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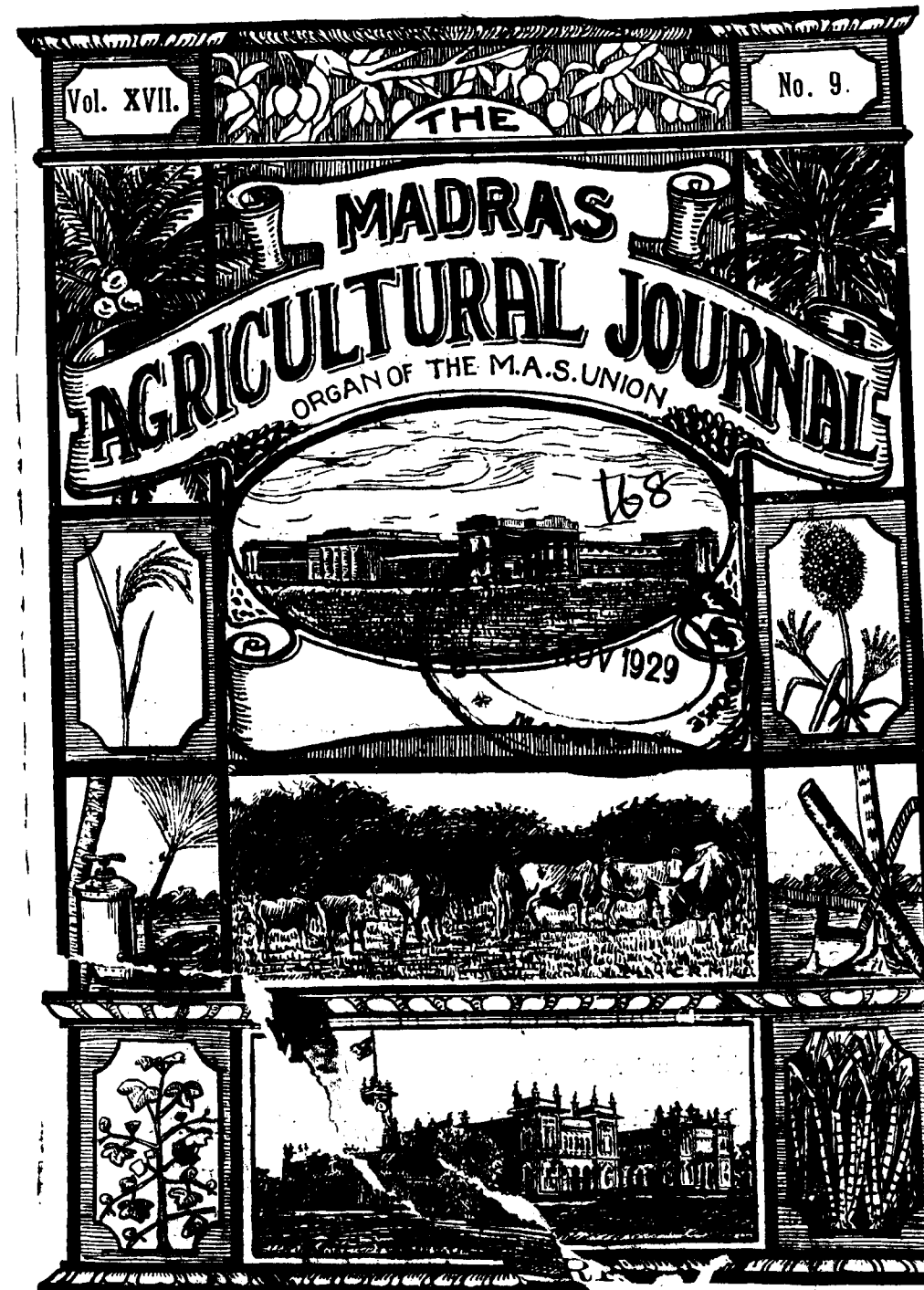


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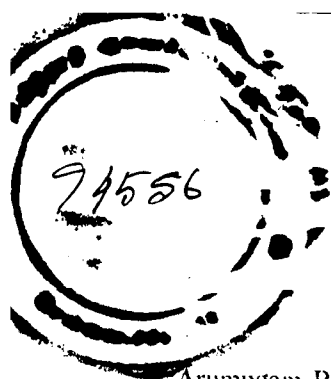
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Farming will never be a success unless the farmer
had more voice in the disposal of
his produce—P. Merrel.

The Madras Agricultural Journal. 168

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

Vol. XVII] SEPTEMBER, 1929. [No. 9.

September 1929 :—The month of September 1929 is an eventful month in the history of the Department of Agriculture, Madras in that many changes have taken place in the important personnel of the department. Mr. Rudolph D. Anstead, the permanent Director of Agriculture goes on long leave preparatory to retirement; Mr. G. R. Hilson, Cotton Specialist assumes charge of the Directorate; Mr. C. Tadulingam the Principal goes on long leave and Mr. P. H. Ramareddi becomes Principal and Mr. T. V. Rajagopalachari becomes the Vice-Principal. Mr. V. Ramanathan becomes the Cotton Specialist. Consequent on these appointments there have been many new appointments to the other gazetted posts. So far as we are aware this is the first instance when so many changes have occurred in a single month.

Vale to Mr. Anstead :—Mr. Rudolph David Anstead, M. A., C. I. E., under whose able guidance at the helm of affairs the Madras Department of Agriculture has, during the past seven years, made steady progress in all directions and gained in popularity, has just laid down the reins of office and gone on long leave preparatory to retirement. Mr. Anstead succeeded Mr. H. C. Sampson as director of Agriculture in August, 1922. During his period of tenure of office, Mr. Anstead pursued a steady and well-thought-out policy of progress in the activities of the department. Agricultural Education and Agricultural Research made considerable progress in his *regime*. The number of students admitted into the Agricultural College was increased from twenty to forty-eight. Schools for teaching elementary agriculture to the sons of cultivators were started at Anakapalli, Kalahasthi and Taliparamba, and one quite recently at Usilampatti. On the side of research, not only has there been an all-round expansion, but new stations and sections have come into existence, such as the stations for paddy breeding at Maruteru and Pattambi, the Central Cattle Station at Hosur and the section of the Agricultural Research Engineer. With regard to propaganda and district work, he has laid the foundations of a comprehensive scheme, whose aim is to bring home to the ryots the results of research as widely and quickly as possible. The two units of Motor Exhibition vans which have been touring round the Presidency since last year have been of great service in popularising the work of the department. Similarly popular exhibitions and shows have been arranged wherever possible. Based on his long experience, moreover, he has drawn up a scheme of future development of the department, which has been accepted by the Government. Mr. Anstead has by his suave manners and amiable disposition endeared himself to all who came in contact with him; and as the head of the department has always dealt fairly with people and given sympathetic consideration to all reasonable representations. In Mr. Anstead's retirement the department is losing a friend and a guide.

Ave to Mr. Hilson :—Mr. G. R. Hilson, B. Sc., Cotton Specialist, succeeds Mr. Anstead and we warmly welcome him into our midst as the Director. He is by no means a stranger to us, and he had already officiated as Director on

two occasions for short periods. He joined the Indian Agricultural Service in February, 1910 as Deputy Director of Agriculture, Northern Division, with headquarters at Bellary. During his tenure of office as Dy. Director, he was responsible for the introduction and popularisation of the Java Cane varieties, such as J. 247. His aptitude for research manifested itself in the evolution of N. 14 and H. 25 cotton strains, which have now become the popular standards for the Northerns and the Westerns type of cottons. Similarly among the Sorghums, he has produced T. 6-Jonna for the Nandyal tract and T. 1- and T. 2-Jonnas for the western Deccan districts, which have become popular in these areas. Among the Ragis, his name will be associated with T. 8-Ragi. In 1920, he was appointed to the post of Cotton Specialist, which was then created at Coimbatore, for organizing the work of cotton improvement and breeding. At Coimbatore, he turned his attention first to the evolution of strains of Cambodia, of which Co.1, and Co.2 are now becoming popular, and then to the local cottons. The improvements effected by him in the joint yoking of several pairs of animals to the plough and the evolution of the new cultivator-known as H. M. Guntaka-which is fitted eminently for tilling the surface soil at different depths and likewise for lifting crops like groundnut, are standing evidences to his practical genius. The recent re-organization scheme submitted by Mr. Anstead and approved by the Government is, we know, quite in accordance with Mr. Hilson's ideas of the lines of development of the department. We are sure, therefore, that under his direction the department will expand more and more and become increasingly useful to the man behind the plough- for whose benefit the department of agriculture exists.

Mr. C. Tadulinga Mudaliyar, Principal of the Agricultural College Coimbatore, left us on long leave, handing over charge on 1st September 1929 to Mr. P. H. Ramareddi who is appointed to officiate as Principal. Mr. Tadulingam will be missed by one and all of his friends in the estate and in Coimbatore town. We wish Mr. Mudaliyar the fullest enjoyment of his well earned holiday and a speedy return to us. We extend our hearty felicitations to Mr. Reddi on his elevation to the Principalship and wish him every success in his new sphere of work.

