

THE JOURNAL
OF
The Madras Agricultural Students'
Union.

Vol. VI. January 1918. No. 1.

Editorial Notes.

Time was when reports of the Departments of Agriculture in the different provinces received short notice, we were about to say, scant courtesy, at the hands of the Secretariats. This attitude changed from the period when Lord Curzon inaugurated a direct agricultural policy for India. Viceroy, Governors, Lieutenant-Governors and Chief Commissioners now take a personal interest in the working and growth of the Agricultural Departments; and Sir James Meston, the Lieutenant-Governor of the United Provinces of Agra and Oudh is not a whit behind the Heads of Administration in other Provinces in his agricultural policy.

In reviewing the last administration report of Mr. Hailey, prior to bidding farewell to the Department in which he had himself served, he goes into the main features of the report and the principal lines of progress. The duties of a State Department of Agriculture might be grouped under four or five general heads :—(1) *Agricultural enquiry* or

collection of data regarding indigenous methods and conditions, (2) *Experiment* which includes both research in the laboratories and experiments in the field, (3) *Demonstration* which tends to give publicity to the work of the Department and which is served by seed and implement depots, exhibitions and field demonstrations, (4) *Dissemination* of evolved truths, which necessitates the establishment of friendly relations and co-operation with the cultivating classes and (5) last, but not least, *Education* where the Agricultural and Educational officers have to co-ordinate. His Honour the Lieutenant-Governor notes, with satisfaction, the rapid and extensive progress attained in the United Provinces, on all the above lines, prior to the outbreak of the war, which took away 2 or 3 officers from departmental work. His Honour does not conceal the fact "that in its days of prosperity, the Government devoted far too small a share of its surplus revenues to the development of India's first and greatest industry" and trusts "that the error will not be repeated when happier times return." While realising that the Agricultural Department is only on the threshold of its work, he impresses the fact that work must be done for the people and that their appreciation and collaboration are essential for progress.

Equally encouraging is the review of the Madras Report by H. E. Lord Pentland's Government. It is a record of progress right through. The Government recognise that the work of the Scientific Officers is a condition precedent to improvements in the field and appreciate its high quality.

The Madras
Department
of
Agriculture.

5.8.11
21.3.13

Investigations have centred on a few crops, like paddy, sugarcane, cotton and groundnut; and propagandist work was continued on the extension of green manures and economic planting, on the use of special manures, like fish manure and superphosphate, on the expansion of drill cultivation and iron ploughs and on the introduction of improved cultural methods. The Director of Agriculture and his officers amply deserve the commendation of the local Government for a successful year's work.

The New Year Honour List contains but few Madras names, but we are glad that the Madras Agricultural Students' Union can convey its hearty congratulations to the recipients of some of the Honours.

The Zamindar of Parlakimidi who is one of our Patrons and who has instituted a Cup for the best athlete of the College becomes the Rajah of Parlakimidi. The Hon'ble member for the Planting Community who is one of the Honorary visitors to the College, who presided at one of our annual Agricultural Conferences and who takes as keen an interest in agricultural matters as in planting industry has the honour of knighthood conferred on him and becomes Sir E. F. Barber. Another Honorary visitor who has been interesting himself in agricultural education and agricultural propagandism, long before he was a member of the Imperial Legislative Council and who now maintains an Agricultural farm and school, is the highly educated Zamindar of Kalahasti, Mr. P. Rama Rayanagar on whom the title of Diwan Bahadur has been conferred.

We take it that, in honouring these gentlemen, Government have honoured the profession of Agriculture.

Our readers will be interested in knowing that the different Agricultural sections were awarded medals and diplomas for their exhibits at the Exhibition as follows :—

Gold Medal :—Government Agricultural Chemist's Section.

Silver Medal :—The College Dairy.

Diploma of Excellence :—(1) Leaf fall disease of Rubber, (2) Sugars and Sugarcane, (3) Model Dairy, (4) Paddy Breeding, (5) Food Products, (6) Insect Pests, (7) Chemicals, (8) Cotton and (9) Fodder Crops and Green manures.

Diploma of Merit :—(1) Indigo, (2) Implements and (3) Groundnuts.

Opening speech of His Excellency Lord Willingdon at the Poona Agricultural Conference.

