

Journal of the Madras Agricultural
Students Union.

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August - September 1925

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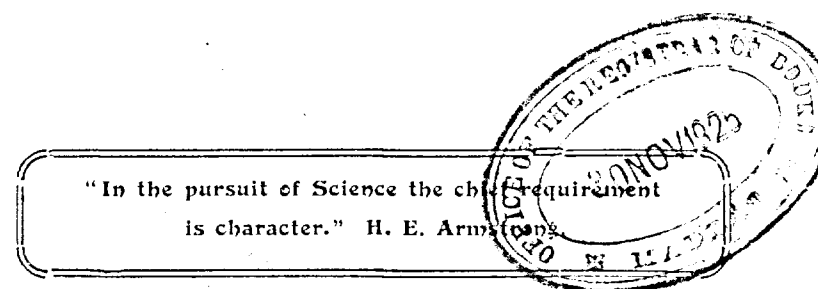
other gentlemen who take an abiding
interest in Agriculture is very
earnestly solicited.

THE JOURNAL
OF
The Madras Agricultural Students' Union.

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Sugar Manufacture

K. KRISHNAMURTHI RAO.

Assistant Sugarcane Expert.

Sugar manufacture may be considered under the following heads:—

- I. Extraction of the juice.
- II. Clarification of the juice and
- III. Concentration, curing etc.

1. *Extraction of the juice.* There are two methods of extracting juice from cane, viz. (a) diffusion and (b) crushing by mills.

(a) Diffusion is effected by slicing canes into chips by means of machines and transferring them into large vessels called diffusers where hot water is poured on them causing the cells to die and allowing the crystalloids to pass through the cell walls until the consistency of the fluid both inside and outside the cells has become the same. In this process, gummy, albumenoid, and other colloidal substances are mostly kept back in the cane itself. The diffusion juice is thus purer than that obtained by crushing. But on account of excessive fuel consumption, the diffusion process is not generally adopted.

Aska in Ganjam is the only factory in India which is adopting diffusion process.

(b) Crushing by mills is the generally accepted method. The canes are first of all prepared by being passed through shredders and then crushed through a series of three-roller mills. The number of rollers varies from 9 to 18.

As bagasse has got the property of keeping back in its spongy tissue some quantity of juice and as it is found impossible to crush out all the juice by this dry method, water is sprayed on to the bagasse coming out of the second mill. This water is known as maceration water and the quantity sprayed depends on the quality of the cane crushed. By using maceration water over 97 per cent of sugar in the cane is being extracted.

The juice of the internodal region of a cane is purer than that of the nodal and the internodes are easier crushed than nodes. Hence, the greater the pressure on the cane, the greater is the impurity of the juice. The first mill juice is, for the above reason, richer than that from the 2nd mill, and the 2nd mill juice richer than the third.

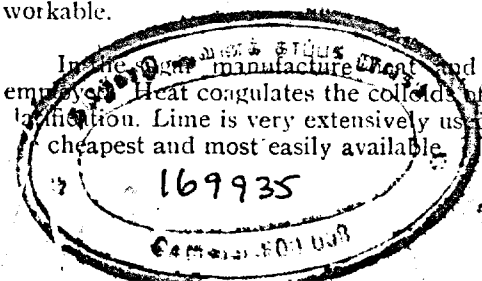
II. Clarification.

Besides sucrose the cane juice contains the following substances:—

1. Reducing sugars, free acids, organic and inorganic salts—in solution.
2. Gums, proteins, colouring matters, pectin—in colloidal solution.
3. Cane wax, fine particles of bagasse and mechanical dirt—in suspension.

It is on account of the presence of the above impurities that cane juice is coloured, turbid and viscous. The object of clarification is to remove as much as possible of the impurities and render the juice workable.

In the cane manufacture heat and lime are the chief agents employed. Heat coagulates the colloids of cane juice and helps in the clarification. Lime is very extensively used as a clarifying agent being cheapest and most easily available.



The effects of liming are:—

1. Neutralisation of the free acids of the juice thus preventing them from afterwards causing inversion of sucrose.
 2. Partial precipitation of albumenoids, pectins and gums.
 3. Precipitation of the acid calcium phosphate as flocculent tribasic phosphate
- $$2 \text{CaHPO}_4 + \text{CaO} = \text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$$
4. Formation of compounds with Sucrose and Glucose. The behaviour of these compounds on heating and when CO_2 is passed, is of considerable importance and interest in the sugar industry and will be dealt with in detail under carbonatation.

Two methods of clarification are generally in use, viz.:—(1) Defecation and (2) Carbonatation.

(1) In defecation the quantity of lime used for clarification is either just sufficient to neutralize the free acids of the juice or is added only in slight excess. When lime is added in excess, the excess alkalinity is removed by sulphitation or by addition of phosphoric acid. In this process gums and pectins are only partially removed.

(2) Carbonatation. This method effects a more perfect clarification. The juice is heavily limed, (one per cent on 100 cane or 70 litres of lime cream at 15° Baumé on 1000 litres of juice) is passed through juice heaters where it never attains a temperature more than 55°C , and then into special tanks where CO_2 is passed. As lime is added in excess, gums and other substances are almost completely precipitated and removed and thus we get a much purer juice than is obtained in the defecation process.

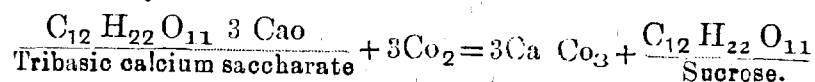
Action of lime on Sucrose and Glucose. Below 55°C excess of lime has no action on sucrose; and on glucose there is merely inter-molecular arrangement rather than decomposition, giving rise to lactic acid ($\text{C}_3 \text{H}_6 \text{O}_3$) and Saccharic acid ($\text{C}_6 \text{H}_{10} \text{O}_8$).

Above 55°C , with sucrose a whole series of compounds called saccharates are formed. Monobasic calcium saccharate which is soluble is transformed on boiling into tribasic saccharate which is insoluble

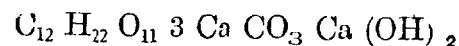
$$3 \text{C}_{12}\text{H}_{22}\text{O}_{11} \text{CaO} = \text{C}_{12}\text{H}_{22}\text{O}_{11} 3 \text{CaO} + 2 \text{C}_{12}\text{H}_{22}\text{O}_{11}.$$

The action of lime on glucose at high temperature is very harmful, the lime glucosates being converted into glucinic and saccharinic acids. These combining with excess lime form basic glucinate of lime which is insoluble and is of dark brown colour. This, on continued boiling spontaneously decomposes into various acids.

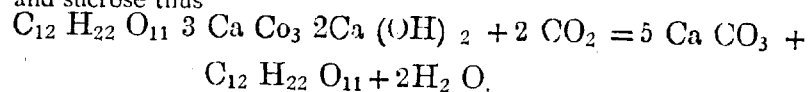
Effect of passing CO₂ gas. When CO₂ is passed into such a juice, calcium saccharates and glucosates are decomposed forming calcium carbonate and releasing sucrose or glucose thus.



Some intermediate products are also formed. In the beginning CO₂ is entirely absorbed but soon the mass becomes viscous and gelatinous. One of the gelatinous compounds viz :—hydro-sucro carbonate of lime has the composition



This is broken up when CO₂ is passed further into calcium carbonate and sucrose thus



Note.—If the calcium saccharate formed is not removed by CO₂, it possesses the property of dissolving other bodies which do not dissolve in water or in sucrose solution, e. g., calcium oxalate, phosphate carbonate etc.

Double Carbonatation. In most factories, CO₂ is passed only once till the juice gives a neutral reaction. But in some factories it is passed twice, on the 1st occasion till the juice possesses as an alkalinity of 0.05% CaO. At this stage the juice is filtered, a small quantity of lime is added and CO₂ is passed a second time till the juice is neutral. The juice is then heated and the sediment removed by filtration.

This process is known as "Double carbonatation". The advantage in this process is that some precipitates like basic-glucinate of lime and a portion of the gummy precipitates which are insoluble in an alkaline juice and which get dissolved when the juice is neutral, get completely removed at the first filtration and thus we get a slightly purer juice than by the single carbonatation process.

Hereunder in a tabular form, the main differences between defecation and carbonatation are mentioned.

DEFECATION.	CARBONATATION.
1. Sugarcane juice is generally made just neutral or only slightly alkaline.	1. Juice is made distinctly alkaline with excess of lime.
2. The neutralising reagents used are Sulphurous or phosphoric acids.	2. The neutralising reagent is CO ₂ .
3. The heated and limed juice is allowed to settle in tanks and the clear liquid either decanted or drawn off.	3. Decanting is not done. The whole juice is filtered.
4. Impurities like gums, pectin, colouring matter etc., are not removed completely.	4. The addition of excess lime removes almost completely the impurities like gums etc.
5. The composition of molasses from defecation would contain less of lime and more of gums in its composition.	5. The molasses from the carbonatation process would contain more of lime and less of gums etc.

REDUCING SUGARS.	GUMS.	LIME.	REDUCING SUGARS.	GUMS.	LIME.
%	%	%	%	%	%
23.6	1.95	0.53	21.6	0.74	1.58

III. Concentration, Curing etc.,

The evaporation of cane juice over a direct fire, as is now done in the case of jaggery manufacture, was the method adopted in the beginning for making raw sugar. Steam as a heating agent was next employed, as high temperatures obtained over direct fire destroyed some sugar. In course of time, rapidity of evaporation was secured by increasing the evaporating surface by employing rotating hollow spheres containing steam.

As the present time, juice is concentrated in what are termed as "Multiple effects." In these, concentration takes place in partial

vacuum and the steam obtained in the first evaporator is utilised for heating juice in the 2nd evaporator and so on. As boiling is effected at low temperatures loss of sugar is very little and colour development in the resultant syrup very insignificant. The syrup coming out of the last evaporator still contains about 50 per cent of water.

Further concentration of this clarified syrup is continued in what are known as "Vacuum pans" to the point where there is not sufficient water for the sucrose to remain dissolved. The vacuum is about 28 inches and consequently the boiling is effected at about a temperature below 60°C.

The separation of crystals from molasses is effected in "centrifugal drums." These centrifugals have perforated walls and are lined with fine meshed wire gauzes and are made to revolve at a high speed. Crystallised sugar is scraped and dried. Large amount of impurities in the cane juice will give a fine grained sugar and the loss of sugar in the molasses will also be greater.

A Note on Fungus Diseases of Crops in the Madras Presidency.

K. M. THOMAS AND P. V. SOMAYAJALU.

Assistants in Mycology.

The common diseases of crop plants brought on by the attack of parasitic fungi cause considerable loss. This often runs into several lakhs. For several years collections were made during casual visits and inspection tours in a few reported localities and life-histories of fungi were worked out in the Mycological laboratory at Coimbatore. This list is an outcome of such labour and is presented in a readable form. These diseases are grouped according to the crops they attack, into those of cereals, pulses etc. The list is a mere enumeration of the several kinds of diseases present, with the localities and a brief description of each disease. No pretence is made to exhaust the list of diseases on crops in this province as it is a work of years and a question of more staff than is available to the Mycological worker in Madras at present. This section would gladly welcome any reports of these diseases in other localities or of other diseases, so that their knowledge may be extended and the loss of crops minimised.

Diseases of Crops caused by Fungi in the Madras Presidency.

Diseases		Time of occurrence	Locality.
Popular name	Scientific name		

I. Cereals (a) Cholan (*Andropogon sorghum*)

1. Short smut	<i>Cintractia sorghi</i> <i>vulgaris</i> Tul. (Clinton).	October June October	Kistna Coimbatore. Bellary etc.
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Very many grains in an ear-head are replaced by dirty grey coloured sacs filled with black mass of spores-the seeds of the fungus.

2. Long Smut	<i>Tolyposporium</i> <i>filiferum</i> Busse	April and October	Coimbatore Salem etc.
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Resembles short smut but fewer grains are affected and spore sacs are longer and somewhat curved.

3. Whole head-smut	<i>Ustilago Reiliana</i> . Kuehn	October and August.	Coimbatore „
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Unlike the other two smuts the whole ear-head is converted into black powdery substance enclosed in a silvery white membrane.

4. Rust	<i>Puccinia purpurea</i> . Cooke	January September December	Coimbatore „ „
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Small elongated reddish brown spots rupturing the epidermis appear on both surfaces of the leaf.

5. Leaf-shredding	<i>Sclerospora</i> <i>graminicola</i> (Sacc) Schrot.	June	Coimbatore
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Leaves are torn into shreds; ear-heads either not formed or grains do not set.

6. Leaf spot.	<i>Colletotrichum</i> <i>Lineola</i> Corda	May, April November	Coimbatore
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Small reddish spots with black dots in the centre appear on the leaves.

7. Sugary disease	<i>Sphacelia Sorghi</i> .	January	Tinnevely Coimbatore
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A honey-like liquid which attracts insects drips from the grains.

Popular name	Diseases Scientific name	Time of occurrence	Locality
(b) Cumbu (<i>Pennisetum typhoides</i> .)			
1. Smut	Tolyposporium Penicillariae Bref	September October "	Coimbatore Bezawada Kistna
A few grains in a head develop into oval spore sacs about twice the size of the healthy grains.			
2. Green-ear disease	Sclerospora graminicola (Sacc) Schrot	September August October November December January	Kistna S. Arcot Coimbatore " Tinnevely
The flowers instead of developing grains are converted into green leaf-like structures.			
3. Rust.	Puccinia Penniseti- Zimm.	September October November	Coimbatore " "
Small brown elongated spots appear on leaves, leaf-sheaths and stem.			
(c) Ragi (<i>Gleusine coracana</i> .)			
1. Leaf Blight	Helminthosporium nodulosum Berk. and Curt.	November July June	S. Malabar N. " Coimbatore
Deep brown elongated spots appear on leaves, leaf-sheaths and stem.			
2. Blast	Piricularia sp	November December June February October	Kistna Vizagapatam N. Malabar N. Arcot Coimbatore
Grey spots with a brown margin appear on leaves, sheaths internodes and nodes. When the ear-head is affected grains are not properly filled.			