The Java Convention of the International Society of Sugarcane technologists.—Elsewhere in this issue is published a short account of the Convention of Sugarcane technologists held in Java in June last. Rao Bahadur Mr. T. S. Venkataraman, the Government Sugarcane Expert was the official Indian delegate deputed by the Government of India. Mr. Venkataraman's work at Coimbatore, which has received international recognition, was greatly appreciated by the members of the convention and many members of the convention came all the way to Coimbatore to visit his station and to study his methods. We understand that he is appointed Chairman of one of the Committees of the conventions to be held at Porto-Rico in 1932.

The Collector of Coimbatore held a Durbar on the 29th of August in the Town Hall and presented to Mr. B. Viswa Nath the sanad and Insignia of Rao Bahadur conferred on him in recognition of his scientific work. We offer our congratulations to Rao Bahadur Viswa Nath.

We offer our congratulations on their promotions to Messrs. V. Ramanathan, T. V. Rajagopalachariar, V. Muthuswami Ayyar, T. V. Subramanyam V. K. Subramanya Mudaliyar, G. Jogi Raju, M. K. Nambiyar, M. U. Vellodi, M. V. Raghava Rao and R. Swami Rao.

During the seven years of Mr. Anstead's regime as the Director of Agriculture, the department of Agriculture had made considerable progress in agricultural education, research and propaganda in the districts. He spared no pains and let slip no opportunity in bringing the activities of the department made known to the members of the Legislative Council, the landed aristocracy and the mirasdars and the public in general and in convincing them of the good and useful work that is being done at Coimbatore and in the districts. In recognition of his services he was honoured with a Companionship of the Order of the Indian Empire by H. M. the King in January 1927.

Apart from his organising capacity and persuasive eloquence, Mr. Anstead is possessed of kind hearted generosity and inborn courtesy which endeared him to all who came in contact with him.



Mr. C. R. HILSON, B. Sc.



Mr. R. D. ANSTEAD, M. A., C. I. E.

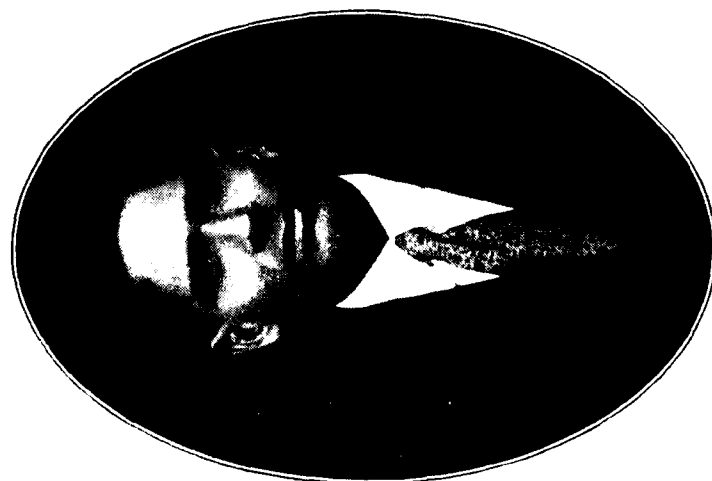
Mr. Rudolph David Anstead, M. A., C. I. E.

An Appreciation.

Mr. Rudolph David Anstead, M.A., C.I.E. Director of Agriculture, Madras relinquished charge of office on 1st September 1929 and proceeded on long leave preparatory to retirement on the age-limit on 2nd June 1931.

Mr. R. D. Anstead was born on 2nd June 1876. He took a natural science degree of the University of Cambridge in 1899. He then went to West Indies as a member of the Imperial Department of Agriculture in that country under Sir Daniel Morriss. He was there employed as a Research Chemist; he worked as a Sugar chemist in Barbados at the head quarters station. In 1905-06 he was appointed as Agricultural Superintendent of Granada in the West Indies. He served there in that capacity for nearly three years and in 1908-09 he resigned that post to take up an appointment in the Indian Agricultural service.

He embarked for India on the 16th April 1909 and arrived in India on the 9th May 1909 and reported himself to the Commissioner of Agriculture Madras on the 12th May 1909. In those days the department of Agriculture was under the administrative control of the Board of Revenue. He was posted as the Deputy Director of Agriculture, Planting districts with headquarters at Bangalore. In this capacity he was in charge of chemical laboratory and was responsible for all analytical and advisory work to the Tea, Coffee and Rubber planters. On the 1st of April 1919, the analytical and advisory work was transferred to the Government Agricultural Chemist at Coimbatore and at the same time Mr. Anstead's headquarters were also transferred to Coimbatore. He continued to be Deputy Director of Agriculture, Planting districts till about the middle of the year 1922. Consequent on Mr. Sampson's retirement, he was appointed Director of Agriculture, Madras and assumed charge of the office on the 7th August 1922.



Mr. P. H. RAMA REDDI, M. A., B. SC.



Mr. C. TADULINGAM, F. L. S.

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Rainfall and Karunganni Cotton-Yields at Kovilpatti.

BY

V. RAMANATHAN.

Asst. Cotton Specialist, Kovilpatti.

It is a matter of common knowledge that the yields of rainfed crops is a mathematical function of the rainfall. The potency of rainfall varies, on the one hand, not only with its magnitude and distribution, but also with the nature of the inter-relation between these two features and on the other, with the stage of plant growth at the time of its incidence and with the condition and the nature of the soil. In a plant like cotton, the growing and fruiting phases of which extend over a long period, the effects of rainfall are made more complicated, and any attempt to dis-entangle this knotty complex will only be in the nature of crude approximations as many of the individual and combined reactions are still unknown. Yet, it is quite essential on the part of the plant-breeder and the agriculturist to know, in a broad outline at least, the behaviour of the plant under various weather conditions and the critical periods at which the rainfall will have the best or the worst effects. This will enable the breeder to evolve a type which will have the best fit between the rainfall conditions prevailing in a locality and the plant, or to seek means to accelerate or retard the growth in such a way that the prejudicial effects may be mitigated, if not averted. Thus, if he has a knowledge that a heavy rainfall in the seventh fortnight after sowing depresses the yield and if the rainfall records of that locality show that the rains are normal at that period, he can reduce the ill-effects by sowing the plants wider and thus induce in the crop a late maturity or by evolving a late strain. Such a knowledge will also enable him to say more accurately whether a crop could be introduced in a locality of a given distribution of rainfall and if so, which sowing period would give the optimum conditions for getting a normal yield. Such useful details are not now available and very many ideas now held are mostly vague and unauthenticated. It is proposed, in

this note, to review with the above purpose, the behaviour of karunganni cotton grown during the last twenty-one years at the Kovilpatti Agricultural Station.

It may be mentioned, at the outset, that on this Station, crops have been raised on a systematic four-year-course rotation, cotton,—cumbu,—cotton and fodder cholam—so that there are two sets of cotton yield figures according to the previous crop. This classification is extremely essential for the proper evaluation of the rainfall effects as it has been found that cotton after cumbu gives on an average 50 lb or 15 % of kapas per acre more than that after cholam. It is not definitely known how this differentiation is brought about, but it may be noted that on this farm, all the cumbu crops have been manured with farm yard manure, the cotton, barring the last two years, by sheep penning and the fodder with some organic manure like fish manure, ground-nut cake or by penning sheep.

With regard to the data worked out in this paper, those for the average yields of kapas for the entire farm obtained up to the 16th May of each year were taken irrespective of the types of cotton grown and of the variation in the soil fertility. In the case of rainfall, the mean sowing dates of cotton were fixed as the basis, in each year, from the data given in the cultivation sheets. Two fortnightly groupings of rainfall prior to, and ten fortnightly groupings after, this date were made for each year. In the aggregate amounts of fortnightly rainfall, all precipitations below 15 cents and above 2 inches recorded in a day were not taken into consideration, as the former would, in all probability, be of no consequence to the plant and as anything above 2 inches would be likely to go away as run off and would not be available to the plant in the latter case. It is true that this method of discarding figures is quite arbitrary. But, some line had to be drawn somewhere to allow for the two known facts and, in the absence of exact information, this procedure was adopted.

The commonly used method in the determination of relationships between any two variables is the working out of the correlation coefficients, but, as the frequency curves of the distributions of rainfall are not normal, its application

will be of doubtful value. The one followed here is to classify the rainfall data in each fortnight into three groups, viz., (1) with no rainfall, (2) with a rainfall below 2.5 inches, and (3) with a rainfall above 2.5 inches, to work out the average yields of cotton in all such years and then compare them. Statement I gives the details thus obtained.

Statement I.
Seed cotton yields in lbs. per acre.
1. After cumbu.

Rainfall in inches.	Fort- nights to sowing.		Fortnights after sowing.									
	2	1	1	2	3	4	5	6	7	8	9	10
Nil.	300	-	396	431	426	319	369	383	396	359	364	356
	(3)	-	(4)	(7)	(7)	(7)	(10)	(12)	(12)	(15)	(16)	(9)
Below	371	399	435	349	337	397	382	365	407	411	356	385
2.5"	(15)	(3)	(4)	(5)	(8)	(11)	(10)	(7)	(6)	(6)	(4)	(10)
2.5" &	461	369	348	343	362	418	330	347	218	-	592	393
above	(3)	(18)	(18)	(9)	(6)	(8)	(1)	(2)	(3)	-	(1)	(2)

2. After fodder.

Nil.	294	-	322	350	368	284	345	329	350	321	323	289	
	(3)	-	(4)	(7)	(7)	(7)	(10)	(12)	(12)	(15)	(16)	(9)	
Below 2.5"	327	314	327	306	295	340	305	326	320	333	330	343	
	(15)	(8)	(4)	(5)	(8)	(11)	(10)	(7)	(6)	(6)	(4)	(10)	
2.5" & above	342	326	325	315	313	362	314	289	230	-	329	394	
	(3)	(18)	(18)	(9)	(6)	(8)	(1)	(2)	(8)	-	(1)	(2)	

(Remarks.—Figs. within brackets indicate the number of years tried.)