Gentlemen, As one who has interested himself in agricultural pursuits for what I regret to feel is more and more becoming the greater part of his life, I am delighted to welcome to our historic capital city of the Deccan you gentlemen who, coming from all parts of India, are engaged in guiding and promoting the progress of our greatest industry. More particularly I wish to welcome my old friend and late colleague, Sir Claude Hill, and am delighted to feel that I am

actively co-operating once more with one whom I know from experience has the ability and energy which puts driving force into any activity which he is called upon to undertake. I have travelled through India in general and through this Presidency more in detail. I have often been struck by the magnitude and variety of the agricultural problems which present themselves for solution and in addressing a meeting like this—the members of which, as I have said, come from every province in the Indian Empire—while I own I feel sorely tempted to go into some detail I feel it would be hopeless for me to attempt to particularise with regard to any special lines of work.

Physical conditions.

Indeed, I fancy that even you experts must in your discussions labour to some extent under the same difficulty which arises from the great range of physical conditions within the limits of this vast country. Take for instance the chief commercial crops for which each province is famous, northern India for its wheat, Bengal for its jute, Bihar for its cotton, Madras for its coconuts and spices and Burma for its rice. These indicate a wide range of climate and agricultural practice and it is not only between the provinces that such marked differences occur. They occur within very limited areas. And a good example of such differences occurs in this very locality of Poona where we now are, which itself has an average rainfall of 30 inches while 40 miles to the west the average is 200 and 40 miles to the east only 19. Such conditions make it difficult for any one to particularise and preclude the idea of any hard and fast scheme of development which shall be of general application. Still, I think that we shall probably all be agreed that the farmers in each district tract have adapted themselves wonderfully to their environment and the constant changes in the crops and the varieties of the same crop, which may be observed during the course of a short journey, bear strong testimony to this adaptation. It cannot, therefore, be an easy matter for the agricultural officer, however expert he may be, to hand out to a cultivator who thoroughly knows his own field, his own climate and his own circumstances, advice which the latter can receive without reservation. We may take it that the farmer has in the course of many

generations skimmed off the surface whatever obvious principles connected with his craft lie there and has worked them up into a system of agriculture well adapted to his local conditions, to his means and to his ambitions. We are not likely to make such addition to the knowledge already possessed by the cultivator merely by conducting simple field experiments, such as taking the variety of a staple grown in one locality and trying it in another or varying the season of sowing or the mixture or rotation of crops.

Practice and results.

Such experiments have been done by the farmer himself hundreds of years ago and his present practice is based on the results which he has observed. The scientific investigator must go further than this and in the vast mass of variable circumstances connected with the growing plant, the soil and the climate which governs the production of each crop, he must be able to detect with accuracy the determining causes and the limiting factors of success or failure. It is only when such knowledge and such skill have been acquired that the investigator, will find himself in a position to bend the forces of nature to the utilitarian purpose of enhanced production by methods which the ordinary cultivator would never find or at the most would stumble upon only on rare occasions and at long intervals. Now, in addressing a body of gentlemen like yourselves, whose life-work lies in agricultural investigation, I feel that I need not labour the point regarding the magnitude and complexity of your work. My object in insisting on these features is to make clear my belief that it is not only by you, who now guide and direct this vast work, that the advance must be made, but by every member of the rank and file of the agricultural departments, each one of whom must add his contribution to the common stock of knowledge, a contribution which however small, must be carefully stored up and assigned its proper place in the edifice which we are trying to rear. I am much struck with the progress that has been made during the past decade by your botanists, chemists and agriculturists and congratulate them heartily on their work, but when I consider the immensity of the task and the handful of men, who are available to tackle it, I should be disposed,

with my eye fixed on the future, to take as the criterion of solid success the number of men whom the department can produce capable of undertaking and pushing through detailed scientific investigation, who can dig down to the root causes and explain the exact process of nature, which in any case determines the success or failure of a crop, and who can apply this diagnosis in such a way as to obtain economic results.

The man wanted.

