused by *Cercospora kopkei* Krug., is noted to assume endemic importance. During the current season, this disease was noted to occur at this Research Station and a survey indicated its presence in the neighbourhood.

Extensive and serious outbreaks of this disease have been reported from Queensland (1) Java, (3) Phillippines, (5, 2) and Formosa (4). In queensland (1) it has been reported that the spots covered as much as 30% of the leaf area and that the varieties Eus and POJ. 2878 were susceptible In Java, the varieties POJ. 2878 and POJ 100 were most susceptible while the varieties EK. 28, D 1. 52 and B 247 were relatively resistant (3). In the Phillippines this disease occurs on the varieties Hemja, Sarethra and Chunnee (5).

The conidiophores of the fungus *Cercospora kopkei* Krug., are fasciculate, emerging from the stomata or occasionally from the epidermis, light greyish olive in colour, paler at the apex 1-12 septate and measure on the average $89.9 \times 7.8 \mu$ the range being $50-140 \times 5-11 \mu$ mostly 67 to $112 \times 7-8 \mu$ geniculate at the upper part. Conidia elongated or fusiform straight, sometimes slightly curved, hyaline or sub-hyaline 1-5 septate mostly 3-4 septate, not distinctly constricted at the septum and measure on the average $39.2 \times 5.6 \mu$ the range $16-53 \times 4.0 \mu$.

Single spore isolations of the fungus were made but these gave rise to non-sporulating mycelial growth only and inoculations on healthy plants of Co. 419 with such isolates did not give rise to positive infection. Hence inoculations were carried out by making a suspension of spores from freshly collected materials and pathogenicity was thus established. Inoculations were conducted on six to seven months old plants of Co. 419, Co. 527 and Co. 449. The varieties Co. 419 and Co. 527 exhibited heavy infection while Co. 449 was not infected. The measurements of conidia and conidiophores exhibit a longer range of variation in size than those reported by Matsumoto (4).

The varieties under study on this Station and the factory farm indicated that most of the shoots exhibited the symptoms but differed in the range of infected leaf area as indicated as follows:

Variety	Percentage of leaf area Infected
Co. 419	50 to 100
Co. 449	Free (not affected)
Co. 527	40 to 100

Co. 658	40 to 80
Co. 785	20 to 40
Co. 956	20 to 40
Co. 1001	20 to 40
Co. 1024	40 to 80
POJ. 3016	20 to 40

It is of great importance to note that Co. 449 is totally free from this leaf spot, though occurring in the midst of heavily infected Co. 419.

Since this leaf spot disease can become a major disease, endemically, attempts were made to assess the loss in weight of canes and quality of juice. For this purpose 20 diseased and healthy clumps from the same field were selected at random and the number of canes counted and weight recorded. These were separately crushed and their juice analysed. The assessment made in respect of the two important varieties of this State is furnished below.

Variety	Average weight of cane in lb.		C. C. S. percent in lb.		Percentage of Loss in lb.	
	Diseased	Healthy	Diseased	Healthy	In weight	C. C. S. %
Co. 419	3.46	3.90	7.33	7.89	11.3	7.09
Co. 527	1.90	2.70	11.95	13.09	29.6	8.78

In nature, the disease normally appears in the latter half of the monsoon season and gradually subsides after the cessation of rains. Crops of less than six months in age do not record heavy infection and are comparatively free. Observational spraying trials with Perenox and Bordeaux mixture 5:5:50 were conducted on Co. 419 at this Station. It was observed that in the sprayed plots there was no spread of infection while the controls exhibited heavy infection. Removal (detashing) of badly affected leaves also helped in checking further spread of infection. But the most successful method is the cultivation of variety Co. 449 which is resistant to the disease and which will record higher tonnage with superior quality juice as compared to the heavily infected Co. 419.

Acknowledgments: I express my heartfelt thanks to Sri S. V. Parthasarathi, Sugarcane Specialist, Palur for affording me facilities for work, and to Sri M. Kandaswamy, Government Mycologist for his helpful criticisms and guidance during the preparation of this manuscript.