The above statement discloses the following facts:—

1. That in cottons grown after cumbu, the optimum conditions for a good yield are that

(a) there should be good rainfall during the two fortnights preceding the dates of sowing and during the fourth, eighth and the tenth fortnights after sowing,

(b) a moderate rainfall between one to two inches during the first fortnight after sowing is welcome,

(c) no rains in the second and the third fortnights following the sowings will be beneficial,

(d) complete drought or light rainfall in the seventh fortnight will increase the yield but a heavy rainfall considerably reduces it &

(e) it is immaterial if the fifth and sixth fortnights are dry or rainy.

2. In the case of cottons after fodder, the above inferences are generally valid barring differences (Vide Statement II.)

(a) Good precipitation or its absence in the first and eighth fortnights does not affect the yield &

(b) rainfall in the fifth fortnight depresses the yields.

Statement II.

Percentage of increase or decrease over 'no rains' in the fortnight.

After	Fortnights prior to sowing		Fortnights after sowing.									
	2	1	1	2	3	4	5	6	7	8	9	10
Cumbu	+28.7	-7.1	-20.0	-18.5	+25.7	+	2.2	-5.7	-13.1	+14.5	+10.7	+ 8.7
Fodder	+12.2	+0.9	-10.9	-17.7	+21.5	-11.3	-3.3	-17.1	+	3.7	+ 2.2	+21.5

(N. B. + or-, respectively, indicate that there is an increase or decrease in the yields over those obtained in the respective weeks when there is no rain.)

Another inference which follows from statement II, is that rains in excess or at inopportune periods do not affect the cottons after cholam so much as they do those after cumbu. In other words, if rains are well distributed, cotton after cumbu yields better and if badly distributed, it suffers more than cotton after fodder cholam.

Again, rainfall influences remarkably the ginning percentage, a commercially important factor in the yield of cotton. The discussion on this aspect of the yield problem will be postponed to another occasion.

Before concluding, it must be pointed out that, in the results obtained above, there are, besides the ignorance about the effective component of rainfall, certain limitations which should not be lost sight of. Firstly, the paucity of the data is a serious handicap in the applicability of this result for the purpose of working out a prediction formula. It is not known if the rainfall of these twenty-one years would form a random sample of the rainfall at Kovilpatti. It is often noticed in many places that the rainfall distribution is not fortuitous when a large number of years is taken into consideration. Mr. S. M. Jacob, I. C. S., has shown that in certain centres in the Punjab, the rainfall distribution takes the form of a sine or a double sine curve. Unfortunately, data are not available to work out the shape of the curve at Kovilpatti. Secondly, there is always a correlation between the precipitations in the consecutive or alternate or even in the several months of the year and the yield is only the resultant of diverse effects produced by them, individually and conjointly. Therefore, the relation worked between the yields and the rainfall in short periods must be interpreted with caution. It is only by properly assessing the influence, by a multiple correlation method, a reliable prediction formula will be obtained.

The available information goes to show that for a maximum yield of karunganni cotton, the following weather conditions must prevail.

1. There must be heavy rainfall in the two fortnights preceding the sowing followed by a light shower of one to two inches in the first fortnight after sowing.
2. A dry spell must be experienced during the second and the third fortnights followed by good showers in the fourth, after sowing.
3. Another dry spell in the fifth, sixth and the seventh fortnights—especially, the dry seventh fortnight is highly important—is extremely beneficial.
4. The eighth, ninth and the tenth fortnights after sowing should have fairly good showers.

Most of the above conclusions are confirmed by the ryots' experiences.

Where is Money in Cotton ?

BY

C. JAGANNATHA RAO, B. A.

Asst. to Cotton Specialist.

"Agriculture is and for many years to come must remain India's greatest industry and the foundation of the State". The average man today has a better realisation of the importance of agriculture to India than he had a few years ago, and the general agricultural awakening continues to expand. Nevertheless, we are still living in a stage of transition so far as scientific agriculture is concerned. Our interest in agriculture has received a strong stimulus from the work of the Royal Commission on Indian Agriculture and we all hope to enter an era of agricultural consciousness and scientific revelations in our onward march to solve the economic problem of the Indian agriculturist.

The economic problem of agriculture expressed in one word is "Income". All the workers in the field of agriculture aim at solving this one problem, each by means of his own special line of attack. We have the various experts may be the crop specialist, the Entomologist, the Mycologist, the Bacteriologist, the Chemist, the Live-stock Expert, the Engineer or the Extension officer—each attacking the economic problem in his own specialised way. It is proposed to confine attention, in this paper, to a consideration, in outline, of the work that is being done by the Cotton Breeder and to a preliminary survey leading unto it, in order to appreciate the scope of his work in contributing to the material welfare of the agriculturist who is "the foundation upon which the whole economic prosperity of India rests and upon which the structure of her social and political future must in the main be built".

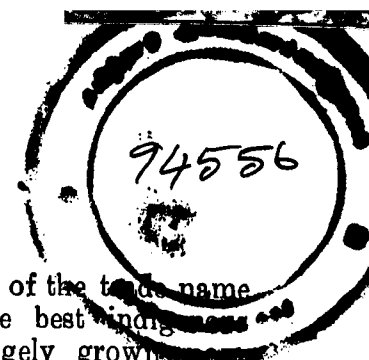
Cotton is one of the chief raw products of India playing an important role in the material prosperity of a great percentage of her people who depend upon it directly or indirectly. The need for improving this crop is, therefore, obvious. India is the second largest country in the world in the production of cotton, the first being the United States of America. She produces about a third of the

output of America or about a fifth of the total world production. The average yield of cotton in India is exceedingly low and works out at about 82 lbs. of lint to the acre, i. e., about a third of the average production of the cotton areas of the United States of America. (It is pleasing to note from a report of the Review of Agricultural operations in India for the year 1927-28, that the yield of cotton lint increased from 81 lbs. to 95 lbs. per acre.) Secondly, the quality of the Indian cottons is also poor the bulk of it being classed as short stapled and unsuited for competition, in the world's cotton markets. The staple of the Indian cottons ranges from $\frac{3}{8}$ to $\frac{1}{2}$ th of an inch with a maximum spinning capacity of 30's, the major portion of it being suited to spin from 11 s. to 20 s. only. For comparison with the superior world cottons, the best of them produce lint of a staple of over 2 inches with a maximum spinning capacity of 300 s.

There has been an ever increasing demand for long staple cotton and steps are to be taken to produce more of this kind. Besides this inherent defect in our cottons by way of short staple, various other causes such as the incorporation of leafy matter due to defective methods of picking, stained material caused by insect and fungoid diseases and the adulteration of superior cotton with inferior cheap quality cotton are to a great extent responsible for the poor prices fetched by the Indian cottons. An improvement of the cotton crop has, therefore, two very important objectives:—(1) the improvement of quantity and (2) the improvement of quality. It will not be out of place here to make mention of the institution of a permanent committee. The Indian Central Cotton Committee with head-quarters at Bombay by the Government of India Resolution dated 31st March 1921, and the establishment of a spinning and a Research laboratory also at Bombay, the former in the year 1924 and the latter in 1925. The scope of these establishments is wide and these work towards the improvement of Indian cotton in most of its aspects. This cotton committee finances various schemes to improve cotton by breeding methods, to study the biochemical aspects of the cotton plant, to investigate the bionomies of insect and fungoid pests attacking cotton in

order to bring them under control, to promote the improvement of cotton marketing and to prevent mal-practices. The spinning and the Research laboratories which together form the Committee's Technological laboratory, have for their immediate aim the provision of facilities for determining the quality of raw cotton thus forming the last link in the chain of Agricultural Research directed to improving the cotton crop of India'. The existence and the labours of these institutions have given a definite impetus to cotton cultivation and 1921 the year of the formation of the Central Cotton Committee, marks an important event in the history of cotton cultivation in India. The completion, by about the year 1932, of Sukkur Barrage scheme, a colossal undertaking which is expected to bring about three million acres of new land under cultivation, will mark another such event.