I will not attempt to illustrate my meaning by reference to questions of chemistry or botany, with which I can claim no more than a very general acquaintance, but as regards your trained agriculturist the man that I want is the man who can grow a crop to perfection, who can tell me how he does it and how he can do it at the least cost with the best results. I know that you have such men but I want to find them not only at the top, but emerging from the rank and file in ever increasing numbers. Addressing myself more particularly to my fellow-countrymen at this gathering, who are engaged in this great work, it is true to say that you have behind you the experience of a century or more of scientific research as applied to agriculture in western countries. It is for you to light the sacred fire in India and to help your fellow-workers in this country to overtake you in the race for such knowledge and in its practical application. In doing so, you will be true interpreters of the imperial spirit and of the imperial destiny of the British race and in proportion as you accomplish this object the voice of those competent to judge will proclaim your work to be well and truly done. To turn now to some of the more obvious aspects of the agricultural situation the points in Indian agriculture which first strike a man accustomed to the farming operations of western countries, by their dissimilarity to the latter, are the seasonal rainfall, the relatively small importance which the rearing of live stock bears to crop production and the great predominance of peasant farming. From these circumstances it results that the peasant is usually dependent for his year's livelihood on a single short season and on a single crop. When these fail him he has little reserve to fall back upon, either in the way of capital or of subsidiary sources of

income. Thus he loses all independence by being generally under a financial obligation to the money-lender and the necessity for State help which arises indicates the weakness of the situation.

Master of his own fate.

It is the prime object of the agricultural department to strengthen the position of the cultivator in such a way as to make him the master of his own fate and not the ready victim of any untoward circumstances that may occur. To secure this object the complex problem must be attacked from every side. You are steadily accumulating agricultural knowledge and passing on to the cultivator the results which you obtain in the form of seed, implements, manures and processes superior to those with which he was formerly acquainted; you are showing him how to improve his farming outfit, how to add to the fertility of his soil, how to combat the fungoid and insect pests to which his crops are subject. I am glad to notice also that you are not neglecting matters of economic organisation for, I know that at your last meeting you went into the question of agricultural co-operation and at this meeting you are to consider the questions of markets and land holdings. Such matters are undoubtedly of very great importance and it seems to me that your labours in the physical field can never come to adequate fruition unless accompanied by corresponding efforts in the economic field, such as those indicated by the subjects that you have now put down for discussion on your agenda paper. Your labours in general may be said to operate in two ways. You may do something for the cultivator or you may enable him to do something for himself. It is very important that you should provide him with good seed, but it is equally important that he should be provided with a suitable holding on which he can grow his crop and a marketing organisation which will enable him to dispose of the produce to the best advantage. You cannot effectively help a man, who cannot or will not help himself and it is largely upon the human factor that the standard of production in any country depends, the human factor which if properly developed can turn a desert into a garden. The psychology of farming is much the same all the world over.

Reward for enterprise.

Give a man a compact block of land upon which he can live and thrive, give him an organisation which will render him tolerably secure against disaster, show him the way to secure a good outturn and make him realise that if he shows enterprise, ambition and industrious habits he and not some one else will reap the profits of his labour. Under such influences the latent industry of the man and the latent resources of the soil will develop and fructify and nature will exchange her frowns for smiles, the smile of a bounteous harvest, the smile of a contented peasantry. So far I have confined myself to matters of general principle, but before I close you will perhaps excuse me if I refer more in detail to a matter in which I am particularly interested as a breeder of pedigree stocks in England. I cannot look round on the live stock in this country without feeling that in their improvement you have ready to hand a field for works in which rapid and marked progress can readily be obtained. When I see the stunted bullocks and the milkless cows of the ordinary village herd and contrast them with the fine draught and milk breeds to be found only in a few limited areas of this country, when I hear that the fleece of a sheep in the Deccan is worth only 4 annas, when I see brought to the market fowls that consist only of skin and bone, I feel certain that there is a vast scope for the application of the principles of scientific breeding and scientific feeding. I know that the problems of live stock in India differ materially from similar problems in England because of the fact that in this country a considerable proportion of the population does not eat meat but I also know that the whole of the population does require milk. Then too, I see in the villages undersized ponies showing evidence of bad breeding, bad feeding and bad treatment, undergrown bullocks performing the tillage operations upon which the success of harvest so greatly depends. The ordinary village bullock is a weakly animal, but he sets the standard of energy; he is a show animal, but he sets the pace to the country in levelling up the standard from the worst to the best which the country now produces in breeds famous and in demand from America to Java. You have before you a work which will produce direct and indirect