Central Sugarcane Research
Station, Palur.

C. L. SUBRAMANIAN,
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Book Reviews

Guide to Bark: by Alfred Schwankl. (Thames and Hudson, London) from Orient Longmans Private Limited. 100 p p. price 12 sh 6 d.

The bark reveals the tree and is the outward expression of its inner character. Further, each kind of tree may be identified by the form and colour of the bark. The bark would tell us at once whether we are dealing with a conifer or a broadleaved tree. Thus the bark gives an important clue to tree recognition. This unique feature has been brought out by the author Dr. Schwankl, the German author and has been translated to English by Edlin. The author gives from a variety of samples, this new and useful approach to the identification of trees which will be exceptionally useful, as the bark unlike the flower will be available at every season of the year, and close at hand even in the tallest tree.

The book is excellently got up and profusely illustrated with 156 illustrations, and will be very useful to many tree lovers, even though the publication deals largely only with trees of temperate regions.

Gleanings.

Injury to Plants by Hormone Herbicide: Careless handling and application of hormone-type herbicides may result in serious damage to economic crops. The absorption of these chemicals produces certain characteristic effects in cultivated plants. The growth abnormalities induced include the thickening of the leaf veins, reduction in the area of inter-veinal leaf tissue and pronounced serration of leaf margins, leaf curling and twisting, and reduction in leaf size. Some plants react by a splitting of the stem and the production of tumour-like tissue growths. Aerial root growth may also be stimulated, while growth forms quite uncharacteristic of a normal plant have been observed. In many instances the plant dies, but one which has not absorbed a lethal dose of the hormone can show evidence of recovery in subsequent new growth.

Plants vary in their sensitivity to hormone weedkillers, and the following list is designed to indicate where these chemicals may be safely used:

- Very Sensitive:** Tomato, beans, grapes, tobacco, zinnia, hibiscus, lettuce.
- Sensitive:** Lucerne, clovers, cowpeas, peas, soybeans, modics, and vetches, beets, crucifers, cucurbits, most fruits (including bananas and citrus), most trees and shrubs and roses.
- Intermediate:** Cereals, potatoes, linseed, asparagus, strawberries, bent and buffalo grasses.
- Tolerant:** Most pasture and turf grasses.

Spray particles may drift many hundreds of yards, and to minimise this danger hormone sprays should be applied when there is a light breeze away from the sensitive plants. Low pressure and fairly coarse nozzles should be used if possible, as larger droplets will fall more quickly than small droplets. Avoid directing the spray jet upwards. The danger of drift is greatest when large areas are treated.

The Chemistry of Rice: It has been found that the scutellum of rice contains 41—50 per cent of Vitamin B of the grain, the plumule and radicle having another 9—12 per cent. The pericarp and aleurone layers together retain about 34 per cent, the grater part being in the aleurone. Milling results in loss of the germ and the bran layers which between them contain more than half the mineral matter of the whole grain, a fourth of the proteins and nearly all the fats and vitamins. Exclusive of the losses on milling, the prevalent practices of washing grains before cooking and of cooking in excess of water involving drainage of the gruel results in loss of 4—10 per cent proteins, 15—30 percent minerals and over 30 per cent vitamins. There is ample experimental evidence to show that rice proteins, small as they are in quantity (8—10 per cent), are nutritively superior to those of wheat.

Preparing Papain: Papain is an important product manufactured from the milk of the papaya fruit. Papaya milk or juice is obtained by tapping the green, unripe, but well-developed fruits. The juice flows well in the morning. The surface of the fruit is scratched lengthwise with a sharp, non-metallic instrument like a bone knife or an ivory piece. A number of such scratches are made on the skin, but not so deep as to cause serious wounds. Scratches are few to begin with, and are increased in number and size to cover the entire skin. Usually, four or five days are allowed between two successive tappings. The juice is collected in shallow chinaware, held underneath the incised fruits. If any

juice hardens on the surface of the fruit it should be scraped off. The collected juice is dried in the sun or in driers. Drying under shade gives a white attractive papain. The poorly dried product is brown or black in appearance. ICAR.

