

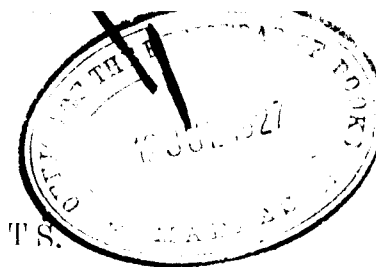
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THE JOURNAL
OF
**The Madras Agricultural Students'
Union.**

MAY & JUNE 1927.

BLOOMING OF RICE AND DEVELOPMENT OF GRAIN. †

BY N. PARTHASARATHY, B. A., B. Sc., Ag.

The study of the blooming of rice was undertaken by the author during the year 1924, as a preliminary to the detailed observations on the blooming of the two wild paddies—*O. latifolia* and *O. longistaminata*—which differed markedly from the cultivated varieties observed. This note is the outcome of the observations on the three varieties—K. 74, P. S. 24 and T. 294—made at the Paddy Breeding station, Coimbatore.

The blooming or flowering of rice is a normal process helping the sexual functions indispensable for the propagation of the species. The whole process of flowering consists in (1) the opening of the glumes, (2) the elongation of the filaments which results in the pushing out of the anthers, (3) the dehiscence of the anthers or the shedding of pollen, (4) the germination of pollen and fertilisation and (5) the closing of the glumes.

The opening of the glumes:—Normally rice flowers open before pollination. Cases are known and are recorded by various observers especially in Italy where the rice flowers do not open, and the sexual processes and development of rice grains take place

† Paper read at the M. A. S. U. Jubilee Conference, July 1926.

The closing of the glumes is not due to the stimulus of fertilisation as the glumes close even when the sexual organs are carefully removed. It seems to be mainly due to the evaporation of water from the lodicules.

The number of days taken for all the flowers on a panicle to complete flowering varies from 5 to 7 days. The number of flowers that open daily both in single heads as well as in all the heads in the plant is tabled below:—

K. 74—FIRST PLANT.—

Date.	No. of flowers opened					Total in the plant.
	1st head.	2nd.	3rd.	4th.	5th.	
21st. August	20	11	...	...	...	31
22nd "	18	23	13	...	...	54
23rd "	27	16	30	8	...	81
24th "	11	13	26	19	11	80
25th "	7	9	21	36	21	94
26th "	3	3	11	23	19	59
27th "	...	...	7	15	12	34
28th "	...	...	3	9	4	16
29th "	...	...	...	7	3	10

K. 74—SECOND PLANT.—

25th "	9	6	...	...	...	15
26th "	18	13	8	2	41	41
27th "	17	15	21	15	6	74
28th "	14	11	24	22	32	103
29th "	4	3	14	27	19	67
30th "	4	...	5	13	7	29
31st "	...	...	2	4	12	18

Order of flowering:—Generally the flowering commences from the tip of the panicle but does not proceed to the bottom in regular succession. If the position of the flowers in each branch of a panicle is marked along the abscissae and the order of flowering along the ordinate, almost similar graphs are obtained revealing a more or less regular order in each branch.

Ripening:—When the flowers open and receive the pollen grains on the stigmatic feathers, they germinate and send out tubes, out of which one at least is successful in reaching the

embryosac and thus fertilisation takes place. It is interesting to watch the growth of the ovary which gradually fills inside of the glumes eventually resulting in what we call the 'rice grain'.

To know when the grains are ripe, i.e., how many days should elapse from the date of opening of flowers to the formation of mature grains, a head in K. 74 paddy was marked for the flowering of the individual flowers and paddy grains were collected from the 15th to the 26th day after flowering and the seeds were dried and their germination capacity tested.

Age of seed in days from flowering and percentage of germination are:—

15 (0); 16 (0); 17 (0); 18 (80); 19 (100); 20 (100); 21 (100); 22 (90); 23 (80); 24 (80); 25 (90); 26 (90);

It is seen that in this variety the grains are ripe 18 days after flowering. This test may be carried out for the long duration varieties and if one can ascertain the minimum number of days required for such grains to give maximum amount of germination, the time allowed for the harvest of a crop can be known with certainty.

Other interesting points about flowering of paddy are

(1) the flowers open without anther dehiscence when they are wholly submerged in water. This phenomenon has been observed in wheat by C. E. Leighty and W. J. Sand.

(2) When two heads are cut (the cut ends being always kept under water) and one of these kept in the sun and the other kept in diffused light inside a room, the latter one is always the first to start flowering.

Thanks are tendered to Mr. K. Ramiah for useful suggestions and M. Anandan, for his valuable criticism in the preparation of the paper.

Bibliography:—

KNUTH:—Hand book of flower pollination.

AKEMENE:—The flowering of rice and some attendant circumstances.

C. E. LEIGHTY AND W. J. SAND.—The blooming of wheat flowers.

E. B. COPELAND.—Rice.

DURBAR HOUSE.

BY AN EX-SOLDIER.

Mine a Durbar house wherein it was n't possible to thrive
To a family of more than five it was a bee-hive.

Years three and ten have I spent and learnt to my cost
'Have your own house before all is lost'

Repairs annual, biennial and quinquennial made the valleys
[leaky

Doors, windows, bolts and hinges became shaky.

Pests infinite have I suffered which I shall mention
The many people too that begged subscription.

To ants red and black my children became proof
The white ants got to the topmost point of the roof.

Bats, cats and rats have disturbed times without number
The rat fall in my house my friends still remember.

The bug to Vishnu's race belongs they say
But to its torture I never was a prey.

The cow is an animal that by rules I was forbidden to have
How and why then should I feed a calv?

The harsh crow at the time of still noon
Has taken away now many a tea spoon.

Centipedes and cockroaches not easy of detection
The latter in numbers enough for class dissection.

Complaint have I none about my faithful dog
Nor about that amphibian the jumping frog.

Mosquitoes day and night, gross by gross
All the research withal of Sir Ronald Ross.

The stupid sparrow I have warned many a time
Poor thing, it was never known for any crime.

The scorpion inevitable has several times stung
Have ready always the potassium permang.

Silver fish in hundreds destroyed my pictures and clothes.
Their dirty appearance is what every one loathes.

The spider, I fear, is a likely cause of disease
For the cleaning of cobwebs once made me ill at ease.

Flies, moths and grasshoppers have at mealtimes been
And before their presence nothing was seen.

The silent gecko adorned the walls at night
Quickly it would disappear at your mere sight.

Add to these the snake, the squirrel, the millipede and my
[friendly fowl
And if more are wanting, the scutigera, the bluebottle and
[the prowling owl.

Now every story has a moral and that is why I am brief
'Not all the policemen could stop the midnight thief.'

INDIA'S CHANCES FOR A POWERFUL SUGAR INDUSTRY.

The prospects of the Indian sugar industry competing successfully with the foreign product are not so gloomy as the review on this subject of some experts would make one think. It is a mistake to take sugar refined from "Gur" as a standard of comparison with the directly manufactured sugar. The cost price should form the right criterion.

In India, the average production of sugar manufactured directly from self-planted canes and with ordinary methods is about 2.50 tons per acre and the cost price about Rs. 7-8-0 per maund. Java, though she produces in most favourable times about 4.60 tons per acre, is encumbered with dearer labour, intense local competition for the acquisition of land and high taxes. In spite of her best efforts, the cost price does not fall below F. 7.50 per picul, equivalent to about Rs. 5 per maund. This does not leave much advantageous difference in her favour, as besides meeting the freight and handling charges, she has to break the barriers of Tariff duty at the Indian ports which raises the cost price of Java sugar landed in India but still in the nearest ports' warehouses, to about Rs. 9-6-0 or Rs. 10-4-0 in the interior. In these circumstances, there cannot be a very hopeful situation before her, especially when India is on the commencement of introducing improved and scientific methods in the industry and Java nearly at the end. Her intensive system of cultivation is reaching the stages of diminishing returns. There is already a search of virgin lands which are rarer now and dearer to reclaim.

The Indian soil is in no way inferior to that of Java, while the climatic conditions are very favourable to the growth of sugarcane. Further, nothing is to be feared when science has given man enough control over nature. It can be greatly improved and modified to suit the needs. About 50 years ago the outturn of the Java Proof station which is now second to none, was only about 0.88 ton of sugar per acre. And even now, while the factories produce about 4.60 tons per acre the Javanese agriculturists following their methods get only from 30 to 35 maunds of raw 'Gur'-like sugar per acre.

It is therefore clear that not the climate and the soil, but scientific cultivation and improved methods of manufacture have largely contributed towards making the Java sugar industry a model one.

This is further corroborated by reference to the history of sugar in other countries. The soil and climate of Egypt are unquestionably inferior to India for the growth of sugarcane but even there the production of sugar has been gradually raised from below one ton to 2.80 tons per acre. What Australia has achieved during the last decade is specially encouraging. Notwithstanding all disadvantages of the soil, climate and situation she could produce sugar not only to supply her own needs but also to have a surplus of about 1,00,000 tons for export. It is the irony of fate that India the original home for sugarcane should have fallen so deplorably back in developing her sugar industry. The real cause of India's failure to make any progress worthy of the name is want of action in the right direction.

In reality the prospects for the Indian sugar industry are very bright, if only the help of science is properly invoked and genuine co-operation, energy and perseverance are brought to the fore. Having regard to the fact that India is favourably placed in respect of some of the chief factors affecting the cane-sugar industry viz; climate, soil, cane varieties, irrigation possibilities, labor and sale, it may be said confidently that if Indians invest sufficient funds India in the near future can be able not only to supply her own wants but also to compete for supremacy in the world's sugar market. Will the Indian leaders genuinely devoted to the welfare of India, earnestly plead the cause of the country's progress in the direction instructing the interested public in

proceed and act rightly and the capitalists who look for the soundest and best productive channels of investment for their money, first give their due consideration to the sugar industry before entering into operation for any other project?

(E. G. Sabine, Assistant Trade Commissioner, Bombay, in the Planter and Sugar Manufacturer, March 1927.)

POULTRY FARMING.

Developing the pullets:—It is essential that pullets should receive a plentiful supply of good nourishing food with green material in abundance. The meat ration should, where possible, be given by itself at a regular time, say at midday. Ovarian troubles are sure to follow if the birds are overfed with meatmeal. When pullets are showing signs of coming too rapidly to maturity and promise to commence laying before they are sufficiently developed to enable them to lay a decent sized egg and to last out a long profitable season, forcing such as meat should be withheld from the ration. On no account should any sudden drastic change be made in the ration. There is no better way of forcing the pullets to moult than by changing their food. Giving a feast one day and starvation diet another will have a similar effect.

Regular culling essential:—An efficient poultryman will not leave culling to the end of the laying season: he will cull all the time. Every poor layer retained in the flock means a drain in his profits. Obviously every drone and the bird that has passed the best period of production reduce the profits being made by those laying up to the mark. Eggs must be produced in the dear season if the business is to be made really profitable. Artificial incubation and brooding have passed the experimental stage and no difficulty is experienced in securing pullets to replace at least a good part of the old stock each year. Culling may even commence during the first five months of maturity, for it is useless to expect a weakly constitutioned bird to make a profitable layer. Then again there are freaks or throwbacks from the best matings which will never develop into satisfactory stock.

Points in culling. Efficient culling is one of the chief secrets of successful poultry keeping. The time of moulting affords one of the best guides to constitutional vigour and laying capacity. For a bird to give a high egg yield she must necessarily be a long season layer and to be a long season layer, she must be a late moulter. With birds hatched at the same time and which have been subjected to similar treatment in all respects, the early moulter is the bird to be culled. In a mixed flock of first- and second year-layers, the second year birds will usually moult later than those in their pullet year. In such cases where the moulting period is taken as a guide, allowance must be made for age. Otherwise many young birds which it would be profitable to keep are apt to be disposed of and the older but less profitable members retained. In addition to being a later moulter the high type layer and the one likely to produce well in the future will present the following signs:—a clean face free from feathers; close feathering, a bright red comb and an alert vigorous appearance.

Selection of breeding hens. Small diminutive specimens should not be bred from, no matter how well they may have laid. The selected birds should be placed by themselves and given a plain ration with the object of discouraging them from laying in the meantime. Where every egg is forced out of the late moulters and intended breeders it is safe to assume that trouble is being laid in store and will be met with later in the hatching and rearing of progeny. Where possible, the proposed breeders should be given a free range. They should not be made to get overfat; for breeding from overfat hens is a common cause of poor hatches and the production of chicks that are difficult to rear.

(Abstracted from 'New Zealand Journal of Agriculture' for February 1927).

BACTERIAL DECOMPOSITION OF TOBACCO—SOME EXPERIMENTS.

BY FAITLOWITZ,

(a) To 10 g. of cigarette tobacco, 90 c. c. of water were added. The mixture was allowed to stand for 2 hours and the macerate was separated from the tobacco by squeezing the latter in a cloth; all macerates so treated gave without exception an acid reaction to litmus paper. The acidity of macerates of different brands varied from 15 to 20 c. c. N/10 NaOH for 100 c. c. of tobacco macerate.

(b) If a tobacco macerate is left to stand for a long time at room temperature (17–20°)—no matter whether filtered or not—then the acidity gradually begins to fall off and the macerate turns alkaline after about 30 hours standing.

(c) On addition of 2 c. c. chloroform to 10 c. c. of a still acid tobacco macerate kept in a well stoppered bottle in order to prevent evaporation of chloroform the reaction remains acid while in another stoppered bottle the same macerate without addition of chloroform turns alkaline after a certain length of time.

(d) Treatment of cigarette tobacco:—40 c. c. of water are added to 10 g. of cigarette tobacco. The mixture is kept in a covered vessel at room temperature till the reaction turns basic. Then the pulp is spread out in a wide open dish and left to stand for 2–3 days till the macerate shrinks as water evaporates. It is then left until a perfect air-dry condition is reached. Tobacco so treated becomes black, gives a basic reaction to litmus paper and evolves an odour probably due to pyridine and amino-bases. The tobacco is then unpleasant when smoked and has no value as cigarette tobacco.