results in every branch of Indian agriculture. My personal efforts as an agriculturist in this country have been directed to the establishment of a small herd of pure bred stock and a dairy farm at Ganeshkhind which I shall be delighted to show any of you, gentlemen, who are interested in dairying and would care to come over to Ganeshkhind this afternoon to inspect my herd and its milk records. In conclusion, I wish to take this public opportunity of expressing to our Director of Agriculture, Mr. Keatinge, and all the officers of the department serving under him, my grateful acknowledgment for the energy and zeal which I have observed in their administration during the years I have lived amongst them. From a close association with their work I can confidently say that we have in this presidency moved rapidly forward in creating a desire among the farming classes for improvement and progress and this has been largely brought about by the fact that Mr. Keatinge has by his experience, energy and sympathy, given inspiration and example to his officers and has gained the confidence also of the agricultural population.

Sowing sprouted seed in wet paddy seed beds.

It is the common, almost the universal practice to sow seed in wet paddy seed beds which has been allowed to germinate slightly. The exact method of doing this, varies in different places,—the practice is common all over India—but generally the seed is moistened either in a vessel or in a bundle of twisted paddy straw and kept for a period from 24 to 36 hours by which time the small rootlet has definitely emerged. The exact reason for this practice is not quite clear and in order to elucidate the matter, the opinions of the Deputy and the Assistant Directors were recently asked. The replies received do not show perfect unanimity; one officer considers that the question is largely one of temperature; more than one think that elimination of light seed is thereby obtained, while all agree that more even germination is thus obtained. This is conceded on all hands, but just how or why needs

a little working out. Let us consider just what the conditions are in a wet i. e., puddled seed bed, for it is only in these conditions that sprouted seed is used. There is a layer of about a couple of inches of water over the surface, covering a very soft well puddled layer of soil, on to which the seed is to fall. After sowing the water is drained off, and the land subsequently only lightly watered till the seedlings are well established.

What now will be the effect of germinating the seed? Firstly it will probably be of higher specific gravity, as though its bulk has slightly increased, it has absorbed a considerable quantity of water. This will make it more inclined to remain where it is on reaching the soil and this is at once an advantage since of the seed moved about with the movement of the water admitted into and drained from the plot, it would stand little chance of success. The question of quick establishment is probably of the greatest importance in the whole business. The young rootlet can penetrate *at once* into the soft mud, so that any slight drying of the surface will not harm it. It is of course impossible to cover seed sown on puddled land; It must lie on the surface, and ungerminated seed would run the risk of finding the surfaces too dry and hard to penetrate with its tiny rootlets. It is suggested also that the sprouting, by producing a seed with a small projecting radicle, is thus instrumental in preventing this seed from sinking too far into the soil, and this is certainly a consideration. The question of the elimination of 'deaf' or 'shavi' grain is probably of less importance. There should not be much of this, and in any case it would be easily seen if the dry seed was sown in the nursery, while the process of soaking, often adopted in a bag or in a straw twist would not differentiate between good and bad seed.

Finally the germination of the seeds all together in the best conditions of temperature and moisture undoubtedly accelerates and facilitates germination. We know little about the actual germination reached by the seed sown under field conditions, but the percentage of failures must be in certain circumstances very high. Pre-germination, by giving every seed a good chance undoubtedly aid in getting

a quick even plant. It seems a pity that the care used in producing the seedlings is so often neutralised by the carelessness in planting them.

R. C. Wood,
Principal.

The Madras Exhibition 1917.

Continued from last issue.

In the last issue, we drew attention to the address of His Excellency the Viceroy in opening the Madras Exhibition and published a contribution on the exhibits sent by the Chemical section. For want of space we had to keep over a sketch of the exhibits from other sections, which we propose to give in this issue as far as space would allow. The experiences gained in the Exhibition of 1915 were availed of in the arrangement of stalls for the show of the exhibits of the Agricultural Department in the Exhibition of 1917. The Government Agricultural Engineer and his staff and the Deputy Director of Agriculture, Fourth Circle, were responsible for the excellent arrangements made for the show and for the comfort of the several officers of the Department and their servants.