Popular name	Diseases Scientific name	Time of occurrence	Locality.
(d) Wheat (<i>Triticum vulgare</i>)			
1. Rust	Puccinia glumarum Eriks. and Henn. Puccinia triticea Eriks. Puccinia graminis Pers.	February January November	Coimbatore " Coimbatore
Small yellow spots afterwards turning into elongated black patches appear on leaf and sheath.			
2. Blast	Piricularia sp.	November	Coimbatore
Grey spots with brown margin on leaves and leaf sheaths.			
(e) Tenai (<i>Setaria italica</i> .)			
1. Rust	Uromyces Setariae italicae (Diet) Yosh.	December January November	Central Farm Coimbatore S Malabar
Small oblong brown pustules occur on both surfaces of the leaf			
2. Green ear disease	Sclerospora gra- minicola (Sacc) Schrot.	November December October August October	Coimbatore " " S. Arcot Bellary
Resembles cumbu green ear. The head is converted into a green leafy structure.			
3. Smut	Ustilago Crameri Koern.	November	Bellary
Instead of grains in the ear head little bags of black powder are seen.			
4. Blast	Piricularia sp.	February December	Coimbatore "
Brown spots with grey centre occur on leaves and leaf sheaths.			

Diseases		Time of occurrence	Locality
Popular name	Scientific name		
(f) Kudiravali (<i>Panicum frumentaceum</i>)			
1. Smut	<i>Ustilago Panici-frumentacei</i> . Bref.	December January August	Coimbatore Tinnevely Godavari
Grains are more or less replaced by somewhat larger spore-sacs containing powdery mass of spores.			
(g) Paddy (<i>Oryza Sativa</i>)			
1. False smut	<i>Ustilaginoidea virens</i> . Cke (Tak)	October December and October February January February	S. Canara Godavari Tanjore Coimbatore Chittoor
Only a few grains are affected ; large velvety greenish masses of spores about twice the size of the normal grains between the glumes.			
2. Blast	<i>Piricularia Oryzae</i> Cav.	February March November December June "	Tanjore N. Arcot Kurnool Coimbatore N. Malabar S. Kanara
Brown spots with grey centre occur on leaves, sheaths etc. When the neck of the ears are affected grains do not develop.			
3. Elight	<i>Helminthosporium oryzae</i> sp.	November October "	Coimbatore Kistna Godavari
Small elongated brown spots appear on leaves, sheaths etc., some glumes are also affected and then the grains do not develop well.			
4. Ephelis	<i>Ephelis Oryzae</i> Syd.	December November	Coimbatore Coorg
Instead of having loose branched panicles the earhead is converted into cylindrical thick set spikes with undeveloped grains.			

(To be continued.)

On Culture. *

R. K. SHANMUGAM CHETTIAR., M. L. A.

Mr. Principal, Gentlemen and students of the Agricultural College.

When the Secretary of the Students' Club invited me to deliver the inaugural address I had to think about a subject, but it was no easy affair. After all I thought the title was not very important and in this connection, I was reminded of an interesting anecdote relating to Mr. G. B. Shaw. Mr. Shaw was once advertised for a lecture and the Chairman on that occasion was in the same plight as Mr. Principal. He did not know what Mr. Shaw was going to speak about; so he whispered into Mr. Shaw's ear, "please let me know what the subject of your lecture will be." He replied with his characteristic humour. "The subject will be announced at the end of my lecture."

Perhaps in the present audience, some might expect me to speak about agricultural or its allied sciences; but I know so little about agriculture or its allied sciences, that I don't intend to speak about any of these. And even were I competent to speak about agriculture or its allied sciences, I would have hesitated to speak about agriculture to an audience of agricultural experts. The great criticisms levelled against the Indian mentality is that the Indian always talks shop. He does not merely talk shop, but thinks shop and acts shop. This habit of talking and thinking shop is very evident wherever you go and whatever walk of life you observe. Just step into any Lawyers' Club and the first thing you hear from any member who enters will be, "what happened to your Criminal appeal? Did you get your man out in the bail application?"

I thought that addressing mainly the students of the Agricultural College, it would not be out of place to tell them what I consider are the main characteristic qualities they should carry with them when they enter the broader field of public life. It is very well known and in our country it has been very greatly recognised that whatever walk of life you might choose in your after life, the duties and responsibilities of citizenship are becoming increasingly great and one may very well ask whether Universities have equipped their students to meet these responsibilities. In considering the requisites and characteristics essential for the discharge of the duties of

* An inaugural address at the meeting of the Agl., Students' Club on Aug. 4.

citizenship, I consider culture as being perhaps the most prominent, and tonight I think of speaking to you of culture—the essentials of real culture and what culture means. Culture is always associated with University life. Now that the Agricultural College, Coimbatore, has been affiliated to the University of Madras, its students become part and parcel of the University. This College must instil in you the elements of culture. So far as I have been able to observe the public life of this country in which I have tried to play some part during the past 5 years, I have come to the conclusion, that if only the leaders of our country were a little more cultured, the course of public life and politics would have been very different. When I talk of public life the necessity for going equipped with the essentials of culture into public life, you may very well ask me whether every one of you is going to be a public man and after all whether it is essential for an ordinary and humble citizen to be so very cultured. I am not thinking of public life in the narrow sense of the term. Every one cannot be a cabinet minister. But I am convinced that every true and honest citizen in however humble a walk of life he might be, can contribute something to the public life. So that if you are true to the traditions of the University to which you belong if you are to carry with you the ideals of the real University life then you cannot shirk the responsibilities of public life. Every one of you can in some way contribute something to the public life. You might ask what is meant by culture. By culture I mean the possession of four fundamental factors :—(1) Broadness of intellectual vision, (2) freedom from clannish feelings (3) cosmopolitanism (4) cultivation of style in speech and talk and genuine qualities. Anyone who pretends to culture must have imbibed these qualities. A man of culture must avoid narrowness of intellectual vision; he must avoid the cultivation of dogmatic assertions. Let me talk to you in detail about what I mean by the possession of these qualities. The tendency of the present age not merely in this country but throughout the world is towards specialisation. This tendency is exhibited in the very existence of this institution. The College here exists for training specialists in agricultural sciences. The tendency to specialisation in one branch of knowledge is a peculiarity of the 19th and 20 centuries. I don't for a moment ignore the need for specialisation in the modern world. In fact the progress that the modern world has made in the field of science is due to the development of specialisation.

The microscope reveals wonderful things to the human eye and the specialist gets the microscopic view of things. What the cultured man must possess and must cultivate is not merely the microscopic view of life. Those of you who are engaged on special subjects should not forget that the world has other great objects than those

upon which you are specially engaged. This tendency of specialisation is apt to restrict broad intellectual growth, so that a man of real culture and those of you who are specially engaged in scientific investigation must realise the bigger world which exists beyond your own studies. You must realise the sum—total of human life and human happiness consists in many elements besides your own petty things. This broadness of intellectual vision is characteristic of the idealist. Two great examples who have made it possible to be great in one field of life and to be a versatile genius at the same time are Bacon and Leonardo de Vinci. No doubt in the stress of the modern world—in this hustling world of the 20th century, it is not possible busy and it is not conducive to the growth of the versatile intellect like that of Bacon. And yet it is possible even in this century of specialisation to have such a catholicity of view as not to ignore other walks of life. Such a man possessing that broadness of vision is described by Bacon as the 'full man'. Every man who pretends to culture must be a 'full man' in the Bacon's sense of the term. While you are here legitimately engaged in your own special studies, while you are expected to devote the greater portion of your time to the cultivation and enlargement of your special field of science, I would impress upon you the necessity of bestowing your attention on the various departments of human knowledge, so that the first requirement of a cultured man is the possession of broad intellectual vision. A man of culture must not have any clannish feeling. This generally is especially great in our country and perhaps greater, as the recent history will reveal, in our presidency than in any other part of India.

You hear people talking of the necessity of establishing democratic institutions in India. People are realising the value of democracy, so much so, that to be called democratic is as complimentary as being called a gentleman, you hear of Rajahs and Princes, striving to be democrats so much so, that the modern world seems to realise that there is something really great in democracy. The ancient Greeks used to talk of democracy as opposed to oligarchy. It is said that essentially democracy brings in equality of all men and as a consequence a democratic Government brings about the equality in the man. John has got a vote now and Joans has one and the labourer Smith has also got the vote now; but the mere fact that these people have got votes has not resulted in the elimination of class rule. Great thinkers are now beginning to realise the economic aspect of democracy. And we know that the Russian Revolution in our own times broke out for the economic development of democracy and the highest conservation of a true democracy is established. To be democratic is not so much to determine a broad form of government but to be democratic is to know how to live with your fellowmen and this is the basis of democracy.

In our country we have tenderness deeply rooted in our every day social life which is the very negation of democracy. The spirit of communalism is the very negation of a democratic ideal so that the man of culture, if he is to avoid that spirit of clannishness must avoid this great pit-fall and cultivate that art of knowing to move with his fellowmen so that, I would ask you to seriously think about it. The leaders have come to realise the baneful effects of the spirit of communalism which are taking deeper roots in the soil.

The Secretary of State for India confidently said that under the present existing state of affairs in India the establishing of a democratic government was entirely out of question. Perhaps the Secretary of State in a sense was just in saying so. Therefore in spite of our criticism of the action of Government in England, there must be a searching of our own heart. There is something fundamentally defective in ourselves and in our own society. Every true citizen who has made that heart-search can have only one conclusion, that the spirit of communalism is, indeed, the most baneful thing in this country. I believe that during the wearisome days of political negotiations, Mahatmaji said that there was no use of asking for and hurrying towards SWARAJ under these conditions. I would ask every one of you to imbibe the spirit of culture which alone will root out all communalism. Would you not contribute something towards rooting out this communalism. I would implore you earnestly while you are mingling with your fellowmen to imbibe this spirit and consider it as a valuable acquisition.

Then we go to style, style not merely in writing, style in speaking, in conduct and in thought. The style is the external form and expression of a man's life and thought and it might be more by precision and aptitude that the man of culture can lay any pretension to that. If he is to cultivate something of art he must study the form as well as the subject. The subject is no doubt very important in an art but form is more important. It is in the harmonious mingling of form and subject that the production of the master-pieces of the world results. In a work of engineering there is not merely the subject but the form and that form ought to correspond to the qualities of style. The lack of this quality I have met with every day in the conduct of many of our public men. You might have heard of what are called bores. There are men who possess the unenviable quality of boring in Councils and in our assemblies, and clearing the House whenever they use to speak. What are the qualities that go to make up a bore? First I would place personal vanity and indifference to the feelings of others. If only the bore realised how very indifferent he is to the feelings of his fellowmen he would cease to be a bore. Bores are not peculiar inhabitants of assemblies. You have got bores in Colleges, in clubs, in your private life. Generally the private bore

is the worst bore. The function of the University and of a man of culture is to see that the spirit of boredom is not cultivated. The University and the College must inculcate the importance and cultivate the practice of style. I have no doubt that many of you are engaged in the study of perhaps very dry matter and you must know more than myself to what extent a certain text book bores. It depends to a very great extent upon style. Even an uninteresting subject may be made readable if only the style is good. It may be that now it is all the more necessary that you must study the great masters of style not merely to mimick them but to understand their secrets.

I said that the fourth quality of a cultured man is the avoidance of dogmatic temper. We are guided every day by dogmas. Some dogmas, for example, religious dogmas we accept not with deference to reason but to authority. What I say is that you must avoid carrying your intellectual operations dogmatically. You must subject your mind or thought to preconceptions but keep them open for the reception of new truths. There are very many people who think that they satisfy this test. By an open mind they imagine a mind prepared to accept any idea whatever. They generally grasp the first idea placed before them. But what I mean to say is that if you have an open mind coupled with a strong active mentality you can avoid the dogmatic spirit. I consider this to be one of the fundamental qualities that go to build culture which are very essential and are even more important.

Character and sympathy for our public life have not been what they ought to be. It is because that some of our most leading men do not possess the commodity called character. The one contribution perhaps that Mahatma Gandhi has exemplified to the front is character. Whatever your intellectual attainments be, you cannot pretend to culture if you fail to possess character. The greatest kindness is not to be wilfully misunderstood. If only men had more sympathy towards their fellowmen, if only you cultivate sympathy you will get the spirit of tolerance. Sympathy is the basis of culture. I would ask you to develop this in this institution. The function of a University is to make men more cultured and you belong to a University today. The practical man jeers at University ideals and calls them academic. But believe me when you go out into public life and begin to shoulder the responsibilities of every day public life you will have more need for University ideals. And, therefore gentlemen, I would implore you to keep always with you the best and most enduring that a University can bestow, great thought, inspiration of great ideals and the consolation of great failures.

President's Speech*

Principal Broadfoot, as President, in his opening remarks stated that it was unnecessary to introduce Mr. R. K. Shanmugam Chetty to a Coimbatore audience. Mr. Chetty who lived in Coimbatore, was known throughout the Madras Presidency as one of the elected members of the Legislative Assembly of the Government of India, in which he had taken a leading part during the last few years. He also mentioned that he had not been able to obtain the title of Mr. Chetty's address but he felt sure that from Mr. Chetty's wide travels in India and abroad and his experience in Council meetings, he had the necessary materials to draw upon to make a very interesting and instructive address. He had therefore much pleasure in asking Mr. Chetty to address the Students' Club.

In conclusion of the address the President in a few words stated the pleasure it gave him to ask for a hearty vote of thanks to the lecturer. He reminded the audience that Mr. Chetty was a very busy man but that he had readily responded to the Secretary's request to deliver the inaugural address of the present session to the Club. The subject chosen was one which would commend itself to all present and he was sure everyone benefited from listening to the address. One additional quality might be added for the benefit of the students and that was sincerity. Whatever they were called upon to do they should do with all their might. To be known as a man to be depended on was one of the best qualifications in after life. It was a quality appreciated by employers and formed the true basis of social friendship.

Clannishness was a term capable of wide meaning but the term is supposed to have originated in Scotland where it is taken to mean national and intellectual pride-worthy acquirements for any citizen. It was probably on account of this loyalty to Scotland that Scotsmen were successful colonizers.

In conclusion he would say that the Agricultural College gave students every opportunity to acquire the requisition of culture as outlined by Mr. Chetty. The hostel life played a very important part in the development of character and it was very pleasing to find the students in spite of caste distinctions pulling so well together on the playing fields. Athletics should always have a prominent place in all residential colleges.

