Journal of the Madras Agricultural Students Union

Vol. No. 6 ~~September~~ June 1924.

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THE JOURNAL

OF

The Madras Agricultural Students' Union.

JUNE—1924.

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THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. XII. JUNE. No. 6.

The Soil of Abandoned Plantations.

By

K. Adinarayana Rao, L. ag.

Since 1850 the coffee and tea industries have become very prominent both in Ceylon and in India. The Madras Presidency including Coorg, Mysore and Travancore, accounts for over two hundred thousand acres, and at one time coffee was the predominant occupation of every planter on the hills. With the advent of Brazil and other countries into the World's market, this industry received a natural check and the earlier, crude methods of cultivation and manuring coupled with falling prices were followed by their natural results. The Planters were forced to adopt economical methods based on scientific teaching. A few overcropped areas had necessarily to be abandoned, some were replanted and a considerable number brought under cultivation to keep up the position of the industry on a sound basis. In these circumstances investigations began to be made as to why certain estates in spite of careful attention failed to give adequate returns. All the resources at the hands of Agricultural Scientists were placed at the disposal of the planters and one of the forms in which such aid was given was through an analysis of the soils for determination of chemical disturbances brought about by years of neglect in cultivation.

A representative sample of soil was obtained from typical abandoned estates in Mysore and investigations commenced in the Research Laboratory of the Imperial Agricultural Bacteriologist at Pusa.

The following is the analysis of the above sample.

Moisture	11.10 per cent.
Loss on ignition	12.50 per cent.
Organic nitrogen	0.25 per cent.
Lime	nil.
Acidity	0. 50 percent in grams $CaCO_3$

A Bacteriological examination was then taken up. Separate culture solutions (like Remy, *Omeliansky* and Ashby's mannitol solution) containing different chemical substances, were inoculated with one gram portions of soil. The results obtained showed that all the bacteria essential to soil fertility were present in the soil. When, however, in order to determine the optimum moisture for nitrification, a quantity of Ammonium sulphate was added equal to 30 milligrams Nitrogen per 100 grams of soil, with different amounts of water (¼, 1/3 and ½ saturation), it was found that the soil failed to form nitrates during the first three weeks but began to do so only after that period. This slow nitrification of *Ammonium* Sulphate indicated that the organisms are not in a very active state under the conditions existing in the soil.

In Remy's solution there was a vigorous formation of Ammonia as the following figures will show:—

	Milligrams of Ammonia per 100 c. c. solution containing one gram peptone.
3 days	52.08
7 ,,	99.40

When plating was carried out in both ordinary and Glucose agars many colonies of *B. mycoides*, among others, appeared and plate counts showed 2,500,000 bacteria per gram of soil. But as this method does not help in forming an estimate of the fertility of the soil in respect of its nitrifying or ammonifying power, * the method detailed below was adopted.

This consists in determining the chemical activities of the organisms present, under standard conditions and involves measurement of the rate of *carbon-dioxide production*, the rate of nitrification of ammonia both in a nutrient solution and in the soil, the rate of *nitrogen fixation* and the *rate of* Cellulose decomposition. The figures so obtained give us an index to the number and the physiological condition of the Bacteria responsible for these important processes which will correctly measure the fertility of a soil.

* [illegible] Memoirs of the Department of Agriculture in India. Bacteriological series, Vol. [illegible], 1911.
Remy: Central [illegible] Bakt: 1912, Lohnis; Ibid; 1904.

Ammonification and Nitrification in soil.

The deficiency of lime in the soil and its high acidity suggested the use of lime. The following series of experiments were devised and carried out.

1. Soil + optimum H_20 (control)
2. Control + lime ($CaCO_3$)
3. Control + Ammonium Sulphate.
4. Control + Ammonium Sulphate + Lime.
5. Control + Hongey cake (*Pongamia glabra.*)
6. Control + Hongey cake + Lime.

Ammonium Sulphate was added equal to 30 milligrams Nitrogen per 100 grams soil and Hongey cake at 60 milligrams nitrogen and lime at 1%.

These were added to separate lots of coffee soil, each lot consisting of 600 grams dry soil. Water was added to the soil so as to make up the moisture content up to 30 per cent which had previously been found to be the optimum in a preliminary experiment. The soil and the manure were thoroughly mixed with the hand and each lot filled in separate glass jars. The jars were covered and kept in the incubator at 30°C. Samples for analysis were taken after thoroughly mixing the soil, to determine the amounts of ammonia, nitrites and nitrates formed at different intervals. Nitrates were determined by the Phenol-sulphonic acid method, nitrites by Greiss-Ilosway method and ammonia was determined by distilling the acidified soil extract with calcined magnesia.

Chart I (not received) illustrates the rate of nitrate accumulation in the soil after the addition of Ammonium sulphate. The marked difference between the lime-treated and the untreated soil is clearly brought out.

It will be seen that by the addition of lime, all the Ammonium Sulphate added was nitrified and also some portion of the nitrogen added as Ammonium Sulphate was nitrified in 16 weeks. In a good soil like the Pusa soil, complete nitrification of Ammonium sulphate takes place in 3 to 4 weeks.

Chart II (not received) illustrates the nitrate accumulation in the soil after the addition of Hongey cake. This oil-cake was added to supply 60 mgs. Nitrogen per 100 grams soil. Only 18 mgs. are converted into nitrates in a period of 16 weeks in the case of the untreated soil but in the lime-treated soil nearly double the quantity

is nitrified. Even this is not satisfactory, considering the amount of organic nitrogen in cake that can be converted into nitrates in a soil rich in lime as for example the Pusa soil. As much as 80 per cent of the Nitrogen in the cake is nitrified in half the period, i. e. 8 weeks in the Pusa soil.

However the two charts mark out the difference in nitrification between the lime-treated and the untreated soil, whatever be the form of nitrogen added to the soil. They further show that by liming, the original nitrogen of the soil is also nitrified to a greater extent.

Charts III and IV (not received) illustrate the ammonification "curves". There is not much difference between the lime-treated and the untreated soil with regard to ammonification.

The figures taken for marking out the curves include NH_3 NO_2 and NO (or total Nitrogen that has been made available).

Carbon-dioxide formation.

To the soil was added Hongey cake to the amount of 1 per cent of the total, The requisite quantity of water was added, each lot of soil and the ingredients to be added to it were thoroughly mixed and separately put into 6 Woulff's bottles in the same order as before. Every 24 hours the gaseous contents of the bottles were removed by aspirating air through, the issuing gases being passed through standard Baryta water contained in Pettenkoffer tubes to absorb the carbon-dioxide evolved. The air employed to scrub out the carbon dioxide was passed through a strong solution of sodium hydroxide to free it from CO_2. The amount of Baryta remaining unchanged at the end of the experiment was determined by titration with standard hydrochloric acid using phenolpthalein as indicator. The rate of CO_2 evolution is an indication of the number and the activity of the soil Bacteria taken as a whole. By standardising the conditions of the experiment, we have been able to draw an exact comparison between the same soil with and without the addition of lime.

(1) Soil + Hongey cake (1 per cent)

(2) Soil + Hongey cake + Lime (1 per cent)

Chart V (not received) illustrates CO_2 production. Addition of 1 per cent lime to the soil increases the production of Carbondioxide $2\frac{1}{2}$ times. While some of this may be due to COliberated from the $CaCO_3$ as the result of acids formed during fermentation the remainder will be due to the enhanced biological activity.

Nitrogen fixation.

Two Erlenmeyer flasks containing 100 c. c.'s Ashby's mannitol solution were inoculated each with 1 gram of coffee soil. One gram precipitated $CaCO_3$ was added to one flask but not to the other. There was also a control. After 3 weeks' incubation, nitrogen determinations were made. After deducting the nitrogen in the control, the amounts of nitrogen fixed with and without lime are as tabulated below:-

Limed	6. 30 mgs. per gram mannite.
Unlimed	3. 98 ,, ,,

Hence addition of lime seems to be very advantageous.

Cellulose decomposition.

With a view to ascertain the capacity of the soil to bring about cellulose decomposition the following solution was prepared and distributed in Erlenmeyer flasks:—

Composition of cellulose solution.