A long hall, nearly 200 feet long and 30 feet broad, had been secured for the Department, one end of which had been raised 3 feet to accommodate the Dairy. The different sections were allotted spaces on both sides of the wall, along which benches and galleries had been erected with barricades to keep off the crowds of visitors. The wall spaces were profusely illustrated with charts pertaining to the different sections and white cloth covering was provided for all the galleries. Just outside the enclosure there were growing crops, which had been planted a month before the Exhibition, and also Agricultural machinery which had been

erected with well-laid walks here and there. Tents had been pitched for officers and student-volunteers and kitchen accommodation provided for the menial servants. Under the supervision of Messrs. J. C. Raju and D. B. Murthi, Mr. V. N. Nanjappayyar, who had former experience as Hostel manager at Coimbatore, ran a mess just outside the People's Park for the benefit of subordinate officers. These several points, each though small in itself, combined to make the stay of the mofussil staff very pleasant; and they are thankful to the Director of Agriculture for his foresight in looking after their comforts.

The following sections were represented :—

Principal's Section. Dairy. Large quantities of milk were daily procured with the help of the Deputy Director of Agriculture for Live Stock and his Farm Manager, Mr. Raghavalu Nayudu, and the milk was skimmed in separators, the cream was ripened and churned and crisp butter was manufactured and sold to the visitors. The supply of both cold and boiling water by separate taps, the Cuddappah slab flooring, the glazed tiles on the walls and the elevated platform rendered the successful working of the Dairy possible; and the smart and clean working of the Assistant Principal, of the Dairy Manager and of the students, and the scrupulously clean handling of the milk, cream and butter were all much admired; and, without exaggeration, we might say that the Dairy Exhibition was one of the most popular and instructive. Only enough butter could not be manufactured to meet the demand.

Implements. A few of the common implements and tools of husbandry, tried by the Department and found useful, were on show. These included amongst others, the buckscraper, an implement used for levelling dry lands, the triangular harrow and the monsoon plough with its spare parts.

Next to the implements' stall was the section of *Sugarcane*, in which there was a fair collection of the indigenous and exotic canes. Two Madras seedling canes M (1192) and M (1302) compared very favourably with the seedling canes of Barbadoes or Mauritius. Java Hebbal had done very well and canes from the West Coast were conspicuous by their thickness and tall growth, while North Indian canes were too poor to compare with Madras ones. Seedlings from the Cane Breeding Station, in different stages of growth, kept side by side with the arrows or the cane flowers and the isolated seeds, were very instructive. Forest and old jaggeries, smoked jaggeries and country made sugarcandy added to the attraction of the visitors. The Assistant Director of Agriculture, First Circle, was in charge of the section.

The next section was a small space allotted to the *Indigo* Expert. Here Dr. Marsden had arranged a model Indigo vat and had specimens of different samples of Indigo.

Next to this there was the *sericulture* section in charge of a sub-assistant from Pusa. Mulberry and eri silk worms in different stages of growth and various kinds of cocoons were on view. An improved reeling machine was at work and samples of silk yarn and cloth were also shown.

Entomology. The Government Entomologist had a very interesting and well arranged section of the insect pests of the Presidency. In this section, insects had been arranged according to the plants they damage, their classification, their structural peculiarities and usefulness to the farmer. Metamorphosis and mimicry in insects were well illustrated by actual specimens. There were also live insects under rearing which had been brought from the College Insectory. The control of insect pests was explained by means of hand bags and nets, model light traps, spraying machines and samples of insecticides. There were several beautiful illustrations, hung on the wall behind, bearing the title on economic entomology.

Just opposite to this section was the Government *Mycologist's*. Several drawings hung on the wall and actual specimens arranged on the gallery explained the havoc played by fungoid diseases, like the bud rots of palmyra and coconut, the smut of cholam, the mahali of arecanut, the fruit rot of chillies, the phytophthora of rubber and the mildew of grapes. The effect of steeping cholam seed in sulphate of copper to prevent smut and the making of Bordeaux mixture for spraying were amongst the several remedies suggested for the combating of the fungoid diseases of the Presidency.