From (a), (b) and (c) we learn that fermented cigarette tobacco (for cigarettes consist exclusively of fermented tobacco) does not become alkaline during the dry fermentation process, but does so if brought into contact with water. Such basic reaction should be attributed to bacterial action rather than to oxidase for it is a well established fact that chloroform does not interfere with enzymic reaction but arrests bacterial activity.

Summary:—The formation of pyridine and amino-bases from nicotine with a resulting basic reaction does not occur to any appreciable extent in the dry fermentation process.

2. In the presence of moisture the decomposition of tobacco leads to a basic reaction. But this condition reduces the quality of tobacco for the purpose of smoking.

3. The decomposition of the tobacco leaf in the presence of water is not due to enzymic action but most probably to the action of bacteria since, in the presence of chloroform which eliminates bacterial action, the reaction of tobacco remains permanently acid.

(From BIOCHEMICAL JOURNAL Vol. XXI No. 1 of 1927.)

TANNING OF HIDES.

The methods suggested hereunder for the curing and tanning of hides were originally printed in a New Zealand weekly, which state that the recipes are vouched for by a southern farmer.

To tan a horse hide for straps first remove the hair. To do this, mix for an average-sized hide about a peck of air-slaked lime in half a barrel of water and stir briskly. Then immerse the hide and let it remain three to five days stirring two or three times daily. Try from time to time to remove the hair with any blunt tool such as the back of a case-knife; remove all the hair, then rinse in clear water. Then make a solution of 3 lb. of crushed alum, $\frac{1}{2}$ lb. of saltpetre, and 1 to 2 lb. of salt. Put these into enough water to fully cover the hide. Let it remain two weeks, stirring once or twice daily. At the end of two weeks the hide will be tanned. Tack the hide out on a smooth place, such as a barn door, stretching in all directions. Get out all the wrinkles, and when nearly dry rub it with tallow, and if at hand, good cod oil, rubbing it in well. Then roll it up for a few days; keep it in a warm place not hot, away from the sun. Soften by rubbing well and if necessary use more tallow. If it is to be blackened, do it before any tallow is put on. Use 4 oz. of nutgalls, 8 oz. of copperas, dissolved in quarter of vinegar or cider, soaking the hide overnight or 24 hours, if necessary. This method can also be used for cow hides and calf-skins.

For tanning hides with hair on, make a mixture of 3 lb. of carbonate of soda, 2 oz. each of nitrate of potash, common salt prussiate of potash, sugar of lead, and pulverized copperas, in 9 gallons of water. Place the hide in this solution for two hours, remove carefully, and rinse in cold water. If the hide is stiff, dip it repeatedly, in this mixture. A gallon of soft soap, 1 quart of fish oil, 1 oz. of borax, 4 oz. of salt, 4 oz. of alcohol and 2 quarts of hot water. This method is especially good for hides to be used as rugs. To tan any kind of skin with hair, or wool on, or without: Take 1 lb. of alum, 1 lb. of Glauber salts, $\frac{1}{2}$ lb. of salt, $\frac{1}{2}$ lb. of saltpetre. Dissolve in warm water. Soak, work and dress.

When tanning sheep skins with the wool on or off remove all fat meat from the skin by scraping with a blunt edged knife. Soak the pelt in a bath composed of 1 lb. of alum and a quart of salt with enough water added to cover the pelt. Put the vessel away in a warm place and turn the skin in the liquid daily. After a week, remove the skin and dry it. When partly dry, rub and stretch the skin to complete drying. If you want sheep skins for leather, remove the wool before putting it into the alum and salt bath. To remove the wool, place the pelt with the flesh side up and sprinkle with quicklime. Moisten the lime and leave for 24 hours after which the wool can be pulled. The lime can be put on the wool side of pelt, but it injures the wool more than if put on the fleshy side. To tan the hides with the hair on for mats or rugs, wash the skin and remove all the fleshy matter by scraping then wash the hair side with warm water and soap and rinse. Take $\frac{1}{4}$ lb. each of salt and pulverized alum, $\frac{1}{2}$ oz. of borax and dissolve in hot water. Add enough rye-meal to make a thick paste and spread on the flesh side of the skin. Then fold lengthwise with the flesh side in. Let remain 2 weeks in an airy and shady place, then unfold, shake well, wash the flesh side in water and scrape with a dull scraper. Pull and stretch and work until dry. The amounts mentioned are enough for sheep skins; for larger skins use more in proportion.

(From Agricultural Journal, Victoria, August 1926.)

BURMA AGRARIAN BILL.

The Burma Agrarian Bill which has been published in the Burma Gazette has for its object the improvement of the relations between agricultural landlords, tenants and labourers. It aims at furnishing an assurance (1) to the landlord that he will get a fair rent; (2) to the tenant that he will obtain fair treatment from his landlord; and (3) to the labourer that he will get a fair wage.

Landlords have at present no security for their rent nor labourers for their wages. The tenant may dispose of his crop by stealth or he may have outside creditors who attach it after obtaining a decree for debt. In such circumstances both landlords and labourers suffer. The labourer suffers also if a tenant makes over the whole crop to his landlord, for a labourer has no valid claim against the landlord for wages. To remedy this, the bill makes rent and wages a first charge on the crop and provides for the landlord and labourer obtaining a warrant from the member of the village committee for attachment of the crop at any time before it has been removed from the threshing floor. Once the crop has been attached, any one who moves it before the warrant has been withdrawn will be guilty of a criminal offence punishable under the Indian Penal Code. The warrant may be withdrawn by the village committee if the parties come to terms. If the committee does not succeed in conciliating the parties the warrant will remain in force long enough to enable the parties to apply to a Civil Court and obtain the orders of the Judge. These rights will be an alternative to existing rights. Both landlord and labourer will continue to have the remedies which they possess at present but they will have to make a choice between the old and the new. So long as they avail themselves of the rights under the bill, they will not at the same time be able to prosecute separate suits. If they avail themselves of the rights and procedure created by the bill and the case goes to a Civil Court they may be required to show that the rent or wage which they demand is a reasonable rent or wage.

Agricultural leases are usually made for one year only. If the crop should fail from natural causes a tenant is at present dependent on the mercy of his landlord who may grant or refuse remission of rent. The bill provides that failure of crop from causes beyond the control of the tenant shall be a valid defence in a suit for rent.

As a consequence of the present conditions crop production is falling off in areas where there is no periodical deposit of silt; land long under cultivation is yielding less than it did fifteen years ago. On the contrary they know that if they spend money on manuring or bunding land the landlord is likely to raise their rent. The bill provides that a landlord shall pay for improvements if he turns out a tenant before the tenant has obtained the full benefit of any improvements made by him. The value to be placed on a tenant's claim is to be settled by the village committee subject to orders on appeal or revision by the Township officer and Deputy Commissioner.

In many districts very large areas are now let to tenants who compete with one another for the land. The bill provides that Government may notify the localities in which rents tend so high as to leave the tenant proportion of the crop insufficient for the maintenance of himself and his cattle. In such notified localities a landlord will not be permitted to turn out a tenant who has paid a fair rent and who has treated him fairly, merely in order to instal another tenant who offers to pay a higher rent. The tenant in such localities will be entitled to take his landlord before a Revenue officer and to obtain an order forbidding his ejectment if he proves that he is paying a fair rent and is giving fair treatment; for example is repaying loans made to him by his landlord. A tenant who has obtained such an order will not be permitted to sub-let the land; it will still be to a landlord to refuse to renew a tenancy if he intends to cultivate the land himself, or by hired labour or if he intends to assign it to a near relative who is an agriculturist or if he intends to leave it fallow in the course of good husbandry. Orders passed by the Revenue officer will be appealable to the Deputy Commissioner and subject to revision by the High Court. The bill also provides that no agriculturist shall in future be imprisoned by order of a Civil Court under a decree for money.

(From 'The Servant of India' dated May 19, 1927.)

PROFIT-SHARING, PIECEWORK WAGES AND HOURS.

Can some inducement be given to men to stay on the land?

Mr. Wyllie of the South Eastern Agricultural College, Wye, applied himself to the question of labour costs and not wages, there being a world of difference he pointed out. So far as the farming community is concerned, he said there is not the shadow of a doubt but the standard by which arable farming must be judged to-day is the profit and loss account.

As a class, farmers are as good citizens as any other. It is unfair to expect them to put production of human food stuffs and rural population before profit; it is entirely false to suggest that nothing stands in the way of doubling or even trebling of the home food supplies but the inefficiency and general slackness of the farming community. I have never been able to understand why farmers should be expected to base their system of farming upon food production and rural population, rather than upon the profit and loss account while no similar principle is expected to operate in other industries. As business men, farmers are no more responsible for the dependence of this country upon imported food stuffs, and for the decline in the rural population than any other class of businessmen.

The Crucial point:—On the point of wages, Mr. Wyllie said the cost of labour is determined by the relation between the wages paid and the work done. At once the crucial question arises; admitting the desirability of paying a good wage, is it possible to combine high farm wages with low labour costs, is it possible that the result of an increase in farm wages might be a reduction of labour costs rather than the increase commonly expected? Like Sir Hall, Mr. Wyllie advocates an interest being taken in his men by the farmer. It has been well said that the lure of high profits is the great stimulus to private enterprise of all kinds, but it is equally true that under moderate conditions the lure of high wages is the fundamental stimulus to the great majority of workers.

The speaker dealt with piece-work and conditions existing in factories; most of the operations usually done by piece-work are just those operations in which neither horses nor machinery are involved. In other words, if mangolds are being pulled at 20s. per acre the cost to the farmer is just the same, whether the worker takes three days or six days to pull an acre; whereas in the factory if a worker is being paid 1s. per unit for a certain article, then the overhead costs per unit for machinery, rent, etc., will be appreciably less if he produces 10 units in a day than if he produces only 6. It is not an argument against piece-work; it is merely one example of the radical difference under which the factory and the farm manager have to work. The other difficulty in regard to piece-work on the farm is that supervision of the workers is less easy than it is in the factory and it is well known that the value of the work to the farmer in, say, setting out swedes or mangolds or sugarbeet depends to a great extent upon the efficiency with which it is done. Therefore it followed that efforts to reduce labour costs on the arable farm must be made along a different road from that followed in the factory.

The Farmer is also concerned:—If it be true, as I think it is, that it is a case of 'hands together' then surely we must admit that the harder and more efficient work on the part of the employee should go hand in hand with harder and more efficient work on the part of employer. That is why I think it is taking too narrow a view of the case to say that the reduction of labour costs is a problem that revolves around labour and labour only. We have now arrived at something like this position granted that, in theory, employer and employee are at one in desiring to reap the largest possible financial reward from the industry and that wages and profits should, in theory, rise and fall together, to what extent can we translate these theories into practice? The employer can do his share by using the most up-to-date methods of manuring, feeding, seeding, marketing and so on. It is also his business to organise the work on the most economic lines and this involves the study of rotations, methods of stocking the farm and so on. Along these lines the progressive farmer is constantly striving to keep down his labour costs and thereby increase his profits.

Put it to the Workers:—He said it was an admitted fact that there was room for improvement in the standard of work done to-day. Probably the very first step that was necessary was

to convince the workers that unless they are prepared either by working harder or longer hours, to increase their output of work then the maintenance of the present level of wages for the present number of farm workers is an economic impossibility.

As to the possibility of introducing some form of profit-sharing or co-partnership as a method by which the workers can be induced to put their backs into it, along with the farmer, he doubted whether there was much room for co-partnership in farming. Its logical development was that the workers must obtain some measures of control and there was perhaps no other industry in which divided control gives such disastrous results as farming—farming by committee is only one degree better than "Farming from Whitehall."

There was a long discussion opened by Professor J. A. S. Watson. There was one thing he said, that wanted saying often and with emphasis, that efficiency in agriculture is not to be measured either by food production or by employment of labour. If it was a matter of importance for the country that a large quantity of food should be produced at home, then that was a matter for the whole country and not for the farmer as an individual. The interest of the farmer so far as the rural population is concerned was to keep a fair share of the efficient and capable people that are born and bred on the land to stay on the land, and that the process whereby the incompetent remained on the farm and the enterprising and efficient go off to the towns should cease. The labor problem was of course the crux of the whole agricultural situation. Labor costs had doubled and farm prices were rather less than 50 per cent above the pre-war figures. Conditions varied, of course, but he thought that the labor problem was most acute, not in those districts where wages were highest but where wages were lowest; the former got better value for their money. If one had an efficient man and paid him well he tended to become more efficient an inefficient man paid badly tended to become more inefficient. He felt strongly that some kind of system of paying by results was necessary. The encouragement of efficiency was a great point he felt sure. More too, ought to be done in the way of training the young people. Work should be so arranged that a youth had a chance to learn all kinds of skilled jobs. Another point was that of equipping a man to do well his work. I feel sure that in the

end we shall have to turn to more machinery, to a bigger team, to double furrow ploughs and to implements on which a man sits instead of walks behind.

What of the future:—Mr. W. S. Gibbard said he was perhaps an old fashioned farmer but he did not agree that wages were too high. "I should like to see the wages higher than they are to-day so that we could keep the young men on the farm but in order to do that, we must obtain a better price for what we grow." In this district the young men went off as soon as they could to the factories and only the old men remained. What would happen when they were gone.

Profit-sharing in farming, said Mr. Alfred Amos, was a thing he believed in. He had adopted a rough and ready scheme and he thought his men appreciated it; they took an additional interest in their work and that was all to the good.

Mr. J.G. King agreed that goodwill between master and man was of fundamental importance. But when they had admitted that this aided by profit sharing was helpful, had they really got to the bottom of the cause of low wages? They did not want more competition for agricultural jobs. They wanted less competition for that work if the standard was to be raised. The trouble was that there was a constant surplus of inefficient workers offering their services. They wanted a higher type of worker, and if he was to be attracted to the land the industry should be organised on a basis of a higher paid worker and a higher mental and physical type.