*Speech at the Agl. Students' Club meeting on August 4th.

EXTRACTS.

A Method of Rice Selection in Assam.

From time immemorial no other crops have received so much attention in the development of civilisation as the cereals. The ancients took special care in sowing and harvesting such crops at the right time; otherwise they were found to degenerate in quality and yield. History shows that the Egyptians and Chinese and later on the Greeks and the Romans selected the best ears of wheat and oats in order to keep the variety pure from the influx of degenerate types that arose out of the old material.

It may be a little surprising to many to know that a similar system of selection of paddy ears is in vogue among the cultivators of Assam. The unlettered Assamese have found out through long experience like their western and eastern brethren that a careful selection of paddy is the best means of keeping up the purity and characteristic qualities of the desired varieties and they have been continuing a process which has up to the present escaped the notice of the experts.

It is a custom common among the peasants in the Assam valley to harvest the rice crop in small bundles called *mutees* which means a handful of sheaves cut and tied separately. Besides it is also the useful practice in upper Assam to store the harvested paddy in the straw in the granary.

Usually two methods of selection are adopted by the people.

1. The most careful cultivators select a plot in the field suitable for seed purposes. In this case the farmers depend for results on their good judgment. Extreme conditions such as areas too dry or too wet are always avoided. Uniform ripening and medium size of straw and ears are specially noted. The bundle of sheaves harvested from selected plots is kept separate for a time until the pressure of work in the fields is over when the *mutees* are opened and selected by hand.

2. In the 2nd case no field selection is done. When the proper season comes round the rice is harvested in *mutees* and is temporarily stored. The *mutees* when opportunity arise are then taken out and selected by hand.

The method of selection from the *mutees* is very simple. The operator unties the *mutees* or bundle, grasps the top of the ears with the left hand and shakes them slowly. This causes the small ears to

fall to the ground. He then grasps the other end of the *mutees* with the right hand and after again shaking the same he lays it flat on the ground. All the small, poor and abnormal ears are then removed. The sound ears that are left are kept separately, threshed and packed in specially made bamboo baskets lined with straw called *Tom* or *Topa*. These baskets are then kept hanging from the ceiling of the house. Some of the cultivators prefer to hang the baskets in the kitchen or over the open fire place where water is boiled. This latter practice keeps the seeds from insect and fungus pests.

The seed baskets are taken down when the sowing season begins and used as desired. In my opinion this process of field and hand selection is perhaps the best and easiest method that every cultivator can follow so as to keep up the purity and quality of the cultivated paddy of the desirable types. That it exists among the Asamese proves how much the cultivator of this tract values good seed for his paddy crop.

(Tropical Agriculturist—Vol. LIX No. 2). M. G.

Who is a Scientist?

What are the chief requisities for a Scientist? Obviously, the first is an *insatiable curiosity* concerning the workings of Nature: and the second, a *tireless patience with small details*. About the third Doctors will disagree. Some will hold for education: some for imagination: others for an acute reasoning faculty: and still others for certain *a priori* or, at least, a *posteri-ori* convictions. For my part, I contend that the third and most essential requisite because it is a kind of saving grace—is a *humorous and healthy* scepticism—an ability to doubt against the loud voice of authority and the circumstantial evidence of the apparently obvious. Of course the scientist must have certain other qualifications—the practical virtues of industry, courage and docility, and psychic virtues of faith, hope and charity: but these he requires rather as a man. Faith for example, is something we all have—and must have. Every one believes in something, if not in Santa Claus, then in the authority of professors, Natural Selection, Psychology, the evidence of plotted curves, statistics or the finality of his own inductions: and he believes with a sincerity that is at once simple and sublime. But in such belief a certain danger lies. It is too easy—and often too profitable—to believe. This is an age of faiths: and they are so many and all-sufficient, so insinuating, so well served by propaganda, so conveniently capsulated that one is apt to gulp them in almost unconsciously, to the ruin of his mental health. Nearly every belief held by normal

beings contains some measure of truth, but none is altogether, or even substantially, true—as stated: and to swallow any of them whole, as many do, does not make for sound science, however much it may promote ethics or prosperity.

The scientist should never make a complete, unqualified act of faith, never surrender unconditionally to a theory or synthesis of facts. When he does he ceases to be a scientist, and is fit only for stratagems, reformism and the bureaucratic somnambulance of efficiency. He becomes a 'practical' man. A 'practical' man cannot afford to doubt. A man of science cannot afford not to. For him a reasonable minimum of doubt is always the incentive to look further, to examine anew, to reassort facts, to probe for contradictions, weakness, omissions,—in other words, to continue the laudable business of exploring the privacies of Nature. It is his *vis a tergo*. He is a scientist primarily because he is curious and to satisfy that curiosity he must be laboriously patient; but he is curious chiefly because—in his secret plasmic self—he is considerably of a sceptic.

[CARL HEINRICH].

Scientific Stoicism.

No man lives to himself alone; no honest effort to get at the truth of Nature, no matter how insignificant they may seem is without value. The man who scorns scientific work which has not an obvious utilitarian trend is ignorant of the history of applied science. The scientific worker who tries to build about himself and his subject a wall of defence against impractical ideas or against what he regards as rival subjects, will merely succeed in insuring himself against recognition by his followers!

[W. A. RILEY].

What Entomology is not.

The subject matter of this science is not insect alone, nor plants alone nor farming alone. One may be a most excellent entomologist or botanist or he may have the whole theory and practice of agriculture at his tongue's end, and at his figure's end as well and yet be without knowledge or resources when brought face to face with a new practical problem in economic Entomology. The subject is essentially the relation of these things to each other; of insect to plant and of plant to insect and of both these to the purpose and operations of the farm and it involves some knowledge of all of them.

[PROF. FORDES].

The Madras Legislative Council.

AUGUST

Madras Legislative Council:—The fourth session of the second legislative Council under the 1919 Act, commenced on Tuesday the 18th August 1925 and lasted for 7 days.

His Excellency Viscount Goschen, in his *opening speech*, after referring to the loss sustained by the death of Sir. P. Thyagaraya Chettiar, said:—

When I addressed the Legislative Council last August, one of the subjects which was engaging the attention of the Government was the *Mettur project* and I stated then that we proposed to place before the House a resolution asking for your approval of the project. Hon. Members will share with my Government the satisfaction we feel that as a result of the conclusion of negotiations with Mysore we were enabled to obtain the sanction of the Secretary of State to the construction of a project which will not only help to irrigate over 2,00,000 acres of fresh land but will also protect and safeguard the existing irrigation system in the Trichinopoly and Tanjore districts. I need not remind you that the land to be newly brought under irrigation has been till now a comparatively barren up-land tract and the *reclamation* of the inhabitants of the locality who to a great extent belong to the *Kallar community* will be one of the notable results which we hope to achieve by the fruition of the scheme. It was my privilege to inaugurate this great scheme on the 20th July last, and I was gratified to observe the presence of several Members of this House who proved the interest they felt in the project by undertaking the long motor journey to the site of the inauguration ceremony. Before I leave this subject, I should like to congratulate my Hon. Colleague Sir C. P. Ramaswami Ayyar and all those who have worked under him on the success that has attended their unflagging efforts to promote one of India's greatest irrigation projects.

I took the opportunity on the occasion to which I have just referred to mention the *schemes of hydro-electric development* which as the House are aware has been engaging the attention of the Government for some time past. It is the object of my Government to initiate and push through as expeditiously as possible certain schemes for the cheap production of power from hydro-electric centres. The most promising of the schemes is the one in relation to the Pykhara water falls which the Government are anxious to inaugurate not

only because of the natural facilities of the particular locality but because for various reasons it will in our opinion be the best object-lesson to the people at large of the advantages of cheap power. Certain negotiations which have been pending for the purpose of enabling the Government to re-acquire control over the water power in the locality and to purchase the concession that had been granted by the Madras Government before they envisaged schemes for the utilization of such power have just now been happily concluded and I trust that it will be possible to start work at a very early period. Hon. Members of this Council will also be interested to learn that a joint investigation of hydro-electric possibilities in South India is now being carried on by the Government and the South Indian Railway Co. and if, as is hoped, the results of such investigation are favourable the subject of electrification of part at least of the South Indian Railway will come within the range of practical politics. Such electrification will not only be of great use from the railway point of view but will establish centres of distribution and utilization of our power resources."

His Excellency then touched upon the question of (1) financing branch lines (2) the stationing of special police in some villages in the Gooty Taluk (3) the extension of the term of office of two additional judges of the High Court, (4) of the necessity for exercising his powers to reserve the Madras Irrigation Bill for scrutiny by the Governor General and (5) the need for an early amendment of the Estate Lands Act.

The legislative measures proposed to be introduced during the ensuing session were then enumerated. They were:—(1) The Cochin Port Trust Bill (2) the Borstal Bill (3) the Village Officers' Restoration Bill.

Viscount Goschen then observed:—

"The Land Revenue settlement Bill which it was intended to bring in this session is awaiting receipt of the Governor, General's sanction and must therefore lie over for the present.

The Hon. Minister for Education will lay before you a bill to constitute the *Andhra University*. The history of the demand for this University and the many discussions which have taken place regarding its character, location and aims must be well known to the Hon. Members of this House. The Madras University has in its colleges over 15,000 students of whom approximately 3,000 are students from the Telugu districts. These figures show that an

Andhra University will develop a real corporate and academic University life at certain carefully chosen centres to identify itself with the commercial and industrial needs of the country by the establishment of technical colleges and to foster scholarship and research by an extension of the existing facilities for advanced literary and scientific study in the Telugu country.

"As Hon. Members of this House are aware an *annual contribution of 348 lakhs to the Government of India* has, since the inauguration of the Reforms, been a first charge on our revenues. With effect from this year this contribution has been reduced by 126 lakhs. The budget for the current year which was passed by this House in March last did not take this remission into account and provided for expenditure chargeable to the revenue account which was in excess of our estimated revenue by no less than 96½ lakhs. As a result of this remission, this serious deficit was converted, into a surplus of approximately 26½ lakhs.

On the 30th March 1925 additional demands relating to 1925-26 amounting to about 4 lakhs were placed before the House which, however, postponed consideration of these demands as they desired to know how it was proposed to utilize the additional revenues rendered available by the reduction in the contribution. Various Hon. Members also expressed the desire that these revenues should be largely used for the benefit of the Transferred departments. The demands which were placed before the House in respect of items the consideration of which was postponed in March last, have been reduced to 2½ lakhs. After providing for these items the surplus in the current year's budget will, on the assumption that our revenue forecast is realized, be approximately 27½ lakhs. In deference to the wishes of this House and having regard to the many administrative needs of the province, my Government have decided to devote the whole of this sum to expenditure on the Transferred departments. I sincerely hope that no unforeseen circumstances will adversely affect the financial situation with reference to which this decision has been reached.

Hon. Members will in due course be asked to vote *supplementary demands* indicating in detail the proposed utilization of this sum, which will enable the Hon. the Ministers to carry out their progressive schemes in departments of Education, Public health and Industries. Funds will, I hope, thus be made available *for the extension of elementary education, medical relief, water supply and roads in rural areas*. There is also before Government a proposal to make provision for granting further relief to tubercular patients in this

Presidency, and fighting the terrible disease which takes annually such heavy toll of our people.

The Hon. the Minister for Development will move a resolution that the *Cotton Transport Act* be made applicable to this Presidency in order to protect certain areas in which cotton of good quality is grown from the admixture of inferior cotton. The practice of adulterating cotton has grown to such a point that the cultivator of good cotton is no longer able to realize the intrinsic value of his produce."

And His Excellency concluded with the prayer that Providence might guide their deliberations in the interests of the peace and content of the people.

During the current session 472 questions were put and answers given. Of this number over 100 related to subjects in which the ruralist is interested.

Q. 8.—In reply to Mr. A. Chidambara Nadar the answer was given that *applications for water* in the villages of the Periyar system which were received after 1st June would be returned as time-barred.

Q. 10.—Mr. A. Ranganatha Mudaliar had for answer that the number of *minor irrigation works* in the Bellary district was 440. Of these 300 were in charge of the P. W. D. and 140 under the Revenue department, the amounts spent in 1923-24 were Rs 77,244 and 37,700 respectively and a smaller grant this year was due to the fact that a Tank Restoration party was working in the district.

Q. 14.—In answer to Mr. T. Adinarayana Chettiar, the Law Member said that protests had been received from certain villages in North Arcot district against the erection of a *pumping station on the Palar river* in Kadayanchi village by the M. & S. M. Railway Co., but no proposals had been made by the Railway authorities themselves for any such pumping station.

Q. 15.—The Law Member answered Mr. S. Satyamurthi that the Government were consulted regarding the new *policy of financing branch lines* and the purchase of the District Board line from Mayavaram to Aranthangi; there was no time to consult District Boards before replying to the Railway Board but that this

Government agreed generally with the Government of India in their new policy, the aim being that those enterprises which serve largely what might be called through communications should be in the hands and control of the State, with the reservation that railway development in this Presidency should receive due attention.

Q. 17—In reply to Mr. S. Satyanurthi, Government admitted that *loans* to co-operative societies for purposes of *reclamation* of silted lands in the flood-affected areas were given only through the Collectors of districts, but this course was adopted as loans under the Land Improvement Loans Act were administered by Collectors and necessary funds were met from allotments under this head and due provision had been made in this year's budget also for this purpose under that head.

Q. 18—To Mr. Cruz Fernandez, the answer was given that *lands* assigned to *ex-service men* were liable to resumption when alienated by way of sale, gift, mortgage or lease in perpetuity within 10 years from date of grant and those assigned to depressed classes were similarly subject to resumption except if alienated to other members of the same class; but a lease other than perpetual lease was not forbidden by the terms of the grant.

Q. 22—Concerning the *damages* due to *floods* to Cauvery bridges at Sirasamudram the Hon. Mr. N. E. Marjoribanks said construction would be undertaken as soon as funds were available.

Q. 56—In answer to the question by Rao Sahib P. V. Gopalan about the purchase by Government of the Krusadai island near Pamban, Government said amongst other things that the University of Madras had asked that a *marine biological station* might be maintained by Government in the island for the use of the students and biologists, the University itself making a material contribution towards the expenses.