Fertilizing the Legumes: Experiments show that a legume crop fertilized with phosphate not only yields better, but also leaves the soil richer in nitrogen, available phosphate and organic matter. As such, the succeeding crops can be grown without manuring. In the experiments conducted at Delhi, superphosphate gave the best results among the phosphatic fertilizers tried.

A berseem crop fertilized with 120 pounds of phosphoric acid (3½ maunds of superphosphate per acre) gave 102 pounds of extra yield of green fodder per pound of phosphoric acid applied. *Methra* and *senji* gave 54 pounds and 52 pounds of extra yield, respectively per pound of phosphoric acid. It was also found that the phosphate application improved the quality of the fodder. The value of the legume as a green manure has also been found to improve by the application of phosphate. May soils in India do not contain enough of phosphates. In such soils, good results can be had by phosphate fertilization of legumes. ICAR.

Sea Island Cotton suitable for West Coast: The Sea-Island cotton, *Andrews*, has been found to be the most suitable variety for growing on the modern lands in Malabar, on the West Coast. Experiments conducted at Pattambi in Malabar and at Mangalore on the West Coast showed *Andrews* to be the most suitable variety from all points of view. Sea-island cotton is the world's finest cotton with a staple as high as 1½ inches to 2 inches, and capable of spinning over 150s counts. *Andrews* has recorded a yield as high as 1614 pounds of *kapas* per acre at Pattambi and was found to be superior to the imported Egyptian variety *karnak* in fibre properties. The ginning outturn was 33 per cent, mean fibre length 1.36 inches and highest standard counts 70s. If properly cultivated and protected from Pests and diseases *Andrews* will give a net profit of Rs. 500 per acre, compared to Rs. 14 to Rs. 90 obtained from other crops such as modern paddy, *til* and *tapioca*. ICAR.

Saw Dust as Cattle Food: Sawdust may be used as cattle food if recent laboratory experiments can be translated into an industrial process. The basis of the new process is the irradiation of the sawdust with radio-active isotopes. This brings about chemical changes in the sawdust converting the indigestible cellulose in the wood particles into a form which the cattle can readily digest. The experiments have shown, it is claimed that the treated saw-dust can be digested by cows and other cattle and converted into sugar food in a perfectly normal manner. The problem at present is one of devising an efficient method of large-scale processing. Which will ensure that all the cellulose is properly converted into the digestible form. Further experiments are now being carried out towards the development of a small pilot plant process for this purpose. (Indian Express.)

Weather Review — For December, 1956

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1956	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1956
North	Madras (Meenam-bakkam)	6.7	+ 1.2	49.8	South	Madurai	1.3	— 0.7	47.5
	Tirur-kuppam*	6.4	— 0.4	47.9		Pamban	7.1	— 0.5	27.0
	Vellore	2.0	— 0.6	44.5		Koilpatti*	1.1	— 1.2	32.6
	Gudiyatham*	1.0	— 2.7	36.4		Palayam-cottai	2.4	— 1.8	16.8
East Coast	Palur*	5.3	— 1.6	55.3	West Coast	Amba-samudram*	3.0	— 2.5	22.4
	Tindivanam*	3.2	— 1.3	45.8		Trivandrum	1.7	— 0.8	48.3
	Cuddalore	5.7	— 1.8	55.8		Fort Cochin	0.1	— 1.5	131.5
	Nagapattinam	7.1	— 3.9	47.4		Pattambi*	£		
	Aduthurai*	3.1	— 2.3	51.0		Kozhikode	0.2	— 1.3	129.6
	Pattukottai*	2.1	— 3.6	40.4		Taliparamba*	£		
Central	Salem	1.4	— 0.4	46.6	Hills	Wynaad*	Nil	— 0.8	86.3
	Coimbatore (A. M. O.)*	0.4	— 0.1	24.9		Nileshwar*	£		
	Coimbatore	0.6	— 0.5	19.6		Pilicode*	£		
	Tiruchirappalli	2.1	— 0.5	39.1		Mangalore	Nil	— 0.7	142.5
						Kankanady*	£		
						Kotekar*	£		
						Kodaikanal	2.0	— 3.2	58.6
						Coonoor*	3.9	— 3.2	52.8
						Ootacamund*	0.6	— 2.0	45.1
						Nanjanad*	0.7	— 0.5	48.1

Note:— 1. * Meteorological Stations of the Madras Agric. Dept.