Distilled water	1,000 c. c.
Potassium Phosphate	1.0 gram.
$MgSO_4$	0.5 ,,
Ammonium Sulphate	1.0 ,,
NaCl	Traces.
Filter Paper	20 ,,
$CaCO_3$ (precipitated)	20 ,,

Strips of filter paper were suspended in Erlenmeyer flasks containing the above solution and sterilised in the autoclave at 120°C for 20 minutes. One of the flasks was inoculated with one gram of coffee soil and the other with one gram of fresh cowdung for comparison. A third flask was also inoculated with one gram of Ragi soil. All the flasks were incubated at 30°C.

The coffee soil is very slow in attacking cellulose, whereas cowdung is vigorous and there is more decomposition of filter paper in the flask inoculated with cowdung than in the one with coffee soil. The Ragi soil flask is better than the coffee soil flask, in the matter of cellulose decomposition.

So far as the laboratory results go, they show that much improvement is possible with the application of lime to the soil of abandoned plantations. In these soils there has been found a large accumulation

of acids. The high acid reaction of the soil has probably exerted an inhibitory influence on the bacteria, which are found to be present in large numbers but are not actively functioning. Lime when added in sufficient quantity to the soil brings about conditions favourable to the development and active work of the important groups of Bacteria intimately concerned with the fertility of the soil.

The solution of the problem therefore lies in the simple method of application of lime which could be obtained in large quantities and at a fairly low price.

Summary.

An examination of the soil of abandoned plantations reveals

1. That all the bacteria essential to soil fertility are present in the soil in large numbers but are not actively functioning under the conditions obtaining in the soil.
2. That the soil has a high acid reaction.
3. That there is practically no lime in the soil.
4. That addition of lime in sufficient quantities improves all the biological activities of the soil to a considerable extent.

Agricultural Research Institute, PUSA, India.

"The King."

Who is the King? The man who holds the plough!
There in high heaven is his charter set,
Pricked in eternal stars, tho' never yet
Has thought to rule; a thousand years, as now,
Has brought his brother bread, regardless how
The bread was shared; and, heedlessly has let
Knavish usurpers wear the coronet --
The regal crown alone awaits his brow.
And humbly he will serve, and be the King;
Bringing the clean counsels of the sunny field
Unto his Parliament and everything
Shall know the wholesome wind and rain, and yield
To the inspiration of the open places;
And God shall see His image in our faces.

ANDREW DODDS.

Tomatoes and how to grow them.

BY M. S. RANGANATHA RAO.

Tomatoes are grown in the city of Madras in private gardens and also in Bangalore where there is a good sale for them. They are also raised on a small experimental scale in the Elementary Schools at Mangalore and other places.

Propagation:—Tomatoes are propagated more from seeds than in other ways. Layering makes the plant grow tall at the expense of the fruit. Cutting has fallen into disuse. By grafting the tomato on potato tubers, Mr. Luther Burbank the American, has produced a new variety of fruit which he calls Pomato. For this purpose potato tubers are potted and when the seedlings are a few inches high, the shoots are cut down to an inch and tomato shoots grafted thereon by the 'wedge method'. The tomato bears heavily but the potato stock does not tuberate. Besides the propagation of tomato is rendered easier, cheaper and more reliable. Sowing of tomato seeds however deserves some attention. Thick sowing ends in failure in the seed-pans and even the seedlings that do come up are often weak and thin.

One ounce of good tomato seed when sown in nursery is enough to transplant quarter of an acre.

Dampness is one great evil that has to be contended against. In the seed pans the holes must be covered with good-sized cinders. Upon these place another one-inch layer of smaller ones, and finish with a layer of partly decayed leaves. Now fill the pan almost to the brim with soil made up of nice leaf soil, sand and loam in equal proportions and well sieved. Plant the seeds about half an inch apart. Slightly cover with soil and gently water the soil.

Rearing the tomatoes out-doors.—Having selected the site where the plants are to come in, proceed to make the soil suitable for their reception. Excavate to the depth of a foot and a half and mix loam, leaf soil or very old manure, burnt garden refuse and bone meal. Tread the whole very firmly, bearing in mind a loose root - run favours a luxuriant growth and a better setting of the fruit.

When growing against supports 15" is the minimum space allowable between any two plants. Water the bed if necessary. Plant deeply and press the soil firmly about the stems of the plants. Secure the plant to a stout stake. Give another good watering to settle the soil. It is desirable to adopt the single stem system which gives a heavy yield of tomatoes.

Thorough digging and good manuring are required for a field crop. If the soil is heavy, work into it plenty of burnt earth, wood-ashes, garden refuse or road scrapings. Owing to its cool nature cow-manure is recommended for sandy soils, and the heating horse manure for heavy soils. Allow at least 2½ feet between plants and 3 feet between rows. Provided good watering is given at planting time no more will be required.

Laterals (side branches) will be growing in all directions and must be constantly removed. Owing to the strong growth many of the ties made will have to be loosened or they will cut through the plant. Weeds will cause trouble and the constant use of the hoe becomes necessary. As soon as a few good bunches of fruits set in it will be an advantage to pinch out the 'leader' at the first or second leaf beyond the fourth bunch. By this time those on the lower bunch will have grown to a good size. It will be advisable after hoeing between the plants to give the soil a good soaking of manure water or a surface dressing of one of the manures mentioned above.

Mulching the plants in hot weather is good. Two days in each week must be set apart for watering. Feeding consists in giving liquid manure and some other manure until the season comes to a close. Reduce the foliage at the bottom of the plant from where the fruit has already been taken.

Cost of cultivation. A rough cultivation sheet of tomato cultivation in ¼ an acre:—

	Rs.	As.	Ps.
Preparing the plot	7	0	0
Transplanting	3	14	0
Watering (four times)	4	12	0
Preparing channels	3	6	6
Weeding and digging	3	0	0
Manuring	9	12	0
Cleaning	0	15	0
Manuring	14	12	0
Propping	10	5	0
Cleaning and plucking leaves	2	8	0
	60	4	6

We received by the first sale nearly Rs. 32/- and we had four pluckings and the receipt by sale came to nearly Rs. 130/-. So this is a profitable concern provided we find a good sale for the yield.

Pest and diseases.—*Aphides* or green fly puncture the epidermis and suck out the sap and thus retard the growth. Females are wingless. In the case of tomatoes the aphides usually infest the growing points of shoots and cause young leaves to curl and become crumpled.

Red spider. This lives in colonies on the under or upper surface of the leaves. Their presence is detected by the paleness of the foliage. Dusting the leaves with flowers of sulphur reduces the disease.

Diseases. Tomato is subject to three diseases, a leaf-rust, a flower-rot and a wilt. For the last viz., *wilt* the remedies are burning and adding quick lime. In planting reject all weakly plants choosing only the healthy, sturdy and short jointed ones.

Fruitless plants. Flowers fall off owing to dryness or wetness at the roots. Want of a free circulation of air owing to over-crowding is the cause. Thin out the foliage and side shoots or remove the whole plants.

EXTRACTS.

Technical education v. s. Practical experience.

In this note I am proposing to raise once more the oft discussed question of practice *versus* theory. In the engineering world, as we all know, there are a number of what are known as practical men and there are a number of what are known as theoretical men. During recent years the division between these is by way of being bridged. The practical man is learning theory and the theoretical man is getting to know that practice is essential for successful work. Some years ago, there was a distinct cleavage between the two, now the gulf is being gradually bridged over. In those days, theoretical men were those who had received a technical education at school, technical classes, and sometimes at college, but had never had the opportunity of putting the theory they had learnt to practical use. The teachers in technical schools and colleges had never had the opportunity of making experience. They had usually worked in the school for the usual terms and had been allowed to assist the lecturers, teachers, etc. with experiments, demonstrations and so on and later on had become demonstrators and still later teachers and professors. The most practical of the professors were painfully wanting