A small space had been allotted to the *Cotton* section which was immediately in charge of the Director of Agriculture. Here the main types of country cotton of both the Tinnys and Northern and the improved ones obtained from them were shown. The yarns up to 40 and 20 counts from Tinnevely and Nandyal tracts and yarn from Red Northern spun to 40 counts were prominent, the last being useful for making khaki. The lint outturn of the Company cotton is shown to be 33% while that of the local cotton is only 25. Endpressed and sidepressed bales were exposed on pedestals in front of the stall to show how cotton was pressed for transport by rail or sea.

The next section was the *Chemist's* section, an account of which was given in the last issue.

Paddy had a separate section, in which the Government Economic Botanist exhibited several individual strains of paddy, the result of laborious scientific work of the Vedapatti Paddy Breeding Station. Soil Survey Maps of Tanjore and Guntur, charts to explain the action of green manures and specimens of concentrated manures added to the instructive scope of the stall.

The Deputy Director of Agriculture, Fourth Circle, had a stall for *Groundnuts*. The different varieties of groundnuts had been pinned with whole plants in a round circle, suggesting the

12 signs of the zodiac. The effect of the adulteration of water, during shelling, in spoiling the kernel and the cake, was very telling. There were also specimens of groundnut oil and cake.

The same officer had taken the trouble of *growing*, just outside the hall in carefully laid out plots, *several crops*, the most prominent of which were thin and thick sowing of paddy nursery, economic transplantation of paddy, green manures and cotton.

The Director of Agriculture had a stall for sale and free issue of Department publications. Prominent amongst the books for sale were Fletcher's insect pests and Wood's Facts and Figures and amongst those given away were bulletins, leaflets and calendars.

The nature of the work being done by the Government *Agricultural Engineer* and his staff in the districts was fully represented by the machinery shown. Among these there were two specimens of boring drills, a hand boring drill utilised for prospecting water for cultivation and capable of working up to 150 feet in alluvial soil and 50 feet in rocky ground, and a power drill used for exploring water in rocky situations. There were 2 model pumping sets, one running on liquid fuel, intended for a season or for a crop and useful for ascertaining the cost of irrigation and the quantity of water required for it, and the other running on kerosine oil used for construction in wells. A model sugarcane furnace to illustrate economy in the consumption of fuel was on view close by.

While the raised platform at one end of the hall was occupied by the Dairy, the opposite end, making up quite a third of the space, had been allotted to the United Planters' Association of Southern India and this had been decorated by the Planters with red and white in an artistic manner. Different grades of *tea* produced by several estates of Nilgiris and Travancore, *cardamoms* of various grades, *coffee* seeds,

fresh, dried and in powder and *rubber* in various stages of production and manufacture, were all kept in attractive cases. The coffee pulper of Messrs. Massey & Co., was also amongst the exhibits.

The success of the Agricultural show was due as much to the sympathetic direction of the Director of Agriculture and the hard and untiring work of the Government Agricultural Engineer and his staff, as to the enthusiastic response, not merely obedience to orders, displayed by all the different Heads of sections in getting exhibits ready and by their subordinate officers in their patient explanation, minute after minute, to the large crowds of all classes of visitors.

M. R. R.

Interesting Boreholes.

Either want of capital or want of enterprise or both have kept the development of borings in quest of subterranean water in this Presidency still in the embryo stage. However, thanks to the Department of Industries or as it is now constituted, the Pumping and Boring Branch of the Department of Agriculture, a good number of hand borings have been done. The number of borings already made is understood to be sufficiently large in certain areas to enable one to arrive at a rough idea of the subterranean water levels in the neighbourhood. Nevertheless it does not appear to be quite safe to draw general conclusions from the few results which might have been obtained in any particular locality. In support of this statement, certain unexpected results met with in the Tanjore District can be quoted. In 1915, a boring was made in the village of Nelpathur, 5 miles from Shiyali, with the object of improving water supply to a rice-mill. The borehole was located in a fresh water well which formed the only source of supply of water to the mill. This village is within 15 miles of the sea coast and is surrounded by a vast tract of wet fields irrigated by the Coleroon in one of its lower reaches. The sub-soil is loam and deeper down fine sand. Everything therefore looked favourable for the striking of a good spring. The augury proved only too true and like Aladdin in the Arabian nights, the