Q. 60—Sriman Sasibhushan Rath elicited the answer that the *Rubber Mycologist* was appointed on 16th May 1921 and his period of contract expired on the 15th May 1925 and the entire cost of the officer was met by the U. P. A. S. I. to whom his services were lent during the period of his contract.

Q. 64—In reply to the question about the reconstruction of the left *flood-bank* of the Uppanar washed away by the floods, Government said that the proposals by the Cauvery Committee for improving the drainage of the area were being taken up in order.

Q. 68—Sriman Sasibhushan Rath asked :—“Why the option of reverting to the old *leave rules* has not been allowed to the subordinates who have already elected the new leave rules after the concession allowed in the note to F. L. R. No. 87-B has been withdrawn as was done when F. R. 81 was amended, and whether, in view of the fact that this change had adversely affected the interests of all Government servants drawing Rs. 300 and less, the Government propose to allow the option to revert to the old rules as a matter of right. ? Government said that the matter was under correspondence with the Government of India.

Q. 76—Mr. T. Adinarayana Chettiar asked “(a) whether it is a fact that (agricultural) demonstrators drawing Rs. 80 to 150 and those drawing Rs. 50 to 75 are allowed fixed *travelling allowances* of Rs. 5 and 10 respectively; (b) whether it is a fact that they are given jurisdiction over two taluks; (c) how many days on an average per month they travel beyond 5 miles distance from their head quarters; (d) how many days every month they remain at head quarters or travel only within 5 miles radius of their head-quarters on account of this restricted provision for their travelling allowance and (e) the reason for not allowing these demonstrators travelling allowance as the other officers of Government.” The Minister for Development replied that demonstrators draw travelling allowances under the ordinary rules and not fixed travelling allowance, that no definite area is prescribed and that they are expected to tour beyond the 5 miles radius for 20 days in the month. In reply to the question whether there was any restriction about mileage they could make, the Hon. Member was informed that they are paid according to rules applicable in the public service.

Q. 77—In reply to Mr. A. Chidambara Nadar's question as to whether the Government have come to a conclusion as to the establishment of an *agricultural farm* in Tiruchengod taluk, *Salem District* and if so, the place where the farm is to be established, Government said that they have come to no definite conclusion as to the site of an agricultural farm in Salem District, that it is proposed to open a paddy breeding station in Malabar and a sugarcane station in the Northern Circars in the course of the next two years and that the question of opening agricultural farms in other areas will be considered as and when funds permit.

Mr. T. Adinarayana Chettiar asked if it is possible to find some money out of the new windfall for opening *agricultural farms in other areas*, the Hon. the Minister replied that it is not possible. Sriman Sasibhushan Rath elicited the answer that the Government have no

idea at present about the location of a *sugarcane farm in the Northern Circars* but that as soon as information is received from the expert it will be communicated to the Hon. Member.

Q. 78.—To Rao Bahadur C. V. S. Narasimha Raju, the reply was given that after handing over of the sugarcane farm at Coimbatore to the Imperial department, the scope of operations at *Anakapalle farm* was extended, that there was only provision for continuing the Anakapalle farm, and that it cannot be said off-hand if there was not a provision made in the budget for 1924-25 for a sugarcane breeding station at Anakapalle and if it was allowed to lapse, Rao Bahadur C. V. S. Narasimha Raju enquired what steps are taken by the Local Government regarding stout sugarcane breeding and got the reply that no breeding work has yet been done for thick canes, but the Government Sugarcane Expert has been experimenting in several varieties imported from abroad, that such of the new varieties produced as seem to be most suitable will be transferred for test to the Anakapalle Agricultural station the area of which will, if necessary, be extended for the purpose.

Q. 79.—To Mr. T. Adinarayana Chettiar, the reply was given that the *re-organization* of the *co-operative department* was sanctioned in G. O. No. 378 dated 12 March 1295 and had been gradually brought into effect.

Q. 96.—In reply to Mr. A. Ranganatha Mudaliyar's question it was said that local boards were not in a position to take suitable steps to prevent *encroachments on country tracks* and that the matter was engaging the attention of Government.

Q. 105.—Government made answer that 52 *ayurvedic dispensaries* had been opened by local bodies during the 3 years ending 28-2-1925.

Q. 117.—In regard to *resettlement in Trichinopoly*, Government said that the scheme report was published in January 1924. Government orders were passed after a consideration of a memorandum by the Local Land owners' Association, that that association had forwarded a copy of the proceedings of the meeting held on 13th February 1925 and that it had resolved to send a deputation to the Governor, and if necessary one to England, but the resolution required no orders of Government.

Q. 119.—Mr. R. Veerian's question regarding money spent on the *Labour department* and for the amelioration of the depressed classes elicited the following statement :—

Year.	Department.	Amelioration.
1922—23	1,24,936	4,75,523
1923—24	1,91,907	5,61,825
1924—25	2,09,528	5,98,218
Allotment for 1925—26	2,35,300	7,76,390

This last includes Rs. 3,35,000 for loans for acquisition of house-sites, Rs. 2,06,300 for education and Rs. 1,42,490 for grants-in-aid (non-recurring).

Q. 167.—In reply to Mr. A. Chidambara Nadar, Government said that steps were being taken to improve the protection of the portion of the northern *bank* of the *Coleroon* lying within the limits of the Trichinopoly district.

Q. 174.—As regards *fixity of tenure* to the tenants under ryotwari land lords, it was given out that Government decided in 1914, after a detailed enquiry, that legislative interference on behalf of tenants in ryotwari tracts was unnecessary.

Q. 212.—By this question Mr. T. Adinarayana Chettiar drew attention of the Government to the hardships involved to traders and coolies engaged in the *manufacture* of crude and refined *saltpetre* by ordering the closure, with effect from 1st October 1925, of 300 factories that existed at present. The Government replied that this question was under their consideration.

(To be continued.)

REVIEWS.

Bud and Boll shedding in cotton

A Preliminary enquiry.

By G. R. HILSON, B. SC., V. RAMANATHA AYYAR, L. AG.,
R. CHOCKALINGAM PILLAI, L. AG.

The investigations that form the subject-matter of this bulletin were made on strains of Cambodia and on a Cambodia Bourbon cross, during the three seasons—1920 to 1923—at the cotton station Coimbatore. The systematic work involved is the first of its kind attempted in India. The authors have, in the main, confirmed the observations of Balls in Egypt, and of Lloyd, Harland and Mason in America.

Daily records kept of buds, flowers and bolls, (both formed and shed) of plants, have enabled the authors to point to the different stages of shedding and the periods of highest susceptibility to it. A large volume of data with curves are appended. A study of the causes for shedding reveals the fact that insects and diseases are only of minor importance and that the vast majority of cases fall under those causes which are labelled unknown. From the fact that the curves of bud and boll-shedding synchronise, the inference is drawn that the same agency must be at work in both cases. The authors also confirm the observations of Mason, and of Lloyd, that the period of greatest susceptibility to shedding is also one of growth retardation. From this the deduction is made that at the stage, when the growth of the plant begins to slow down, the plant is carrying many more reproductive numbers than it can possibly mature and a process of natural pruning sets in.

This leads us to the fundamental question which all research on the subject has to answer, namely whether shedding is a necessary phenomenon in the life of the normal plant or whether it is due to preventable causes. No definite statement on the point has yet been made. The subject is very complicated. A wide and varied series of causes in and outside the plant body brings about shedding. Mason finds an intimate connection between abscission and cessation of growth. Balls presumes, as the initiating factor a water deficit in the body of the plant. Amongst other factors which have been from time to time noted are:—Overluxuriant growth of plants, root interference and root pruning by cultivation, excessive drought, considerable precipitation followed by low evaporation and asphyxiation of roots in water-logged soil. Besides, there are genetic differences between plant and plant. It is obvious, from the host of causes now enumerated, that the subject requires a very wide and at the same time, specialised study.

The bulletin under review marks a distinct step in advance. It has lifted investigation to a point which enables definite experimental work to be begun. To all further work on shedding and to those interested in the problem, this preliminary is of much use.

“GOSSYPIMUM.”

Papers on Indian Tabanidae.

BY MR. P. V. ISAAC.

In the Memoirs of the Agricultural Research Institute, Pusa, (No. 5 Vol. 7 and No. 10 Vol. 8) Mr. Isaac has a series of papers on Indian Tabanidae.

Tabanids are a family of flies. The females of this family are well known for their bloodsucking habits while the males are more simple in their diet, living on nectar or the juices of plants and fruits.

The author first of all gives us a practical and simple method for rearing Tabanid larvae. He then discusses the number of moults in Tabanid larvae. Life histories of *Tabanus rubidus* and *T. Strialus* are also given in detail.

M. C. C.

Some Indian Species of the Dipterous genus *Atherigona*, Rondani.

BY MR. J. R. MALLOCH.

(Pusa Memoirs No. 11 Vol. 8).

The genus *Atherigona* belongs to the family Anthomyiade, order Diptera. Many of the species of this genus are destructive to cereal crops and grasses. Mr. J. R. Malloch describes in his paper 15 species and the key, based mostly on males, helps us to identify the species easily. Mr. Y. R. Rao's short note, added as an appendix, on the habits and food plants of some of the species is very interesting and it helps us to study the species in detail.

M. C. C.

New Indian Psyllidae.

BY DR. D. L. CRAWFORD.

(Records of the Indian Museum, Vol. 26, part 6, pp. 615-625). Psyllids are a family of bugs, generally small in size, belonging to the sub-order Homoptera. Mr. Lefroy, in his “Indian Insect Life” (1909) writes:—“No species has been carefully studied and very few are ever known. In the present state of Entomology their identification is practically impossible and the Indian species are almost wholly unrecorded.” I am sure when he revises his book he will have deleted these two sentences, for Dr. Crawford's study of the Indian Psyllidae has helped us to extend our knowledge of this family. Mr. T. V. R. Ayyar in his “List of Psyllidae recorded from India and Ceylon” mentions about 46 species in all.

Notes on the status of some parasitic Hymenoptera in South India.

Those of us who are interested in the biological control of insects will welcome the paper read before the Science Congress, Bangalore, in January 1924, by Mr. T. V. Ramakrishna Ayyar on "the status of some parasitic Hymenoptera in South India."

There are many methods of controlling insect pests mechanical, cultural, biological etc. Of these, the last method is receiving special attention at the hands of entomologists all over the world. The biological method consists in breeding parasites of various insect pests and helping them to do their work effectively to lay their eggs in or on their hosts. When full fed they generally construct silken cocoons inside which they pupate. In course of time the adult emerges and the process is thus repeated.

The author in his paper gives us a list of the more important members of the four families Braconidae, Ichneumonidae, Evanidae and Chalcididae. Under Braconides the most important are Apanteles and Microbracon species the former parasitising such well known pests as Amsacta, Prodenia, Chloridae etc. and the latter Earias, Adisina, Child etc. Four genera are represented in Ichneumonidae and one in Evanidae. The family Chalcididae has about 9 genera of which the most important Stenomacrus and Scutellista species the former a parasite of the coconut caterpillar Nephantis and the latter of the black scale of cotton, Lecanium Nigrum.

The Nim Mealy Scale (*Pulvinaria Maxima*, Green.)

Mr. T. V. Ramakrishna Ayyar in his memoir on "The Nim Mealy Scale" published by the Research Institute, Pusa, gives us a detailed account of the Coccid *Pulvinaria Maxima*, Green a pest of Nim trees found in and around Coimbatore.

Generally during the cold weather, according to the writer, the leaves and shoots of the Nim trees are seen to be covered over by thousands of white mealy patches. These are the egg-sacs deposited by the female insects. Each egg mass has about 650 to 900 eggs of light greenish yellow colour. The eggs hatch out in 12 to 14 days and the newly hatched larvae begin to feed on the sap of the Nim trees. As a result of this drain on the plant sap the trees present a blighted appearance. In the case of young trees they occasionally dry up. Not only the larvae but the adults also are responsible for the loss.

The best time, according to the writer, to tackle the pest is when the eggs sacs are being deposited. Pruning of the badly infested branches and spraying with Fish Oil Soap (1 lb. in 8 gallons) are recommended. It is gratifying to note that there are a few natural enemies such as *Scymnus Coccivora* (Coccinellid) and *Eublemma Scitula* (Noctinidae) which check the increase of this pest.

GLEANINGS.

A grave agricultural situation in England:—is the title of an editorial in an issue of the Farmer and Stock Breeder in August. This gives the area of arable land this year as 318,000 acres less than in 1914. Since 1918, the decrease in arable land has been 1,700,000 acres which is almost a sixth of what remains. The live stock census is a mixture of good and bad while the cattle figures are quite satisfactory and the total is well above the pre-war average with an addition of over 50,000 to breeding resources. There are more dairy animals and sheep have increased by about a million. Pigs and sows, foals and farm horses show a substantial decline.

Growth of Australian population:—From 1860 to 1923 the average rate at which the population grew was 2.25%, the average gain by immigration being 0.55%. The rate is similar to the American figures for the last century and approximates closely to the present position in Australia. Australia is faced with a choice between increased population with its corollary of greater national security and an easy going acceptance of the present easy going economic scheme.

Automatic Bowl. (Fleming's). Messrs. P & R. Fleming & Co., Graham Square, Glasgow, are the manufacturers of the individual automatic drinking bowl for farm stock and particularly Dairy cows. It is a matter of common knowledge that Dairy cows require from 15 to 20 gallons of good pure water per day for the production of maximum milk, and that cows must have continuous access to their water supply. *A cow drinks water when thirsty if water can be had.* It is obvious that *large quantities of cold water taken at one time are liable to produce injurious effects.*

The individual bowl system consists of an adequate supply of good pure water led through wrought iron piping to the automatic drinking bowl fitted at each cow's head. The bowl is well and strongly made easy to clean.

The advantages of the individual bowl system as given by users are:— (1) Increase of milk production varying from 10 to 25 per cent according to circumstances. It must be remembered that milk normally has 87 per cent of water content. (2) Improved general health of herd. (3) Cleanliness of system and the ease of dismantling fittings for sterilizing. (4) Low initial cost. (5) Saving of labour.

Besides these direct benefits there are many other indirect advantages by the use of the automatic bowl. The most perfect and up to date system undoubtedly is that in which each animal has a separate bowl for its own use and the individual drinking bowl system is the best yet devised for the efficient and proper watering of dairy and other stock, having regard to the maintenance of maximum production with accompanying profit to the owner.