in practical experience and this led to their interpreting laboratory experiments wrongly. There is of course only one test for any new discovery, any new feature that is discovered in the laboratory or the experimental room and that is in actual practice. The difficulty was there was rarely any opportunity of putting the discovery to the test of practice. It was and is very rare for a really new discovery to be made in the laboratory or the class room; but occasionally new facts were made out but it was not safe to rely upon them until they had been submitted to the test of practice; hence theoretical men were rather dreaded where practical engineering work had to be done. The practical men, though he might not have a good knowledge of the principles of the work he was engaged in, knew the practical side of it thoroughly and could be relied upon to carry out any work within his knowledge well. The theoretical man, on the other hand, was often led astray by some wrong interpretation of the principles of the branch of engineering he was engaged in. The practical man who had experience was never wrong where he had experience while the theoretical man was often wrong because of his want of experience and his wrong interpretation of well-known laws. In modern engineering work theory and practice go hand in hand. The modern engineer studies the principles of his branch of engineering and every time he meets with trouble he refers the matter right back to first principles. If an apparatus fails to work and after much trouble he succeeds in making it, he wants to know why it failed to work and he refers the whole thing back to the principles upon which that branch of engineering has been built up. There is of course the question of new discoveries when they are made; but the modern engineer is not troubled by them; he is keenly on the look out for them, keenly on the look out for any information that will help him to keep his apparatus working; and that will enable him to reduce working costs and this means that he will study any new discovery that comes to his notice and will look out for new discoveries in connection with his branch of engineering. I do not wish to be misunderstood in this matter; education however it is obtained must be of immense value to the man or woman who obtains it but education must be looked upon in a broad way; it must not consist only of book learning. Modern books are of great value to the young engineer and the papers that are read before engineering institutes should be of still more value. It may and does happen very often that an engineer has to work out a problem in connection with his practice. In the old days before the advent of scientific and engineering societies he would have kept the matter for himself; it would have been a card in his favour if occasion had arisen, where his special knowledge obtained in this way came in, but it is now well understood that there is much more to be gained by an interchange of ideas between engineers and between practical and

theoretical men than the opposite; and so the modern idea is to give of one's knowledge freely and so take the gifts the gods bestowed in the matter of knowledge obtained from other people's experience. The question of theory and practice is by way of settling itself. The modern engineer when asked or when the question arises, which will he have, theory or practice, if he is wise, gives the same answer as an ecclesiastical dignitary is reported to have given when asked which see he would have, his reply was "both". The ecclesiastical story involves a pun; the two Sees in question were Bath and Wells, both in Somersetshire. The bishop is reported to have replied both but to have meant Bath. Any way the two Sees were joined and succeeding bishops have been dignitaries of both places. The tale is very appropriate to the question I am discussing; the student of engineering or of any branch of work, if asked which he would rather have theory or practice ought to reply "both". There is theory and practice in every branch of work; and certainly in every branch of engineering; also in every industry into which scientific knowledge or the knowledge of first principles enters and that I believe means every branch of work. The tendency in modern times is to refer every difficulty right back to first principles. The referees do not always know they are doing this; in many cases they merely ask why; but the answer is always the same if it is correct, a reference back to first principles.

(*Indian and Eastern Engineer, New Series* Vol. LIV, No. 1, January 1924). S. R. V.

Prospectus of the College of Tropical Agriculture, West Indies. The College Prospectus for the year 1924-25, is a document which is worthy of careful perusal by those interested in tropical agriculture. The Prospectus naturally deals mainly with courses of study, that is to say it has reference principally to the educational and training functions of the institution in respect of students attending the College and does not concern itself to any extent with the equally important matters of research and extension work. The principal course of study is that which leads to a Diploma in tropical agriculture, and to obtain this Diploma students are required to pass three examinations which are normally to be taken one at the end of each academic year. The first examination must be taken by all candidates, and it includes Agriculture, Botany, and Zoology, Chemistry and Physics, Mathematics and Economics, History and Geography. The object of this first year's training is to give a grounding in the sciences underlying the various lines of activity connected with the great domain of tropical agriculture. The subjects indicate that this foundation is intended to be of a liberal character, and it will be observed that recognition is given to two aspects not commonly

regarded by the layman as essential. The first of these is Mathematics. The recent progress in biological research, in agricultural experiments and in economic inquiry and control renders it necessary for every serious student of tropical agriculture, whatever his ultimate vocation may be to possess a sound knowledge of mathematical methods and principles, particularly in relation to algebraical geometry and statistical method. Agriculture, Agricultural History and Geography,—the second noticeable feature—are designed to render the student familiar with the material and economic environment under which his future activities will take place. Coming now to the courses of study for the second examination leading to the Diploma it will be found that the Syllabus requires differentiation. Students are required to state which one of three courses they elect to take: *Estate Management*, intended for students who wish to become tropical planters or agricultural administrators; *Agricultural Sciences*, intended for students who wish to become specialists in some branch of Agricultural and natural sciences, experiment station workers or teachers; and thirdly *Chemical Technology* provided for students who wish to become specialists in the manufacture of tropical plant products. In prescribing this differentiation it will be observed that it has much in common with that in operation at the University of Cambridge School of Agriculture, with the exception that Chemical Technology is introduced at the Imperial College as a full-status vocational subject, and one which is likely to develop considerably in the future. The essential characteristic of this second year's differentiation is the separation as far as desirable of the management and purely technical points of view. It is not possible, nor indeed is it desirable, to draw a hard and fast distinction, for the Administrator or Manager needs for success biological and physical information just as a purely technical officer needs to know something of the science and art of administration. The valuable feature of the differentiation is that it encourages the formation of definite points of view, prevents that kind of aimless drift which was so characteristic in many agricultural Colleges ten or fifteen years ago. In the third year the differentiation of the second becomes more specialised. In Estate Management, the different tropical crops are studied from the estate standpoint, attention is given to various economic subjects such as accountancy, agricultural law and marketing, as well as to the manufacture of crop products. In the agricultural sciences the final examination includes the Ecology of crop plants, Genetics and either Mycology or Entomology. In regard to Chemical Technology the final examination comprises such subjects as the manufacture of crop products, special Chemical Technology, Factory Control, Analytical Chemistry, Marketing and Mycology. Perusal of Syllabus will show in general that marked emphasis is laid on Estate Management as a subject in itself, on the Ecology of crop plants, on Genetics an

Sugar Technology with which may be included the study and control of technical fermentation processes. rum distillery, cacao curing, coagulation, milk and its products, pen manure and silage. It is difficult in the space available to give any satisfactory account of the detailed instruction or to make it evident how the large variety of subjects ranging from the most abstruse problems of colloid science down to the more everyday but equally important problem of handling the labour supply are fitted into a continuous system of training. The only explanation lies in the point of view, and anyone who is familiar with the vast variety of problems that occur in tropical agriculture will realise how necessary this point of view is on the part both of the students and the staff. It has been truthfully said that all sciences meet in agriculture and the new prospectus of the College confirms this by showing that it is necessary to embrace to some extent almost every subject that is studied in connection with science, business and administration. Without point of view this large collection of subjects becomes nothing short of bewildering, and there is no doubt that successful agricultural education depends upon everyone concerned being broadly familiar with general principles of human knowledge relating to agriculture and with the nature of the work of others. A feature of the Syllabus is the provision of special work for fourth year and post-graduate students. Problems for investigations in Agriculture are provided and special topics selected in relation to the problems assigned. In Genetics, lectures practical work and research, problems in genetics and plant improvement are arranged. A special series of lectures on the genetics of cotton is already in operation and similar courses for other tropical crops will later be arranged. In Plant Physiology, special work can be provided. Detailed mycological and entomological investigations in regard to tropical crops can be carried out under the direction of the Professors concerned while in Chemistry facilities for the study of problems of bio-chemistry, soil science and agricultural chemical analysis are provided. The erection of the model sugar factory now in progress in the College grounds will soon allow of a continuation of the study of sugar technology for students who wish to qualify for higher posts in sugar factories. With the completion of the new College building space will be available in the present building for chemical technological work with rubber, cotton fibres and cacao. For students who wish to engage in agricultural administration or in the purely business side of tropical agriculture courses of study can be arranged in regard to the analysis of estate and factory accounts, the methods of Government administration in relation to tropical agriculture and efficiency studies of labour and of general management. From what has been said it will be conceded that the new Prospectus is of a comprehensive character which by means of the scientific grouping of a vast number of subjects according to vocational point of