Now, confining our attention to Madras, a glance at the geographical distribution of the various types of cotton in the presidency will be necessary before proceeding further. We have five fairly well-defined zones extending over the presidency. The first in the North-west of the presidency, comprises the districts of Anantapur and Bellary, and is known as the 'Westerns' zone. *G. Herbaceum* with variable and relatively small amounts of *G. Indicum* thrives here and is mostly poor quality cotton, being short and leafy. Adjoining this zone and commanding the districts of Kurnool and Cuddapah (only a part), we have the zone of the 'Northerns' also a leafy cotton being a mixture of *G. Herbaceum* and *G. Indicum*. The third zone, situated in the north-east part of the presidency and including the district of Guntur and parts of Nellore, Krishna and Godavari, is known as the 'Cocanadas' zone where predominates a mixture of immense heterogeneity-*G. obtusifolium* Cocanada forming the prominent part of the mixture. This cotton is also inferior in quality and is suited for the production of Khaki yarn. The fourth and the Central zone encloses the districts of Coimbatore, Salem, S. Arcot, Trichinopoly and west Madura where are grown cambodia, karunganni, uppam and Nadan (a perennial cotton). The last zone but of great importance is situated in the southern most part of the presidency embracing the districts of Tinnevely, Ramnad



and Madura. It is here that the cotton of the trade name 'Tinnies' flourished and karunganni the best kind of cotton of Madras, is the type that is largely grown. All these zones in the presidency are together responsible for about a tenth of India's total production.

With a view to improve cambodia cotton by the isolation of pure strains a central station was started at Coimbatore in the year 1920 and the scope of the station has since been enlarged. With this station as the nucleus, work in the other zones was started by Cotton Assistants. Later in the year 1926, with the idea to give more attention to the improvement of cotton and to allied agricultural problems, Koilpatti station was made a regular sub station under the charge of the first Assistant Cotton Specialist.

Having obtained an idea of the origin and expansion of cotton stations in this presidency, we turn to a consideration of the problem 'improvement of cotton' at these stations. The primary object of all these stations is to analyse the several constituents of the local mixtures by the selection of pure lines. There are various heritable characters that go to make up the two objectives cited before, viz., (1) improvement of quantity and (2) the improvement of quality. The recognition of these heritable characters and their definition or method of measurement and the isolation of pure strains in which these characters are combined in various ways together form the foundation of all plant-breeding work on cotton. Detailing the stages, the work can be classified in to

- (1) the testing of varieties,
- (2) the isolation of lines from the mixture with desirable characters,
- (3) testing their purity for the defined economic characters,
- (4) comparing the yielding powers of the breeds declared pure with the local mixture or the district strain when there is one under cultivation, and
- (5) testing the spinning quality of the strain and multiplying the seed.

These, in brief, are the various stages of pure line work in cotton before a strain could be released as of utility

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to the ryots—not to mention of various other trials that it has to be subjected to on the station, such as manurial trials, spacing experiments, proper time for sowing, the effect of the strain on the preceding and the succeeding crops rotating with it, cultural and irrigation experiments and so on.

When the economic possibilities of isolation of pure lines of any tract are exhausted, a manipulation of the various desirable characters by crossing strains with a view to introduce variability and with the object of forming new combinations of characters and the fixing of the desired combinations will be taken up. This work of hybridization has been in progress at the Cotton Breeding station, Coimbatore, and the endeavours will, ere long, bear fruit.

Having thus outlined the main lines of work, we will attempt at a broad analysis of the characters that go to make up (1) Quantity and (2) Quality in cotton. Quantity per acre and quality together go to make up the monetary value of the cotton crop per acre. Quantity of lint per acre depends upon the number of plants per acre and the yield per plant, both of which, in their turn, depend upon the interaction of hereditary characters and environmental factors. Number of bolls per plant, number of loculi per boll, number of seeds per loculus, the weight per seed and the weight of lint per seed are the hereditary characters affecting the yield of lint per acre. Characters which affect the quality of the lint are length, strength, colour, lustre and uniformity in each of these. A strain in cotton with a good germination percentage with a capacity for resistance to insect and fungoid pests, which will be capable of thriving under a wide range of diverse conditions, which will yield a good number of bolls of a big size the majority of them dehiscing early in the season, the bolls containing the maximum possible number of locks, each lock containing a good number of big seeds full of lint, long, strong, silky, white lustrous, uniform, with very little waste and capable of spinning high warp counts and with few or no undeveloped ovules, is the ideal before the cotton-breeder. It is, perhaps, next to impossible to achieve this ideal, but it is quite possible to strike at a strain with a number of these useful characteristics. The cotton-breeder is ever watchful of

useful combinations of these characters in his line of work with the aim of solving the economic problem of agriculture viz., 'Income'.

It has been said with reference to America "Agriculture is not merely a way of making money by raising crops, it is not merely an industry or a business; it is essentially a public function or a service performed by individuals for the care and the use of the land in the national interest, and farmers in the course of their pursuit of a living and a private profit are the custodians of the basis of the national life. Agriculture is, therefore, affected with a clear and unquestionable public interest and its status is a matter of calling for deliberate and far-sighted national policies, not only to conserve the natural and human resources involved in it but to provide for the national security, promote a well-rounded prosperity, and secure social and political stability". When such is the status of Agriculture under American conditions, its place in building up the national interest in India, out and out, an agricultural country, is of supreme importance. The heterogeneous mass of material at the disposal of the cotton-breeder in these cotton stations, which occupy a place of vital importance in any scheme of agriculture in the presidency, is a mine of wealth, as it were, and to work these mines, patriotism, patience and perseverance on the part of the breeder and funds, sympathy, trust and patience on the part of the public are required. Here, then, is money in cotton for the benefit of the tiller of the soil and for the lasting glory of India.

My thanks are due to Messrs. G. R. Hinson and V. Ramanatha Ayyar, Cotton Specialist and Asst. Cotton Specialist, respectively, for their helpful criticism.

The Role of the Teacher in Rural Reconstruction Work.

BY

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Village life-Existing conditions.—South Indian village life is noted for its simplicity and unruffled nature. Changes of Governors or Viceroys, a civil war in Afghanistan, or even flood havoc in other parts of the country, do not have any effect on the calm atmosphere of the village. The old routine is followed in its never changing rigidity and sequence. The wants are few, necessities little, and the village folk are never in a perturbed or busy state over anything except the problems affecting their own time-honoured customs or regulations. The arrival of a Government official in the village is an event of some importance and except for this and festival days when the village deity may be propitiated, the primitive calm and serenity of the village is rarely disturbed.

Ignorance is no more bliss. The rural population is steeped in utter ignorance of conditions obtaining outside their own taluks. They do not know and are not in a position to realise fully when told how matters are remarkably different in other countries which are marching with the times. When a villager is told about the greatly advanced condition of rural life in the Western countries, he simply wonders and leaves it at that. In fact he is himself unable to explain clearly why he is living in the same old ways and following the same crude methods in his work. It is not at all a question of wealth, but the fact is that proper modernising influences have not been at work in rural areas. The man in the village often minds his own business and does not seem to know what it will be to live and act for the community, apart for himself. There may be exceptions, but really the move towards better sanitation, better dwellings, better health, better organisation for thrift and credit, and a better realisation of the Village Unit in the Province, in short the move towards progress in all lines, is so poor and slow as to be

almost imperceptible. The villages are as it were, in deep slumber compared to those in modern countries. It will be decades before they emerge out of the old groove, shake off the chaff in their old ways and adopt methods and manners that will make them prosperous and powerful in days to come.

The Teacher in the Village.—In keeping with the quiet atmosphere of the village, the village school-master is often un-assuming and obscure though in fact he is practically the only literate man, and whose help the village-folk constantly seek for obvious reasons. He is therefore in the most advantageous position in the village to effect any improvement and change in the life and organisation of the village. But we find that all teachers are not capable of utilising their situations to the best advantage, since there are only a few of the right type with the requisite qualifications and outlook, and when there are such men available, the facilities and encouragement given are far from satisfactory. With his low pay he is never up to the mark in any aspect of his life,— dress, mode of living and in having any enthusiasm for organising the society for common good. The majority of them have not been able to realise fully the potential position they occupy in the community of the village, and they are not imbued with that spirit of patriotism to be of greater use outside the four walls of their schools. Nor we find in them commonly the eagerness to train their students to the best of their abilities. It is then a case of dull routine of teaching in the class-rooms and outside the teacher's presence is rarely felt except when he is called upon to decipher a letter or write petitions to the authorities.

How a Teacher can assist.—Broadly we can classify the teachers into the following three divisions, so that it may be easier and clearer to consider how best they are placed in their respective positions and environments to be of use in rural reconstruction. There are firstly the teachers in towns and cities, secondly those in the villages and thirdly those on inspection work touring in rural areas.

1. Teachers in towns and cities. At the present day all these teachers, at least the majority of them, devote their

attention entirely to teaching work in their colleges or schools. But they have enough leisure at their command by way of vacations and holidays. When proper incentive is given in the shape of ample facilities and adequate remuneration, selected teachers may be prepared to go out to the villages during these holidays, and have persistent talks with the villagers, with a view to dispel their ignorance and infuse in them the requisite enthusiasm and enterprise for an attempt to improve themselves. This sort of work, may as it were, pave the way for an effective reconstruction work. Necessary impetus may also be given to make sets of teachers specialise in one or other of the lines of reconstruction work. The Association of teachers in towns and cities can take the lead in this matter. Such teachers may arrange to halt in each village for some days and see that a start is made in any one of the lines of improvement. They should visit the same villages repeatedly to see that the attempt at progress does not slacken. As is the case in many of the schools in France an attempt can be made to induce the students in towns to adopt cooperative methods in the purchase of their necessities, and by this means they will be put in the right direction to form ideas about co-operation and its advantages in their early impressionable age. When some of these students return to the village after their education they will be in a better position to practice co-operation. Dr. Sudhindra Bose writing about education of young America remarks that, 'they (the teachers) strive to stir into action the full energy of the boy. They are intent to look upon each pupil as a human individual and not as a machine. The attitude of the teacher towards the student is of helpfulness and good comradeship. This friendly democratic spirit on the part of the instructor fascinates, stimulates and utilises the energy of youth. The two together begin to taste the joys of an intellectual life.'