2. £ Data are not received as these station are not in Madras State.

The month began with a few thunder showers in Madras, the weather elsewhere being mainly dry. In the succeeding two days isolated showers were received in portions of Madras while the rest of the region had only dry weather. On 4th December 1956 rains were fairly wide spread in coastal Madras and at a few places in interior Madras as well. For two days from 5th December 1956 weather was mainly dry with the exception of localised showers in South Madras on 5th December 1956 and at a few places, mainly in coastal regions on 6th December 1956. The entire region had only dry weather on 7th December 1956. Weather was mainly dry upto and inclusive of 21st December 1956 with the exception of very light showers at Pamban on 8th December 1956, coastal Madras on 13th December 1956 and Trivandrum on 15th December 1956. For three days from 22nd December 1956 localised showers were received in southern portions of the Madras State, when the weather elsewhere continued to be dry. On 25th December 1956 scattered showers were received in Madras, but other regions had only dry weather. On 26th December 1956 and the next day as well wide spread showers were received in Madras State. Localised showers were received in Madras State on 28th December 1956. In the last three days of the month the weather was mainly dry with the exception of a few isolated light showers in South Madras on 29th December 1956.

Considering the month as a whole rains were fairly sub normal practically throughout the State with the exception of Madras (Meenam-bakkam) and Salem.

The noteworthy rainfall and the zonal rainfall in inches are furnished below:—

Noteworthy Rainfalls			Zonal Rainfall			
Date	Place	Rain-fall in inches	Name of Zone	Rainfall for the month	Departure from normal	Remarks
2/12/56 & 4/12/56	Madras (Meenam-bakkam) (Each day)	2.0	North	4.0	— 0.6	Below normal
4/12/56	Pamban	3.0	East Coast	4.4	— 2.4	do
6/12/56	Nagapattinam	3.0	Central	1.1	— 0.1	Just below normal
27/12/56	Tuticorin	3.0	South	3.0	— 1.3	Below normal
			West Coast	0.4	— 1.0	*Far below normal
			Hills	1.8	— 2.2	do

Note: * Data from five stations only are considered.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 11—12—1956

C. B. M. & M. V. J.

Departmental Notifications

Gazetted Officers—Postings and Transfers

Names and present post	Posted as
Abdul Samad A., Oil Seed Specialist, Coimbatore	Paddy Specialist, Coimbatore.
Bhavani Sankar Rao, Paddy Specialist, Coimbatore	Oil Seed Specialist, Coimbatore.
David M. J., Dt. Agricultural Officer, Pattukottai	Agricultural Information Officer, D. A's Office, Madras.
Mohd Ibrahim P. A., Coconut Nursery Asst. Adiramapatnam	Temprary Assistant Oil Seed Specialist, Pattukottai.



Review of Market Conditions of Commercial Crops in the Area of Market Committees for the Month of November, 1956.

Cotton: (in the Section: Candy = 784 lb. Pothi = 280 lb.)

Tiruppur: The soaking rains received almost in all parts of Coimbatore district enabled sowings of cotton on a larger scale than in the previous year. The output of cotton in this season is expected to be a bumper one mainly due to the receipt of timely rains. The textile mills in this district are already in possession of good amount of stocks and the prospects of bumper production from the new crops have set in a sober tone in the market importing a slight recession in prices. This market started during the month with an opening balance of 9338 edys. of lint (8494 edys. of Cambodia and 843 edys. of Karunganni) and 7464 pothis of Kapas (7063 pothis of Cambodia and 401 pothis of Karunganni). Arrivals during the month amounted to 2144 edys. of lint and 4445 pothis of kapas of both Cambodia and Karunganni varieties. Total disposals have been reported to be 4708 edys. of lint and 6057 pothis of kapas leaving a closing stock of 6773 edys. of lint (5872 edys. of Cambodia and 901 edys. of Karunganni) and 5852 pothis of kapas (5685 pothis of Cambodia and 167 pothis of Karunganni at the close of the month. The despatches of lint were mostly confined to Kerala State, Mysore, Madurai, Salem, North Arcot, Madras, Tirunelveli, Ramnad, Tiruchirapalli and Orissa.