regarded by the layman as essential. The first of these is Mathematics. The recent progress in biological research, in agricultural experiments and in economic inquiry and control renders it necessary for every serious student of tropical agriculture, whatever his ultimate vocation may be to possess a sound knowledge of mathematical methods and principles, particularly in relation to algebraical geometry and statistical method. Agriculture, Agricultural History and Geography,—the second noticeable feature—are designed to render the student familiar with the material and economic environment under which his future activities will take place. Coming now to the courses of study for the second examination leading to the Diploma it will be found that the Syllabus requires differentiation. Students are required to state which one of three courses they elect to take: *Estate Management*, intended for students who wish to become tropical planters or agricultural administrators; *Agricultural Sciences*, intended for students who wish to become specialists in some branch of Agricultural and natural sciences, experiment station workers or teachers; and thirdly *Chemical Technology* provided for students who wish to become specialists in the manufacture of tropical plant products. In prescribing this differentiation it will be observed that it has much in common with that in operation at the University of Cambridge School of Agriculture, with the exception that Chemical Technology is introduced at the Imperial College as a full-status vocational subject, and one which is likely to develop considerably in the future. The essential characteristic of this second year's differentiation is the separation as far as desirable of the management and purely technical points of view. It is not possible, nor indeed is it desirable, to draw a hard and fast distinction, for the Administrator or Manager needs for success biological and physical information just as a purely technical officer needs to know something of the science and art of administration. The valuable feature of the differentiation is that it encourages the formation of definite points of view, prevents that kind of aimless drift which was so characteristic in many agricultural Colleges ten or fifteen years ago. In the third year the differentiation of the second becomes more specialised. In Estate Management, the different tropical crops are studied from the estate standpoint, attention is given to various economic subjects such as accountancy, agricultural law and marketing, as well as to the manufacture of crop products. In the agricultural sciences the final examination includes the Ecology of crop plants, Genetics and either Mycology or Entomology. In regard to Chemical Technology the final examination comprises such subjects as the manufacture of crop products, special Chemical Technology, Factory Control, Analytical Chemistry, Marketing and Mycology. Perusal of Syllabus will show in general that marked emphasis is laid on Estate Management as a subject in itself, on the Ecology of crop plants, on Genetics an

Sugar Technology with which may be included the study and control of technical fermentation processes. rum distillery, cacao curing, coagulation, milk and its products, pen manure and silage. It is difficult in the space available to give any satisfactory account of the detailed instruction or to make it evident how the large variety of subjects ranging from the most abstruse problems of colloid science down to the more everyday but equally important problem of handling the labour supply are fitted into a continuous system of training. The only explanation lies in the point of view, and anyone who is familiar with the vast variety of problems that occur in tropical agriculture will realise how necessary this point of view is on the part both of the students and the staff. It has been truthfully said that all sciences meet in agriculture and the new prospectus of the College confirms this by showing that it is necessary to embrace to some extent almost every subject that is studied in connection with science, business and administration. Without point of view this large collection of subjects becomes nothing short of bewildering, and there is no doubt that successful agricultural education depends upon everyone concerned being broadly familiar with general principles of human knowledge relating to agriculture and with the nature of the work of others. A feature of the Syllabus is the provision of special work for fourth year and post-graduate students. Problems for investigations in Agriculture are provided and special topics selected in relation to the problems assigned. In Genetics, lectures practical work and research, problems in genetics and plant improvement are arranged. A special series of lectures on the genetics of cotton is already in operation and similar courses for other tropical crops will later be arranged. In Plant Physiology, special work can be provided. Detailed mycological and entomological investigations in regard to tropical crops can be carried out under the direction of the Professors concerned while in Chemistry facilities for the study of problems of bio-chemistry, soil science and agricultural chemical analysis are provided. The erection of the model sugar factory now in progress in the College grounds will soon allow of a continuation of the study of sugar technology for students who wish to qualify for higher posts in sugar factories. With the completion of the new College building space will be available in the present building for chemical technological work with rubber, cotton fibres and cacao. For students who wish to engage in agricultural administration or in the purely business side of tropical agriculture courses of study can be arranged in regard to the analysis of estate and factory accounts, the methods of Government administration in relation to tropical agriculture and efficiency studies of labour and of general management. From what has been said it will be conceded that the new Prospectus is of a comprehensive character which by means of the scientific grouping of a vast number of subjects according to vocational point of

view is likely to serve in course of time a useful function in connection with tropical plant industry and development.

(*Tropical Agriculture* Vol. I. No. 5, May 1924)

[A comparison of the above with the current prospectus and course of studies of our Agricultural College will be rather instructive.—*Editor.*]

GLEANINGS.

Leaning on the Government.—Depending upon the Government to do a lot of things for you which you could do as well or better for yourself involves a shirking of responsibility; it implies a native reliance upon some sort of supernatural power with which the popular imagination seems to clothe Government.

Government is not a natural agent—it derives no power, no vision, no ability from any source other than the resources of the people themselves. A Government can be no greater industrially, or purer morally, or more competent mentally than its makers. Governments are not ordained; that idea of government disappeared when men discarded the notion that their rulers were such by divine right. Governments are constituted, erected as a scheme of organization intended and designed to protect the public welfare.

Once we lose sight of the fundamental concept of representative Government—that is, that it is a system under which the individual must always be accorded the fullest possible freedom of action, a system under which self-reliance and independence are conceived to be the supreme virtues of manhood—we cannot avoid being led deeper and deeper into the morass that surrounds the public welfare, ideas that belong to concepts of Government which vision the individual as a weakling and the Government as a crutch for him to lean on.—*Selected.*

(*The Philippine Agriculturist*—Vol. XII No. 9.)

Is Agriculture doomed to die out of existence? Synthetic chemistry has for some time been the greatest enemy of planters. The great indigo industry of India has more or less been made unprofitable by the synthetic dyes made in Germany. The greatest exponent of

synthetic chemistry of the present day is the German Professor, Dr. Erwin Fischer. He had won the Nobel Prize for chemisty in 1902. It has been the sole purpose of his life to exploit the possibilities of chemistry in substituting synthetic products for natural products. Once he announced that he had found out from coal cells a "proteid," the most important form of food, which supplies muscle and tissue to the body and is absolutely essential for the maintenance of life. But nothing more was heard of him or his discovery in Germany even in war time, or in America where much was expected of the discovery. Now the Professor has again emerged out of obscurity and has proclaimed absolute disaster in the future for all employed in agriculture and planting. In a lecture on "The Future of Chemistry" he says that the chemist of the future will probably, to a large extent, take the place of the wheat field, the cow, the sheep and the butcher. Food, in his opinion, can be built up artificially from the original cells and the necessary material can be found almost anywhere. Coal is found to supply the cells in abundance and, therefore, becomes in the chemist's hands the richest of foods. Thus the agriculturists and planters hereafter will have to forego their occupation and beg for their bread before Dr. Fischer and his followers. They will have to atone for their sin in forcing up the prices by artificial restrictions and the poor peasant will have to sink into nothingness for want of nourishment. Not the agriculturist and planter alone are in danger. From the refuse of coal Dr. Fischer has been able to smell the scents of all flowers, from the rose to the violet, to enjoy the flavours of all fruits, from the pine apple to the peach, and to taste all forms of sugar. Therefore all kinds of cultivation have to be given up. Hereafter the world is large enough only for a few chemists. Our only consolation is that Dr. Fischer had not been able to save his country from want when Germany was threatened with starvation in the Great War.

(From the *Daily Express* 5-6-24.) T. S. V.

Expert Milking.—Figures as to the remarkable difference in the milk of a cow when milked by an expert and a novice were given by Dr. Crowther, who said the results of tests he made in 1904 were so extraordinary that he has never dared to publish them. Four cows were milked on alternate days by an expert milker and a novice. One cow, on the days she was milked by an expert, averaged 11.3lbs. a day, but when milked by a novice she only averaged 9.4lbs. The average proportion of fat obtained by the expert was 4.2 per cent., against 2.5 per cent. by the novice. In the other cows, the difference in the yields was equally striking.

In later experiments, he found the great importance of quick milking against slow milking, and obtained most extraordinary results,

especially in the amount of fat. In one experiment he found that by quick milking 10 per cent. more milk and 30 per cent. more fat were obtained.

Observations of that kind, he said, brought out that skilful milking was almost the key to the situation. It was no use spending a lot of time and money in getting good cows and devising scientific rations unless they had efficient milking. A bad milker would do more harm by his clumsy and incorrect methods of milking than the farmer would by neglecting scientific feeding.

(*Journal of Agriculture, Victoria*, Vol. XXII. Part 5.)