2. Teachers in Villages. These are in fact best placed for doing something substantial in the reconstruction of the village. If every teacher or teachers in every village make up his or their minds to bring about certain improvements in the village little by little then there will be progress in all the villages at the same time. The teacher can attempt to become the teacher of

the village itself. He should try to gain knowledge of rural conditions in other countries, particularly the progress made in such lines as sanitation, agriculture and co-operation, so that during his leisure time and at nights he can gather the villagers at a common place and tell them about these, thus creating an interest in them to compare their present position in their country with those in others. The teacher can arrange to get vernacular leaf-lets that are supplied free by the Departments and read them out to the ryots now and then to infuse in them the desire to get the help of such Departments. By constant effort on the part of the teacher, the school in the village can become a sort of library and information-bureau, where the villagers can obtain through the help of the teacher, information on prevention of epidemics, control of diseases and pests upon their crops, price fluctuations of the market and such other general and important facts. The teacher ought to be diligent and painstaking, so that he can get the help of the Government Departments to supply him with their leaflets, bulletins and other publications. But here again, an incentive is required so that a large number of teachers in rural areas may willingly take up this work as a subsidiary avocation. The incentive may be given by the Taluk or the District Boards which control the schools, in the shape of increased pay and recognition of merit. Judging by the improvement the teacher has been able to bring about in the life and condition of the village. Of course, there may be a few who are doing and may do such sort of ameliorative work in the villages in their own way without expecting any sort of reward for their efforts, but such ideal teachers are so few as to be negligible.

There are teachers' Associations for groups of villages and teachers of these villages meet at a particular village once in the month for discussions and exchange of ideas. In these meetings the teachers may chalk out a programme of work suited to their conveniences and conditions in their villages and watch the improvements they are able to effect. If they are enthusiastic in this way the officers of the several Government Departments will only be too glad to help them and even lead them. The development of the village on modern lines can take place only when the spirit, energy and eagerness evolve from the village folk them-

selves, and not when outsiders and officers visit the village now and then for preaching or otherwise. As the teacher is a resident of the village and can feel one with the others, he can by slow degrees kindle the national feeling in them and rouse them up to activity. First of all, the teacher can get himself acquainted with the modern ideas of better dwellings, sanitation, prevention of diseases and such other essentials for a healthy life, though in an elementary practical way, and then constantly din into the ears of the rural population, so that in course of time he is able to show some improvement in the life and health of the village. After this he can possibly take up co-operative work and make the people realise the great necessity for co-operation in every sort of work whether in their village or outside it. Thus he can prepare the soil, as it were, for the experts of the several Government Departments to carry on the work in those lines successfully and completely. If there are more than one teacher in the village, they can join and do the work more easily or each can take up different lines of work.

To achieve a uniform success in this way, sets of teachers can be selected to undergo short training in the particular branches of reconstruction work, and then sound encouragement given for energetic work. The Government should liberally aid the managements of the schools, Boards and private bodies, so that they may have in turn ample finance to enable them to utilise the services of those teachers to the best advantage. In this connection, what Mr. T. V. Apparsundara Mudaliar suggests is worthy of consideration,—“The first need is to establish schools for training of industrial instructors in the various language areas. What is needed next is a school in connection with a boarding house with a few acres attached for cultivation, a carpenters' shop and a weaving shed. The farm would pay some part of its own cost, the carpenter would make the school furniture and some of the pupils' clothes might be woven in the shed. The Superintendent of the Boarding house would be a specially qualified industrial instructor. The school would be half-time school, one part of the day devoted to ordinary school subjects and the other half to industries. From the boarding house as centre an advance might be to extend this system to village schools.”

3. Teachers on Inspection work.—As these are officers constantly touring in rural areas, they are also placed in a very advantageous position to do something in this line. If they are given a little more latitude in their sphere of work by the Department, they will be able to devote some attention to this problem of rural development. These teachers can not only study and work out the preliminary lines of rural reconstruction themselves with reference to the tract in which they work, but they can also influence the teachers under them in the several villages to actively co-operate in making a united front. During their visits to schools on inspection work, these teachers can make it a point to meet all the inhabitants of the village at least on one day, to talk to them forcibly on any one topic of developing the village on modern lines. Of course the teacher may not have sound knowledge in these lines, but however he can try to open the eyes of the people to possibilities yet un-thought of, and thus slowly change the outlook and activity of the rustics. For example he can concentrate his attention towards advising the villagers in the matter of keeping their houses clean, village roads and cattle-sheds as clean as possible and not allow children to play upon filth and dirt. When something has been done in this direction he can next devote his attention to the rebuilding of old dirty houses at inconvenient places in the village, by the efforts of the villagers themselves, for the benefit of the poorer lot. Thirdly he can attempt at influencing the more well-to-do ryots to join together for their purchase of seeds or manures or even in selling of their produce, and thus a beginning in co-operative work may be made.

In this way other lines of work may be taken up and much achieved if only the inspecting teacher takes interest, and is enthusiastic and painstaking. Of course the village school-master has to be often instructed in the subject to get the greatest help out of him. There ought to be facilities for the inspecting teacher to equip himself with a working knowledge of the several aspects of the rural reconstruction work. The aid of the officers of the respective Government Departments may also be sought as often as possible, and later the actual carrying on of such work to a success shall be greatly shouldered by these officers.

Rural 'Extension Work'.—The carrying on of rural reconstruction work on the lines of the Extension Departments organised long ago in the United States of America, is also most desirable. The idea underlying Extension work is given in the following, which is taken from an American Bulletin. 'Extension work is a system of instruction which is to be modified, reorganised and developed until it proves an effectual medium for disseminating knowledge, correlating and concentrating the efforts of the farmer along certain lines, and bringing him to a proper appreciation of the relationships of intelligent effort to success in a given environment. Extension teaching can and should be the means of awakening an interest on conservation and the economic and social problems which lie at the basis of any movement which proposes to rejuvenate country life.' The formation of rural extension work departments attached to some Colleges in the presidency would mean the utilisation of the services of some of the able teachers of these institutions in rural service. These teachers may carry on the work as pioneers, until a batch of men specially trained for this purpose is available to form a sort of a small department by themselves. For example, the staffs of the Agricultural, Veterinary and Medical colleges may make a beginning in extension work, until graduates of these colleges have been trained for this purpose, appointed and made available to take up the work as whole-time workers. It is stated that in America, in order that experienced men may be available, the college employs additional instructors to take the regular class-room work, while heads of departments are engaged in extension work. This system is also well worth trying here in our country. •

Itinerant Schools.—The organisation of itinerant schools, for placing in a practical manner before the people of a given locality the more important scientific facts and principles involved in the development of improved agriculture, cooperation, health etc., of the village, may also be looked into. This will be one of the most successful means for disarming the suspicions of the people. 'The travelling school will also place both knowledge and method within the reach of the teachers of the villages in a form which will result in the introduction of such instruction in

rural subjects as is desirable in village schools.' These schools may stop in a locality for one or two seasons according to necessity with reference to availability of enough number of adults and teachers to attend the school and also the nature of instruction to be given. Teachers for these schools shall be drawn from the staffs of the Technical colleges and Government departments which are connected with activities in rural areas. Mr. Arthur Mayhew writing about the Imperial Education Conference says that India has peculiar difficulties unlike other countries in the matter of the solution of the problem of rural education. He continues, "that in South Australia, where large areas are sparsely populated, the State provides a trained teacher for an attendance of six children provided that the parents furnish a school room and a living room for him. There are more than 500 such full time schools in the State and the annual cost per pupil reaches £ 40. Where six children cannot be gathered, education is carried on by correspondence, the classes being conducted by a trained staff at headquarters."

Attached to the itinerant schools, there may also be a travelling Library and Exhibit, which can be left in each village for some time and the teachers there trained to help the people, with practical hints from the library and illustrated by the exhibits, on all points of rural development.

Conclusion.—Agricultural training may be introduced in training schools for teachers who are to work in rural areas. Or the training of such teachers should be so modified as to befit them in their work in villages most eminently and to the greatest advantage. For, the need of the present is not so much for a special kind of education for the rural schools, as it is to apply that education to rural conditions. The departments mainly concerned in rural improvement work should classify their leaflets and bulletins for the use of teachers who may be expected to be guided largely in their work by these publications. The teachers in villages can then be made to cooperate actively in the extension or reconstruction work that may be organised. The idea is to make the teacher not only a better teacher of the pupils but also one of the public on

matters of common interest and improvement. Thus according to one American authority, 'If we are to make extension work useful in the highest degree in the betterment of country-life, we must create a sentiment for ideal rural citizen-ship, not for the man with the largest farm or the biggest bank account or the most influential in political circles, but for the prosperous well-to-do farmer who has built up his farm and will leave it better than he found it; for the man to whom his farm is his home where he expects to live and die and not to move into town.' This is exactly the ideal we should also follow in this country.