Fruitless Arable Farming:—Dr. J. A. Voelker said he had 5 years now as a practical farmer (paying for it himself) and he had no hesitation in saying that except on first class land arable farming was a losing business. It was not that wages were too high but they were too high in comparison with the return that one got for the produce. The trouble of the matter was the workmen themselves; to try to stir some of them up to harder work or to taking a share in the interests of the farmer himself was impossible.

Lord Bledisloe considered that to get the best value out of labor, it was desirable to have a good lay-out of one's farm and

buildings. In that respect he thought they suffered from the fact that they were turning their farms largely to purposes they were not originally intended for. On the point of profit—sharing his lordship said money was not everything in the world; it was desirable to promote the health, the comfort and the contentment of one's men and to induce them to take a greater interest in their job. "I have found myself that many of my younger married men stay much more at home of an evening and seem to show a healthier interest in their work in consequence of being put in touch with the interesting things of life by means of a wireless set. Profit sharing, he thought, did not succeed in the majority of cases. What was possible was to provide a welfare fund if there were any profits at all.

With 50 years experience of farming, Mr. W. Hesler said his conclusions were nearly as pessimistic as those of Dr. Voelker. Some years ago he inaugurated a system of profit—sharing and they were satisfied up to a point. That was when he was making a profit but for 5 years he had made substantial losses and the interest of the men had largely vanished. As to piece-work his experience was that men would not want it.

Mr. A. H. Mason said it seemed to him that Mr. Wyllie had tried to caulk a ship with a hole in its side. The fact was that the cost of production was much more than the prices realised. He was told in his youth that unless the price of a sack of corn paid a labourer's wages for the week, the farmer was losing money. That was true today.

(From *Farmer and Stock-Breeder* dated March. 7, 1927.)

CAN THERE BE ANY DIVORCE BETWEEN RESEARCH & TEACHING.

[Hans Zinsser, Harvard University, discusses in the *Journal of Bacteriology* for March 1927, the question of the interdependence of Research and Teaching with reference to Medicine and Public Health and we reproduce the relevant portions below].

This question "involves a general discussion of the functions of the departments which instruct in preclinical sciences, and calls for some consideration of the assertion—frequently coupled with

such criticism that 'research and education are not the same things' and had better be separated. This last suggestion, we believe, is a pernicious one chiefly because it fails to recognise the importance of a high order of scientific background for that most difficult of all teaching, the exposition of the simple, basic facts to beginners—a task that is incompletely performed unless the information conveyed arouses curiosity and awakens the critical faculties. If the scientific laboratories of medical schools were to be planned to serve purely teaching functions, they could be organised cheaply and simply; but, though it sounds a paradox, such limitations would defeat their very teaching purposes. We are admitting of course, that medical students cannot be graduated as investigators and it is surprising that any one should assume that otherwise reasonable educators are not aware of this. But we assert that the separation of investigative activities from departments engaged in the exposition of any subject in Medicine would irreparably damage their purely educational effectiveness. Men who devote themselves exclusively to the teaching of subjects as actively advancing as are the various departments of medical knowledge, with little or no interest in investigation, show themselves by this testimony inadequately endowed with intelligent curiosity and imagination. They are manifestly pedants whose faculties are left unstirred by the most fascinating invitation to intellectual adventure that modern thought has to offer. The teacher of a growing science who abstains from inquiry is as much out of place in a laboratory as a prohibitionist in a wine cellar. Moreover, to teach adequately and inspiringly signifies not the dispensing of other men's thoughts but, rather, the distillation of accumulated knowledge through the mind of the expositor, carrying over a part of himself in the process.

Over-emphasis on mere pedagogy in the teaching of a science—a real danger, if recent critics are given their heads—may easily do to medicine what it has done, in our own experience, to science courses in some of our Teachers' colleges. In at least one institution known to us the University chemical department did not, a few years ago, accept as equivalents courses given on the same subjects to the students in its own teachers college. These things are not cited in order to belittle the desirability of developing better methods of instruction in the sciences. They are mentioned in support of the view that the best and most inspiring teachers those whose spirits have

catalyzed the latent capacities of their students and have transmitted to them something more than forgettable facts, are the investigators whose teachings have been interwoven with that joy of their work that is born of the spirit of exploration. We may paraphrase the remark attributed to Sir Thomas Lipton that "married men make the worst husbands" with the truism that the professional pedagogue makes a poor teacher of science. He will teach by a perfect technique, perhaps, the things he has read in a printed book, or the things that he has been told and shown, but his teachings will be as uninspiring to his students as Toulminson's sins were to the devil in Kipling's poem.

Incidentally, in spite of the encouragingly generous recognition by the universities of the truth of these principles, it is growing annually more difficult for the scientific laboratories generally to recruit the most promising young men for their important tasks. Competitive opportunities in the clinics in research institutes and in the industries, with better pay and less routine, are luring many of them away. And in this alone there is a sufficient element of danger without added discouragement from those who would reduce these teaching departments to the status of some Mohamadan schools where the scholars study the philosophy of the Koran by chanting it in unison. It might mean that gradually intellectual leadership in fundamental investigation would drift away from the universities and if this should go far enough, these institutions upon which after all, the intellectual development of the future depends, would cease to be truly universities and become mere teaching high schools without inspiration and without hope.

Let us admit that there are rare and precious spirits with a genius for investigation who have no talents or desires for teaching and who in the interest of husbanding our gifts, should be protected from the interruption of the class-room. It is an obvious waste for men of the Loeb and Theobald Smith type to be burdened by routine be it so ever limited. These however are a small minority for whom exceptional provision is justified and as a matter of fact provided. But, fortunately, men with excellent teaching ability have often been capable of considerable originality in research, and many others with investigative talents of no mean order have not exceptionally, possessed sufficient ability to expound. Any defects in pedagogic technique have been amply

compensated for by the enthusiasm they have conveyed to their students. We need go no farther back than the present generation to illustrate the contention that the teachers, those who have most influenced medical students and whose spirit is most alive among the younger practitioners of our country today, were men actively and productively engaged in investigation. Would a system of separation of these two functions have developed Welch, or Remsen, or Edmund B. Wilson, or Chittenden, or Halstead, or Henderson, or Huntington, or Lusk, or Abel, or Folin or a host of others whose pupils are shaping destinies of American medicine today?

It is too often assumed that originality and scholarship are incompatible with common sense. But the professor and scientist who holds *an egg* in his hand while he times the boiling of his watch or who looks under the dresser for a collar button that is in his shirt, is more frequent in the humorous weeklies than in real life. It is quite safe to have confidence that those who are studying the problems as a whole realise that medical students must be given primarily the information which will prepare them for the duties of their profession. But they believe that such instruction cannot be safely limited to a recital of facts. They believe—or, at any rate, a great many of them do—that science and the student are best served in establishments in which every student may have opportunities for contact with men engaged in active investigation; and in which no instructor shall be entirely removed from the stimulating association with the eager and intelligent young minds that demand reason and proof as well as dogma from the teachers. Scope and the selection of material, and not the limitation of intelligent curiosity, are the real problems; and though, undoubtedly, many mistakes are being made and the pendulum has perhaps often swung too far towards irrelevant details—there are natural reactions against the dull lecture systems of other days.

The problem—and we do not claim that it has been solved—lies perhaps in a closer coordination of the laboratory teaching with its clinical applications. But whatever the solution may be, and it is being earnestly sought, it surely will not be found in a sterilization of the teaching force which indeed more often need a Voronoff than a general surgeon.

Let us be thankful that the medical schools are so closely allied to universities, so strongly influenced by the fundamental departments of Physics, Chemistry and Biology and that university authorities are recognising the important principles that true education signifies the planting of seeds in fertile soils and not the feeding of the ripened fruit of the past season.

WHAT THE 1s. 6d. RATIO MEANS.

By. S. M. SHAFI, B. A., B. Sc. (Economics) London University.

Ratio and Prices :—There was a time when the rate of exchange between two countries was said to vary with the favourable or unfavourable balance of trade. But the war and the postwar experiences all over the world have shown conclusively that both the exchange variation and the balance of trade are in fact an expression of the internal price level of the two countries and the internal price level of any country is determined by its own monetary policy. It follows, therefore, that the relationship between the rate of exchange and prices is direct, and automatically with this theoretical consideration it is not difficult to see that the rupee ratio cannot be reduced to 1s. 4d. without at the same time altering the level of prices. Stabilising at 1s. 4d. must mean a depreciation in the value of the rupee and a consequent rise in the general level of prices. This rise in price will lead to social and economic evils which are not desirable in the best interests of this country. The vast majority of the Indian people are those whose incomes, by law or custom, are fixed in terms of money. The reversion to 1s. 4d. must worsen the position of all these people to the extent of $12\frac{1}{2}$ per cent. There is no reason why these people should be made to suffer by a deliberate policy of inflation.

Adjustment of Prices :—The question at once arises whether prices and wages in India have actually adjusted themselves to the 1s. 6d. ratio. Here it must be remembered that 1s. 6d. has maintained itself as the market rate for over two years. In the modern world a period of two years is long enough for purposes of such adjustment. Apart from that the very fact of a steady exchange is in itself an evidence of the harmony between the internal and external purchasing power of the rupee. The

relevant figures from the report of the Royal Commission may be quoted to support the argument that a substantial adjustment of prices has in fact taken place.

Period.	Exchange.	Index No. of prices.
December 1922—June 1924	1s. 3d.	176.
July 1924—June 1925 ...	1s. 6d.	160.
July 1925—present time	1s. 6d.	158.

It is quite clear from the above figures that the index number of rupee prices has been falling according as the rate of exchange has been rising and further that a steady rate of exchange has its counterpart in a steady index number of prices and the connexion between the two indeed unmistakable.

Effect on Agriculture :—Much has been talked about the loss to agriculture through stabilizing the rupee at 1s. 6d. Before considering this particular problem it must be realised that no country can have a permanently favourable rate of exchange. The rate of exchange is after all an expression of the internal and external price levels and it must adjust itself to the relative purchasing power of the currencies concerned. If there is any temporary variation either way its existence gives rise to a set of conditions which readjust disparities in the rate. It must therefore be understood that no permanent loss or gain can accrue from stabilization at one figure or another.

Now as to the alleged loss to agriculture it is said that agriculturists in India are as a class debtors and stabilization at 1s. 6d. would benefit the creditors at the expense of the debtors. This argument tacitly assumed that all these debts were incurred when the rate was 1s. 4d. This is far from true in the first place, 1s. 6d. has been the market rate for over two years and all debts incurred during this period would not be affected at all. In the second place it cannot be contended seriously that 1s. 4d. has been the rate ever since it broke down in 1917. From that time onwards it has fluctuated mainly with the varying fortune of the silver market and no worship of tradition should blind us to the real state of affairs.

(From Mysore Economic Journal, March 1927)

CURRENT TOPICS.

Sunspots and Rainfall. Studying the correlation of sunspots and rainfall with reference to Australian conditions, E. T. Quayle records that from the first to the fourth year when the sunspottedness is usually at its maximum, the rainfall is rising to its maximum, then the rainfall begins to decline not regularly but so as to reveal drought tendencies every third year or in the sixth, ninth or twelfth years of the sunspot cycle the last being much the worst. (Experiment Station Record. Vol: 55 No. 9)

Starch. Raw starch is composed of at least two carbohydrates: called amyloses, certain noncarbohydrate substances, notably fatty acids and phosphorus compounds. One carbohydrate (amylose A) is insoluble in water and when dry is a pale brown hard substance and leaves ash on igniting. Amylose B easily dissolves up to 8 per cent by weight in water and burns completely away.

Rice starch contains more amylose A of higher content of fatty acid than corn starch. Potato starch contains much less fatty substance, but its phosphorous content is specifically high, phosphorus occurring in both amylose A and amylose B of rice starch. (F. Hardy, in Tropical Agriculture, March 1927)

The Hawaiian Islands. They lie 2100 miles southwest of San Francisco and at about the same distance as Samoa. They are very isolated and are surrounded by ocean attaining a depth of 16,000 ft. Of the eight inhabited islands the largest is Hawaii. All the islands are of volcanic origin and included in the Archipelago are the highest mountains in the Pacific, Mauna Kea attaining an elevation of 13,823 ft. Of the many volcanic craters two are active, viz: Muna Lea and Kilanea, the latter being the largest active crater in the world. The climate of the islands is cool and healthy, considering the latitude, with a mean annual day temperature of 80 F. and 68 F. at night. The rainfall varies enormously in different localities; in one region only about 16 inches fall in the course of a year while in other parts it may exceed 300 inches. The staple industries are the growing and export of sugar and pine apple. The flora is extremely rich and is very remarkable for the very high percentage of endemic genera and species. Usually herbaceous genera here extraordinarily develop into trees and shrubs. There are no indigenous land mammals while the insect fauna includes a high proportion of endemic forms. Hawaii is as big as Norfolk.

(Dr. A Imms in the Annals of Applied Biology, August 1926)

Fertilizing action of Cyanamide and its Derivatives:—
In a soil sufficiently moist the reduction of cyanamide to urea and of urea to ammonia is complete in 48 hours, but with less moisture and therefore less contact with the soil polymerisation to dicyanodiamide takes place; the use of cyanamide as a fertilizer under cover is not advocated, but out of doors rain speedily dissolves the cyanamide and brings it into contact with soil organisms; Cyanamide cast in sticks and supplied in bags is specially liable to polymerisation owing to its partial hydration and the pressure to which it is subjected in manufacture; samples of these were totally inactive as fertilizers and were even deleterious. The nitrogen present as dicyanodiamide should be tested for as well as the cyanamide nitrogen. Guanylurea is not harmful to the same degree as dicyanamide but is equally inactive as a fertilizer for at least several months. A solution of free cyanamide treated with sulphuric acid is converted into urea sulphate and this solution concentrated gives with natural phosphates a nitrosuperphosphate which is preferable as a fertilizer to mixtures of superphosphate and cyanamide for in the latter dicyanodiamide and guanylurea are formed.