maistry one day working in his usual jog-trot fashion was confronted with a gigantic spring which put a stop to his work suddenly. The lining pipes were inserted only to a depth of 85' and the depth of the boring too was practically the same as the strata passed through comprised mostly of sand. There was a sudden outburst of gases first and shortly afterwards a big beautiful fountain of salt water shooting out into the air to a height of 25' above ground level began to play. Large quantities of gas were discharged along with the water. Fossil shells and fine black loam were also ejected out. This extraordinary phenomenon was only intermittant in character as the fountain used to gradually weaken and die out in 3 to 12 hours time. The subsidence of the fountain was found to be due to the choking up of the bore hole. A single tapping with the sand shell used to suffice for the resuscitation of the fountain. The fountain was thus kept working 3 or 4 days when it was found that the walls of the boiler room and the drying floors developed cracks owing apparently to the settling of the foundations which again was due to a disturbance in the deeper strata. The borehole was therefore allowed to seal itself. The Director of Industries was of opinion that the spring might after sometime turn into a fresh water spring and advised that it might be kept flowing. But the owner of the mill feared the consequences of such an experiment and therefore at his request the lining pipes were withdrawn and the borehole closed.

The same ryot who owned a good number of acres around his rice mill wanted to sink a second borehole a little away from the mill. A site which was about 2 furlongs off was accordingly selected. The results of the 2nd bore were quite as unexpected as those of the 1st were. For some depth down, only alluvial soil was found. Below that there was sand, and through the dogged persistence of the ryot, the boring was carried down to a depth of nearly 220' at the great risk of losing all or at least a great number of the lining pipes. The strata passed through were little more than moist and at last the borehole had to be given up. The results of the 1st borehole were indeed exceptional and could not be taken to be typical of the surrounding area. The results of the 2nd borehole indicated

probably more truly the condition of available water supply in the neighbourhood. The peculiar feature about these two boreholes is that the strata passed through were almost identical in character below a certain depth and yet the results were so different.

H. Venkatramaniah,
Engineering Assistant, Agricultural College.

Green Manure to Paddy Fields.

Chorus:—Green manure improves your fields.

If retted and used, great profit yields.

1. With outside leaf improve thy land,
If hills or woods are near at hand.
2. Those named below the best do seem:—
Pungam, Nuna, or well known Neem.
3. Or Vempali or Portia
Wild croton, or any Cassia.
4. With Erukam too thou may'st treat
Thy land, or best with indigo seet.
5. When getting outside-leaf is hard,
These grown on thy field will thee reward:—
6. Indigo or wild indigo,
Sunn-hemp or Dhaincha do thou grow.
7. Choose which-so-ever thy land doth suit,
And with the season fits to boot.
8. In two-month's time take care to plough,
For else these plants too woody grow.
9. If drought prevents thy ploughing them in,
Cut them, and bury thy land within.
10. If too much manure thy land doth yield,
Give away the excess to a neighbouring field.
11. If thou usest, rest thou sure,
Thy crops will lodge, through excess manure.

12. For one whole week thou needs must wait,
For transplanting, after the ploughing-in date.
13. For early crops thy green manure,
From other fields thou shouldst procure.
14. And saline land doth the same require,
If crops on this thou dost desire.
15. If the land is slightly alkaline,
The Dhaincha alone doth flourish fine.
16. With bone-meal, green manure combined,
Enricheth lands as many do find.
17. D B. Murthi gives these hints, well meant,
On behalf of our gracious Government.

(Sd.) B. Pattabhiramiah.

Extracts.

The cultivation of Potatoes from Potato Skin, Experiments carried out in Italy :—

In the spring of 1916, at S. Angelo of Alifa (Province of Caserta), experiments were carried out on the cultivation of potatoes by cutting the skin into strips about 2 m. m. thick (that is to say, with some of the flesh still adhering to it), with the eyes. From 100 parts by weight of potatoes 45.5 parts of skin for planting and 54.5 parts which could be used for food or trade purposes were obtained. The experiments were carried out on square plots, all of which had been similarly treated as regards the preparation of the soil and manuring.