(Extract from Scottish Farmer August 8th 1925.)

N.B.—I had two cows in milk at one time. Both were country cows. One was red in colour and the younger. The other was grey. It is my interesting experience that when water was given to both the cows in the same vessel, the red cow would never even touch the vessel, the red cow always wanted to get at the water trough first. But the grey cow showed no such punctiliousness. Even when the water was used by the grey cow in the absence of the red one, this latter had the sense to detect that the water had been used previously and so would refuse to drink out of the vessel. Served anew in another vessel she drank with all cheer. Interesting discrimination in a cow! Isn't it? Will other readers give their experiences.

S. N.

Bacterial nitrogen fixation:—The area under crops in America is on an average 375 million acres and 10 % of this area is under legumes. Bacteria in the root nodules of leguminous plants may fix 50 to 103 lbs. per acre of nitrogen per year and those living freely in the soil may store in their bodies 10 to 40 lbs per acre per year. Taking the average figures for nitrogen assimilation per acre per year as 60 lbs under legumes and 10 lbs under nonlegumes, the annual total effect will be one million tons of nitrogen fixed by root nodule bacteria and $1\frac{1}{2}$ million tons by nonsymbiotic soil bacteria making in all $2\frac{1}{2}$ million tons. The importance of this factor is very evident when we consider that commercial fertilizers applied annually to soil do not add more than 200,000 tons of combined nitrogen.

The nitrogen contained in all crops harvested each year is estimated approximately to be $4\frac{1}{2}$ to $5\frac{1}{2}$ million-tons. This is 2 to 3 million tons in excess of the gain due to bacteria. This excess must be covered mainly by nitrogen stored in the humus of our soils, which

represents approximately 2000 to 3000 lbs per year or 375 to 550 million tons for the whole area. This depletion in nitrogen produced a marked decline in soil fertility, which is very pronounced in the soil under cultivation for hundred years or more. The nitrogen in animal manure and that coming down in rain may reduce this, but the losses occurring in leaching, denitrification, surface washing etc. counterbalance the effect. The final result is a depletion of soil nitrogen in America.

This condition of things is remediable. In Germany, for example, bacteria supply nearly two-thirds of the nitrogen that crops need, while in America only one half is so supplied. Increase in the efficiency of bacterial nitrogen fixation and prevention of all available losses of nitrogen from manure and soil will bring about less depletion in soil nitrogen. This can be done first by increasing the area under legumes. With regard to bacteria in the soil attempts should be made to propagate the best strains and to give them conditions for working. Good tilth of soil, a reaction close to neutral, a sufficient supply of humus, lime, phosphate and potash and a carefully planned crop rotation are the conditions where both symbiotic and non-symbiotic bacteria can work most effectively.

(Journal of the American Society of Agronomy, August 1925.)

In addition to the above, the following observations in the same journal, of Brown and Hart in inoculation experiments with Azotobacter are worthy of note. Soil inoculation may increase the nitrogen content of the soil. Small quantities of nitrogen preferably as nitrates or ammonium salts increase this nitrogen fixing power. Fallow soils produce more nitrate under inoculation than cultivated ones. Cultivated crops give better results than those uncultivated. Soil cultures are more efficient in nitrogen fixing power than liquid cultures.

British Botany. At the present day the tendency of British Botany is once more towards concentrated application to Imperial needs of another sort from those of the Victorian age. Agriculture, forestry, plant pathology and plant breeding all rightly command the interest of young aspirants, and the state is beginning to offer the inducement of salary attainable in respect of qualifications. It is for those who direct the progress of the teaching of the science to higher course that they shall not by allowing too early specialization along applied channels send out specialists too quickly and imperfectly qualified. But the more grave risk is they should allow the central institution to lose again their hold upon the broad stream of pure science, as their predecessors did in the middle of last century by over-concentration upon special requirements.

(F. O. Bower in New Phytologist, 12th August 1925.)

Effects of castration on immature animals. Manual D. Sumulong, of the Veterinary College, Philippines working on guinea pigs summarises his results in the Philippine Journal of Science, July 1925. Chief of these are :

1. Castration of young and growing guinea pigs not only develops the attitude and temperament peculiar to the females.
2. Castration tends to cause a moderate acceleration of growth in body weight, length, height and circumference. The acceleration does not occur simultaneously nor immediately after the operation. The increase in length and height begins to manifest when the castrated animal is approaching the age of maturity and increase in weight and circumference only when it has reached or passed the age of maturity.
3. The vertebral column and long bones tend to grow slightly longer than normal after castration.
4. The general body conformation remains unmodified after castration.
5. The weights of internal organs and deposition of fat are not influenced by castration in young and immature animals.

Cereals in Rumania. Wheat. Total area is 2,690,341 hectares. Both hard and soft kinds are grown. When grown on a large scale it follows maize and on less extensive areas it comes after peas and beans or rape in a few localities, for several years in succession in the same field. If after maize the soil is only tilled once, in other cases twice. Sowing is done from September until winter commences. Drills are largely used but small farmers continue to broadcast. Before sowing the soil is harrowed and after, a bramble-harrow is drawn. Harvest is made between June 20th and July 25th, sickles being in large use. Threshing is done by hand, animal power or machine. In Busambia, Dobriya and Moldona, stone rollers are sometimes used.

Maize. is the principal food of the rural population and in 1922—23 occupied 3,405,492 hectares. Date of sowing varies from 1st April to 1st May. Seed is sown broadcast in clumps or with machines. Beans and marrows are grown between rows of maize. The crop is earthed up twice and harvest comes off from 15th September. Other cereals are barley, oats and rye. The barley area is fast increasing as it replaces wheat, the growing of which is subject to severe regulations,

Oats are sown in fields which have been planted with maize. Oat growing is carried on by small farmers. Rye is a winter cereal and is more extensive where the soil is sandy. (Substance of a note in the International Review of Science and Practice of Agriculture, Rome, No. 3 April-June).

These practices seem to differ little from those in vogue in this country to-day.

The Clove. This plant which was once of importance in South India is now confined to a few localities and the industry is almost extinct, the quantity of cloves imported being 7 million lbs. valued at 15 millions Rs. in 1900. Elsewhere it does better. Introduced from India and Malaya, it was grown on a large scale in Mauritius. From thence the seeds were taken to Zanzibar in about 1100 A. D. The destruction of the Mauritius plantations by cyclones and its cultivation enforced by the early Sultans have contributed to the present flourishing state of the industry in the Zanzibar group of islands which provide some 90. p.c. of the world's requirements and have about four million trees on 40,000 acres. The annual yield varies from 3,000 tons in a poor year to 14,000 tons in a good season. and the tree grows from 15-20 feet high. Zanzibar enjoys ideal conditions and lies between 5. 40 degrees and 6. 30 degrees, S. Latitude. It rests partly on coral formation and presents heights of red ferruginous clay which do not exceed above four to five hundred feet except in the north-west. The soils are fertile enabling two crops to be taken in a year.

The 'Clove of Commerce' is the dried unexpanded flower but gathered just before the flowers expand and when the buds have turned from green to pink. The buds are gathered by hand. Drying takes from 3-4 days in dry weather. Too fierce a sun causes loss in essential oil. "Mother of Clove" is the mature seed and is of less value than the clove with which it is mixed.

Y. R. R

"Bunching" or "Clumping" disease in ground nuts. Messrs. H. H. Storey and A. M. Bottamby of South Africa (according to Nature. Vol. 116. No. 2907) have proved that the disease known in Africa as Rosette which they believe to be identical with "bunching" is transmitted by insects. We learn that during recent years the cultivation of groundnut in parts of South Africa has been seriously handicapped by outbreak of this disease. The leaves of an affected plant become small, twisted and closely crowded, giving the plant a bunched or rosetted appearance. (Hence the name). These leaves are

yellow and in many cases show definite mottling. No seed is set by a plant diseased at an early stage of growth. Experiments made at Pretoria and in Durban showed that when aphids were removed from rosetted groundnut plants and allowed to feed on a single mature leaf of a healthy plant, the characteristic symptoms appeared afterwards in the young leaves while control plants remained healthy.

[In this connection we gladly publish a note on this disease kindly sent by the Government Mycologist and request readers to say what loss if any occurs in this presidency, where the latest figures show 1,811,190 acres under this crop-Editor.]

In the rainfed ground-nut plots in the Agricultural Sub-station, Palur, South Arcot District individual plants appear as if they are tufts of dwarf shoots with yellowed leaves and stand erect instead of spreading. These stop growing after a time. This disease has been called "Clump disease" as the plants grow in dense clumps. Only individual plants or a few in localised patches exhibit this character. Plants quite close to these are normal in their habits of spreading and bear well developed pods and this disease cannot therefore be considered to be transmitted through the soil. Nor is it confined to anyone variety or varieties. Almost all the 20 varieties grown are subject to this attack. This disease is not transmitted through the seeds. Apparently healthy seeds from diseased plants were obtained from the sub-station and sown in pots in the Pot culture house at Coimbatore. The plants that grew out of these were normal and developed no clump disease whatever. The ground-nut growers of this locality attribute this to adverse soil conditions and to immaturity of pods at the time of collection. The diseased plants were examined in detail and sections from all parts failed to show the presence of any fungus hyphae. The varieties badly affected by Clump disease in the Palur Sub-station are:—

1. Barbados Ceylon. 2. Carolina. 3. Local Mauritius. 4. Mauritius. 5. Senegal. 6. Transvaal. 7. Virginia Bunch. 8. Virginia Runner. 9. Virginia Mauritius. 10. West African.

S. S.

Count in Yarns. Yarns are always quoted by the pound, the price differing according to quality and fineness. The latter is indicated by numbers, from (1's) one's upwards: The limit of fineness in the mercantile article is about (300's). These numbers are arrived at in the following manner,

In the early days of the trade, when yarns could not be spun with the regularity that can be accomplished at present, uniformity was secured by reeling the yarn, and assorting the hanks according to weight. The circumference of the wheel was $1\frac{1}{2}$ yards, and the 80th revolution was indicated by a rap from a released spring, the length then wound being 120 yards or 1 "lea". When 7 leas had been wound, they were tied together, forming 1 "hank", or 840 yards. The number of these hanks in 1 lb indicates the fineness of the yarn, which is expressed thus—4's, 12's, 20's, 32's 40's 60's etc to 300's. From the lowest numbers it is customary to rise 1 hank at a time, up to 10's: thence steps of two hanks are generally taken up to 24's; then 4 hanks at a rise, up to 40's; after this, the gradation, though sometimes 5, is generally 10 at a step. Any numbers between these would be special, and would require to be spun to order.

Cotton yarns are always bought and sold by Avoirdupois weight, but in ascertaining the counts or numbers, it is necessary to subdivide the pound into Troy grains, of which it contains 7000.

The measure employed is as follows:—

54 inches 1 thread (or circumference of reel)

4320 „ 80 „ 1 lea

30240 „ 560 „ 7 1 hank or 840 Yds.

To ascertain the counts of a yarn, 7,000 is divided by the weight (in grain) of 1 hank. It is customary however to take a proportionately less quantity, say 1, 2 or 3 leas, the dividend being 1,000, 2000 or 3,000 accordingly. The quotient is the number of hanks in 1 lb, hence the number of the yarn.

S. N.

Cumin Seed. How neglectful methods of harvesting are proving harmful to the farmer is brought out in G. B. Patwardhan's account of an analysis of a few samples of cumin seed, which is largely exported from Bombay to America. Plantago seeds were a fair admixture. Plantago is a field weed in Guzerat which produces the same kind of seed as cumin and when cut with it is indistinguishable from it but lowers the quality of the produce.

(Poona Agricultural Magazine; September 1925).

Deep cultivation and ratoon crops of cane. In an experiment conducted on 500 acres of plantation in the West Indies, it has been found that deep subsoiling close up to the cane stools on either side

at depths of two feet and over increases these yields from about 10 tons to 20 tons per acre. The extraordinarily favourable result is probably due to the aeration of the soil and the greater penetration of the side roots into fresher soil. The effect has been found to last for several years.

(The Planter and Sugar Manufacturer, August 15).

What embargo has done for Queensland. The Queensland parliament is taking steps to stabilise the sugar industry. During the past 5 years the area under cane has increased from 160,000 acres to 220,000 acres and the number of growers from 4,000 to 6,000. An agreement has been entered into with the Commonwealth Government in respect to sugar crops for the next three seasons, a pleasing feature of which is the extension of the embargo on imported sugar. The disposal of the surplus production this year and last is an inconvenient problem, but the arrangements made for sales overseas and for reduced prices for and rebates on sugar used in jams, canned fruits, etc., will result in the rapid disposal of the excess. Thus writes a Brisbane correspondent to Planter of September, 12.

P. C. Patil states the effects of *farm prices on the labour bill* of the farmer in these terms:—"In agriculture wages do not fall in proportion to the fall in prices of farm products. Apart from inertia and increase in the standard of living the combination of wage-earner does not permit lowering of wages. The hands are not as organised as mill owners, where as the farm labour though not well organized has some combination while the farmers not only lack combination but on the other hand compete against each other in the labour market and so raise wages." Not only the wage bill but the bill of the farmers' requirements, such as clothing, implements and food products (other than those produced by him) remain comparatively high.

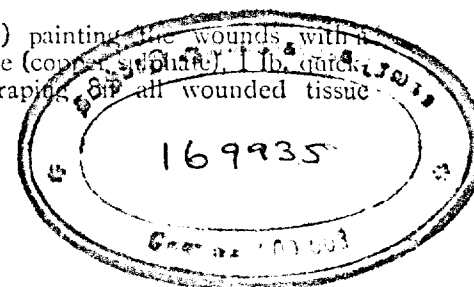
Floating wealth in America. From Mysore Economic Journal for July 1925, we learn that money is more plentiful in America than it has been for years. Call money on the New York Stock exchange today is as low as 2 per cent and loans outside the exchange at 1½ per cent. The federal reserve bank rate of discount now stands at 3½ per cent. Bankers' acceptances range from 2 to 2½ and commercial paper from 3½ to 4 per cent. Recently 150,000,000 dollars of federal Government loan were offered at 2½ per cent and the subscriptions totalled 600,000,000 dollars. In addition, industrial and business concerns have increased their capitalization and finance themselves by securities independently of banks. In May 1924, 625,919,200 dollars worth of corporate securities were floated and this is the largest on record.