(W.G. Caray in Chemistry and Industry, March 11, 1927).

The Mineral Constituents in Economic Nutrition:—
The economic importance to stock, of lime, phosphoric acid and the "ash" elements generally has been well illustrated, but it is not, perhaps, out of place to remind readers that the mineral portion of bone contains more than 80 per cent of phosphate of lime along with smaller amounts of carbonate of lime and other mineral salts, whilst a gallon of cow's milk contains approximately $\frac{1}{4}$ oz. of lime, one third oz. of phosphoric acid and one sixth oz. of chlorine. The drain of minerals from the system of the heavy milking cow will be realised readily from these figures. The following table showing the mineral constituents of the milk of various animals is instructive in this connexion:—

Species.	Potash.	Soda.	Lime.	Chlorine.	Phos'ic acid.
Man	0.075	0.024	0.049	0.043	0.056
Horse	0.095	0.013	0.114	0.028	0.121
Cow	0.177	0.059	0.161	0.100	0.189
Sheep	0.216	0.039	0.277	0.068	0.269
Pig	0.071	0.076	0.395	0.104	0.317
Dog	0.131	0.054	0.338	0.140	0.564

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The table is set down in the order of the rates of growth of the species, from the human subject, of which the newly born takes 180 days to double its birth-weight, to the rapidly-growing dog, whose newly-born puppy doubles its live-weight in 9 days. The point of interest illustrated by the table is that the more rapid the rate of growth of the animal, the richer is the milk of the species in lime and phosphoric acid. There is no apparent similar uniformity for the other mineral elements. The importance of lime and phosphoric acid in the economy of milk production and, therefore, of growth is demonstrated.

(F. E. Corrie in "Scottish Farmer" dated 2nd April 1927)

Applied Chemistry Reports 1926. (England) Visible light has no deleterious effect on cotton though it destroys the yellow pigment. Flax, hemp and other textile fibres show improved lustre and increased suppleness if the retting operation is supplemented by successive treatment with hot alkaline lye at atmospheric pressure and soft soapy water until all resinous matter has been removed.

BY-PRODUCT AMMONIA.

The world's production of nitrogen expressed in long tons of pure nitrogen for the year ending March, 31, 1926, was 1,245,400 tons; byproduct sulphate of ammonia 24.5 per cent, Chilean nitrate of soda 26.1 per cent, synthetic ammonia 23.2 per cent, cyanamide 12, nitrate of lime 2.4, other forms of synthetic nitrogen 9.6, other forms of bye product nitrogen 2.2.

SEEDS, NUTS AND KERNELS IN TON.

Imports into England Copra—74,372; Palmkernels—221,328; Groundnuts—101,985; other nuts and kernels—5,487; Soya beans—46,358; Castor seed, 27,172; Cotton seed 536,828; Linseed—300,143; Sesame seed 1166; Rapeseed—16,205; Other sorts seeds—23,496; Total—1,415,240.

VEGETABLE, ANIMAL AND OTHER OILS AND FAT IN TON.

Trade in England Palm oil, 19,373; Palm—kernel oil, 350; Cotton oil, 11,336; Rape seed oil, 7038; Linseed oil, 14,257; Castor oil, 2,641; Soya bean oil, 48,379; other seed oil including vegetable tallow, 28,715; Unrefined coconut oil, 29,909; Refined coconut oil, 7382; Fish oil, 29,909; Refined coconut oil, 7382; Fish oil and whale oil, 58,809; Oleo margarine oleo oil and refined tallow, 34,456; Tallow, 46,756; Total imports 359,431; Exports 181,687. The exports were mainly refined cotton oil, linseed oil, unrefined palm kernel oil and grease and animal fat of the United Kingdom.

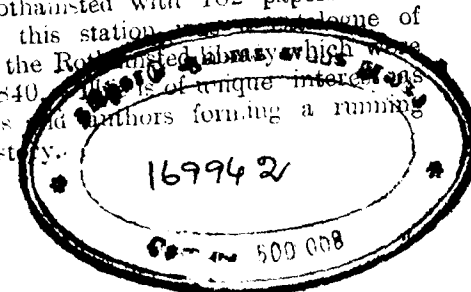
EDIBLE FATS IN TONS.

Butter, 290,981; Margarine, 66,672; Lard, 112,707; Imitation lard, 3,437; Total imports 473,797; Exports 19,451.

Dark sheds and Development of Calves. Gullikson and Bakles as the results of experiments they conducted with four Holstein heifer calves in Minnesota observe that as could be measured by general observation, weights and rate of skeletal growth the absence of sunlight was without effect upon calves kept in darkness from the age of one week to 2 years.

The Old Mexican Valley. From the results of recent investigations, Mr. Zelia Nuttall says that Mexico valley in remote antiquity was inhabited by a race which made pottery, used knives and built a truncated structure faced with unworked stones. This area was the home of the *Teozintli* from which maize developed. The survivors of the catastrophe due to flood and the volcanic eruption estimated at 2,000 to 5,000 years ago seem to have drifted southward to Guatemala developing the Maya and Mexican calendar. From this site they were driven out by a catastrophe possibly volcanic, possibly a famine and immigrated northward carrying maize to Central America and settled down in Mexico valley.

Agricultural Progress in Britain. A review of an account of recent progress in agricultural and horticultural science in the United Kingdom in the "Experimental Station Record" for November reveals that the period covered has seen considerable development. There are now in operation 18 research institutions and 14 advisory centres in England and Wales, 5 research institutions and 3 advisory centres in Scotland and 7 research divisions in Northern Ireland. Approximately £ 400,000 of public funds is being spent annually and the scientific personnel alone includes well over 100 workers mostly on a fulltime basis, while the grant for higher education in 1909 in England and Wales was less than £ 13,000. The papers published during the years 1922-25 numbered 1146 and covered a wide range of subject matter and the heaviest contributor was Rothamsted with 182 papers. One noteworthy contribution from this station was a volume of printed books on agriculture in the Rothamsted library which were published between 1471 and 1840. It contains notes on many books and authors forming a running commentary on agricultural history.



England's Agricultural wealth in 1926. The new valuation of the agricultural land in England and Wales was based on the principle of land valuation adopted by the surveyors' institution. In contrast to the estimated valuation of agricultural land in England and Wales at £ 815,000,000; the tenants' capital was £ 360,000,000. That worked out to an average of £ 19 an acre for smaller holdings, and at an average of £ 11-10 per acre for farms of 500 acres and upwards. Thus the whole capital in agriculture was £ 1,170,000. Last year the total value of output was £ 225,000,000 which worked out at £ 8-10 an acre. If that was the average and if the average rent was 31s. an acre, that showed that there was a sufficient margin to enable men to get a comfortable living out of their holdings. The only means by which that had become possible was by revolution in agricultural methods. At present two-thirds of the total output of farming was produced by the sale of livestock, only about one-fifth from crops and only one-tenth was drawn from corn production. That had only shown how rapid had been the change in English and Welsh farming. It appeared quite clear from the report that 31,000,000 to 32,000,000 acres were under cultivation by agriculture and horticulture. The change from 1871 to the present time was remarkable. There had been a drop of 300,000 in the number of cattle during the last 12 or 13 years and in the last 15 or 16 years a drop in the sheep population of 2,000,000.

(Walter Runciman, M. P. in the House of Commons).

Why students fail?—Some Scottish views.

Agricultural students will require to take their studies much more seriously than many of them seem to have done during the past session. The results in the March examinations in the West of Scotland College taking them overhead are distinctly disappointing. The vice-chairman, in announcing the results on Wednesday, presented to the students two alternative explanations of these comparatively poor results; either they were not as diligent as their predecessors or they were not as clever. The Principal suggested a third alternative; that the examiners had been tightening up the examinations. The other Governor present who did not speak ventured to suggest a fourth. *In all centres of learning there is now and there has been since the beginning of this century a growing tendency to multiply outside interests apart from the legitimate work of the classes. Far*

too much time is devoted to sports and the multitudinous out-growths that have no bearing on the serious business of the colleges. One of the most distinguished research workers of today during his university career had neither time nor money to expend on these interests. Outside the classroom and the laboratory he was altogether unknown. His classmates distinguished for the most part in these extraneous lines are today all but unknown—his is a world-wide reputation. Students in college days should work and work at their studies.

(From the Scottish Farmer, dated 26th March 1927.)

NOTES.

Economic Botany in the Empire. About Mr. H. C. Sampson's appointment at Kew referred to under 'Notes' in our last issue, a fuller account as published in a contemporary which a valued correspondent has kindly forwarded is worth perusal and is given below:—

The Royal Botanic Gardens, Kew, have received a grant of £ 4,000 for five years from the Empire Marketing Board, through the Ministry of Agriculture and Fisheries. At Kew is centred the general staff of economic botany within the Empire; its director is official botanical adviser to the Secretary of State for the Colonies, and those engaged in agricultural development overseas regularly look to Kew for expert advice.

The grant will be devoted partly to the employment of an economic botanist to be attached to the Royal Botanic Gardens, who will be available either to visit the Dominions and Colonies from time to time or to set free a superior officer of the Kew staff to undertake overseas missions, and partly to sending botanical collectors to various parts of the world to study and bring home plants of economic importance for cultivation at Kew and distribution to the Dominions and Colonies.

Mr. Hugh C. Sampson, C. I. E., formerly Director of Agriculture, Madras, has been appointed economic botanist at Kew in connection with this grant.

Monsoon Rainfall in 1926.

Fore cast-Division.	Period.	actual rain fall inches.	Departure from normal.	Percentage departure from normal.
Peninsula.	June-Sep.	36.8	+2.7	+8.
	Aug-Sep.	24.4	+7.5	+44.
Northwest-India.	June-Sep.	23.1	+3.7	+19.
	Aug.-Sep.	15.2	+4.2	+38.
Northeast-India.	June-Sep.	54.1	+1.5	+3.

N. B.—This statement is interesting in view of the failure of the Northeast monsoon rains which has caused anxiety in this Presidency.

Australia Gets Closer. Diwan Bahadur T. Rangachariar who went to Australia as the Indian representative at the opening of the New Federal Capital-Canberra-will, we learn, make an intensive study of the agricultural conditions in that young continent before he leaves for Madras. With the excellent impression which another countryman of his Mr. R. K. Shanmugam Chettiar M. L. A. had made during his visit as a member of the Indian Parliamentary delegation our Australian friends should have gathered better ideas of Indians which will tend to knit together these two countries to the mutual advantage of both; for Australia and India are in the main agricultural countries at present and India imports from Australia wheat, dairy produce and fruits in large quantities, though her horses, thanks to the advent of the more expensive motor vehicles, have ceased to find favour in this land.

The Baroda Villager. Peasants in the Baroda State are not overburdened with worldly goods. Some districts are constantly visited by famines. It is therefore some relief to find that the Salt works at Okha for which the foundation stone was laid on the 5th May by the Dewan, Mr. Rao Bahadur V. T. Krishnamachariar will provide occupation to thousands of villagers. It is expected that these works will in the early stages produce 75 thousand tons of salt annually and will supply to Bengal. It is reported that the site is capable of meeting the full requirements of this province which now gets its supply from Liverpool. But Baroda has been permitted by the Government of India to furnish only one-sixth of the imports at present and by developing the Okha works in the long run may capture the Calcutta market.

In the course of an interesting communication which he sends on the 'Need for Agricultural Banks in Rural areas' and which space forbids us to publish in full Mr. P. V. Hanumantha Rao, a member of the District staff, Coimbatore, observes that the population of India has increased, the productive capacity of the land has gone down, there is an annual deficit of ten million tons of grain in the country and this is due to the fact that abler men in a family abandon the village leaving the development of village economy in the hands of their less able brothers.

Usually in a village there are a few rich men who become bankers. They advance money on the security of land at a very high rate of interest. The produce from the land is barely sufficient for the ryot's expenses and payment of interest, much less the extinction of the debt and the land becomes the rich man's. The evil is growing apace and that roughly about 5000 mortgage deeds to the extent of Rs. two crores are registered annually in the taluk of Palladam alone.

Mr. Rao finds in the existing co-operative societies and banks no means of extricating the poor cultivator and would hence suggest that an agricultural section of the District Urban Banks be opened with facilities to make credit more mobile and less stringent in the case of the cultivator, who by the nature of his profession can only adjust his instalments to the period of harvest of crops which vary in their character. He would fix the limit of the rate of interest chargeable at $7\frac{1}{2}$ to 8 per cent, the period of repayment to 20 years and make it obligatory on the part of the local government to invest in these banks public monies to the extent of half the share capital of the banks.

Madras Cotton Crop Final Report. The area sown with cotton in the Madras Presidency in 1926—27 is estimated at 2,330,100 acres. The present estimate represents a reduction of 20 per cent from the final area of 2,920,700 acres in 1925-26.

2. In the South, bursting of bolls commenced a month earlier than usual; the first pickings began about the middle of February. In the Central districts, the first pickings began in March. In the Deccan, the pickings of the *hingari* or late crop commenced about the middle of January and came to a close by the end of March. Pickings are almost over in the Cocanadas tract.

In Raynad and Tinnevely, the rains in February and March damaged part of the crop which was in the process of maturing or picking. The staple is however very satisfactory. The rains were beneficial to the late sown crop in the South of the tract. The quality of the crop in the other districts is satisfactory especially in Coimbatore.

The crop was generally free from disease but was affected by prolonged drought in most districts during the major portion of the growing and maturing stages. The Deccan districts, Guntur and Nellore suffered the most.

The seasonal factor for the Presidency works out to 82 per cent of the average as against 93 per cent last year. The figure reported now is the lowest reported in recent years. On this basis, the yield works out at 400,000 bales of lint against 568,600 bales in the previous year, a decrease of 30 per cent and against an average of 417,700 bales.