Chemical Aids of the Eradication of Weeds.—Numerous specifics have been tried with varying success for the eradication of briar and other useless vegetation, but their expense and their harmfulness to stock have been drawbacks to their use. Arsenic preparations have been largely used, and satisfactory formulæ are as follows:—(1) Sodium arsenite used at the rate of 1lb. to 2 gallons water. (2) Arsenious acid (white arsenic) dissolved in water at the rate of 1lb. per gallon, with the addition of either (a) ¼lb. of caustic soda, or (b) ¾lb. washing solution. When the arsenic is dissolved 2 gallons of water are added for use. The toxic character of these preparations, it may again be pointed out, necessitates caution in regard to stock. —A. A. Ramsay, Chemist.

(*Agricultural Gazettee of N. S. W.* May 1. 1924.)

The Question of Wet or Dry Milking.—In the Journal of the Ministry of Agriculture (London) J. Mackintosh, N. D. A., National Institute for Research in Dairying, Reading, discusses the question of wet or dry milking. Much of the criticism dry-hand milking comes, he says, from those who have never tried that method in conjunction with systematic washing of the udder and teats. Where such a method is practised, it will be found that both milkers' hands and cows' teats become more flexible, and wet milking with milk as the lubricant becomes unnecessary and is soon recognised as a dirty habit. When a cow has sore teats, it is permissible to use vaseline during milking, but in such cases great care must be taken that the milk never touches the hands. In several cases the milk thus obtained should not be mixed with that offered for sale.

From personal experience he has found that the adoption of dry milking, combined with careful cleaning, has resulted in the skin of the teats becoming of a soft yet tough texture, with a greater freedom from sores, and the whole operation of milking has become much more easy and pleasant.

(*Agrl. Gaz. N. S. W.*, May 1st, 1924).

Indian Foreign Trade during 1923—24. The yardage of cotton piece goods imported decreased by 70 per cent from 1593 to 1486 million yards and the value by 2 per cent to 57 crores of rupees. In cotton yarn there was a decrease of 15 million lbs. in quantity and Rs. 132 lakhs or 14 per cent in value. Raw cotton rose from 11,000 tons valued at Rs. 173 lakhs to 13,000 tons valued at Rs. 251 lakhs.

Exports of wheat increased from 220,000 to 638,000 tons in quantity and from Rs. 344 to Rs. 912 lakhs in value owing to larger shipments to United Kingdom.

Rice not in husk increased by 4 per cent to 2,177,000 tons while the value decreased by 8 lakhs or 2 per cent. to Rs. 3462 lakhs. Raw cotton showed an inrrease of 29 crores of Rupees to 98 crores and by 12 per cent. to 37,620,000 bales, seeds, by 7 per cent in quantity to 1,255,000 tons, by value 9 per cent to Rs. 2982 lakhs. Cotton twist yarn recorded a decrease of 33 per cent. in quality and quantity and amounted to 38½ million lbs. valued at Rs. 366 lakhs. Exports of coottn goods increased in quantity by 8 million yards, coupled with a decrease in value of Rs. 40 lakhs.

[*Abstracted from the Indian Trade Journal*, May 15, '24.]

Research Scholarships in U. K. The Ministry of Agriculture and Fisheries has awarded the following travelling research fellowships to research workers in agricultural science: (1) 250 £ to Mr. F. L. Engledon of the Cambridge University Plant Breeding Institute, for a visit to the United States to investigate American work on barley genetics, cereal yield testing, and the quality, storage, and production of wheat; (2) 50£ to Mr. E. S. Salmon of the South Eastern Agricultural College, Wye, Kent, for a visit to Czechoslovakiato to investigate the growing of hops in that country; (3) 60 £. to Dr. A. G. Ruston, of the University of Leeds, for a visit to Switzerland and Denmark for the purpose of investigations into agricultural costings. In addition to these felloships, the Ministry has awarded grants to workers in agricultural science to enable them to represent Great Britian at international conferences and congresses. This is a new and welcome development. Grants for the present financial year, amounting to 175£., have already been awarded to Sir John Russell, Prof. R. C. Punett, Dr, B. A. Keen. Mr. G. W. Robinson, and Dr. N. M. Comber.

Nature—24th May 1924.

[The necessity for such scholarships is perhaps greater in this country than in England—*Editor.*]

CORRESPONDENCE.

Madras Agricultural Lower Subordinates' Association.

The following was received for publication from Mr. S. Muthusami, Secretary of the above Association on the 17th June 1924:—

At a general body meeting held on 13-4-24 it was resolved to communicate the following resolution to be published in the Journal.

The resolution runs thus:—

"The members of the Madras Agricultural Lower Subordinates' Association assembled in a General Body Meeting on the 13th April 1924 respectfully request the Director of Agriculture, Madras, that in view of recent announcement made of the creation of sixteen new appointments in the Upper Grade and in view of the fact that the lower subordinates will soon cease to exist as such and will be absorbed in the Upper Subordinates, service, the Director may be pleased to consider the claims of some of the members of this service and make some nominations of them to the Upper Grade."

The Director of Agriculture has replied as follows:—

Director of Agriculture's reply L. Dis. No. 344/24 of 5-5-54.

"The request to promote some at least of the lower subordinates to the Upper Division will receive the Director of Agriculture's consideration".

The Chilean Nitrate Committee of Calcutta have sent the following information regarding their latest prices for the benefit of our readers:—

Prices of Chilean Nitrate of Soda.

The Chilean Nitrate Producers' Association have cabled to the following effect regarding their selling prices for Nitrate of Soda for the year 1924—5.

In July, 1924, the price will be £9-15-10 per ton, delivered free at Chilean ports. The price will rise by small half-monthly increments until January 1925 when it will be £10-10-10 per ton at which figure it will remain until May 31st, 1925.

DEPARTMENTAL NEWS.

The Second School Day-Taliparamba. The Second School Day of the Agricultural Middle School, Taliparamba was celebrated on the 17th June 1924, R. D. Anstead, Esq., M. A., F. M. U., Director of Agriculture, Madras, presiding on the occasion. Prominent amongst the audience were Messrs: C. K. Kerala Varma Raja of Chirakal, K. T. Kammaran Nambiar, M. L. A., M. Govinda Kidavu, Dy. Director of Agriculture, A. C. Kunhunni Raja, District Munsiff and K. Unnikrishna Menon, Assistant Director. A good number of jenmies and cultivators and the local officials and vakils were present on the occasion.

The President was brought in procession by the students with flags, a caparisoned elephant and musical accompaniments and was received at the entrance by the Head Master.

Sports commenced at once and various items such as 100 yards and obstacle races, high jump etc., were gone through in quick succession, the boys evincing great liveliness to the admiration of the onlookers. The guests as they came in were received and entertained at tea. At about 4. 30 p. m. the audience met in a decorated pandal in the school quadrangle and the proceedings of the evening commenced with the Head Master's welcome address. The annual report was then read wherein the progress of the institution and the various activities of the students were indicated and grateful reference was made to the District Education Officer, Malabar, Mr. V. K. Raman Menon, from whom the control of the school had been transferred to the Agricultural Department since April 1st.

The President then presented the certificates to the first batch of students all of whom—14 in number—had passed. The gold medal instituted by the Deputy Director of Agriculture for the best all-round student of the class was won by P. Kunhambu Nayar. Suitable prizes in the shape of books were awarded to the second best boy and the best student in practical agriculture. Winners in the sports were then presented prizes which were in the shape of choice articles of daily use. Student Unni Nayar scoring highest was declared the Champion of the year and was awarded the Championship medal. The President in giving his address (reproduced in full) congratulated the staff and the students on the success of the institution and spoke on the aims of the Agricultural School and concluded with words of sound advice to the students—past and present.

The Deputy Director of Agriculture Mr. Kidavu then addressed the outgoing students in Malayalam calling on them to increase the productivity of the Malabar soil to meet the increasing demand for agricultural products consequent on the increase of population.

There was a dramatic entertainment at 6 p. m. in which some of the junior officers of the Department also took part and kept the audience in merriment. The boys put on board a few selected scenes from the well-known 'Dhruva Charitam' which was much appreciated by the audience. With the singing of 'God Save the King', the function came to a happy close at 8. 30 p. m.

The President's Speech.

(R. D. ANSTEAD ESQ.)