In this connection the banking situation in India is well worth study and is as follows:—The clearing house returns in the last prewar year showed a total clearance of 650 crores. In 1920, with 109½ crores of capital and reserve, the banks held in India 235 crores in deposits. In 1923, the corresponding figures were 131 crores. The seven larger cooperative and provincial banks have a total capital and reserve of 57 lakhs and the deposits and loans received amount to over 4 crores as against only 15 lakhs when the war began. The smaller co-operative banks are 72 in number, with a capital and reserve of 15½ lakhs and the deposits and loans received amount to 6 crores.

"*The effect of grass on trees*" by Alfred Howard reproduced from the proceedings of the Royal society, is a highly interesting and practical contribution on the elusive problem which confronts the horticulturist. The paper deals with observations made on both fruit trees and forest trees. The first comprise mango, guava, custard, apple, sour lime, and a few others. The effects of grass on these were harmful and varied with the species and with the period in the life of the tree where the grass is planted. Young trees are more adversely affected than fully developed individuals which contain large quantities of reserves. Deciduous species suffer more than ever-greens. The grass is harmful in two ways by restricting the aeration of the surface root in the monsoon and by reducing the supply of combined nitrogen during the whole year. The forest trees behave in a different way altogether. Here the deep root system admits of growth during the dry season when the grass is dormant and enables the tree to utilize the moisture and food materials in the soil down to at least 20 feet. This markedly extends the period of assimilation. The habit of the plant is a great advantage in the struggle for light and the active roots of the surface system are resistant to poor soil aeration and are able to reach the surface and to compete successfully with the grass for oxygen and for minerals.

M. N. Kamat writing on a few treatments made for remedying Gummosis on citrus trees in Poona and Ahmadnagar observes that the outward symptoms are an abundant exudation of gum in patches on the trunk of the tree, usually at the collar and sometimes through wounds on branches and scale buds. These patches or wounds, in severe cases, form a regular and complete ring round the collar. The tissues become soft and peel off.

The treatments given were :—(1) painting the wounds with a paste consisting of 1½ lbs. of blue stone (copper sulphate), 1 lb. quicklime with 2 gallons of water (2) scraping off all wounded tissue



cleaning the wounds with a strong jet of pure water and painting the wound with a 50 % solution in water of crude carbolic acid and covering over by a paint of coal tar to prevent further exudation and as a disinfectant. These are reported to have given satisfactory results especially No. 2.

G. B. Patwardhan gives a description and history of a useful plant (*Khaya Senegalensis*) introduced from Calcutta into the Ganeshkind Botanical Garden Poona in 1905. This plant is known as African Mahogany and is a native of Tropical Africa. At Poona, on soil 5-5½ feet deep it has grown to a height of 57 feet in 20 years and its girth 30 feet from the ground is 3½ feet. On account of its straight growing habit and paucity of branching, Patwardhan considers it best suited for planting on alluvial banks of rivers and edges of cultivated fields. It is a valuable timber tree and its bark is also useful for tanning.

(Poona Agricultural College Magazine).

The Land Bank of Southern Rhodesia-1924 was established primarily for the promotion of agricultural and pastoral interests. Money could be advanced to landowners on mortgage of land within the colony, or on note of hand, and to co-operative companies or societies. Collateral securities are accepted in practice, but the ownership of land is *a sine qua non*, except to holders of Crown land under "agreement of purchase," or to intending purchasers of land who should however immediately register transfer of property simultaneously with the passing of the bond to the Land Bank. The bank is conducted on business lines and sufficient and proper security is absolutely insisted on, the maximum advance made is £ 3,000, which may be increased to £ 5,000 with special permission of the Governor for large agricultural works and improvements. The period of repayment ranges from 5 to 30 years and payment is done by instalments, calculated in all cases on a basis of 6 per cent interest. Applicants fill in prescribed forms which are sent with fees for application and valuation to the Magistrate of the district who forwards it to the nearest valuator for valuation. A meeting of the board considers the merits of the case, which if accepted, the necessary legal procedures are adopted. The average time between application and receipt of money varies from 6 to 8 weeks. The applicant assumes responsibility to meet the regular instalments on due dates and to carry out the purposes specified for the loan in addition to maintaining land and buildings in good condition and to insure the latter when necessary. (Rhodesia Agricultural Journal, August 1925).

S. N. V.

Pests and diseases:—Sugarcane :—What is described as "streaked disease" is reported from South Africa. In the whole of Natal and Zululand, the two principal sugar growing sections, where canes take two years to mature no area is free from this disease :—it is said by the Planter and Sugar Manufacturer that this disease is transmitted by planting diseased cuttings, a plant once affected has never been known to recover and so far P. O. J. seedlings alone have shown any freedom from this disease. The only symptoms of value are the leaf markings. The leaf of an affected cane plant exhibits on its whole surface a pattern produced by broken, narrow pale stripes running in the direction of the veins of the leaf and thus characteristically differ from pale areas in mosaic which are of irregular shape and always spread unevenly laterally over several veins.

Notes.

Phosphorus in milk. H. D. Day writes in the Biochemical Journal (Cambridge) Volume, XIX, No. 3, that at least two acid-soluble compounds containing phosphorus in organic combination are present in cow's, goat's and human milk, one compound being readily hydrolysable by extracts of various tissues and by dilute acids, and one being considerably more stable.

The more readily hydrolysable compound is present to the average extent of 4.4 mg. per 100 cc. in cow's milk, 13.3 mg. in goat's milk, and 3.3 mg. in human milk. In the last two milks the acid-soluble organic phosphorus compounds account for from 10-25 per cent of the total phosphorus of the milk.

Both the hydrolysable and the stable phosphorus compounds pass readily through a collodion dialysing membrane which holds back protein.

Though not acted on by pepsin or trypsin, and only slowly attacked by pancreatic juice, the hydrolysable ester is probably broken down by the intestinal juice before absorption. Extracts of many tissues are also able to hydrolyse this phosphoric ester.

Poultry. Those who feed some soft food-most only feed grain—should, in the moulting season, make up a tonic powder specially useful for moulting fowls by compounding two parts of powdered charcoal, one part flowers of sulphur, and half a part sulphate of iron. One table-spoonful will do for 20 fowls.

Chickens hatched, say, in January to March generally lay from July to September. If not, there is something wrong with the strain the feeding or the environment.

Young turkeys are susceptible to sore-head or chicken-pox due to their sleeping in the same spot every night among their own droppings. Give them a clean spot, administer Epsom salts through drinking water or in some soft food, paint sores with tincture of Iodine, or cauterize with an old needle made red-hot. an old knife-blade can serve the same purpose.

A New Use For Raisins. The raisin growers of America report having discovered a new use for raisins. They are found to be effective as an afternoon bracer to take away "that sleepy feeling." It is reported that a number of large business corporations are now serving a small package to their entire office force as a mid-afternoon bracer. One of the best known newspaper offices in Canada has arranged for small packages of raisins to be passed among their employees each afternoon, and every employee from the printer's devil to the President takes ten minutes to refresh himself with a handful of appetizing and healthful raisins. The practice might be well adopted here. (Federal Dept of Markets and Migration, Melbourne.)

Y. R. R.

How to reduce rat population.,? Barium Carbonate and squill are the best materials (Says the Journal of Union of South Africa). They should be mixed with some fat, made into a paste and smeared over the slices of bread (or thin rice cake Ed.). Press two slices with the smeared surfaces touching each other to form a sandwich cut up into small squares and distribute around the rat-holes. Touch the baits as little as possible with your hand, as otherwise rats with their extraordinarily developed sense of smell refuse to approach them very near. Leave water in shallow vessels so that rats can drink it as this poison induces thirst in them. Water when it gets into their stomach dissolves the drugs and hastens the poisonous effects.

Y. R. R.

Rice Cultivation and Tractor Ploughing. In a neat little article on the subject, Mr. H. W. Jack writes in the Malayan Agricultural Journal for May 1925 that "at Pulua Gadong paddy station at Malacca a block of 5 acres was ploughed and harrowed with a Fordson tractor in 1922 and some 7 acres of additional new land were ploughed and harrowed in 1923 using a caterpillar type of tractor—the Cletrac—, that with the Fordson 2.9 acres were ploughed, working 8 hours a day, at a calculated cost of 8.50 dollars and cost of harrowing twice was 2.30 dollars so that cost of preparation would be 11 dollars and figures

with the Cletrac were much the same. These costs do not include cost of machinery or transport or interest on capital or depreciation or supervision.

In contrast, buffalo ploughing costs in Malacca were 2.50 dollars per acre including buffalo and implements. Harrowing and rolling cost about the same. In Malaya, ploughing takes 5-6 days, harrowing 3 days, and rolling 1-2 days or 9-11 days per acre in all; and under departmental supervision, all the operations paying wages at 50 cent. per day of 5 hours, were accomplished at a cost of 5 dollars an acre exclusive of cost of upkeep of buffaloes.

He concludes that the economy and suitability of using buffalo in preference to mechanical power, under existing conditions of paddy cultivation is apparent.

Rural Economics:— The Polish Republic, says Alfred Wood in the International Sugar Journal for August, has 73 beet factories and 403,632 acres under beet, has an average population urban and rural over the whole country of 29 per 100 acres. The total population of Germany averages 51 persons per 100 acres. The corresponding figure for England and Wales is 98 per 100 acres. Taking the agricultural area alone, 29 persons live upon the land per 100 acres in Poland and 20 in Germany. The area in England and Wales of arable land and grass is 25,876,797 acres and not more than 3,764,506 persons live upon the land, an average of 14 persons per 100 acres. In comparison with Germany, there is a shortage on English agricultural land of 1,500,000 persons or 300,000 families though England is twice as thickly populated as Germany. It is not therefore surprising that England depends so much upon her colonies and dependencies for her food.

Scorpion Bite. The irritation caused by insect bites is owing to formic acid or some other substance that the insect injects for the purpose of thinning the blood and preventing its coagulation until it can be sucked in. The itching ceases when the acid is neutralised by an alkaline application, as Ammonia, Soda, Limewater, Glycerin; or Carbolic soap. The application should be made immediately after the bite, before scratching has abraded the skin and given an opportunity for the germs of inflammation to infect it. Scorpion bite causes an inflammatory and often painful swelling, together with dizziness, faintness, nausea, blurred vision, headache numbness of the extremities and even paralysis. It is best to apply Ammonia or Tincture of Iodoine and to give some strong coffee or some stimulant to drink.

Strychnine in Sandal. A sandal tree that was found growing besides a *Nux Vomica* plant was received from the Forest department to investigate the presence of strychnine in various parts of the tree. A search for strychnine in various parts of the tree showed that the small roots contained about 0.34 per cent of it and that the bark up to three feet from the ground contained 0.31 per cent of the same. The white wood up to three feet height was found to be very slightly bitter, indicating the presence of only very small quantities of the bitter principle. The heartwood is practically free from all bitterness whereas the leaves are extremely bitter.

After oil has been distilled from the heart wood, further examination of the materials on hand will be undertaken.

(Mysore Agr. Dept. Administration Report 1923-24). G. N. R.

Sugar Notes. Dr. Prinsen Geerligs has a resume of the Hawaiian sugar industry in a recent number of *Die Indische Mercur*. He says that the first two tons of sugar were exported from the Islands in the year 1837. In 1855 the United States agreed on a reciprocity treaty whereby Hawaiian sugar was to pay 40 per cent duty on entrance into this country. In 1876-77 Australia came to Hawaii and wanted sugar and Dr. Geerligs seems to think that the island was within a hairbreadth of becoming an English possession and this compelled the Americans to drop the duty. The first sugar factory was erected in 1835 at Koloa and in 1861 the number had risen to 22 of which 9 were operated by steam, 12 by water power and one by oxen. In 1893 the island became a republic and was incorporated into the United States in 1898. Irrigation schemes were begun as early as 1857. In 1914 there were 58,650 acres of irrigated land. The cost is 70 dollars an acre or 42 dollars per ton of cane raised. The cane area is given at 568,000 acres or 228,000 hectares.

(The Planter and sugar Manufacturer Vol. LXXIV, No. 21)

Sugar in Canada:—There are seven refineries in Canada and they made in 1923, 420,000 tons sugar of which 19,700 tons were from sugar beet, grown on 22,450 acres, the yield being 216,000 bushels and Canada imported in 1924, 420,000 tons of raw sugar.

Cuban Sugar Crop:—The total sugar received at the ports up to 30th June, says the Planter and Sugar Manufacturer, was 4,264,739 tons; the local consumption was 80,000 tons and the quantity exported was 3,003,394 tons. Europe took 783,876 tons, China and Japan 34,018 tons, S. America 24,318, Canada 76,167 tons, the balance went to the U. S. A.

Cane area in Spain this year was 1,488 hectares and was cut in April and May.

Sugar Industry in Portuguese East Africa. The chief centre of cane culture is the Lower Zambri valley, where the Sena Sugon Estates Limited cultivate a large area and own four large factories, three of which have a capacity of 15,000 tons a year and the fourth 20,000 tons. A second organization is the Compantua Colonial do Buzi which has two factories with a total capacity of 16,000 tons of sugar per annum.

In the Lourenco Marques district the Incomate Estates have a factory with a capacity of 15 thousand tons.

Near Inharrime, the Mahamba Estates possess a small factory.

The exceptional floods last year reduced the season's output and this country bids fair to augment its production.

Sugar. Americans consumed during the first half of this year over 3 million tons of sugar. Based on the 10 yearly average their consumption during the next six months is 16 per cent less. Thus their 1925 consumption would be about 5 and a half million tons.

South Africa is importing foreign sugars.

If Imperial preference were non-existent, West Indies and Mauritius would cease to work on remunerative lines at present low price levels.

The American President has decided to maintain the existing sugar import duty.

In the Nile valley and Natal only thin and hardy canes of the Indian type are grown.

Beet Sugar. In England last year 22,637 acres were under beet and this season 60,000 acres.