Ramanathapuram District: The Karunganni cotton crop in this district is coming up well as a result of favourable rainfall. The production of cotton, it is observed is definite to give its maximum yield in this area. Here also the perceptible prospects of a good new crop have registered a slight set back in the level of prices compelling to move down lightly. The three markets of Sattur, Rajupalayam and Virudunagar put together opened at the beginning of the month with

a stock of 4250 pothis of kapas and 3240 cadys. of lint with which were added 3200 pothis of kapas and 1635 edys. of lint by way of receipts. The transactions in all the three markets amounted to 5070 pothis of kapas and 1710 edys. of lint. There was a closing stock of 2650 pothis of kapas and 3165 edys. of lint at the end of the month in all the markets.

The prices of Karunganni kapas and lint were gradually decreasing following the heavy stocks expected from the current season. The prices of lint and kapas of different varieties in these markets during the month are as follows:—

Kapas (per pothi)		Opening prices	Closing prices
Karunganni	...	Rs. 109/4	Rs. 106/8 to 109
Tinny Karunganni	...	Rs. 83/4 to 100	Rs. N. A.
Tinny	...	Rs. 58 to 75	Rs. 66/8 to 75
Uganda I quality	...	Rs. 108 to 116/10	Rs. 116/8 to 120/12
do II "	...	Rs. 96 to 104/3	Rs. 100 to 112/8
do III "	...	Rs. 70 to 91/10	Rs. 58/5 to 92

Lint (per cdy. of 784 lb.)		Opening prices	Closing prices
Karunganni	...	Rs. 866	Rs. 826 to 866
Tinny Karunganni	...	Rs. 830 to 836	Rs. 800 to 825
Tinny	...	Rs. 770 to 810	Rs. 746
Uganda M. U. 1 Certified...	...	Rs. 1040	Rs. N. A.
" M. U. 2 "	...	Rs. N. A.	Rs. N. A.
" Uncertified "	...	Rs. 930	Rs. 956
(N. A. Not Available.)			

Cotton seeds (per standard Maund of 82 2/7 lb.)		Opening prices	Closing prices
Karunganni	...	Rs. 12/2 to 12/14	Rs. 10/5 to 11/5
Uganda	...	Rs. 8/8 to 8/10	Rs. 7/8
Cambodia	...	Rs. 6 to 8	Rs. 6

There has been a decline by Rs. 5/- and Rs. 20/- respectively in the prices of Karunganni kapas and lint compared to that of last month.

South Arcot: The recent rains in this district have held up the pickings of cotton to a certain extent which resulted in a reduction of the arrivals of cotton to the markets. The markets at Villupuram and Panruti have had a stock of 195 pothis of cotton kapas at the beginning of the month. About 2141 pothis in all have been added to this from out of receipts into these markets. Total despatches—which were mainly to Tiruppur in Coimbatore districts—were 2093 pothis leaving a closing stock of 243 pothis at the end of the month.

The average prices of cotton kapas in these markets ranged from Rs. 90 to 92/6 per pothi during the month.

Groundnut: (In this Section: Candy = 531 lb. of kernels.
Bag = 80 lb. of pods.)

South Arcot district: The quality of groundnuts in general, marketed in several places of the district was poor during the month. The cause for unusual poorer quality noted in the crops this month was ascribed to the heavy rains inundated the groundnut fields and which affected the quality. The nine markets of South Arcot district have in total received 6,710 tons of kernels, 5,678 tons of which arrived from the local winter crops. Some receipts were also noticed from Andhra state. Crushing in local mills improved which figured at 4292 tons while crushing of country chekkus declined which came to 166 tons only. The increased arrivals have cumulatively increased the despatches also consequent on demand from other districts. About 2589 tons of kernels in all were disposed of during the month. There has been some despatches to Pondicherry, the quantity being 214 tons. There was a closing stock of 2732 tons of kernels with the trade at the end of the month.