I look on this school as a most important step towards the solution of the problem of Agricultural Education in this district. The Agricultural Department are endeavouring to teach the agricultural population, improvements in local methods of agriculture which they have carefully tested out, first of all in their laboratories at Coimbatore, and then on a field scale on the farm at Taliparamba; to introduce new methods of cultivation, new and improved strains of seed which they know will give bigger yields under local conditions of soil and climate, better implements, and better and more economical methods of farming.

Now, the farmer is naturally, and quite rightly, a conservative being. He is not going to change his own methods, which he knows will give him a certain result and a living, for new methods, unless he is quite convinced that these latter are better than his own. He is not going to risk his all, his means of existence on his small plot of land for the sake of what he often thinks is an experiment, just to please an officer of the Agricultual Department. He is apt to distrust results obtained on a Government Farm, thinking that methods have been used to obtain them which he cannot command. He thinks that there is a "catch somewhere." I do not blame him at all, but I am anxious to adopt a system which will win his confidence, and convince him once for all that the Agricultural Department exists for his benefit, and has his welfare at heart, and exists for no other purposes whatsoever.

One method we have adopted to attain this desirable object is the establishing of demonstration plots on the farmer's own land. With these many of you are no doubt familiar. The farmer is able to see the improvements we advocate — carried out on his own land, with his own labour and cattle, and so is convinced that we are not

trying to persuade him to do something he is not capable of doing. He reaps the benefit of the increased crop and can adopt the improvement in future years with safety.

But one difficulty the Agricultural Department constantly meets with in this work is that of a lack of education, the inability of the farmer to understand what we are endeavouring to teach, and the benefits to be obtained from it. It is to overcome this difficulty in the future generation that this school, and others like it, have been established. We feel that if the sons of farmers can come to a school like this and learn to read and write and figure, and carry out the improvements we advocate on their own school farm, learning as they go along the reasons behind the improvements; if they follow step by step each process and are taught how to work out the profit and loss on it, they will be better able, when they grow up and farm their own lands, to understand the departmental advice which is given to them, and more likely and better able to weigh for themselves the possibilities of such recommendations; better able to test them out for themselves under every local condition of soil, and climate and market.

Boys who have received such an education will be in the position to benefit from future improvements advocated by the Department, better able to increase their knowledge at all times, better able to make more out of their land. This then is the aim and object of this school. It is an experiment. But I venture to say that, short time as it has been in existence, it is a successful experiment, and I hope that full advantage will be taken of it and that others like it will be opened before long.

There are other things which I hope you students who are leaving the school to-day have learnt, and you who are still at school are learning, and one of the most important to my mind is the Digi-nity of Labour. No farming can be successful unless the farmer himself works on his own land. That I may tell you is an axiom. There is a saying in my country among farmers that it is the master's foot and the masters hat which make the crops grow, meaning, it is the farmer's constant presence which leads to success. It is false pride of the worst description to be afraid of performing manual labour and I think one of the great faults of this country is the tendency which exists among all classes to get some one else to do things for them. I noticed this tendency very much when I first came here from a Colony, where we all had to do things for ourselves. When there is a job to be done, there is a tendency, is there not, to tell some one else to do it who tells some one else, till the

actual "doer" is the man who cannot find anyone below him to tell. The result is that it is done badly every time. Now, I hope this school is teaching you to do things for yourselves, and not to be ashamed to do them, especially when it comes to work on the farm.

In this connection, I am going to criticise the headmaster's report, and I hope he will not take amiss of what I say. Speaking of the school museum he says he is in correspondence with various officers for good specimens. Now, the way to make a museum of value is to prepare your own specimens, and I strongly advise the headmaster not to ask officers to supply specimens, but to encourage the students to prepare their own material. Then it will be a museum of far more interest and value. I would much rather see the museum full of poor specimens collected by the school students, set up and understood by them. than beautifully fitted out with glass cases and model specimens. So too with the foot-ball ground, which the headmaster says is uneven and requires levelling. I should like to hear him report that the students, under his guidance and with his help, had levelled it.

Do not be afraid of hard work. Do not be afraid of doing manual work yourselves. This is the way to make farming pay, and, believe me, it is the way to become good citizens and manly men, and it leads to content of mind and body.

I see that the Deputy Director is programmed to give the leaving students a word of advice, and perhaps I have already trespassed too much upon his ground. So I will say no more, but only wish — those of you who are leaving us to-day — success, and those of you who are staying for another year a successful termination of your studies and welcome those who have joined the school for the new course.

Opening ceremony of the Agricultural Middle School, Anakapalli. The new buildings of the Anakapalli Agricultural Middle school were opened on the 15th May by the Hon'ble Sri, B. Venkatapathiraju Garu, B. A., B. L., M. L. A., (now C. I. E.). It was an eventful day from an agricultural point of view. The President and various visitors from the three northern districts arrived at 8 A. M. and were welcomed by Mr. K. T. Alwa L. Ag., Assistant Director in charge in a neat, short speech. This was followed by the Presidential address. Mr. Raju briefly reviewed the situation of the country from an educational point of view emphasing the need of Agricultural Education and compared the situation in India with that in foreign countries which he had visited during his deputation to Fiji and quoted facts and figures to show that the expenditure incurred in matters connected with agriculture and agricultural education was miserably low in this country.

After the opening of the buildings, Mr. D. Panakala Rao, the Master of the Middle School, read his report on the working of the school. The successful final year students were presented with certificates and the best of them B. V. Raju was given a Meston Plough as a prize, which was the gift of Mr. V. Achyutaramayya, Farm Manager, Anakapalli. About 150 guests from outside were entertained at dinner.

In the evening, papers were read. Mr. Jogiraju, Farm Manager, Samalkot, read a very interesting paper on paddy wherein he dealt in detail with the difficulties in conducting experiments and the highly scientific nature of the work. It was very much appreciated by the ryots and the educated gentry. This was followed by a paper on 'Agriculture' by Mr. Kandarpa Narasimham Pantulu, a cultivating land owner (published in extenso in this issue). Mr. S. Seetharama Pathrudu next spoke on the subject of sugarcane, briefly dealing with the past history, the present condition, and the future development of this crop with special reference to the Circars. He showed the various centres of sugarcane in charts and explained the present situation and pointed out how each centre could be devoloped from the cultural, manurial and varietal point of view, and dwelt on the importance of a detailed study of the economics of each part of the country.

After the president's concluding remarks a vote of thanks was proposed by Mr. Y. G. Krishnarao Nayudu, Assistant Director of Agriculture, I Circle.

All the guests and visitors were entertained at a tea party in the Hostel quadrangle. During the night a magic lantern lecture was given.

The next day, Mr. Alwa held the District Officers' conference and gave many practical and useful hints as to how they (demonstrators) in future should conduct themselves in their propaganda work.

It is believed and hoped the school day will in future be celebrated in the same style every year.

AGRICULTURE.

By Mr. Kandarpa Narasimhan Pantulu.

Agriculture is the first and best occupation in life and is the most healthy, useful and noble occupation of man according to our ancient Rishis. The ancient Romans had great enthusiasm for

Agriculture. Cicero and Cato were great admirers of agriculture. Cato said, "I come now to the pleasures of husbandry in which I vastly delight. They are interrupted by old age and they seem to me to be pursuits in which a wise man's life should be spent &c."

Importance of agriculture in India. If there is any country solely and wholly dependent on agriculture it is India. The peasant is the back-bone of the country and the land revenue derived from him is the back-bone of the Imperial finance. Native arts, indigenous industries and country manufactures died under foreign competition. Most of the people of India depend on agriculture as the means of their levelihood. India, therefore, has become an agricultural country. Agricultural industry is the only industry from which all other industries draw their life blood. In the present crisis, agriculture is the hope and strength of India.

The present state of agriculture in India. The art of agriculture is known to the Indian peasant. But the art has come down to him unimproved from generation to generation. The science of agriculture is hardly known to him. He is still content with his old fashioned plough. He is generally ignorant and backward. Our agriculture is in a deplorable condition. The reason is not far to seek. It is this—that our agriculture is left in the hands of an ignorant and illiterate class of cultivators. There are two classes of cultivators:—

The first class comprises men owning lands and cultivating the fields with the help of their own women and children. They are illiterate, ignorant and deeply indebted.

The second class of cultivators are persons who own lands and invest money in agricultural enterprise. They possess capital, intelligence and ability. But they do not take any personal interest in cultivation. They leave everything to their servants who are ignorant, illiterate and low paid.