Synthetic farm yard manure. Very laudable attempts have been made during the past 70-80 years to make good the loss occasioned by cropping. The latest attempt in this direction is the preparation of a manure from waste material in a farm. It has been claimed for this manure that it possesses all the properties of farm yard manure and will supplement the present inadequate world supply. This dispenses

with the maintenance of farm animals which are considered a necessity in cropping and the agency employed in the synthesis of this new form of manure is added bacterial stimulants. As a result of recent investigations, writes Prof. F. Hardy in *Tropical Agriculture*, it has been demonstrated that the decomposition of plant residues through the activity of micro-organisms takes place in several stages.

Technicalian's luck. Small departments cannot hope to offer the prospects necessary to attract the best type of research workers. There can be no adequate means of checking the quality of the work performed. There can be no opportunity of transferring men whose idiosyncrasies may make them unsuitable as colleagues in a particular department. Above all, those qualities which make for enthusiasm in research are rare and should be given an outlet other than that provided by promotion to executive or administrative experimental posts. It is indeed rare when a research department is placed under the control of a many functioned department, the best results are obtained. Thus write the Commissioners on Scientific Research and the Amani Institute.

(*Tropical Agriculture*. 'September, 1925).)

Cooking vegetables. Remember that in cooking most vegetables should be put on in freshly boiling water. Salt should be added when they are about two-thirds done. Lying in very cold water for an hour or more will partially restore to wilted vegetables quality and freshness. Every green vegetable should be cooked rapidly and covered to retain its colour. If the water is very hard, a tiny bit of soda added, no larger than a pea, makes the vegetable cooked in it tender and of better color. Ordinary water does not require such addition. When soft water is used the salt must be in from first to prevent loss of flavour and substance. Cooking a vegetable after it is done toughens hardens and detracts from its flavour. The best dressing for vegetables at their perfection is seasoning with butter paper and salt or other suitable stuffs.

(*The Jamaica Journal*—July 1925.)

The City of Glasgow has got a severe snub from the Parliamentary Committee which has been considering that city's claim to swallow up large sections of the counties of Lanark, Renfrew and Rumbarton. The Committee has ruthlessly excluded the whole of the middle ward of Lanarkshire from its grasp and it has also refused sanction to its grabbing big slices of Renfrewshire and Rumbartonshire. The reason of the opposition to the demands of the City is the essential injustice of including square miles of agricultural land within the ratable area of a big city.

Germination tests made by L. B. Kulkarni on *Andropogon purpureosericeus* and a few other grass seeds from Bombay in the Seed-testing department laboratory at Washington have shown that *Andropogon purpureosericeus* germinates readily over a remarkably wide range of temperature conditions.

(Poona Agl. College Magazine.)

B. B. Joshi names a few earlier *modes of castration* which were extremely painful and describes the Emasculator method as the best and most widely practised of the less painful and more modern methods:—emasculator, vasectomy, bisection, vasoligation and vas-occlusion.

(Poona Agl. College Magazine.)

Cinnamon has marked antiseptic powers, the scent of which is said to be fatal to microbes. A decoction should be taken freely by persons living in places affected with typhoid fever or cholera. Decoctions of cinnamon bark will cure cancer in early stages.

(Poona Agl. College Magazine.)

The House of Commons has sanctioned the introduction of a bill whose object is to authorise local authorities to pay *compensation for animals slaughtered* on account of their being affected with tuberculosis or suspected of being so affected. The compensation to be paid may vary in amount up to three fourths of the amount of compensation awarded to their owners:—

(*The Scottish Farmer* July 18, 1925).

Royal Commission on *Indian Currency. Personnel*—The Right Hon. Hilar Young (President), Prof. Coyajee, Sir Maneckhji Dadhaboy, Sir Rajendranath Mukerjee, Sir Purushothamados Thakurdos, Sir Norcott Warren, Mr. E. W. Preston, Sir Henry Straosch, Messrs. A. V. V. Ayyar and Buxter (Joint Secretaries).

Indian Science Congress. The 13th annual meeting of the Indian Science Congress will be held in Bombay on January 4th to 7th, 1926. His Excellency Sir, Leslie Wilson will be the patron and Mr. A. Howard C. I. E. the President. The sectional presidents will be:—Agriculture Mr. G. S. Henderson. (Pusa); Mathematics and Physics Prof. Meghanath Saha (Allahabad); Chemistry—Dr. B. B. Day (Madras); Zoology; Prof. H. R. Mehra (Benares); Botany. Rev. E. Blatter (Bombay); Geology—Prof. B. Sahni (Lucknow); Anthropology—Mr. N. Subramania Ayyar (Travancore); Medical and Veterinary Research—Dr. R. Row (Bombay); Psychology—Dr. H. H. Bhattacharya (Decca).

The *Edinburgh and East of Scotland College of agriculture Farm* was opened on July, 18 by the Secretary for Scotland. It was purchased in 1922 and taken over in 1923. Its primary objects are (says the Scottish Farmer, of July 1925) to provide facilities for research on farm crops.

Grape vines. Immature sour thinnings of grape vines are no waste. An excellent preserve can be made from them, the flavour of which is agreeable.

How to make Ice cream. 6 lbs. cream (22 per cent butter fat) 18 oz., sugar and the juice of four lemons and two oranges or some flavouring (or in similar proportions) make excellent cream—says Miss M. Steward of the Dairy School, Kilmarnock.

Inbreeding per se is not injurious provided the animals inbred are of sound stock and there is a careful selection of the individuals that are used for breeding—says Dr. Helen Dean King of the Wistar Institute of anatomy and biology.

Europe has economised on *land*—U. S. A. on *labour*.

Labour. The workers in coal mines in England work seven hours a day.

Land and Estate sales:—Of the sales reported in the Farmer and Stock Breeder (a recent issue) the following are noteworthy in view of the situation in this Province.

One farm of 163 acres in Lancells was disposed of in auction for £ 4,050. Free held estates comprising 350 acres in a part of Hertshire realised in auction a total of £ 24,250.

Two freehold farms near Newcastle, comprising in all 530 acres of arable pasture and plantation land were sold at £ 10,600.

Live stock:—H. F. Hungreford, Manila, says that efforts now made in Philippines at breeding cattle for the meat market by importing Australian herds, Polled Angus, Herefords etc. are not in the best interests of the agriculture of the country.

Jules Stoklasa (Prague) and J. Penkava state that *photosynthesis* in the chlorophyll cell in plants is assisted by Beta and Gamma rays emitted from various radio-active substances.

Plantains:—The consumption of bananas in the British Isles is one stem per head per annum, in the U. S. A., the same, and in Canada not half a stem per head, while in Germany, Holland, Belgium, and France they have no bananas today. What is it in Madras? We had 124,000 acres in 1923-24 and one acre carried over 800 plants.

Research schemes in Ceylon:—At the Board of Agriculture meeting in Kandy this month (September) the resolution that the Board should support the proposal to establish a Tea Research scheme, received very warm support both from the planters and the Governor. His Excellency explained the present position and said that before long a coconut research scheme would also become necessary and hoped that the local legislative council would also consider it essential. (The Madras Mail)

A *Central Cotton Research station* is to be opened in Trinidad by the Empire Cotton Growing Corporation, says the Journal of Depart: of Union of South Africa for September, 1925. This is intended to investigate the cotton plant in all phases of its growth to ascertain and estimate the importance of the several factors which contribute to the final result.

A grant of Rs. 3,027,432 has been sanctioned for opening an agricultural *research station in Sindh* in connection with the Lloyd Barrage scheme and Dr. H. H. Mann Director of Agriculture, Bombay has been put in charge of the scheme.

Rice. The (July) Jamaica Journal quotes from the California Countryman, that the Japanese type of rice is grown almost exclusively in California. This is a short grain non-glutinous type and majority of the rice is marketed in the Hawaiian Islands and Japan the Americans showing a preference for the long or medium grain, rices.

Siam. Cheengmai—an inland tract comprising the two provinces of Payab and Maharal has a population of one and a half million including 2,000 Indians; of late years an increasing quantity of rice has been exported. There are several mills which husk rice. The rice export business has given a stimulus to agriculture.

(Journal of the Royal Society of Arts. No. 3799).

Sugar crop in Cuba. Sugar made up to 20th July was 50,00,000 tons an increase of a million tons over the record crop of last year.

Weather. Louisiana. Sufficient rains were received in all sugar sections this month (August) and the crop is reported to progress favourably.

Wheat. America thinks that in her own interests, the present excessive wheat acreage should be reduced if possible by substituting beet as their production is today not well balanced and large quantities of wheat and other commodities are produced only for export to foreign markets over which the U. S. A. has no control, while sugar which she imports in large quantities from Cuba is little grown

Estate Notes.

Messrs. H. Narahari Rao, Under Secretary to Government and M. K. Venkatachariar, Ag. Registrar of Co-operative Societies paid a visit to the College and the latter met in an informal meeting the Principal and certain senior heads of Sections.

Students' Corner.

August—September.

Games. In connection with the Rony cricket tournament, we played three matches. Against the Coimbatore College we scored 75 runs, all told, winning the match by a narrow margin of nine runs. We lost to the Stanes' High School and the Gymkhana. These defeats were mainly due to want of good fielding. We also lack good hitters out. This game requires more student participation than at present.

With the approach of the Hockey tournament in October, more interest will centre round hockey, in which game, one side—especially the defence requires much reinforcement. We played two matches with outside teams. We won the Coimbatore College by two goals to nil and lost against the Foresters by four goals to one. Two matches were played between officers and students, in which the former won.

In football also, the students' team suffered similar defeats. In tennis we are having a very busy season. The courts are always full and it is probable that a series of matches will be arranged between the officers and students.

None of the teams, in general, have materially been strengthened by student additions this year. Notwithstanding this, there is a keener interest in games than last year. This is a hopeful sign of the future.

Students' Club.—For the first time in the annals of the club the system of starting work with an inaugural address by a public man was introduced. Mr. R. K. Shanmugam Chettiar, M. L. A., gave the address on 'culture' under the Presidency of Principal R. C. Broadfoot. Their speeches are published elsewhere in this issue.

Prices of the Principal food-grains and salt in the Madras Presidency in June.

	Rice.	Ragi.	Cholam.	Cumbu.	Salt.
Ganjam	5.7	15.7	0.00	0.00	16.1
Vizagapatam	5.6	12.2	0.00	1.11	14.1
Godavari (East)	5.9	11.4	10.2	13.0	13.2
" (West)	6.3	10.9	8.6	9.5	15.3
Kistna	5.8	10.1	8.7	10.0	14.3
Guntur	5.6	10.0	8.8	8.5	17.4
Kurnool	5.2	11.0	10.5	9.2	13.9
Bellary	4.9	10.7	9.4	0.00	12.3
Anantapur	5.6	9.8	9.7	9.7	13.6
Cuddapah	5.0	10.1	10.1	8.6	14.4
Nellore	6.0	9.9	9.4	8.9	18.8
Chingleput	5.7	8.5	0.00	0.00	19.7
Madras	4.7	7.7	0.00	0.00	20.2
South Arcot	5.0	7.7	0.00	6.7	17.4
Chittoor	5.5	9.0	0.00	9.0	16.4
North Arcot	5.4	8.2	0.00	7.5	16.9
Salem	4.8	8.3	7.0	6.5	13.9
Coimbatore	4.7	7.5	6.6	7.3	13.8
Trichinopoly	4.5	7.7	8.2	6.5	13.9
Tanjore	4.6	6.4	0.00	5.8	17.8
Madura	4.8	7.8	8.0	6.3	15.8
Ramnad	4.4	7.7	9.2	7.2	17.0
Tinnevely	5.4	9.2	8.4	6.5	19.4
Malabar	5.2	0.00	0.00	0.00	14.5
South Kanara	5.5	0.00	0.00	0.00	16.0
The Nilgiris	4.9	6.9	0.00	0.00	10.3

(Figures represent number of seers (imperial) of 80 tolas per rupee)

Vital Statistics:—Total for 81 Municipal towns in Madras in June is Births 8,113; deaths 7081 For 82 Rural towns births 3,362; deaths 1,995. For 52,198 villages births 96,000; deaths 60,006.

June rainfall in inches.

Ganjam, 9.76; Vizagapatam, (A) 9.75; (L) 5.86; East Godavari, 4.57; West Godavari, 5.63; Kistna, 5.26; Guntur, 3.58; Kurnool, 1.99; Bellary, 0.84; Anantapur, 0.58; Cuddapah, 1.05; Nellore, 1.32; Madras, 0.23; Chingleput, 0.97; South Arcot, 1.97; Chittoor, 1.51; North Arcot, 1.21; Salem, 1.64; Coimbatore, 1.39; Trichinopoly, 2.82; Tanjore, 0.76; Madura, 1.67; Ramnad, 1.94; Tinnevely, 1.06; Malabar, 32.08; South Kanara, 52.15; The Nilgiris 10.04.

Area cultivated in Government and minor inam villages in Madras from April to June 1925. (Areas in hundreds of acres omitted).

First crop.—Ganjam, dry, 1 60, wet, 10, 3; Vizagapatam, 36, 5; 30, 9. Godavari, East 21, 0 & 9, 2; West) 15, 5 & 25, 6 Kistna, 1, 7 & 2 Guntur 6, 2 & 3 Kurnool 7 1 & 3. Bellary, 7, 9, & 8. Anantapur 101 & 4, 2. Cuddapah 3, 6 & 4, 5. Nellore 1, 5 & 1, 7. Chingleput 10, & 14, 2. South Arcot 30, 0 & 28, 2. Chittoor 5, 6 & 8, 0. North Arcot 469 & 286. Salem 997 & 208 Coimbatore 1382 & 62. Trichinopoly 56 & 47, Tanjore 26 and 12. Madura 205 and 160. Ramnad 45 and 21. Tinnevely 166 and 212. Malabar 411 and 1527. South Kanara 156 and 1276. The Nilgiris 60 and 9 Total dry 5707 acres wet 5204 acres.

Seasonal conditions of the Madras Presidency in September.

The Director of Agriculture writes:—

Fairly good rains were received in the last week of August in the Circars, Deccan, and on the West Coast and Hills, but there was little rainfall in the other districts. The rainfall in August was satisfactory except in Salem, Madura, Ramnad and Tinnevely.

The monsoon slackened on the West Coast after the first week of September. In the other districts also, the rainfall in the month has been defective so far.