The success of the movement mainly depends upon the proper selection and training of teachers best fitted for the work. It is interesting to examine what Dr. Sudhindra Bose gives regarding the system by which teachers are employed in America. 'Great care is exercised in the selection of teachers who are hired by the year and when employed they have to sign an isolated contract with the school authorities. It contains stipulations in regard to faithful service and spotless private life. Should the teacher fail to live up to his pledge he would lose his job with the forfeiture of all salary. ...I adduce it to urge that some such system which draws the school closer to the life of community would be a long step forward in the Indian world of education. The products of such a system will become the centre of civilisation in our waste places.' Thus the great aim will be to make the teacher a real power in the village, an outstanding figure in the social and economic life. The attempt to achieve this end will mean the creation of facilities and launching forth of schemes to make the teacher in the village, town and city, take active and abiding interest in the improvement, prosperity and progress of the village and its peoples.

Notes on the Influence of Weather Conditions on the Breeding of Eulophids in the Laboratory, Calicut.

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Among the various parasite enemies of the Coconut Caterpillar (*Nephantis seinopa*), is a small delicately built, Hymenopterous parasite of the Fam. Eulophidae, which attacks the pupal stage of the Coconut pest. The female wasp pierces the pupal skin with its ovipositor, and inserts its eggs inside. The grubs that hatch feed on the contents of the pupa and develop inside. When full-fed the grubs turn into small pupae filling the inside of the hollowed skin of the chrysalis, and transform in about 10 days into wasps, which make their way outside by eating tiny holes in hollow pupal shell. As many as 200 to 280 parasites have been noted in individual pupae. The period of development covers 16 - 20 days under normal conditions. It is very prolific in nature; and is present in large numbers during the period between June and December. It is, however, very susceptible to changes in the climatic conditions and almost disappears during the hot months from March to May.

At the temporary Parasite laboratories opened on the West Coast in connection with the control of the Coconut pest, various parasites are being bred and multiplied under controlled conditions with the object of liberating them in places where they may not be present. The Eulophid is one of the parasites that has proved itself suited to laboratory breeding, as it readily lays eggs on fresh pupae introduced inside tubes. As this was found to be abundant only during the rains, and to disappear during the drier months, it was proposed to breed it in numbers in the laboratory during such adverse parts of the year, and to liberate them in numbers at the beginning of the monsoon, so that they might quickly multiply and bring about a speedy control of the pest. It was found, however, that even in the laboratory there was a similar want of success in making them breed. In order therefore, to find out the factors that affected their breeding, attempts were made during the past two years to investigate the question, and a series of experiments were undertaken at the laboratory with this object in view. Observation of the conditions in nature plainly indicated that the chief factors involved

were the relative moisture content of the atmosphere and the prevailing temperature. During the dry months of March-May, tubes containing parasites under rearing were placed in a specially constructed breeding chamber, in which conditions of lower temperature, (78°-82° F.) and higher humidity (92 to 96%) could be maintained, by means of an ice-pack. More than 100 tubes were placed under observation; and at the same time controls were also kept under ordinary conditions. Results of these experiments were examined with regard to the following points:- 1. Number of adults emerging from individual pupae, 2. Duration of the period of development, 3. The condition of the adults emerging and 4. Relative percentage of failures.

The experiments have shown that, given the right conditions of humidity and temperature, this parasite can be made to breed normally, to produce the normal high number of adult parasites per pupa as during the rains and to produce healthy, vigorous adults instead of the weaklings emerging during the hot weather.

It was also noted that, though higher temperatures than 85° F. have the effect of accelerating the development, they had the result of killing many of the grubs. If concomitant with the higher temperatures, there was also lower humidity, the result was that the *Nephantis* pupae given for egg-laying dried up very soon, so that the grubs inside were starved for want of nutriment. In such cases, even if the adults emerged, they were noted to be weaklings of small size. On the other hand, if the humidity is very high, conditions appear to be favourable for the development of a fungus which destroys the parasitised pupa; and in other cases, if the humidity is high, the wasps that have developed inside the pupa, appear to be unable to bite holes in the sides of the pupal skin and emerge out, possibly because the wet weather makes the skin perhaps too tough and leathery for them to bite their way out. In such cases exposure to the sun for a short time enables them to find their way out through the skin. From these observations, an explanation is found for the fact that, in nature, the parasite is found flourishing most abundantly during the months August-November, a period during which there is sufficient rain to give the proper amount of humidity, as well as a fair proportion of sunshine.

The Java Convention of the International Society of Sugar Cane Technologists.

The International Society of Sugarcane Technologists had its origin originally in the pan-Pacific Food Congress. It was felt that sugar was sufficiently important as an article of food and persons connected with sugar were sufficiently numerous to justify the formation of a separate organization. Practically from the time of its inauguration, India has been associated with it. The Sugarcane Expert to the Government of India has been the regional Vice-Chairman of this Society for some time and to-day the Society has on its rolls about a score of members from India.

The Convention which took place in Java in June this year was the third of its kind, the Society meeting once in three years in the various sugarcane countries of the world. The first convention was held at Honolulu in Hawaii and the second in Cuba. The next convention to be held in 1932 is to be at Porto Rico.

The Java Convention attracted quite a number of delegates from all over the sugarcane world. This is apparently because of the fact that Java, the place of meeting, has been in the front rank of sugarcane countries for some considerable time. Almost all the countries were represented with the exception of Cuba. The island of Hawaii had deputed quite a large number of their experts to the meeting. The Indian delegation consisted of (1) M.R.Ry. Rao Bahadur T. S. Venkatraman Ayl., Sugarcane Expert to the Government of India; (2) K. C. Banerjee Esq., from the Tamkuhi Factory in Bihar and the Hon. Secretary of the Sugar Technologists' Association (of India); (3) S. J. Sabnis Esq., from a Sugar Factory in Burma; (4) U. K. Das Esq., now working at the Sugar Experiment Station, Honolulu, Hawaii; and (5) Wallawolker Esq., who had recently gone to the West to study the sugar industry there in all its aspects.

The visit to Java was of particular interest to the Indian delegation, as Java still possesses certain relics of Hindu culture and civilization and the commercial relation-

ship between India and Java is of some duration. To-day India is the best customer of Java. One remarkable feature it has impressed the Indian Delegation was the combination of extremely favourable conditions for the growth of the sugarcane obtaining in that island. The climate and irrigation facilities are almost ideal for the sugarcane. A second noticeable feature was the fact that cane growing was almost entirely in the hands of enlightened European planters with ample resources in the form of capital. Because of this the cane crop in Java is receiving very good attention. A third striking feature was the effective control which the factory has over the quality and quantity of cane that is supplied to it. All the delegates were very much impressed with the extreme cleanliness in the Java sugar factories some of them having neatly tiled floors.

The sugar industry of Java is very highly organized. The General Syndicate of Sugar Manufacturers—a private organisation established at Sourabaya in 1893—comprises practically all the sugar interests in that island. It has plenty of funds at its disposal and watches the industry from the time the cane sown in the field to the time that the sugar is actually sold to the various countries. It is a model of what such organizations ought to be. It runs a very efficiently staffed and highly organized experiment station at Pasoeroean which is in a position to give timely and real help both to the planter and to the manufacturer. The sugar industry in Java fully realizes the value of scientific methods and organized research to the industry. It has substantially benefited in the past from the results of scientific work and is confident that science would do even more to it in the future. The organization in Java is an unique example of what can be achieved by intensive mutual co-operation between the various departments.

The Java Convention was presided over by Dr. J. Jeswiet who has been connected with the Java sugar industry for some time. He is probably the best living authority on sugarcane varieties and the creator of P. O. J. 2878 the present wonder cane of Java. At the convention were found some of the leading workers from the various parts of the world; from Australia, Hawaii, Formosa, Mauri-

lius, Trinidad, the Philippines, the United States of America and India. The Java sugar industry showed its appreciation of the foremost workers in the sugarcane world by announcing at the Association their election as Honorary members of the Java Sugar Syndicate. Messrs. Prinsen Geerligs and Noel Deerr were both recipients of such an honour. The latter is now with Messrs. Begg Sutherland & Co., who control a number of factories in Bihar.

The discussions at the various meetings were of intense interest and reflected the all-world character of the International Society. Perhaps more important than the meetings was the personal contact which scientists from all the world over were able to establish with one another. Many scientists who had read each other's work with interest were able for the first time to discuss various matters in person. The long and interesting excursions kindly arranged by the Java industry greatly helped in the establishment of personal relations. The various organizations in Java connected directly and indirectly with the industry co-operated to make the members quite comfortable and their sojourn in Java both instructive and interesting.

Dr. F. W. Zerban was elected General Chairman for the Porto Rico meeting; while Mr. Noel Deerr and Rao Bahadur T. S. Venkatraman were elected Chairmen, the former for Factory Operation and Chemical Control and the latter for Varieties (including selection and propagation).