The prices of groundnut kernels have been falling from Rs. 152—8—0 per candy, because of poorer quality of the type marketed.

North Arcot district: Harvesting of winter bunch variety groundnut has been completed in this district just now and that of spreading variety commenced during the beginning of second fortnight. About 30% of the produce is estimated to have been marketed thus far. The prevalence of lower rates for groundnut kernels have led the sellers to release their stocks only piecemeal and they were a little reluctant to give up their produce in whole. The yield of the crop this year is also reported to be only round about 50% of the normal. Pest attacks have, to a little extent, caused damage to the groundnut crops and in such cases the yield was even below 25%. The arrivals in all the markets were poor. There was a stock of 651 tons of pods and 141 tons of kernels at the beginning of the month. Total arrivals during the course of the month amounted to 3368 tons of pods and 3592 tons of kernels of which 2267 tons of pods and 2871 tons of kernels were transacted leaving a closing stock of 1752 tons of pods and 862 tons of kernels at the end of the month.

The export policy of the Central Government suspending the exports quota of groundnuts seems to have greatly discouraged the buyers, who in their purchases, offered only low prices. The sellers, however are reluctant to part with their produce. This crop is therefore becoming susceptible to violent fluctuations in the prices. The prices

of kernels ranged from Rs. 145 to 170 per candy in the open markets while they were ranging from Rs. 150 to 172/8 per candy in the regulated markets. The prices of pods were quoted at Rs. 16 to 17 per bag. The prices of kernels now prevailing are double that of the prices which ruled during the corresponding period of last year. The regulated markets in this district are expected to serve very usefully to both the growers and sellers in securing a reasonable price.

Ramanathapuram District: Harvests of groundnuts in the taluks of Aruppukottai and Sattur of this district have been carried on extensively during the earlier part of the month. Heavy downpour of rains have however suspended the harvests in the latter part of the month. The yield of the local crop production is expected to be high and the arrivals from other districts like South Arcot, North Arcot, etc have, therefore, been gradually coming down. Good amount of receipts found its way to Virudhunagar market late in the month, have attracted the chekku owners who have stepped in for purchases. About 660 tons of pods and 260 cdays of kernels were totally received during the month in Virudhunagar market of which only 20 tons of pods remained at the close of the month.

Despite the arrivals being heavy, the prices have been ruling steady on account of the market having been nursed by good demand. The prices of pods were quoted at Rs. 14 to 16 per maund while the prices of kernels were quoted at Rs. 150 to 155 per candy.

Gingelly: (In this section: Bag = 168 lb.)

South Arcot district: Virudhachalam is the only big centre where large scale transactions of gingelly are taking place. This market started its activities with an opening balance of 651 bags of gingelly at the beginning of the month with which were added 1023 bags by way of receipts locally as well as from other districts. The arrivals during the month were below 25% of previous month's receipts as the harvests of this crop was concluded during the earlier part of the month. Crushings by rotaries and chekkus have dwindled and accounted to 205 bags in all. Deducting a quantity of 1119 bags of gingelly despatched to other districts like Tiruchirapalli, Tanjore etc. there was a closing stock of 350 bags at the end of the month.

There were no large variations in prices of gingelly and the average prices varied from Rs. 60/9 to 71 per bag.

Tobacco: (In this section Candy = 500 lbs.)

Tiruppur: The transplantation of the tobacco crop in Coimbatore District progressed briskly with the advent of adequate rains in this district. The area under tobacco has dwindled this year in this district

as a result of the large stocks of chewing tobacco kept stocked without any demand during the previous season. The lack of demand is surmised to be due to the re-organisation of Madras State, resulting in the prominent tobacco assembling centre of Palghat being included in the Travancore—Cochin State, where there are some extra taxes to be paid. The production of tobacco last year was also larger one, resulting in the present stagnation. About 1743 edys of chewing and 520 edys of cheroot tobacco were despatched to Palghat, Ernakulam, Kottar, Quilon and other centres in Kerala State, Andhra, Mysore and the districts of Madras State. There was a closing stock of 39,135 edys of chewing and 1000 edys of cheroot tobacco at the end of the month.