3. The estimated area and yield under the several varieties are given below :—

Area in hundreds of acres; yield in hundreds of bales of 100 lb. lint.

VARIETY.	Area in		Yield bales in 400 lbs. lint.	
	1926-27	1925-26	1926-27	1925-27.
	(1)	(2)	(3)	(4)
	ACS.	ACS.	BALES.	BALES.
Irrigated Cambodia ...	162,4	194,0	92,3	110,5
Dry Cambodia ..	157,6	216,5	29,9	41,9
Total, Cambodia ...	320,0	410,5	122,2	152,4
Tinnevellies (a) ...	583,8	705,3	145,0	180,0
Salams (b) ...	183,3	193,6	31,7	35,8
Northerns & Westerns...	1,029,0	1,311,9	73,3	150,2
Cocanadas ...	158,3	277,3	25,2	47,3
Others ...	20,7	22,1	2,6	2,9

Madras gingelly crop final report. The area sown with gingelly in 1926-27 is estimated at 6,59,500 acres against an average of 774,68 acres.

(a) Includes upham, karunganni, and mixed country cotton in the South.

(b) Includes karunganni in Coimbatore, upham nadam and bourbon.

2. 207,600 acres have been reported as sown since the date of the forecast issued in January. These late sowings were mainly on wet lands in the Circars, Carnatic, and the South where gingelly was raised as a second crop after paddy.

3. There has been a fairly general reduction in area in the Circars, Carnatic, and Central districts owing mainly to the scanty rainfall at sowing time for the main crop. The greatest reduction in area is found in East Godavari, West Godavari, Chingleput, South Arcot, North Arcot and Salem where the area has fallen from 322,800 acres to 169,900 acres. In Bellary and Anantapur, area has increased from 20,200 acres to 45,500 acres owing to good sowing rains in June. There has been an increase in area in the South where the late crop was grown on a larger area as there was not enough water for raising paddy; the crop was also grown on the black cotton soils, taking advantage of the unusually heavy rains in February and March.

The main crop has been harvested except in the South. The yield was slightly above normal on the West Coast and normal in Anantapur, Cuddapah, Coimbatore, Tanjore and Tinnevely. The crop suffered from drought in the other districts, especially in East Godavari, West Godavari, Bellary, and Nellore. The condition of the late sown crop is generally fair.

The seasonal factor for the Presidency works out to 91 per cent as against 100 per cent in the previous year. On this basis, the crop of 1926-27 is estimated at 80,800 tons as against 106,500 tons in the previous year and an average yield of 104,750 tons.

5. Details are given below.

[Area in hundreds of acres, i.e., 00 being omitted; yield in hundreds of tons, i.e., 00 being omitted.]

Groups of districts.	Area sown upto	Yield of the area
	the end of March 1927, acres.	sown in 1926-27 tons.
Circars ...	298,900	37,100
Deccan ...	54,000	5,100
Carnatic ...	36,100	4,200
Central ...	117,300	14,708
South ...	138,500	17,200
West Coast ...	14,700	1,500
Total ...	659,500	8,0800

N. B.—Figures are estimates.

Two methods are in vogue in Great Britain in slaughtering animals. They are the old-fashioned poll-axe method and the recast captive-bolt pistol method which is considered more humane. Under the former system 14 million animals are killed yearly and under the latter 1 million animals.

The importance of Zoology in agricultural education is well known. Considering the enormous interest taken in animals of all kinds in Great Britain, it is curious to note that there are only five Zoological gardens in that country while in Germany there are more than 20 and as many as 92 in the United States of America.

Mr. M. J. R. Dunstan, Principal of the Royal Agricultural College Cirencester, is retiring at the close of this session. For 36 years he has been engaged in agricultural educational work.

Madras Advisory Committee :—Agricultural and Veterinary Departments.

The Hon'ble Mr. A. Ranganatha Mudaliyar, Minister for Development, President; Secretary to Government, Development Department Ex-officio Member and Secretary; Members:—Messrs. G. Premayya, L. Ag., R. Nagan Gowda, P. H. D.; Diwan Bahadur S. Kumaraswami Reddiyar, Tinnevely; A. B. Shetty, S. Kanara; and C. R. Parthasarathy Ayyengar (Chittor).

Co-operative Department. The Hon'ble Mr. A. Ranganatha Mudaliyar Minister for Development, President; Secretary to Government Development Department Ex-officio Member and Secretary; Members :—Messrs. K. Sarabhareddi, Kurnool; H. B. Ari Gowder, Nilgiris; V. I. Muniswami Pillai, Ooty. Vadamalai Tiruvanatha Sevuga Pandiya Thevar, Zamindar of Saithur, Madura and Syed Tajuddin Sahib Bahadur.

AMERICAN LETTER.

PART III:—IN WONDERLAND.

Dear Friends,

Your letter of March, 2, and the several items of very interesting news therein give me a pleasure which I cannot sufficiently describe. I hope I may have the good fortune to have such bulletins now and then. I dare say my letters must be

reaching you all right. T. V. S's regarding my boy Natarajan gives me no small amount of delight and happiness. When sometimes I calmly think over my affairs and actions, I feel whether after all I was not temporarily insane during the second semester of 1926; and now that I am in a far-off asylum, I am getting a bit sane again but have to complete the prescribed incubatory period before I am certified as such. News about the club and the elections gives me amusement and also food for thought. There are some excellent periodicals in this country which ought to find a place in our officers' club and of which I am preparing a list.

One or two things which have created in me profoundest admiration for this country are (1) as regards the health of the people, the sanitary arrangements for water, milk, vegetables and foodstuffs generally and the wonderful way in which the health of the children especially is attended to; (2) the Libraries. The University Library at Berkeley in California is in itself worth a pilgrimage. Oh! What a lovely sight to see over 5,000 students and school mistresses, professors and students, all on the same benches with absolutely no difference of any kind. At this university there are only ten thousand students and 300 professors and teachers. It may interest our friend Mr. U. V. Venkatasubba Ayyar to know that the management of the library here—issue of books and their receipt, Cataloguing etc.,—is all in the hands of two dozen young and smart girls who are assisted by students who work part-time and earn one or two dollars an hour. By the way in one of the 2 to 3 thousand pigeon holes for journals I was surprised to find our friend, the young prodigy of the M.A.S.U. journal for July wherein my conference paper was published.

One can pass days and nights here without feeling how the time passes and still, mark you, the libraries are open from 8 a. m. to 11 p. m. continuously on week days and for half-a-day on Sundays. You may know in old days when I too was a boss, I used to quarrel in vain with Messrs. Wood and MacRae to extend the library closing time by an hour after 4 p. m. (This extension of time has been granted now—Ed.) When on this subject I must confess that I have not come across any bosses in the institutions I have visited. I have looked into some public offices and many other institutions

here in vain to meet the individual that corresponds to our belted knight. The genus *peon* or *chaprasi* has no place in America. Professors and students carry their own loads, go to the Post office and fetch their own tappals, while their wives and daughters sweep the floor and do gardening with such help as they can occasionally get. Only very rich officers and landlords maintain servants. The State never burdens them with servants like as our good old country does. Clerical work in most offices and business concerns is wholly managed by very smart and neatly dressed girls or flappers as they are called. Often you come across a flapper in pants and coat and with the hair not merely bobbed but cropped too like that of a boy. The automobile is a pest here. There are any number of this type of vehicle. I am getting sick of its ubiquitous presence and 90 per cent of them are driven by girls and even old hags often at a breakneck speed. Road traffic however is beautifully controlled. By the way the rule is different from ours. In our country the rule is "If you go right you go wrong, if you go left, you go right." Here in the U. S. A. it is just the reverse. I noted it first in Hawaii on my way across the Pacific. Living in this place is very costly and a couple of dollars is the minimum expense a day.

PART II:—ACROSS THE EASTERN SEAS

Our steamer sighted *Singapore* on the morning of the 23rd November. The general scenery, as the steamer gradually approached the landing place down the straits is one of extraordinary beauty—with the water way studded with numerous small islets, the blue mountain ranges along the mainland forming a background for the landscape and the green vegetation as far as the eye could reach, in fact Nature in all its glory seems to revel in this tropical region. This glorious panoramic view one can never forget. Hundreds of ships of all nations and thousands of native crafts (*sampans*) crowd the water way and the port appears to be one of the busiest and largest in the World—at any rate the largest in all Asia as I was told. At the landing quay numerous people await the ship and as soon as the gang plank is connected a motley crowd of hundreds rush on board—some to meet their relatives, some who are would-be passengers, some who are baggage agents, some who are idle sight-seers and a good many who are native pedlars and hawkers bringing in all sorts of curios and local wares for sale on board and last not the least in importance the ubiquitous

ous money changer who could give you the correct exchange values of any and all the current coins of different countries! The money changer is a study in himself. He speaks a dozen languages and knows the names of every ship, its date and time of arrival and departure and above all is an adept in the fluctuation, market value and exchange rates of all coins of the World! I came across one very interesting specimen of this kind, a native of Karaikal, Tanjore, settled in Singapore for the past 20 years and carrying on this trade of a money changer. As the ship was scheduled to stay a day in Singapore I went ashore and spent the time in going round the city. The dashing motor cars, the crowded tram cars and the darting rickshaws in hundreds all proclaim how busy the city is. I wondered whether it would be possible to find such a mixed population of all races and nationalities in all sorts of colours and costumes anywhere in the World as in this City! You find the Malay, the Chinese, the Dyak, the Burman, the Madrassese, the Bengalee, the Guzerati, the Sinhalese, the Jap and all the Western representatives! India is very well represented especially South India and Ceylon, but it pained me very much to note and to be told that the great majority of our countrymen come here to do only the work of day labourers and menials! The sturdy Moplah and the wiry Tamil were evident in numbers in the harbour and the work of unloading and loading cargo from and into our ship was all done by the Moplah and Tamil gangs shouting and yelling in their native slangs which only a solitary individual among the crew and passengers of our ship ever understood! Chance also brought me in touch with a smart Tiyya of Cannanore playing a motor taxi in the city for the past few years! The last orthodox Indian meal with rice and dhal, curry and rasam and curd and chutney was enjoyed with all zest in the hotel of a Madura (not a Palghat) Brahman at a cost of 70 cents (about a Rupee). The busiest quarter of Singapore is Raffles place which would correspond to Chowringhee in Calcutta, Fort in Bombay or Mount Road in Madras. The new comer from India becomes terribly surprised at the number of motor vehicles and at the terrible street traffic. Speaking of street traffic it was a curious sight to see *Live semaphores* in the busy street junctions—a man with a wooden board strapped on to his body with danger and pass signals to direct traffic! I have recently secured a photo of this curious individual and shall send you the same in due course! The Raffles Museum was visited here; though the Natural History collections are not so numerous,

they contain some very rare and interesting tropical forms rarely seen elsewhere. The visitor new to these parts gets some idea of the Chinese and their ways—especially their method of sticks (chop sticks). The tropical fruits and vegetables displayed for sale defy all description, every kind of fruit is available—Bananas, Melons, Papayas, Oranges of sorts, Pine Apples, Mangosteen, Sapodilla, Avocado and many a variety of fruit! Nothing however struck me more than the wonderful display of sea shells and corals of various kinds kept for sale in the harbour—a sight which will thrill any Naturalist, especially one interested in Mollusca and they sell very cheap! So was the case with beautiful cane and coconut shell wares of various kinds. A few things that struck me as characteristic of the place were (1) Most people have their teeth gold edged—dentists appear to carry on a roaring business! (2) the middle and higher classes generally wear white drill with closed collars and two small studs at the collar below the chin (3) they also wear hats with or without trousers; the Malay and Chinese labourers have their palm leaf peaked hats (4) many Chinese and Japanese have taken to European dress, including women! these latter look remarkably picturesque in their native garb but unfortunately many are taking to western ways!

Due to a quite unexpected and unfortunate incident on board the ship on the 24th of a Malay deck passenger running amok and wounding a few cabin boys, the time of departure of the ship was delayed and we left Singapore only on the 25th afternoon. As the shades of evening were falling we bade good bye to the Malay coast with its unending rows of coconut trees which by their slow forward and backward motion at the edge of the waves appear as though asking the voyager to linger! Again a period of monotonous eating and sleeping and gazing at the horizon, writing letters and awaiting the next port of halt! The passenger gets postcards, note paper and covers free and he of course writes as many letters as possible and waits to post them at the next port of call! And then to while away the time some make use of the ship's music grinders and some pour over the dog eared shilling and half-penny magazines in the ship's library.

We approached Hongkong during the early hours of the 30th November and by day break the towering hills of the colony almost overhanging the harbour's edge came into view. During the six hours' stay of the steamer in Hongkong some time was

spent on shore sightseeing. Hongkong as you know is a British Colony and the far eastern out post of the British Empire, possessing one of the finest harbours in the World. It is an island of about 30 miles in area situated at the mouth of the Canton river. Here I saw for the first time a woman selling newspapers an old infirm Chinese woman and to satisfy her and to mark my curiosity I purchased a copy of the "Hongkong Express". A striking thing which I noted with some national pride in this place and in the next port we visited, was the towering personality of the tall stalwart Sikh policeman guiding street traffic in busy centres in the midst of pigmy Japs and Chinese like Gulliver in Lilliput! It was a source of mutual pleasure when we exchanged courtesy and enquired of each other's welfare. From the time we left Hongkong and the ship directed its course northwards into higher latitudes the cold weather gradually began to tell and the work of the fans in the cabins gave place to the steam heaters with which all the cabins are warmed, and some of us felt the need for the use of the extra blanket kept in reserve and hot water for drinking and washing purposes. The weather too was for two or three days during this time pretty windy and rainy and I was reminded of the typhoons for which the China Sea is notorious, the average annual number of the typhoons being 16.