One of the important general lectures at the convention was by Dr. Jeswiet and entitled "The American Sugarcane Expedition to New Guinea, 1928". With a set of very interesting lantern slides and motion pictures the Doctor detailed the remarkable expedition which he, along with Dr. Brandes of the United States of America, undertook to explore the wild regions in New Guinea in quest of wild and disease resistant varieties, with the object of using them for hybridization purposes later on. On another evening the delegates had the privilege of seeing the official film of the "General Syndicate of Sugar Manufacturers" entitled "The Java Sugar Industry". This film represented the salient features of the Java industry and the various

stages of its development. It visualized to the delegates the industry in all its aspects from the preparation of land for cane planting to the stage where the finished product is sold to customer through an organized system of brokers. The excursions included visits to various irrigation works. One such was a reservoir built up near the crater of an extinct volcano and capable of irrigating about 700 hectares of cane. The phenomenal increase in acre yields obtained in Java by a very careful application of science to the industry in all its aspects is a lesson to India and shows the possibilities in the future of India producing her own needs in the matter of sugar. It is now fairly well known that certain of the canes bred at the Imperial Sugarcane Breeding Station, Coimbatore, are already spreading very rapidly in the main sugarcane provinces of India such as, The United Provinces, The Punjab and Bihar, considerably increasing the acre yields in those provinces. The founding of the Coimbatore Station in 1912 was one of the first activities of the Central Government towards helping the Indian sugar industry and the results have shown that the activities of that Government have been on the most promising lines. One of the Coimbatore productions—Co. 281—has been found useful in countries outside India, viz., Cuba, Florida and Louisiana.

(T. S. V.)

Estate News.

On the 8th August the Hawaiian Delegation which represented that country at the 3rd Convention of the International Society of Sugarcane Technologists held at Java in June 1929, paid a visit to the Imperial Sugarcane Breeding Station at Coimbatore. The party consisted of the ex-President of the Hawaiian Sugar Planters' Experiment Station Committee, the Secretary of the above Committee, the Director of the Hawaiian Sugar Planters' Experiment Station, the Sugarcane Breeder for Hawaii, the wife of the Director of the Hawaiian Experiment Station, and a few others.

They were lodged partly at the newly built Rest House at the Imperial Sugarcane Station and partly at the Agricultural College Rest House. They carefully went over the work at the Coimbatore Station and visited the neighbourhood to get acquainted with the conditions of growth of the sugarcane crop and the manufacture of jaggery. They also paid a hurried visit to the temple at Perur and were much interested in the sculpture of that temple. They also paid a hurried visit to portions of the West Coast, Palghat and near about Kollengode.

They were so much impressed with the work going on at the Coimbatore Station that they have decided to leave their Assistant behind for a three-month training in the methods developed at the Coimbatore Station. They are carrying with them very good impressions of the hospitality and simplicity of the Indian village life. They left for Colombo on the night of the 10th instant via Pollachi-Dindigul, and are proceeding to Egypt where they hope to spend a few days. After visiting Europe and England they will be going back to Hawaii which they expect to reach about three months later. This party has been on a sort of world tour from March this year and are carrying with them a lot of photographs and movie pictures of the places they visited.

Another member of the same delegation, a Nematologist, Dr. Miss. Cassidy, spent over a fortnight at the Imperial Sugarcane Station studying nematodes on sugarcane and other roots.

Students' Corner.

GENERAL.—Under the auspices of the Students' Club, Rao Bahadur B. V. Nath, Government Agricultural Chemist, gave a lantern lecture on "the Development of Agricultural Chemistry" at which Mr. G. R. Hilson presided. Mr. Nath vividly traced the development of Agricultural Chemistry from its beginnings and concluded with an able elucidation of the present day problems tackled by the Agricultural Chemists of our country.

The College closed for the Michaelmas holidays from the 15th and the III year students will meet the Principal at Hospet on the 1st October, to proceed on an agricultural tour in the Ceded districts and Circars.

CRICKET.—For the first time, the Pachaiappas College team from Madras came down to Coimbatore to play a series of matches. In the match with our College team the homesters fared badly.

WEATHER NOTES FOR JULY 1929.

The Monsoon was active during the first ten days of the month on the west coast, when some heavy falls were reported, during this period rainfall was scanty in the Carnatic and South, and associated with local storms of small magnitude. In the Circars the monsoon was fairly active almost throughout the month, and fairly general though light rain was frequent in connection with a series of shallow depressions which formed at the head of the Bay and crossed inland in the North-West angle of the Bay and moved westward into the Central Provinces. The monsoon weakened by the 11th and rainfall became light in the west coast, and as is usual during periods of weakness of the monsoon local showers appeared over the South and continued till the end of the month.

Temperature was high over the greater part of the Presidency and the excess was most marked on the Madras Coast. Maximum temperatures of 100° F and above being recorded on 16 days at Madras, and a temperature of 104° F on the 15th. In the interior, south, and the Circars the excess was less marked.

The other climatic elements were not far from normal, with the exception of rainfall which was below normal over nearly the whole of the area, Malabar excepted.

Table of Rainfall for July '29.

Station.	Rainfall.	Departure from normal.
Gopalpur	5.4	—1.1
Vizagapatam	1.1	—8.2
Cocanada	5.0	—0.6
Masulipatam	4.1	—1.8
Kurnool	4.4	—0.3
Bellary	0.2	—1.6
Anantapur	0.5	—1.7
Cuddapah	1.4	—2.5
Nellore	1.4	—1.2
Madras	1.9	—1.9
Cuddalore	1.7	—1.4
Vellore	4.1	—0.3
Salem	2.1	—1.6
Coimbatore	1.6	+0.2
Trichinopoly	...	—1.6
Nagapatam	1.9	...
Madura	0.1	—1.6
Pamban	0.1	—0.8
Palamcottah	...	—0.4
Trivandrum	9.8	+2.4
Cochin	25.5	+3.1
Calicut	42.1	+12.5
Mangalore	39.4	—1.4
Bangalore	1.6	—2.5
Mercara	49.7	+7.0
Kodakanal	3.0	—1.8
Coonoor	2.8	—0.9

WEATHER NOTES FOR AUGUST 1929.

RAIN FALL.

Places.	Actual.	Average.	Departure from average.
-	-	-	-
Gopalpore	7.6	7.9	+0.3
Vizagapatam	8.8	5.1	+3.4
Coconada	2.8	5.6	-2.8
Masulipatam	6.6	6.8	-0.2
Kurnool	2.8	5.2	-2.9
Anantapur	0.6	2.7	-2.1
Bellary	0.1	2.2	-2.1
Cuddapah	1.2	5.7	-4.5
Nellore	1.7	3.3	-1.6
Madras	4.5	4.5	-
Cuddalore	7.6	5.4	+2.2
Vellore	1.8	5.8	-4.0
Salem	1.6	6.5	-4.9
Coimbatore	1.4	1.1	+0.3
Lawley Road	0.3	-	-
Trichinopoly	1.6	3.8	-2.2
Negapatam	3.2	5.2	-2.0
Madura	0.7	4.3	-3.6
Pamban	-	0.6	-0.6
Palamcottah	-	0.5	-0.5
Trivandrum	1.8	4.6	-2.8
Cochin	9.0	12.3	-3.3
Oaliout	11.5	15.3	-3.8
Mangalore	18.1	23.2	-5.1
Bangalore	1.7	5.4	-3.7
Mercara	20.6	25.7	-5.1
Kodaikanal	6.3	6.6	-0.3
Coonoor	2.4	3.8	-1.4

The monsoon was generally weak in South India during the month and rainfall was generally in defect. The deficiency in rainfall was most marked on the Carnatic, South, Mysore and Ceded districts. Elsewhere rainfall was nearly normal. General rain fell in the Circars almost throughout the second half of the month in connection with four depressions which formed at the head of

the Bay and crossed inland. Rainfall on the West Coast was connected with a revival of the monsoon that took place on the 10th and had spent itself by the 12th. Thereafter rainfall was sporadic. Over the Carnatic and South rainfall was scattered and occasional associated with thunder storms. Temperatures were generally above normal especially on the Coromandal coast. Nellore reporting a maximum temperature of 102 on the 1st, 12th and 16th and maxima of 100 and above on eleven days in all. Temperature was markedly below normal on the same coast for a few days during the third week of the month and during the passage of a depression inland. Other climatic elements were not far from normal.

REPORT FOR RESEARCH INSTITUTE
OBSERVATORY.

Absolute maximum temperature 91.5
 Absolute minimum temperature 67.5
 Mean maximum temperature 88.7
 Mean minimum temperature 70.7
 Mean wind velocity per month, 7.1 M. P. H. (Maximum wind velocity 14.0 M. P. H.)
 Total miles ground per month. 5313.13 miles.
 Total hours of bright sunshine. 192.8 hours.
 Total rainfall during month. 0.33"
 Heaviest fall in 24 hours. 0.31" (10th)
 Total rainy days (0.10" and above) 1 day.
 Mean humidity 70.6.
 Mean atmometer evaporation 49.6.

The weather was dry and warm with scanty rainfall. Winds were fairly strong during the month due to steep of pressure gradients., SW and NE wind making an advance into the area of low pressure in the North of the Bay. Barometer was steady with oscillations due to influence of depressions in Bay. (P. V. R.)

Tit-Bits.