The prices of different varieties of tobacco ruled out in this market during the month are extracted below :

Variety	I Grade Rs.	II Grade Rs.	III Grade Rs.
1. Chewing tobacco—Sun cured.			
(a) Meenampalayam	300—350	200—275	150—175
(b) Other varieties	200—250	100—175	75—100
2. Cheroot varieties :			
Sun cured (grown in Erode and Bhavani taluks)	260—320	200—250	120—150
3. Chewing varieties :			
Pit cured (grown in Palladam and Sular areas)	200—300	125—175	75—125

Review of the Administrative Activities of Market Committees for November, 1956.

General: After the re-organisation of the states, there are only five Market Committees left in the Madras State, viz. South Arcot Market Committee, Coimbatore Market Committee, North Arcot Market Committee, Tirunelveli Market Committee, and Ramanathapuram Market Committee. The first two are the premier Market Committees in the State in their order of preference handling sizable quantities of commercial crops in their regulated markets. The third Market Committee is just at the stage of an infant. The last two Market Committees are under legal restraints. All the above Market Committees except Coimbatore Market Committee, are functioning under 6-A of the Madras Commercial Crops Markets Act.

The following are the progress made in the issue of licences by the Market Committees in the State.

	Section 5 (1)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
North Arcot Market Committee	753	2535	335	1109	134	684
South Arcot Market Committee	617	2728	589	2382	571	2241
Coimbatore Market Committee	10	889	11	954	20	640
Tirunelveli Market Committee	—	13	—	16	—	17
Ramanathapuram Market Committee	—	29	—	28	—	5
A: During the month	B: Upto the end of the month from January 1956.					

Meetings: A meeting of the Coimbatore Market Committee took place on the 10th when 13 subjects were discussed and disposed of.

A meeting of the tobacco Adhoc Committee took place on the 10th when the final report of the ad-hoc committee on the continuance of tobacco as a commercial crop in Coimbatore district was passed.

Quality appraisal: The South Arcot Market Committee continued its work on the analysis of quality of groundnut kernels marketed in that district. During the month 78 samples were analysed in three markets from out of the arrivals of 24896 bags in 9019 lots. The results of analysis reveal that the crop marketed at Vridhachalam was good containing minimum dryage and damaged kernels. Moisture and damaged kernels were large at Panruti and Cuddalore markets respectively.

Quality Competition: The competition for summer groundnuts was closed in all markets and 222 entries have been secured in all. The winter crop quality competition has commenced from 1—11—56.

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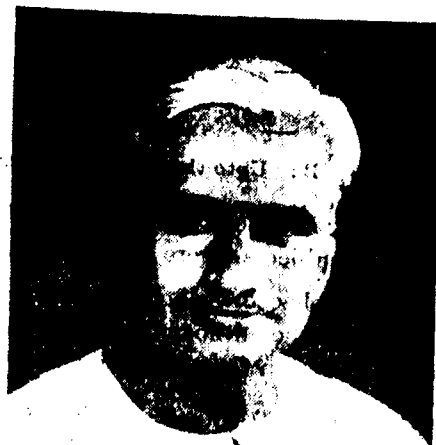
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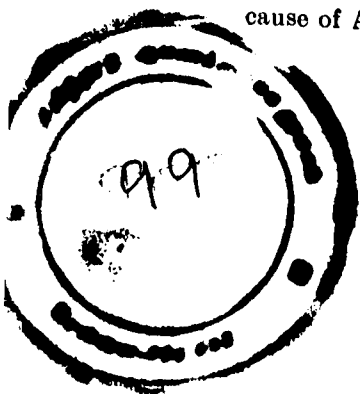
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