The morning of the 3rd December found our ship ploughing the muddy yellowish waters of the mouth of the mighty Yangtse Kiang. From here the steamer passed into the Khangpoo river the last of the tributaries of the Yangtse and after a course of 13 miles up this river came in sight of the now famous city of Shanghai by 10 O'clock. Here we halted just one day and though I was advised that it would be risky to venture into the city as a stranger I went round the whole city in a rickshaw and posted a couple of letters for home in the big Chinese Post Office, I wonder whether they reached their destination! Shanghai is a very big city and is the chief Emporium of trade in the East, And it was only after I saw Shanghai that I realised the grandeur of the Chinese Empire and its remarkable and unlimited resources! The peculiar political arrangements in this city will strike any unprejudiced mind not only as extraordinary but most unjustifiable. Practically every European Power and America have their separate concession areas with their own Post Offices and arrangements and all within the Chinese territory. Just think of the British, French, American, Japanese, and German, having

Separate Post Offices within an area of 8 or 10 sq. miles in addition to the Chinese Post Office. All parts of the city are very busy and look almost like one of the modern American or European cities with hotels and cafes, clubs and dance halls. It is called the "Paris of the East" by some. The average Chinese cooly in the docks is a remarkably healthy and fine looking individual and both the men and women do hard work in the boats in spite of the very chill and rainy weather.

We left Shanghai the next afternoon in very chill and rainy weather and at the mouth of the Yangtse we had to wait several hours to get the tide since there was not sufficient water for the steamer at the entrance. By the 7th we entered the inland sea of Japan and soon came in sight of the Land of the Rising Sun.

San Francisco, }
12th May 1927 }

T. V. R.

UNIVERSITY OF MADRAS.

B. Sc. Ag. Degree Examination, 1927.

PART I.

ENGINEERING.

Monday, 21st March 1927

[7 A. M. to 10 A. M.]

[N.B.—Only six questions are to be answered.
Question V is compulsory.]

I. A reservoir the top of which is 40 feet long by 25 feet broad and whose sides slope inwards at a slope of 1 foot horizontal to 2 feet vertical, is 14 feet deep. Find its capacity in cubic feet.

II. Sketch and describe the action of a screw jack. In a screw jack, the pitch of the screw is $\frac{1}{2}$ inch, and the lever is 14 inches long. What weight can be lifted by an effort of 50 lbs?

III. A circular pipe sewer, 12 inches in diameter, runs half full. The slope is 1 in 300. Find the discharge. $C=90$.

IV. Explain how you would sink a well, with brick steining, 8 feet diameter inside, to a depth of 20 feet, in alluvial soil.

V. A sanitary cattle-shed is to be constructed to accommodate 24 cows. Make dimensioned sketches of plan and sections of your design and note the materials used in the structure.

VI. Describe, with sketches, the working of any two of the following:—Lawn mower; Hay press; Straw chopper; Spraying machine.

VII. Discuss, in brief notes, the scope for use for agricultural purposes, and the conditions favourable for employment, of each of the following:—Wind mills; Crude oil engines; Motor tractor; Electric power.

VIII. Sketch the normal indicator diagram for a four-stroke crude oil engine, and explain clearly its meaning. A crude oil engine is required to drive a pump to discharge 500 gallons a minute with a maximum lift of 29 feet. What is the B. H. P. of the engine that you will order for the purpose?

BOTANY.

Monday, 21st March 1927

[1 P. M. to 4 P. M.]

[N.B.—Only six questions are to be answered.
Question II is compulsory.]

I. Describe briefly the development of cotton fibre, from the time of pollination of the flower to the time the lint is ready for picking.

II. What are secretory tissues? Mention some tropical plants from which products of great economic importance are derived.

III. Give a full account of the characteristics of Rutaceae. Mention some plants of this family that are common in South India and state their economic importance.

IV. Write short notes on:—Periblem; Caryopsis; Sympodial branching; Callus; and Mitosis.

V. Describe three ways by which the plant may use the food which it manufactures.

VI. Why do you cut fodder cholam when it has begun to bloom? Mention the various kinds of food materials it contains at that time, and describe the manner in which the plant manufactured them.

VII. What is phellogen? What role does it play in the development of a tree?

VIII. Construct floral diagrams for the following:—Cucumber; Brinjal; Orange; Mustard; Coffee; and Rice. Give their botanical names and mention the family to which each belongs.

CHEMISTRY.

Tuesday, 22nd March 1927]

[7 A. M. to 10 A. M.

[N.B.—Answer any five questions.
All questions carry equal marks.

I. (a) 0.2427 gram of an organic substance containing only carbon, hydrogen and oxygen gave, on combustion, 0.3553 gram of carbonic acid and 0.1461 gram of water. What is its empirical formula? (b) Mention the general methods by which you would arrive at the molecular and constitutional formula of a substance whose empirical formula is known.

II. Define (a) homologous series, (b) isomerism, (c) optical activity and (d) unsaturation, with suitable examples.

III. What is glycerol? How is it prepared? How would you arrive at its constitution?

IV. Write a short account of either alkaloids or glucosides.

V. Describe in detail how you would carry out the qualitative analysis of a double silicate containing iron, aluminium, calcium, magnesium, and potassium. Explain the reactions involved.

VI. What are the proximate constituents of a soil? Explain how they would modify its physical and chemical properties.

VII. Trace the changes which the organic matter of the soil undergoes in wet and garden cultivation.

ZOOLOGY.

Tuesday, 22nd March 1927]

[1 P. M. to 4 P. M.

[N.B.—Only six questions are to be answered.
Question I is compulsory.]

I. Describe, with the aid of a diagram, the alimentary system of an insect and compare it with that of an earthworm.

II. What are the characters of the order Rhynchota? Give a broad classification of this order, mentioning six important families in each division.

III. Write what you know about the biological control of insect pests. Illustrate your answer, as far as possible, with reference to South Indian conditions.

IV. Describe briefly the more important devices used by insects to protect themselves against their enemies.

V. 'The control of insect pests depends to a large extent on the study of their habits and life histories.' Discuss this statement, with special reference to the Red Hairy Caterpillar (*Amsacta albistriga*) and the Rice Hispa (*Hispa armigera*).

VI. What is Lac? What are its uses? Give a short account of Lac cultivation in India.

VII. Describe three of the major pests of the Mango tree in South India and state what measures you would adopt to control them.

VIII. Write short notes on the following:—(a) Nutrition in Hydra, (b) Termites, (c) Trypanosomes, (d) Parthenogenesis, (e) Respiration in fish and (f) Acarina.

AGRICULTURE I.

Wednesday, 23rd March 1927]

[7 A. M. to 10 A. M.

[N.B.—Answer THREE questions in A and THREE questions in B. Questions III and VIII are compulsory. Write answers to questions in A and B in separate answer-books.]

A

I. What do you understand by sedimentary and transported soils? Explain briefly how they are formed and how they are distinguished.

II. Describe briefly the advantages of preliminary cultivation on dry soils and give the best possible time for each operation.

III. What is meant by rotation of crops? What are the chief factors that determine rotations and systems of farming? Give the advantages of rotation.

IV. Explain why soils become alkaline, and how alkaline lands can be reclaimed.

B

V. Explain briefly how the two monsoons affect the course of agricultural operations in Malabar, Coimbatore and Tanjore districts.

VI. (a) In working with a mould-board plough, the following drawbacks are noticed:—(i) The plough does not plough the full width. (ii) The earth sticks to the mould-board and has to be scraped off frequently. (iii) Pressure has to be put frequently at the handles. (iv) The furrow slices dry into hard clods. Explain what causes these drawbacks. (b) You are asked to compare the work of two kinds of mould-board ploughs. Explain how this is done, and to what points you would pay particular attention.

VII. What is meant by 'soil erosion'? Explain the nature of the damage done on ordinary arable land by such erosion. Describe, with suitable sketches, the methods by which you would prevent the erosion under the different conditions met with.

VIII. (a) What advantages, if any, has the method of drill sowing over broadcasting (in the case of, say, cholam or cotton)? Describe any three models of local seed-drills you may be aware of; and explain in what ways the local drills are capable of improvement. Can you suggest any simple way by which such improvements can be effected? (b) State what considerations would guide you in fixing the seed rate of different crops.

AGRICULTURE II (ANIMAL HYGIENE).

Wednesday, 23rd March 1927 [1 P.M. to 7 P.M.]

[N.B.—Only six questions are to be answered.
Question II is compulsory.]

I. What are the symptoms of health in cattle?

II. Give the symptoms and treatment of:—Fever, Tympanitis, Fardel-bound and Yoke-gall?

III. Mention any two common contagious diseases amongst cattle and write notes in detail on them.

IV. What is the average period of gestation of the mare, the cow, the buffalo and the ewe? Mention the names of the young ones of these animals.

V. What are the actions, uses and doses in cattle of the following drugs? Oil of turpentine, magnesium sulphate, potassium nitrate and ammonium carbonate.

VI. How will you prepare a pregnant cow for parturition?

VII. Enumerate the several organs of digestion in the ox; and describe the function of the liver.

VIII. In the construction of a temporary isolation cattle shed to house 50 Ongole animals, what considerations would you have regarding site, accommodation of animals, servants, storage of food and fodder; etc.? Give details of the same with a rough sketch of the plan.

PART I—PRACTICAL.

ZOOLOGY.

Tuesday, 29th March 1927]

[7 A. M.]

I. Make a dissection of specimen A (Cockroach) to expose the salivary glands.

II. Dissect out the following organs from specimen B (Frog), place them in the watch glasses provided, and name them (a) Pancreas (b) Gall bladder (c) One Lung (d) One Kidney (e) One testis or Ovary.

III. Identify specimens 1 to 20.

IV. Questions based on students' collection of insects.

V. Viva-voce.

AGRICULTURE—ANIMAL HYGIENE.

Wednesday, 30th March 1927]

[6-50 A. M.]

I. Identification of the internal organs of ram and ewe (from dissection.)

II. Identification of the common drugs, instruments, appliances and their uses.

III. Different methods of restraining cattle for operations.

IV. Drenching and handling of cattle.

V. Minor surgery.

VI. Oral examination.

CHEMISTRY.

Thursday 31st March 1927]

[10-40 P. M.]

I. Examine substance in test tube for not more than 2 bases and 2 acids.

II. The flask A contains an aqueous solution of a non-nitrogenous organic substance. Identify it.

III. Estimate the CaO content of the solution in flask B per litre.

V. Oral Examination.

ENGINEERING.

Friday, 1st April 1927]

[6 A. M. to P. M.]

I. Make a hands sketch, for purposes of a chain survey, of the Rest House Compound, bounded by Subba Rao Road on the east, Robertson Road on the north, Workshop and Dairy on the west and the masonry drain on the south.

II. Chain between stations A and B, making neat sketches and taking offsets.

III. Take a line of levels from the north verandah of the A.C. and R. I. to the western side of Freeman Building, touching upon the given 4 Bench marks—separate Bench marks for each candidate—and reduce the field book.

IV. Prepare a door cleat, as per dimensions given, with the given piece of timber—carpentry tools provided.

V. Measure out specified positions of the Rest House building and make out estimates of quantities and cost of one of the following:—

(a) distemping walls double coats	} Measuring tapes, foot rules and estimate forms provided.
(b) wood-oiling timber	
(c) brickwork in chunam	
(d) plastering.	

VI. Plot the given chain survey of a triangle, the three sides of which were given, state the length of the tie line, and calculate the correct area to the nearest cent. (Gunter's chain used—correct length 66-25.)

AGRICULTURE.

Saturday, 2nd April 1927]

[6 A. M. to 11 A. M.]

I. To fit up the "Monsoon" plough supplied dismantled; to hitch bullock to plough; to plough given strip of land by splitting or gathering as directed. Also *vive voce* on plough adjustment in field.

AGRICULTURE (VIVA VOCE.)

Saturday, 2nd April 1927]

[2 P. M. to 8 P. M.]

Samples given and questions asked upon.

I. Slip point share, (2) *Cyperus Rotundus* (3) *Harioti* grass, (4) Lucerne (5) Guinea grass (6) Chaffed Jola straw (7) Rice bran (8) groundnut oil cake (9) Cotton seed.

BOTANY.

Tuesday, 5th April 1927]

[Time 10 A. M. to 1 P. M.]

I. Describe fully specimen A and refer it to the family, mentioning other plants of economic importance of this family in this Presidency.

- II. Write full morphological notes on, B, C, D, E and F.
 III. Identify the slides G, H, and I.
 IV. Make preparations of the specimen J and identify it.
 V. *Viva voce*.

- (a) Carrot branches with inflorescence.
 (b) *Jasminum* „ „ tendrils.
 (c) *Crossandra* inflorescence.
 (d) *Acacia auriculiformis*—phyllodes seeds and fruits.
 (e) *Hiptage Madagblota* fruits.
 (f) *Asclepias curassavica* inflorescence.
 (g) Slide—Ragi spikelets.
 (h) „ Nerium leaf section.
 (i) „ Mango flower.
 (j) „ Cucurbita stem.

VIVA VOCE.

Mixture of fruits and seeds adapted for dispersal.

Euphorbia heterophylla (Cyathium)

Alternanthera echinata (Weed)

Gloriosa superba (Herbarium sheet) Tendril.

Aloe (Xerophytic)

Coconut with 3 carpels.

Commiphora Berryi (Xerophytic).

PART II. THEORY.

BOTANTY I.

Thursday, 24th March 1927].

[7 to 10 A. M.

(N.B.—Only FIVE questions are to be answered
 Question VI is compulsory).

I. Describe the root system of the cotton plant, and explain in what way it influences the system of rotation in Madras.

II. Describe briefly the 'Tikka' disease on groundnut (*Cercospora personata*). What preventive measures would you adopt to keep it under control?

III. What are 'continuous' and 'discontinuous' variations and what bearing have they on evolution in general and improvement of crop plants in particular?