Ignorance, negligence and indifference are displayed at every stage of agricultural operations. No attention is paid to the selection of suitable crops. No attention is paid to the selection of good seed. The land is not well manured. The rules of weeding, thinning &c. the principles of neatness and cleanliness in harvesting and marketing are hopelessly overlooked and the result is nothing but loss in the agricultural concern. The Indian peasant has lost his staying power and a single failure of crops brings on famine in the country.

Ideal of cultivation. Our present ideal of cultivation is not high. The general belief is that no talents, no abilities, no originality and no learning are necessary for an agricultural pursuit. Any youth found unfit for any other profession is thought to be the best fitted for an agricultural career. The sooner we get rid of this notion the better.

Scientific Agriculture. The necessary condition of success in agriculture is that, hand in hand with the culture of land must go the culture of the mind. Scientific agriculture means the utilization of scientific knowledge to secure the best possible results from the practical agricultural pursuit with the greatest possible economy. The study of science enables a man to understand, guide and control the natural forces that create all industrial progress.

Result of Scientific Agriculture. The results of scientific cultivation are marvellous. By the help of scientific knowledge, America produces 600 lb of cotton per acre on an average, whereas we in India produce 60 lb of cotton per acre.

Inoculation of land in America is one of the wonders of science.

Government Aid in India. The Department of Agriculture has been in existence for a long time. Experimental Farms have been doing their work for many years. But until recent years, what was going on within the four corners of the farms was hardly known to the outsiders and much less to the rural cultivator. Now the Government changed their policy and began in right earnest the work of agricultural improvement. The agricultural staff is being strengthened. The experimental farms are being extended. The schools of agriculture are being increased in number. Attempts are being made in every possible manner to popularise the Government institutions. For instance the work that is being done on sugarcane by the department at Anakapalli in the introduction of a suitable variety called 'Java' which I tried myself in my fields is really commendable. We shoud acknowledge with a sense of gratitude the good work that is being done by the Government to promote the cause of agriculture.

Self-help in India. Now we come to a very unpleasant question. That is one of self examination. It is very easy to find fault with others. It is very difficult to determine what we should do for ourselves. Our educated men and our leaders have fully recognised the urgent necessity for scientific improvement of cultivation. But they have not done anything worth mentioning except perhaps a few speeches on platforms. Let us see what the people in America, England, Denmark & Germany have done. They don't depend upon

the Government for every thing. They have great faith in themselves, in their power and strength. The secret of their success lies in their power of self-help, organization and co-operation. They form societies for collecting statistics and general information connected with agriculture. They diffuse agricultural knowledge amongst the cultivators and engage eminent Chemists for the purpose of conducting investigations. There are agricultural periodicals ably conducted and widely read.

In America so long ago as in 1867 associations of farmers were started to further their interests and particularly to bring their producers and consumers, farmers and manufacturers into direct commercial relations without the intervention of middlemen or traders. Now these Associations wield an immense influence both on the people and the Government.

The Duties and Responsibilities of Educated Indians. To achieve success in Agriculture Educated Indians have the following duties to perform:—

1. to educate the masses.

2. to create a genuine enthusiasm in the wealthy classes and big zamindars and induce them to employ their capital in the development of agriculture.

3. to advocate the cause of the poor cultivators and to help them and protect their interests in the matter of legislation.

We must form companies, raise funds and start co-operative movements for promoting the art and science of agriculture. We must have our Agricultural Associations and Libraries. We must send some students to America and Japan, &c., to learn the science of agriculture.

The future of India depends upon successful agriculture and successful agriculture depends upon a thorough knowledge of business and business on business principles.

The Agricultural Industry is the principal Industry on the success of which all other Industries of India must depend. Every right thinking man interested in the salvation of India must do his duty to the motherland and all should make common cause, remembering the noble words of Goldsmith.

"But a bold peasantry their country's pride
When once destroyed, can never be supplied".

Mr. Alwa's Welcome Address.

The following are passages extracted from Mr. Alwa's address:—

* * * * *

Now comnig to the question of agricultural rural education with which we are directly concerned to-day, the question has been engaging the attention of the Government for the last 7 or 8 years. A committee consisting of Education and Agricultural Experts was formed. It considered the question in detail and on its recommendation it was decided to start two agricultural middle schools in this Presidency, one at Taliparamba in North Malabar and the other at Anakapalli as an experimental measure. A small beginning was made at Anakapalli two years back to start the classes in a rented building and a report of the working of the school will be presented to you shortly by the Head-master. The one progress we have made in these two years is that from a rented building we are going to a parmanent building. The other is that the control of the school has changed hands. It was worked by the Educational Department for the past two years, but from this year it will be controlled by the Agricultural Department. In the beginning the Agricultural Department thought that its sphere of work was Research, Experiment and Demonstration of agricultural truths and the question of rural education was the concern of the Educational Department. Well, the Educational Department tried it for two years and returned it to us saying that this is an experiment not on soils or on manures but on demand for agricultural education. We are asked to prove that there is a demand for agricultural education from the rural population. If that is proved by experiment, then the further development of this system of education will have to be taken up by the Educational Department. The experiment which we are going to undertake is a peculiar one. In our usual experiment we used to be independent and conduct them without the co-operation of others. The material which was wanted to test, or to deal with, we used to purchase from the market. But the present material which we are asked to test cannot be purchased. Somebody should supply it with willingness and we look to the ryot population of Andhra Desa to supply us this material.—I mean the boys. We are quite ready with buildings and staff and waiting for your co-operation to undertake the experiment in right earnest. Well gentlemen, I am sure you will co-operate with us and make this joint experiment a success. In case we fail-which God forbid, the burden of failure will fall on your shoulders and it will prove that there is no demand for agricultural education in Madras where 70 % of the population depend on agriculture for their livelihood.

No doubt education is a good thing and every community should have it, but what we should aim at is the right sort of education. A rush for higher education of a wrong type which creates an apathy to one's ancestral profession is sure to do harm to a rural community. As one belonging to an agricultural community I will not be sorry if a farmer chooses 'no education'. between 'no education and a wrong type of education'. 'No education' might lead him to stagnation or slow progress, but a wrong type of education will lead him to destruction—I mean destruction to his profession.

Now you may ask me where a right sort of education is given to farmers' children and I gladly point out to you this institution which is to be opened shortly. The aim of this institution, in brief, is to create an interest in farmers' children for the occupation of their parents and to impart a knowledge with which they can improve that profession. We want men to develop rural life and these boys are trained with that object in view.

So gentlemen, the success of this experiment much depends upon you and the interest you take in this institution. If you supply us with material for this experiment it will be proved that there is demand for agricultural education, in this part of the country.

* * * * *

ESTATE NEWS.

Boy Magician:—On the 13th Instant there was a Magic performance at the Officers' Club at 5 p. m. It was interesting in two ways: Firstly the performer was a Boy of 12 years and secondly he was a musician as well, entertaining the audience with tunes from his flute during the intervals. The items were very interesting and the tricks were cleverly done considering his age. The hat was sent round at the close of the performance and a decent sum was collected.

The Rain:—June was exeptionally wet this year at Coimbatore. The monsoon burst very early and the first half of the month was rainy throughout with but few fine days. There was a continous heavy drizzle modulated by periods of heavier rainfall. There was much fear that the proposed visit of His Excellency would be spoilt by this wet weather. However the weather cleared by the 16th so that there was nothing to complain of on that day from the point of view of the weather. The tanks have received their full supply of water rather early and the maidan is green and smiling with its new growth of grass. Of late there has been a welcome break in the monsoon.

Send off to Mr. Bhandary:—There was a social gathering at the Officers' Club on the 18th to bid farewell to Mr. K. T. Bhandari on the eve of his leaving Coimbatore on transfer to Palur as Farm Manager. He was a prominent and popular figure at the club and his absence will be very much felt by the members especially at the Volley Ball and the cards Table.

STUDENTS' CORNER.

Reopening:—The College reopened on June 16th and the new classes for B. Sc II and B. Sc. III and certificate Course II were formed. The Government having ordered the closing of the Short Course, fresh students were not admitted.

Selection for B. Sc I:—The Honourable the Minister for Development Dewan Bahadur T. N. Sivagnanam Pillai, Avl., arrived at Coimbatore on the 20th Instant and attended to the selection of students for the B. Sc. (Ag) Decree in conjunction with the Director of Agriculture and the Principal. Further applicants were interviewed at Madras and Samalkot. 21 students have been selected: 10 at Coimbatore, 9 at Madras, and 2 at Samalkot.