On the whole, the South-West monsoon was up to or above the average in the Circars, Chingleput, and the West Coast; it was in defect in the other districts, especially Bellary, Salem, and Coimbatore.

2. Water-supply is good in the Circars and on the West Coast; it is sufficient in parts elsewhere but inadequate in Bellary, Anantapur and parts of the Central districts and the South. Tanks in Kurnool, Cuddapah, the Carnatic districts, Chittoor, and North Arcot contain partial supplies.

3. Except in Bellary sowings on dry lands up to August have been satisfactory owing to the fairly good rains of July. The season for *mungari* or early sowings is now over in Bellary. The total area sown on dry lands was ten per cent. greater than the average; it was however less than last year by three per cent, the main decreases being in Bellary and Coimbatore.

Sowings on wet lands exceeded the average and last year by more than ten per cent.

4. Standing crops are generally fair, but crops in parts of Tinnevely and dry crops in parts of the Madanapalle taluk of Chittoor and the districts of Coimbatore and Trichinopoly have been affected by drought. Standing crops in parts of East Godavari, West Godavari and Kistna were slightly affected by the heavy rains of August. Paddy alongside rivers in parts of South Kanara was affected slightly by floods in August. Cholan in parts of the Hadagalli Taluk of Bellary and dry crops in parts of the Anantapur district were affected by grasshoppers. As the crops were young, the lands were mostly resown and the damage was slight.

5. First crop paddy is being harvested on the West Coast, and the yield is good; the harvest of first crop paddy has commenced in Trichinopoly and Tanjore with fair yields. Irrigated ragi and early cumbu have been harvested in parts of the Circars, Carnatic, and Central districts, early gingelly in the Circars and Chingleput, and groundnut in Coimbatore. The yields are generally fair. Cotton in the South has given fair summer pickings.

6. Grazing is generally available except in parts of Salem and Coimbatore. Fodder is generally sufficient.

7. Prices of foodgrains are lower than those of the corresponding period of last year in most districts.

8. Prospects are generally fair. But the condition of the dry areas in the Coimbatore district is causing anxiety. There have however been good rains recently in parts of the district and prospects are likely to improve.

Editorial Notes.

CO-OPERATIVE DEPARTMENT.

The cooperative department is entering on a new phase of life and this is amply testified to by the reorganization of the department early this year providing for a larger organization and development of the non-credit side. This implies work in the villages and staff conversant and wholeheartedly sympathizing with the rural conditions and it is surprising that in manning the department this consideration which should dominate other considerations seems to have not been given due weight. We submit that in March last, the working committee of the Union pressed the claims of duly qualified agricultural graduates for appointments in the co-operative department. The Minister of Development during the last conference indicated that the claims of agricultural men would not be forgotten and Mr. C. V. Venkataramana Ayyangar, M. L. C. appealed for better co-operation between the agricultural and co-operative departments and forging the connecting link between the two departments. Still it is regrettable to note that not one among agricultural B. Sc. Ag's (some even hold double degrees) was taken by the co-operative department and we shall not be surprised if for want of intimate knowledge of agricultural conditions on the part of the executive staff now entertained, progress in co-operation is not so rapid as it would otherwise be. We will quote from a recent memorandum of Sir Horace Plunkett—the father of co-operation in the British Empire. He says "It is not enough for an organizer to have an enthusiasm for his task and the gift of influencing audiences. He must in addition have four special qualifications. He should be educated in at least the elements of agricultural science so that he will support intelligently the technical officers of the Government's agricultural departments; he should understand agricultural economics including the keeping of accounts with special regard to costings and marketing, he should be a practical farmer preferably one who is known to have farmed to a profit and lastly he should know thoroughly the technique of co-operative organization." We still hope that the co-operative department will find it possible to take in agricultural men early enough so as to further the cause of rural development.

THE SWAMIKKANNU MEMORIAL FUND.

It is a melancholy record we have to make in referring to the unexpected demise of the Hon'ble Dewan Bahadur L. D. Swamikannu Pillai in September. The late Mr. Pillai was the officiating Director of Agriculture in 1920 and did yeoman service in pushing

through the claims of Indians for higher posts in this department. Not only in this department but in his capacity as Secretary to the Board for several years, his services were ungrudgingly given to the cause of the country. Born of humble but respectable parents he worked his way through till he attained a position which is coveted by all Indians:—the elected President of the local legislature. Mr. Swamikannu was a man of great talents, a deep classical scholar, a vigorous thinker and had not trammels of office interfered, he would have risen very high in the scientific world and left an undying name. Even as it is his astronomical lore which is epitomised in his Ephemeris is sure to carry his name through to several generations of his countrymen and of earnest students of astronomy. A pious Christian, a sincere patriot, his loss is severe and the Madras Presidency will, we hope, unite in paying homage to him in the only way possible by trying to follow his principles in unifying all shades of opinion for the advancement of the Province. The Gazetted officers of this department started a memorial in his name while he was alive and at the public meeting held on 5th September 1925, under the auspices of the Officers' Club and the Indian Officers' Association, it was decided to perpetuate his memory in a suitable manner and to utilize the sum of Rs. 600 already collected by the Gazetted Officers as a nucleus for a bigger fund for this purpose. We hope members of this department will rise equal to the occasion and raise a suitable memorial.

Principal Wood's Retiral.

A recent issue of the local Government Gazette announces the extension of leave to Mr. R. C. Wood until October, next year and his retiral immediately there after. Mr. Wood came out to India in October 1905 and after a few months' stay at Pusa where he became the favourite of Mr. J. W. Mollison, was posted to Madras as successor to Mr. C. Benson. He was entrusted with the responsibility of exercising control over a few farms situated as far distant as Bellary, Attur, Koilpatti, and Coimbatore. This last taxed his energies to the utmost and the posting of Mr. C. J. W. Shepperson soon after ended his connexion with Coimbatore and he became a District officer. The reorganization of the department with a whole-time Director at its head pinned him to the Telugu districts until December 1909, when he was pitchforked into Coimbatore as Principal to relieve Mr. Shepperson whose period of probation was then terminated. Mr. Wood continued in this capacity until 28th March 1919, when he

became acting Director in place of the late Mr. G. A. D. Stuart who was drafted to Pusa as officiating Agricultural Adviser to the Government of India. He went home on leave in May 1920 and on return in November 1921, found himself once again as Principal. He again went on long leave in April 1922 during which period he sought and obtained permission to take service under the British Empire Cotton Growing Corporation as Cotton Expert in Tanganyika and now continues in a similar capacity in Swaziland. It were ungrateful not to acknowledge the ungrudging services he rendered to the College and the Union. Their present condition is chiefly due to him. In conjunction with Mr. D. T. Chadwick, he drew up in 1914 an extremely practical syllabus for the students of the Coimbatore Agricultural College which was copied later in other provinces. Possessed of a facile pen, a fluent tongue, limitless capacity for work, varied tastes, and resourcefulness, he made an ideal Principal though owing perhaps to his long being wedded to the scheme he started in 1914 and his short contact in the interregnum in 1922 he did not show much enthusiasm for the University course which came into being in 1921. It is regrettable that a man of his attainments should have been lost to this country. We wish him very many years of active work as he is still in the prime of life and we hope that he will not forget his first love.

List of Some of the books received in the Agricultural College Library during 1924.

Anderson, O. G. & Roth. Insecticides and Fungicides—Spraying and dusting equipment 1923. *Andrews, E. A.*—Factors affecting the control of the mosquito-bug. *Armstrong, E.*—Chemistry in the 20th century 1924. *Bailey, L.* Cyclopaedia of farm crops 1922. *Baker, E. C.*—Fauna of British India Birds Vol. I. *Bhatia, R. L.*—Elementary text book of Zoology 1923. *Bond J. R.*—Farm implements and machinery 1923. *Bose, C.*—The physiology of the ascent of sap 1923; Life movements in plants Vols. 3 & 4; Response in the living and non-living 1922. *Briggs.*—Text book of Economics 1923. *Buxton, P. A.*—Animal life in the deserts 1923. *Chase A.*—First book of grasses 1922. *Clements & Long.*—Experimental pollination 1923. *Cook, M. T.*—College Botany 1290. *Coulter, M. C.*—Outlines of genetics 1923. *Dewar, D.*—The commonbirds of India, Vol. 1. 1923. *Ellis, R. H.*—Short account of the Laccadives and Minicoy 1924. *Eltringham, H.*—Butterfly lore 1923. *Fryer, P. W.*—Successful spraying and how to achieve it 1923. *Gamble, J. S.*—Madras Flora part 6. *Henslow, T. G.*—Garden development 1923. *Kenneth, J. E.*—

Ceramics The science of smell 1921. *Knuth, P.* Trans. by *A. Davis.*—Hand book of Flower pollination Vol. 3. *Lankester, Sir, A.*—Great and small things 1923. *Lyon and Buckman.*—The nature and properties of soil 1922. *Morgan, C. R.*—Emergent evolution 1923. *Palmer and Westell.*—Pests of the garden and orchard 1922. *Punnett R. C.*—Heredity in Poultry 1923. *Quintus, R.*—The cultivation of sugarcane in Java 1923. *Rangachariar, K.*—Practical botany 1923. *Russel, E. J.*—Farm soil and its improvement 1923. *Sampson, H. C.*—The Coconut Palm. *Sharp, L. W.*—An introduction to Cytology 1921. *Shaw, G. E.*—Hand-book of Malayan agriculture. *Taylor, E. S.*—Industrial hydrogen 1921. *Thompson, H. C.*—Vegetable crops 1923. *Venn, J. A.*—Foundations of agricultural economics 1923. *Wallace, R. and Watson, J. A. S.*—Farm live-stock of Great Britain 1923. *Wadde, R. A. and Buckle.*—The principles of Insect control 1923. *Watson, J. A. S. and More J. A.*—Agriculture 1924. *Weaver, J. E.* and 3 others Development and activities of roots in crop plants 1922. *Wheeler, W. M.*—Social life among the insects, 1922. *Wood, T. B.*—Animal nutrition.

Departmental Notifications.

August.

Postings and Transfers:—

Mr. R. Balasubramaniam to report himself for duty on the 29th August at Guntur, as Cotton Assistant, vice Mr. Gopalaratnam transferred to the Cotton Breeding Station Coimbatore.

Leave etc.

First Circle:—

Mr. G. Sitharama Sastri Demonstrator, Tenali leave on average pay for one month from 18th August.

Third Circle:—

The 15 days' leave granted to Assistant demonstrator P. Naghadara Naidu is cancelled.

Mr. M. V. Raghavalu Naidu, demonstrator, extension of leave by 7 days.

Central Farm:—Mr. V. T. Subbiah Mudaliar, Farm Manager, extension of leave by one week.

Entomologist's section:—Mr. C. K. Subramania Ayyar, Sub-assistant extension of leave by one month.

September.

Appointments and Postings:—

Mr. A. K. Canesha Ayyar, Lower subordinate promoted as Upper subordinate Agricultural section, on probation, in the Vth grade with effect from 29th April.

(2) The following diplomates are appointed Upper subordinates Vth grade on probation for two years:—

Mr. S. S. Kachāpeswara Ayyar	to VIIIth Circle Coimbatore.
N. C. Tirumalai	to IVth Circle St. Thomas Mount.
P. A. Venkateswaran	to VIIth Circle Tellicherry.

(3) Messrs. A. Ramalinga Ayyah and V. Chidambaram Pillai Lower subordinates promoted to Upper division Vth grade, Agricultural section with effect from 1st September on probation for two years.

Leave etc.

First Circle:—

Mr. V. Batchi Raju, assistant demonstrator, extension of two months leave on medical certificate.

Third Circle:—

Mr. L. Narasimhachari, demonstrator, Tadpatri, leave on average pay for 19 days from 3rd with permission to prefix the holiday on the 2nd September.

Mr. G. L. Narasimha Rao assistant demonstrator, Kurnool, leave on average pay for 10 days and leave on half average pay for 10 days from August 31 and extended by 11 days i. e. up to 30th September.

Mr. K. Rama Rao, Farm Manager, Nandyal, extension of leave by one day 27th August.

Mr. S. M. Kalyanaramier, Cotton Assistant, Nandyal leave on average pay for 10 days from 28th September with permission to avail of the holidays on 26th and 27th September.

Mr. A. Venkobachar, assistant demonstrator, Markapur leave on average pay for one month from or after 5th October.

Fourth Circle:—

Mr. P. Kannan Nambiyar, assistant manager, Palur, extension of leave on medical certificate for one month.

Sixth Circle:—

Mr. C. A. S. Ramalingam Pillai, assistant demonstrator, extension of leave on average pay for 3 days and of half-average pay for seven days.

Seventh Circle:—

Mr. M. U. Vellodi, Farm Manager, Nileshtar, leave on average pay on medical certificate for 21 days from 8th September.

Mr. M. K. Nambiyar, Head master Taliparamba School leave on average pay for 12 days from 21st August with permission to avail of the holiday on 2nd Sept.

Live Stock Section:—Mr. M. Krishnaswami Ayyangar, assistant Manager, Hosur, leave on average pay for two months on medical certificate from 27th August.

Central farm:—Mr. V. T. Subbayya Mudaliar, Farm Manager extension of leave on medical certificate for three weeks. Further extension for 12 days on medical certificate.

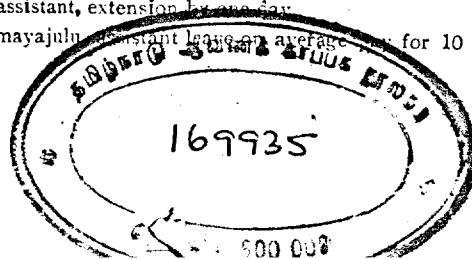
G. E. B. Section:—Mr. Samuel Jobitha Raj, assistant, leave on average pay for 20 days from the 29th September.

G. L. B. Section:—Mr. S. N. Chandrasekara Ayyar, assistant leave on average pay for one month from 11th September.

G. E. Section:—Mr. P. N. Krishna Ayyar, assistant, leave on average pay for 16 days from 15th September, with permission to affix 1st October a public holiday.

Mr. C. V. Sundaram Ayyar, assistant, extension by one day.

G. M. Section:—Mr. P. V. Somayajulu, assistant leave on average pay for 10 days from 28th September.



(v)

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(vii)

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Journal of Agriculture (Pusa).

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(viii)

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