IV. What are the effects of high temperature, intense light and high winds on carbon assimilation in plant?

V. What is 'Physiological drought'? Under what conditions do you find it in Madras and how can you overcome it?

VI. A locality contained two types of cotton, one having yellow petals without eyespot and the other having white petals with red eyespot. Through hybridisation of these two types and raising 'selfed' progenies of F₂ and F₃ generations, a pure form of cotton having yellow petals with red eyespot was evolved. Explain fully under what conditions this is possible.

BOTANTY II.

Thursday 24th March 1927].

1 to 4 P. M.

(N. B.—Only FIVE questions are to be answered.
 Questions V is compulsory)

I. What is vegetative reproduction? Give examples of different kinds. What are its advantages and limitations in crop improvement?

II. Describe briefly the methods of reproduction in fungi, and state the effect of food supply on the form and reproductive activity of a fungus.

III. Give a botanical description of sugarcane. Compare its root system with paddy and discuss how far paddy is suitable as a crop for rotation with sugarcane.

IV. Describe with suitable examples, three types of vegetation which have adapted themselves to live under conditions of scanty supply of water.

V. What are fibres? Classify the fibre plants of India according to the families to which they belong. From what part of the plant are the fibres secured in each case? Describe one of the plants in technical language.

VI. Explain fully the terms 'Mass selection' and 'Pure line breeding'. What are their advantages and their limitations in agriculture?

CHEMISTRY I.

Friday, 25th March 1927.]

[7 A. M. to 10 A. M.

(N.B. Answer any FIVE questions. All questions carry equal marks.)

I. What is meant by 'available plant food' in the soil, and what methods are available for its determination? Discuss the relative merits of the different methods.

II. What kinds of soils in the Presidency are usually rich in potash and what kinds are poor? When observation is indecisive, how would you arrive at the information you want?

III. How is superphosphate manufactured? Mention the substances present in, and give the composition of, a well-made superphosphate. Explain the action of superphosphate in the soil.

IV. What are the determinations usually made in the analysis of a feeding stuff? What is the precise significance of each of these and what other factors have to be taken into consideration in arriving at an estimate of the nutritive value of the feeding stuff?

V. How is the manurial value of a feeding stuff calculated? What is the manurial value of groundnut cake used as a concentrated food? Explain what happens to the nitrogen of groundnut cake consumed by fattening cattle.

VI. Describe the constitution of 'fats and oils'. Explain the significance of the terms 'saponification value', 'iodine number' and 'free fatty acid value'.

VII. Name the various compounds of lime used in agriculture, mentioning the functions of several compounds under different conditions.

CHEMISTRY II.

Friday, 25th March 1927.]

[1 to 4 P. M.

(N. B.—Answer any FIVE questions. All questions carry equal marks.)

I. What are the chief objects aimed at in the chemical analysis of soils? How far, in your opinion, do the methods at present in use attain these objects? State your opinion of a soil which, other conditions being satisfactory, gave the following analysis, and describe the treatment, if any, it should receive:—

Organic matter	2.56 per cent.	Lime	0.26 per cent
Magnesia	0.57 ..	Available potash	0.006 ..

Available phosphoric acid 0.002 per cent.

II. Explain the principles involved in the sedimentation method of mechanical analysis of soils. What properties of soils depend directly on their mechanical constitution?

III. Give a brief account of the nature and functions of the more important micro-biological population in the soil.

IV. Trace the changes taking place in the sugar contents of the sugar cane plant at different stages of its growth. Explain how the sugar contents will be affected by (a) manuring, (b) soil alkalinity and (c) arrowing.

V. What are enzymes? Describe how they may be prepared. Give three typical examples of enzyme actions in nature and explain how the action of these enzymes is utilised in Industrial processes.

VI. Give an account of the changes which the nitrogenous compounds undergo during the fermentation of farmyard manure.

VII. (a) Explain the utility of the lactometer in detecting adulteration of milk.

(b) A sample of cow's milk gave the following readings :—
Lactometer reading—28; Temperature—81F° Fat by Leffman-Beam—4.6; Calculate the total solids.

(c) How would the figures for 'Specific Gravity', 'Fat' and 'Solid-not-fat' be affected, if 30 parts of water be added to every 70 parts of above milk?

AGRICULTURE I.

Saturday, 26th March 1927]

[7 to 10 A. M.

(N.B.—Only FIVE questions are to be answered.
Questions V and VI are compulsory).

I. Estimate the approximate cost of the following operations explaining how the figures are arrived at:—

(a) Ploughing one acre of stiff black cotton soil with Galloway plough. (b) Pulling paddy seedlings from the nursery and transplanting them on an acre of wet land. (c) Drilling cholam with the ordinary three-tined gorru and covering it with guntaka on one acre of dry land. (d) Harvesting groundnut and picking the pods from one acre of medium soil under garden cultivation.

II. Make a list of implements necessary for the cultivation, harvesting and crushing of sugarcane; and place, against each implement, its approximate price and the area that could be covered in an average working day.

III. (a) Describe any silo suitable for our Presidency and mention the position that it should occupy in relation to the other farm buildings. (b) What are the conditions under which ensilage making is likely to prove advantageous, and give an account of its making and utilisation.

IV. What is meant by catch-cropping? Explain fully the conditions favourable to catch cropping and the system or systems under which it can be adopted in India.

V. (a) What factors have the greatest effect on the composition and value of farmyard manure, and what losses are likely to occur in making and storage? What steps should be taken to reduce these losses to the minimum. (b) In what manner do dressings of farmyard manure and artificial manures differ in ultimate effects?

VI. You have a farm capable of carrying 50 cows and the necessary young stock and breeding bulls. You have also a sum of Rs. 5,000 for the purchase of cattle and your ultimate aim is to build up a first rate Dairy herd of Nellore breed. Explain how you will proceed.

VII. 'The Cooperative movement, so far as the ryot population is concerned, is more a failure than a success in the Madras Presidency'. Examine this statement and discuss briefly how this movement can help the progress of agriculture.

AGRICULTURE II.

Saturday, 26th March 1927.]

[1 P. M. to 4 P. M.

(N.B.—Only FIVE questions are to be answered.
Questions 2 and 7 are compulsory).

I. Name the principal varieties of cotton grown round Coimbatore and describe their peculiarities under (a) habits of growth and appearance, (b) soils suited, (c) pests or diseases to which subject, (d) the quality of cotton and of seed, (e) the ginning percentage and (f) the yield of kappas per acre.

In what characteristics are marked distinctions noticeable? Explain the nature of the restriction imposed by Law on the transport of Cotton in the Madras Presidency.

II. In the case of a farm consisting of 5 acres of wet land (under a good tank) and 15 acres of dry land (red loamy soil), give (a) details of equipment in live stock and implements necessary, with approximate cost, (b) a simple cropping scheme (not for intensive farming) and (c) an approximate estimate of receipts and expenditure for one year.

III. In what respects are the local breeds of sheep capable of improvement? Describe any notable work that has been done in this respect in South India, and state the extent of improvement found to be possible and its money value. Discuss the merits or otherwise of cross breeding with Merino sheep, as a method of improving local breeds.

IV. Discuss the effect and comparative merits of the following as nitrogenous manures:—(a) Nitrate of Soda, (b) Calcium cyanamide, (c) Ammophos grade (20-20), (d) Sulphate of Ammonia, (e) Castor oil cake, (f) Dried blood, and (g) Growing and ploughing sunnhemp. What quantities per acre of (d) and (e) would you consider necessary for a heavy crop of sugarcane on land receiving 10 cartloads of cattle manure per acre? Describe how you would apply the quantity specified by you.

V. (1) Write notes on the following cattle feeds:—Cotton seed, Groundnut oil cake, Cholam green fodder, Cholam ensilage, Paddy straw, and wheat bran.

(2) In what dairies does whey become largely available? What profitable use can you suggest for skim-milk? How does whey differ from skim-milk?

VI. In what ways are the local methods of sugarcane milling and jaggery boiling capable of improvement? Describe in detail the improvements you would recommend.

VII. You own a city milk selling dairy, with 6 Delhi buffaloes and 12 Scindhi cows. Give an estimate of receipts and expenditure, for Coimbatore conditions, from one year's working.

AGRICULTURE ESSAY.

Monday, 28th March 1927.

7 A. M. to 10 A. M.

Write an essay on _____ of the following subjects:—

The scope and limitations for successful farming in the country and the qualities that would make a successful farmer.

or

The measures for increasing the manurial resources of the country including the desirability of legislation in that behalf.

PART II:—PRACTICALS.

BOTANY No. I.

Wednesday, 6th April 1927].

[Time 2 P.M. to 5 P.M.]

I. Describe fully the specimen (a) and refer it to the family to which it belongs. Mention plants of economic importance.

II. Write short notes on (b), (c) and (d).

III. Cut sections of material (e) and explain the various parts with sketches.

V. Viva voce,

- (a) Sunflower branch with flower heads
- (b) Slide—Vertical section of an anther showing pollen mother cells—tetrad division and formation of pollen grains.
- (c) Slide—Karyokinetic cell division
- (d) Slide—Reduction division
- (e) Cholam stem

Viva Voce:—Pot bound plant, *Chrysanthemum* suckers, Good and bad grafts of mango.

BOTANY No. II.

Thursday, 7th April 1927]

[Time 2 P.M. to 5 P.M.]

I. Assort the various seeds in the sample (a). Mount them giving their botanical and popular names.

II. Take section of the material (b) and write a short note on it.

III. Write notes on (c), (d) and (e).

IV. Every seed in the sample (f) represents the produce of one plant in (F_2) generation. Study the total population and make a report.

- (a) Assorted seeds of crops, casuarina, etc.
- (b) Paddy root.
- (c) Petiole of *Nelumbium*

- (d) Nerium leaf. (T. S.)
 (e) Puccinia (Teleuto spores)
 (f) Horse gram—black and brown Proportion 90 of black to 70 of brown.

AGRICULTURE I.

Friday, 8th April 1927.]

I. To fit up the seed drill given dismantled and get it ready for sowing.

II. To fit up the given plough, supplied dismantled, and to get it ready for ploughing.

III. Viva Voce:— Judging three samples of cotton provided; Judging a good working bullock on the farm; questions on the loose box system, the cattle manure; storage and carts; samples of oil seeds to be identified and also questions upon; orals on synthetic farmyard manure, silage and a cotton growing Co-operative Society; Delhi breed of buffaloes, a reinforced mould board.

CHEMISTRY I.

Saturday, 9th April 1927]

[10 A.M. to 4 P.M.]

I. Determine (i) Insoluble mineral matter and (ii) Phosphoric Acid in the sample of manure in bottle.

II. Flask (b) contains the Hydrochloric extract of a soil. Estimate Ferric oxide and lime, preparing your own standard solutions, if necessary.

III. Oral examination.

CHEMISTRY II.

Sunday, 10th April 1927]

[10 A.M. to 4 P.M.]

I. Flask (b) contains solution of KCl. Perform such qualitative and quantitative experiments with the soil supplied, as are necessary to deduce the retentive capacity of the soil for acid and basic radicles. Also comment on the influence of the potassium chloride on the other basic constituents of the soil.

II. Determine lactose in the sample of milk contained in flask (c).

III. Oral examination.

AGRICULTURE II.

[11th and 12th April 1927.]

I. Prepare butter from a given quantity of cream including packing for sale.

II. Oral examination in dairying and dairy animals.

III. Handling the working animals and ploughing red soil field in a given time with monsoon plough.

List of B. Sc. Ags. 1927. Achyuta Variar U; Bapayya D; Gopalan Nayar T; Krishna Rao V; Krishnasami C. S; Kunhikoran Nambiyar A; Mayandi S; Parameswara Menon P. K; Ramachandran S; Ramachandran S. V; Rammohan Rao A; Ramanathan K; Ramaswami K; Sankaranaryanan C. S; Sivasankara Menon K; Subramanyam P. Sudarsanam; Sundaresan M. V; Tangavelu C. V; Vaideswaran K. B.

List of Successful Students in Part I. Ambikacharan K; Gopalan R; Kochunnikuttan Achan P; Krishna Reddi T; Krishnaswami V; Kunhikrishnan Nambiyar K; Muttuswami S; Natesa Ayyar P. K; Padmanabhan M. K; Padmanathan B. S. (private student); Ramabhadran G; Ramachandra Rao S; Raman Menon K; RamanMoosad C; Ranganathan K. S; Samuel C. S; (private student) Subbayya M. S; Sundarsanam (private student); Tangavelu, Thomas N. K; Vaidynathan M; Venkatacharya B. V, Venkatasubrahmanyam M. K.

Failed in one subject-chemistry-Abraham M. C; Krishnan K; Sundaresan G; Uttaman P.

DEPARTMENTAL NOTIFICATIONS.

MAY.

Appointments Posting etc. :—Mr. C. Tadulinga Mudaliyar to be Principal Agricultural College from 15th May vice Mr. M. R. Ramaswami Sivan retired from service.

Mr. H. Shiva Rao to be Government Lecturing Chemist in the Madras Agricultural Service with effect from 24th December 1926.

Mr. G. Kasturi Ranga Dikshatar, Supervisor, P. W. D. to officiate as Assistant Agricultural Engineer, vice Mr. H. E. R. Dunhill on leave.

Mr. S. Sitarama Patrudu to be Assistant Director of Agriculture on probation in charge of the Sugarcane Station, Anakapalle.

Messrs. P. V. Samu and A. R. Krishnamurthi to be Lower Subordinates on probation and posted to Vth Circle. Mr. P. Narayanan Nambiyar to be Lower Subordinate 5th grade on probation and posted to Deputy Director Livestock's section.

Messrs. C. S. Krishnaswami Ayyar, M. K. Swaminatha Ayyar, and M. C. Krishnaswami Sarma are confirmed in their appointments.

Leave etc. Mr. N. S. Kulandaiswami Pillai, Assistant Director in charge of 5th Circle leave on average pay for 16 days from 16th May; Mr. C. Narayana Ayyar, Assistant Director Fifth Circle to be in additional charge of the 5th Circle.