Scholarship for B. Sc. (Ag.) I:— The scholarship for the best student of B. Sc., Class I (1923-24) has been awarded to T. R. Narayanan with effect from 16th June 1924.

EDITORIAL NOTES.

His Excellency's Visit.

His Excellency Viscount Goschen visited the Agricultural College Estate on Thursday the 19th June as indicated by us in our last issue. His Excellency and party which included his daughter the Hon'ble Mrs. Balfour and Lieutenant-Col. Balfour (Military Secretary) and Mr. Vernon, Collector of Coimbatore, arrived at the Central Farm at 9-30 a. m. His Excellency was welcomed by Mr. R. D. Anstead, Director of Agriculture, and introduced to all heads of sections that had gathered there to welcome him. His Excellency then entered the enclosure wherein the large herd of Coimbatore cattle consisting of various breeds including the very promising half-breds and inspected them with great interest. The party then motored to the Sugarcane Breeding Station where the aims of the station and the measure of success so far attained were explained to His Excellency with the aid of suitable exhibits. The Paddy breeding station was next visited and His Excellency had a look at the

new strains already evolved at the Vedapatti and Aduturai paddy stations. The wetlands of the Farm where a splendid stand of green manure crops was to be seen were next inspected. The Cotton Breeding Station was next visited, where combed samples of the improved and indigenous varieties were shown. The party then moved on to the Millets station where the work done so far on the "Treasures of the humble" was explained. The Insectary had unfortnately to be omitted from the programme on account of want of time and the New College Building with its expansive halls now nearing completion, was hurriedly inspected, after which the party left the Estate for Coimbatore. We are informed that His Excellency stayed at Coimbatore for the night and left by special train for Tiruppur *en route* to Karur.

We are glad to state that in a letter received by the Director from the Military Secretary, His Excellency has been graciously pleased to convey his thanks to all the Officers of the Agricultural College and "to state how glad he was to have had the opportunity of making a comprehensive survey of the valuable work being carried out at Coimbatore."

We hope that His Excellency will find it convenient for him, at a not very distant date, to visit the Estate once again accompanied by Viscountess Goschen and inspect the laboratories of various experts at the College and see the students at work.

The visits of the Hon'ble the Development Minister.

The Hon. Dewan Bahadur T. N. Sivagnanam Pillai Avl., the Minister for Development, arrived at the Agricultural College on the 20th and made a stay of 2 days in connection with the selection of students for B. Sc., Ag., I class. On Saturday the 21st June he was so kind as to visit the following offices and stations in order to acquaint himself with the work that is being carried out at the Institute. He visited the Botanic garden on the 20th at 5 P. M. when the Government Lecturing Botanist showed all items of interest to him. Next morning, his first visit was to the Sugarcane Breeding Station. After viewing the farm and acquainting himself with the nature of work carried on there and the aims and accomplishments of the station, he visited the Paddy Breeding Station and made enquiries as to the relative merits of the new strains of paddies produced at the station. The Millets Breeding Station was then visited, where the work done so far was explained to him. In the afternoon he visited the Insectary where the work done by the Entomological section as to the remedial measures against the major pests of crops of the presidency was explained to him. He took particular interest

in the work done in regard to the Pest Act against Cambodia cotton and made searching enquiries regarding the same. He next inspected the collections of insects at the Entomological Laboratory after which he went over to the section of Mycology where the Mycologist explained the main activities of the section and the benefits conferred on the ryots thereby. He was so gracious as to express himself satisfied with what he saw and left for Madras the same evening.

We earnestly hope he would re-visit the Institute sometime later and examine the working of the various sections in greater detail.

The College Day and Conference.

The College Day and Conference — the event to which the resident members of the Union always anxiously look forward to — is fast approaching, and the members of the Working Committee — and especially the resident Vice-President and the Secretary — are feverishly busy making arrangements for the Day. We take this opportunity to convey our compliments to the members in the districts and earnestly desire that as many of them as could, would attend the function and contribute to its success. We also trust that members would readily come forward with papers and give us the benefit of their experience at the Conference. The Union building — for the erection of which the Working Committee have been pressing for such a long time — has at last become an accomplished fact and will be opened on the 15th instant at 3-30 p. m. by the Honourable Mr. C. P. Ramaswami Aiyar, B.A., B L., C.I.E., one of our patrons — for whom our thanks are due. The provision of a building for the Union will, we are sure, fulfil a long felt want and serve to give the necessary facilities for a proper working of the Committee during the coming year.

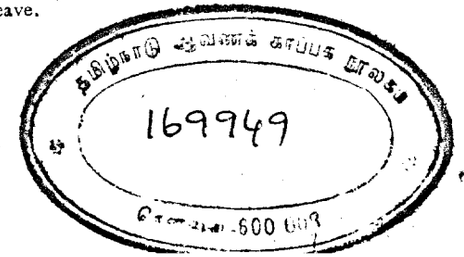
DEPARTMENTAL NOTIFICATIONS.

Leave.—

1. Rao Sahib T. S. Venkataraman, Govt. Sugarcane Expert leave for six weeks from or after 23rd june 24.
2. Mr. K. T. Bhandary, Teaching Assist, the leave on average pay for one month granted extended by one week.
3. Mr, K, L. Ramakrishna Rao, Assistant to the Cotton Specialist, the leave on average pay granted extended by leave on average pay for one day and leave on half average pay for 14 days in continuation thereof.
4. Mr. L. Narasimhachari, Farm Manager, the unexpired portion of 1 day's leave on 1—6—24 from the 15 days leave on average pay granted cancelled.
5. Mr. Subrahmanya Ayyar, Farm Manager, leave on average pay for 16 days from 31—5—24.
6. Mr. Chinnaswami Naidu, Farm Manager, leave on average pay for two months from or after 1st July 1924.
7. Mr. K. Narayana Ayyangar, Farm Manager leave on average pay for six months on medical certificate granted extended by two months.
8. Mr. S. Kuppuswamy Ayyangar, Agricultural Demonstrator, the leave on average pay for six months granted extended by two months on medical certificate,
9. Mr. Krishna Rao Nayudu, Agricultural Demonstrator, the combined leave for four years and one month, extended by leave without pay for six months.
10. Mr. S. Ramaswami Raju, Sub Assistant to the Govt. Lecturing Botanist leave on average pay for one mouth from 16—6—24.
11. Mr. A. G. Ramaswami Ayyah, Sub Assistant to the Govt. Entomologist granted leave on average pay for two months from or after 19th July 1924.
12. Mr. U. L. Srinivasa Rao, Sub Assistant to the Millets Specialist, leave on average pay from 1st july 1924 for two weeks.
13. Mr, M. Krishnaswamy Avyangar, Asst. Farm Manager, 14 days leave on average pay granted extended by 10 days.
14. Mr. C. A. S. Ramalingam Pillai, Assistant Farm Manager, the leave on average pay for three months and 25 days granted, extended by six weeks on medical certificate.
15. Mr. G. L. Narasimha Rao, Assistant Farm Manager, granted leave on average pay for 13 days from 9—6—24.
16. Mr. V. Narasimhamurthi, Assistant Farm Manager, the leave for three months granted, extended by extraordinary leave without pay for four months.
19. Mr. G. L. Balraj, Assistant Farm Manager, granted leave on average pay for 10 days with effect from 27—6—24.
18. Mr. P. V. Sambasiva Rao, Assistant Agricultural Demonstrator, granted leave on average pay for two months from or after 15—7—24.
19. Mr. K. E. Viswam Ayyar, Asst. Agr. Demonstrator IV Circle, a month's leave on average pay from 26—5—24.
20. Mr. P. H. Rama Reddi, leave extended by one day.
21. Mr. V. T. Subbiah Mudaliar leave extended by two months.

Transfers, Posting etc.

1. Mr. K. Raghavachariar Upper Subordinate II grade to be in charge of the IV Circle during the absence of Mr. D. Ananda Rao on leave.
2. Mr. K. Krishnamoorthy Rao Asst. Sugarcane Expert to be in charge of he Sugarcane Experts Office during the absence of Rao Sahib T. S. Venkataaman on leave.



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