Ideals of Public Service:—Study as fully as is possible to work in combination, manifesting combined effort. This is especially needful where science and scientific enterprise are involved.—Aim at some other ideal than emolument of office and the briefest extent of daily or weekly service; aim to make yourself ever more mentally strengthened, equipped, and efficient for the discharge of your duties,—that is what you owe to the public whose servants you are.—Henry Tryon Nauture—August 17th, 29. (Y. R. R.)

"Fall in Love with your Work"—To man who "watched the clock," or has a grouch against the "boss" will never go far—in that business. The probability is that he will not succeed in any other. His policy to do no more than he is paid for, means that he will never be paid any more than for what he does—and he is cramping himself as well his business. Mediocrity or worse is a—yawning for him.

"Fall in love with your work"—that way lies success. If you cannot fall in love with your present work, work up to the work you can; or, if necessary, change your work. As a witty American puts it "An artist is a man in love with his work." Let's try and be all "artists".—'Country Life' (Sydney). (Y. R. R.)
—Queensland Agril. Journal—Aug. 29.

184 feet flag pole.—An one-piece flag-pole of Douglas-fir, 184-ft. long, has been presented to the Canadian Exhibition at National Toronto by the Timberland Lumber Company Limited, New Westminster. The flag-pole has a 34-inch base and a ten-inch tip. It is estimated to be 275 years old, and was obtained on the timber limits of the company between Ladysmith and Natalmo.

Tallest Chimney.—The tallest re-inforced chimney on the American continent is said to be that erected in 1927 at the plant of the Horne Copper Corporation, Noranda, Rouyn District, Quebec. It is 422 feet 6 in. high from the base to the top of the shaft, and 18 ft. in diameter inside the lining at the top. Its base

consists of a re-inforced concrete ring, 17 ft. 6 in. deep and 35 ft. outside diameter, and 23 ft. inside diameter; and the shaft, which is designed to withstand effects of acidic gases within, has a capacity of 550,000 cub. feet of gas per min. at temperatures from 300° to 400° F. The International Nickel Company has under construction at the present time at Copper Cliff, Ontario, a chimney of even greater proportions. It will have a height of 600 ft., and have a shaft of approximately 50 ft. diameter.

(Extracted from Mechanical World and Engineering Record 5th July, 1929.) (Y. R. R.)

Cadmium Batteries.—Cadmium has been recommended for use in electric storage batteries. A battery having cadmium plates can be discharged completely and allowed to remain discharged indefinitely, whereas such abuse causes serious damage to ordinary lead batteries. As they cost fully twice as much as lead batteries, cadmium batteries have not been widely used, although there are several makes of miners' safety lamps employing an alkaline electrolyte, one nickel electrode, and, instead of the usual iron electrode of the Edison battery, a mixture of iron and cadmium in a thin perforated metal case. Monochromatic red light for scientific investigation in physical laboratories is produced by means of cadmium. In the quartz-cadmium vapour lamp developed by the United States Bureau of Standards the cadmium is alloyed with a very small fraction of 1% of gallium, giving a long-lived lamp that does not become clouded by adhesion of cadmium vapour to the walls.

From "The Mechanical World & Engineering Record." August, 30, 1929. (Y. R. R.)

Building Board from Bagasse in the Philippines.—Fibre board impregnated with some material which will retard termite infestation and destruction, while providing a resistance to typhoons, will be of immense value to the Philippine Islands. It has been found that the fibre board manufactured from bagasse, when impregnated with soluble silicates, is fire-proof. It is believed that an asphalt compound can be added to the pulp so that it will not permit of termite destruction. With the creation of such a building material, there will be an unlimited market for a Philippine manufacturing company.

From "The Planter and Sugar Manufacturer." Aug. 10, 1929; (Y. R. R.)

Departmental Notifications,

For September 1929.

GAZETTED:—

Mr. R. Chockalingam Pillai is confirmed as Assistant Cotton Specialist from 1-9-29. Mr. M. Mangesa Rao to be Assistant Director of Agriculture on probation vice Mr. A. V. Tirumurngaththa Pillai retired. The following Upper subordinates are appointed as District Agricultural Officers on probation:—Mr. G. Jogi Raju to First Circle; Mr. M. Viraraghava Rao to Third Circle; Mr. M. K. Nambiyar to Sixth circle; Mr. M. U. Vellodi to Eighth Circle. Mr. R. Swami Rao Manager Nandiyal to act as Assistant Director Fourth Circle vice Mr. Y. G. Krishna Rao on leave. Mr. T. V. Rajagopalachariar to officiate as Vice-Principal, Agri. College. Mr. V. Muthuswami Ayyar to officiate as Lecturer in Agriculture. Mr. S. Jobitha Raj Assistant Paddy Specialist Maruter to officiate as Assistant Paddy Specialist Pattambi vice Mr. Ananthan on leave. Mr. R. O. Broadfoot Deputy Director, Madura to Eighth circle Coimbatore; Mr. M. Mangesa Rao to be in charge till 8th October; Mr. S. U. Khan to be Deputy Director Second circle on return from leave; Mr. B. Ramayya on return from leave to Sixth Circle Madura.

NON-GAZETTED:—Confirmations, transfers etc: The following are confirmed in their appointments:—Upper subordinates Messrs. K. Sivasankara Menon, A. Ramamohan Rao, S. V. Ramachandran, K. Varadachari, P. Subramanyam and C. Narasimhacharya. Lower Subordinates Messrs M. Alaghiriswami, P. V. Samu Ayyar and E. Achyutan Nayar. Mr. N. Kesava Ayyangar assistant Cotton section to Cotton Station Koilpatti vice Mr. C. Jagannatha Rao granted leave; Mr. C. Jagannatha Rao after expiry of leave to be Cotton assistant Nandyal; Mr. S. Kalyanaraman, assistant Nandyal to Cotton Station Koilpatti and relieve Mr. Kesava Ayyangar. Mr. K. S. Krishnamurthi Ayyar is transferred to Kallakuruchi and Mr. R. Venkataramana Ayyar will hold charge of Vriddachalam Taluk alone. Mr. B. Dasappa Malli assistant demonstrator Gobichettipalayam is transferred to Ooty to work under the Curator. Mr. M. A. Balakrishna Ayyar demonstrator, Tiruvettipuram to Palakuppam Farm; Mr. M. Eggiaswami Ayyar to be in charge of experimental work of the farm and to assist the Manager. Mr. N. Krishna Pillai, Manager Palakuppam will undergo training under the demonstrator Tindivanam for 6 weeks and will take charge of Tiruvettipuram subcircle; Mr. C. Annamalai demonstrator will undergo training at Madanapalle.

Leave etc.—II circle:—Mr. K. V. Seshagiri Rao assistant demonstrator Tenali, leave on average pay for 14 days from 9-9-29. Mr. G. Sitarama Sastri demonstrator, Vinnkonda leave on average pay for 13 days from 2-9-29.

Third Circle:—Mr. P. Naghadar Nayudu, assistant demonstrator, extension of leave on medical certificate for three months. Mr. N. Annaswami Ayyar demonstrator, Kadiri, leave on average pay for 15 days from 16-9-29.

Fifth Circle:—Mr. L. K. Narayana Ayyar assistant demonstrator, leave on average pay for one month from 24-8-29. On expiry he will join duty at Shiyali new circle.

Eighth Circle:—Mr. K. Avadanayakam Pillai demonstrator Coimbatore leave on average pay for 18 days from 23-9-29.

Cotton Section:—Mr. O. Jagannatha Rao, assistant leave on average pay for one month from 29-8-29.

M. S's Section:—Mr. P. Krishna Rao assistant leave on average pay for 15 days from 5-9-29.

G. E's Section:—Mr. M. S. Kylasam Ayyar, assistant extension of leave on average pay for 5 days.

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The Ramasastrulu-Munagala Prize 1930.

1. The Prize will be awarded in July 1930.
 2. The Prize will be in the form of a Medal and will be awarded to the member of the Union who submits the best account of original research or enquiry, carried out by him on any agricultural subject.
 3. The subject matter shall not exceed in length twelve foolscap pages type-written on one side.
 4. Intending competitors should notify the Secretary of the Madras Agricultural Students' Union not later than the 15th May the subject of the paper which they propose to submit and the paper should be sent in so as to reach the Secretary, Madras Agricultural Students' Union not later than the 1st June 1930, with a covering letter showing full name and address of the sender. The authors' name should not be shown on the paper which should be entered under a *nom-de-plume*.
 5. Four type written copies of the essays should be sent in.
 6. The name of the successful competitor will be announced and the prize awarded at the time of the Conference.
 7. The Union reserves to itself the right of publishing all or any of the papers.
 8. All references in the paper to published books, reports or papers by other workers must be acknowledged.
 9. Papers submitted will become the property of the Union.
- Any further particulars may be obtained from the Secretary Madras Agricultural Students' Union, Lawley Rd. P. O. Coimbatore

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The Cardamom Planter

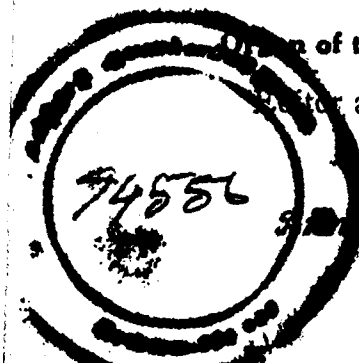
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