Mr. P. S. Jivanna Rao, Assistant Lecturing Botanist leave on average pay for six weeks from 9th May.

Mr. K. Krishnamurthi Rao Assistant Sugarcane Expert, leave on average pay for six weeks from 20th April; Mr. U. Vitall Rao to officiate.

First Circle. Mr. D. Panakala Rao, Manager, Samalkota leave on average pay for 12 days from 9th May.

Third Circle. Mr. B. Venkataramana, Assistant Demonstrator, Markapur leave on average pay for one month from or after 2nd May.

Mr. K. Jagannatha Rao Demonstrator, Prodattur leave on average pay for one month from 2nd May.

Mr. K. Rama Rao, Demonstrator, Cuddappah, leave on average pay for fifteen days from or after 10th May.

Mr. L. Narasimacharya, Demonstrator, leave on average pay for six weeks from or after 1st May.

Mr. G. L. Narasimha Rao, Assistant Demonstrator, Kurnool, leave on average pay on medical certificate for two months from date of relief.

Mr. K. Ramanatha Ayyar Manager Nandyal, leave on average pay for one month from or after 3rd May.

Mr. S. M. Kalyanarama Ayyar, Assistant to Cotton Specialist, extension of leave on average pay for 12 days.

Fourth Circle. Mr. P. Janakiram Ayyar, Assistant demonstrator, Mailpatti leave on average pay for six weeks from or after 10th May.

Seventh Circle. Mr. P. Kannan Nambiyar, Assistant Manager, Nileshwar leave on average pay for 15 days from 2nd May.

Mr. K. Soopi, Assistant Manager, Kasargod, leave on average pay for one month from 6th June

Eighth Circle. Mr. D. S. Subramanyam, Assistant Demonstrator, leave on average pay for three weeks from or after 10th May.

Curator's Section. Mr. K. K. Hegde Assistant Manager, Najananad, leave on average pay for 11 days from 9th May.

P. S. Section. Mr. C. Rajasekhara Mudaliyar, Assistant, extension of leave on average pay for two days.

M. S's. Section. Mr. U. L. Srinivasa Rao Sub-assistant, leave on average pay for one month in continuation of the Easter holidays.

Superintendent's Section. Mr. S. Narayana Ayya, Teaching Assistant leave on average pay for one month from 10th May.

Mr. A. M. Richards, Veterinary Assistant, leave on average pay for one month from date of relief.

Artists' Section. Mr. S. Subramanya Ayyar, leave on average pay for one month from 4th May. Mr. P. Doraiswami Mudaliyar, leave on average pay for 15 days from 2nd May.

JUNE.

Postings, Confirmation, etc. Mr. A. V. Tirumuruganatham Pillai, Assistant Director, on return from leave is posted to the 5th Circle, Trichy. Mr. M. A. Sankara Ayyar, Assistant 5th grade is confirmed in his post.

Leave First Circle. Mr. P. L. Narasimham assistant demonstrator, leave on average pay for 15 days from date of avail.

Second Circle. Mr. K. V. Seshagiri Rao assistant demonstrator, extension of leave for 25 days.

Third Circle. Mr. M. Satyanarayana, farm manager, extension of leave on medical certificate by one week. Mr. C. Subbarao Naidu assistant demonstrator Allagadda leave on average pay for 12 days from 14th.

Fourth Circle. Mr. M. Eggiyaswami Ayyar, farm manager, leave on average pay for one month from 1st June. Mr. S. R. Srinivasa Ayyangar, demonstrator, leave on average pay for one month from 16th May.

Sixth Circle. Mr. C. S. Namasivayam Pillai, assistant demonstrator Uthupattu leave on average pay for one month from 6th June.

Mr. C. A. S. Ramalingam Pillai, assistant manager leave on average pay for 20 days from date of relief.

Seventh Circle. Mr. P. Kesavanunni Nambiyar, demonstrator Badagara leave on average pay for one month from 5th July.

Curator's Section. Mr. P. Abishekanatham Pillai, manager, Potato Farm leave on average pay on medical certificate for four months from or after 1st June. Mr. K. G. S. Bhandary to be in charge.

C. S's. Section Mr. V. Chidambaram Pillai, manager Koilpatti leave on average pay for three weeks from 31st May.

M. S's Section. Mr. P. Krishnamurthi, assistant manager, leave on average pay for 20 days from 22nd May.

G. A. C's Section. Mr. P. A. Raghunathaswami Ayyangar, assistant, leave on average pay for one month from 10th June. Mr. T. Rajagopala Ayyangar assistant, leave on average pay for 15 days from 8th June. Mr. S. Kasinatha Ayyar, assistant, leave on average pay for 10 days from 7th to 16th June.

Artist's Section. Mr. S. Subramanya Ayyar, Artist, extension of leave on average pay for one month and two days.

Superintendent's Section. Mr. C. V. Seshachariar, Manager leave on average pay for one month from 28th June.

CORRESPONDENCE.

SIR,

I have been reading your editorial note in the April issue of your journal entitled "An Unmerited Oblivion". The writer of the offending note is away on vacation, and it will be difficult for me to reach him, but I am sure he will agree with me in saying that there was absolutely no offence intended. The aim of that note was to give a summary of what the students observed. Everything in the article makes it perfectly clear that it was a very inadequate survey. I am perfectly sure readers would have taken all the conclusions at the value which such a circumstance warranted.

The offending sentence reads as follows :—

"The Government demonstrator is apparently not perfect: indolence, lack of vision, even a lack of responsibility, are some of the criticisms levelled against him. Apart from this, even those who know anything about modern agricultural methods do not avail themselves of such knowledge. One book says that, though a villager is in possession of 'an improved plough, he never brings it out of his house.' "The visits of the Government demonstrator are few and far between, and he fails to pierce through the sentimental conservatism and ever-growing ignorance of the cultivator."

Now, when this statement is read again, I do not see how any offence could be taken. There is no institution in the world regarding which some members cannot be criticised in this way. Moreover, the failure and the improvement of a farm is here very clearly attributed not exclusively to the Agricultural Demonstrator, but very largely indeed to the faults of the farmers themselves. The writer of this paper and I have had frequent talks about this, and I am warranted in saying that he as well as I have sincere regard for the work of the ordinary Agricultural Demonstrator amid so many handicaps and difficulties. Indeed I have reason to know, that he has very few encouragements in his dreary official life.

When I have said this I may be permitted to say at the same time a word on the other side. Recently, that is, this since offending article appeared in the *Young men of India*, I have had occasion to visit the zemindary of a friend of mine, who is one of the most progressive gentlemen in our province. I was astounded to find that his extensive domains were absolutely innocent of any kind of improvement. I was told by the Manager that the Agricultural Demonstrator had never been in these parts: I could not believe it. All that I could make out is that his presence was not effective. How much of this is due to any fault of the Demonstrator, how much to the utter inadequacy of the demonstrating staff relative to the needs of the district, how much to the cast-iron barriers which the Zemindary presented to him, I do not know.

Then, I know another friend of mine, who is genuinely desirous of repeated visits from the Demonstrator, and has as a matter of fact adopted many of the improvements he has suggested. But his main difficulty is that the Demonstrator is very

uncertain and unreliable in his visits. Why? My friend imagines it is because his farm is within five miles of the Demonstrator's headquarters, and that therefore when he visits it he could not charge T. A. and Batta. I do not know the rules of the C. S. R. Perhaps there is something in it, perhaps not.

The fact is that our whole demonstration system is in extreme infancy as compared with the experiments in other countries, and until it develops enormously there will be constant cause for criticism. And after all, is not criticism the healthiest agency for improvement?

I am,
Yours truly,
K T PAUL.
Editor Young Men of India.

EDITORIAL.

Ills of Free Trade:—In a recent issue, we referred to a novel state function which the U. S. A. congress wished its government to undertake. It is now understood that this contagion has, in spite of the Roaring Atlantic, spread to the Emerald Isle also, where unrestricted freedom has, it is felt, brought about depression in trade in Dairy products. The Irish Free State has decided to expend £ 455,000 in purchasing the whole of the Irish creameries, buying out those of them that are proprietary, scraping those that are redundant and handing back the balance to the co-operative societies under restrictions. This example in State socialism has, as a contemporary would put it, been rendered necessary because of the cut-throat competition between creameries of all kinds in that little isle. There are at present 580 creameries in Ireland of which 180 are proprietary creameries.

Air Studies in India:—The Meteorological department is one of the oldest departments in India but for several decades could not make much headway as the science of meteorology itself was in swaddling clothes. With the rapid strides science has taken in recent years especially in the realms of mathematics and physics the study of weather has shown unmistakable signs of systematization and the honourable names in this connexion are

those of Elliot, Simpson, Walker, and Field. Until now collation of statistics of rainfall fell to the lot of local revenue officers and of those of wind velocity, temperature, pressure etc., devolved on the devoted heads of the few members of the overworked staff in about a dozen observatories in this country and the limitations of staff precluded any researches being made in this direction. Government have become alive to the prospects opened up by the present developments in aviation elsewhere and have devoted more funds for this purpose. We are informed that a central research station for air-studies is being established at Poona and the headquarters of the Imperial Meteorological department will be shifted from Simla next year. At the new headquarters will be carried on not only all the regular routine work of preparing the daily, weekly, monthly and annual weather reports but also investigations in the laboratories and in upper and lower weather regions. It is expected that closer co-operation will be ensured between the meteorological, agricultural and engineering departments and that better attention will be paid to the forecasting of rain and of the monsoon conditions which are so vital to crop production.

Rao Bahadur M. R. Ramaswami Sivan. We congratulate Rao Sahib M. R. Ramaswami Sivan on the title of 'Rao Bahadur' conferred upon him. Mr. Sivan retired from the Principalship of the Agricultural College on the 15th of May with an unblemished record and after a strenuous career of over 30 years. An old student of Saidapet he joined the agricultural College as an assistant bailiff in the nineties of the last century and worked his way up until his activities in the department culminated, during a period of extension, in his being appointed Principal of the Coimbatore Agricultural college in December last year.

All his years he spent as an enthusiastic, impressive and loved teacher and except for a short interval Chemistry claimed him as a votary though owing to peculiar circumstances he was not able to devote himself much to research. His interest in this branch, however, has remained unabated and one of his important contributions is a Memoir on "Phosphatic nodules" in the Trichinopoly district.

A man of much self reliance and with legitimate pride born of boundless energy and optimism he was able to gain ground

inch by inch and step by step in the whole of his official career. Obstacles only spurred him on to renewed vigor and redoubled effort in trying to overcome them.

He was virtually the founder of the Madras Agricultural Students' Union and has continued as a prop all these 18 years of its existence.

The Indian Science Congress did him the honor of electing him as the President of the agricultural section for the Madras Session in 1924.

Towards the closing years of his service he became a member of the University and represented agriculture in the several authorities of that erudite body. In this capacity he was also responsible for wholesome changes in some regulations touching the agricultural degree course.

His is an example of one who has risen high through pluck perseverance and a cautious adaptation to varying conditions—the concomitant of necessarily changing policies in a young department like that of agriculture.

He is a man of forward views in social matters and in this has had the full and active co-operation of his talented wife.

We wish him many more years of useful work and hope that he will find public life very congenial and enjoy the unstinted support of those who know him.

Principal C. Tadulingam. Students, members of the staff in the College and in the districts and friends all over the Presidency will extend their hearty felicitations to Mr. C. Tadulingam on his being appointed as the permanent Principal of the Agricultural College.

Born in a very respectable family of the Vellala community long resident in Madras he received his education in the Presidency College under Sir Alfred Bourne. Mr. Tadulingam soon became attached to and specialized in Botany—one of the most unexplored of sciences in those far-off days. He was offered and accepted the post of Botanical assistant to Mr. (now Dr.) C. A. Barber C.I.E. in

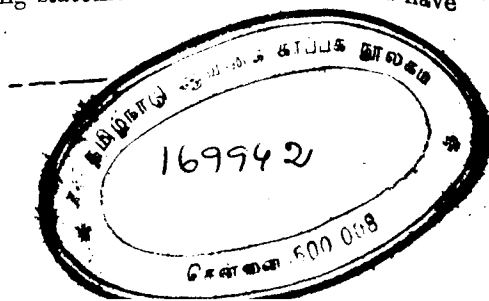
1901 and through special investigations and tours of collection and examination of Flora in the several Hill and forest Ranges in Madras, Mysore and Travancore gradually and steadily built up his reputation as a Botanist. With the concentration of the different sections of the department at Coimbatore he moved to this place and joined the Agricultural College in 1909 where he successively filled the posts of Lecturer and Assistant Botanist until September 1923 when he became the Head of the Botanical Section on the retirement of Dewan Bahadur K. Rangachariar Ayl.

He has been a most successful Warden of the Hostel, a popular Vice-President of the M. A. S. Union, an amiable resident of the Colony and a gentleman of extremely affable manners and courtesy. To these qualities he adds in an abundant degree tact and powers of persuasion essential in an administrative officer. And it gladdens all hearts to know that Mr. C. Tadulingam has been chosen to be the Principal.

The Principalship of the Agricultural College is a prize-post in the Department and it needs extreme tact and patience of the officer to win the approbation both of the officials and the public and we are sure that both residents and staff will actively co-operate with and help Mr. Mudaliar to steer clear in situations where others may feel embarrassed.

Chintaldevi Farm. Our attention has been called to the following sentence on page 164 in the April (1927) issue inadvertently put in in connexion with Chintaldevi Farm viz., that "according to the Kavali correspondent of the 'Justice', the fate of this useful institution seems to be hanging in the balance and proposals seem to be afoot to hand it over to private bodies for being run as a Dairy Farm."

We are authoritatively informed that this has no foundation in fact and that there are no proposals of any kind. We very much regret that a misleading statement of this nature should have appeared in this journal.



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