On the 19th March alternate plots were planted with whole potatoes and skins of the same variety respectively. Identical methods of cultivation were carried out at the same time on all the plots. The harvest was gathered on the 4th August. The vegetation of the different plots was uniform and there was no great difference in the yields. The average yields were as follows :—

	Yield from whole potatoes.	Yield from skin in strips.
Area of each plot. ...	43 sq. yards.	43 sq. yards.
Quantity of material used for planting. ...	120 lbs.	55 lbs.
Potatoes harvested. ...	633 lbs.	619 lbs.

In terms of weight per acre these results show that $5\frac{1}{2}$ cwts. of skin yielded $63\frac{1}{2}$ cwts. of potatoes, whereas 12 cwts of whole potatoes yielded $63\frac{1}{2}$ cwts.

Use of flowers of Sulphur for Preserving Potatoes :—

The Director of the Agricultural Colony of Lamotte-Beuvron, France, has for a long time past obtained excellent results by dusting potatoes with sulphur in proportion as they are stored in the silo or cellar.

Reddish or pink potatoes lose a little of their colour but retain their germinating faculty and acquire no taste of sulphur. As a result of the heat produced at the beginning of heaping the sulphur becomes transformed into sulphurous anhydride which spreads throughout the silo or store and destroys the latent germs of rot, especially those at the surface of the tubers.

This method is used by the Director with equal success for the preservation of accumulated stocks.

(From the International Review of Agriculture, April 1917).

C. T.

The successful experiments by British agriculturists of ploughing throughout the night with the aid of a powerful motor car acetylene head light will undoubtedly interest original agriculturists, who, with the present scarcity of farm labour, cannot during the short autumn and winter days, cultivate as much land as they require. In the farm where the experiments were made the motor tractor had been at work for five days and

three nights, and the whole 40 acres (160 stemnata) were ploughed in that time. To plough the same acreage with a horse plough would take fifty six days—and with such small and weak horses or oxen as are used in the East, perhaps one hundred days; while with a motor-tractor working the average eight hours a day it would have taken twelve days. Acetylene apparatus and motor lamps are easily obtained in all towns in the Near East, and the experiment is worth trying. (Mysore Economic Journal).

W. R.

Correspondence.

In response to a query regarding the fencing of coconut topes, may I give you a suggestion? I, a recent visitor to the West Coast, the land of palms, was struck by the neat yet substantial mud wall fencing around every garden. This seems to be the best, and at the same time the cheapest method of protecting plantations. As to their lasting, there need be no anxiety, when one finds them keeping so well in a tract of 120 inches of rainfall annually. If the soil is too clayey you may add some sand and vice versa. To make the wall strong, it must have a broad base say about 3 to 3½ feet and the top about ½th foot. A layer of tiles may be arranged on the top to prevent corroding or if scaling is to be prevented, agave may be planted, which also binds the soil. Hariali may probably be planted on the sides before the rainy season, which will prevent washing.

A live hedge like korukapally is good, but there is a great difficulty in raising it and keeping it intact till it becomes substantial, and as the fencing gets older it becomes gappy. There is also the other trouble, that the live hedge robs a good deal of the plant food from the soil, and the trees around the hedges would not bear so well as the rest.

K. Raghavachari.

“The combined method of broadcasting and transplanting of paddy.”

Anent the above article which appeared in the October issue I may say that a similar practice is in vogue in Palghat and Valvanad taluks of Malabar with the 1st (kanni) crop. The practice down here differs in the following respects from the one described by Mr. Iyengar.

(1) The first operation of broadcasting is done in the dry and not in puddle.

(2) The practice is resorted to only under special circumstances such as :—

(a) The foulness of the field with weeds.

(b) The unsatisfactory growth of the broadcast caused by adverse weather conditions.

(c) The too gappy nature of the field due to unsatisfactory germination or the grouping of the seeds in small heaps caused by heavy rains soon after the sowing.

(3) The practice is not followed unless the ryot is faced with one or the other of the difficulties mentioned above even though there may be water enough to puddle the land and plant.

The yield is usually higher than the broadcast and the extra expense is also not much.

Indirectly this practice has been helpful in bringing home to the minds of the people the value of thin nurseries and the attempt has been quite successful in some cases. But some, even though they realise, from their own experiences of this combined method, the benefits accruing from sowing the nursery sparsely and adequately manuring it, would not adopt it while sowing their nurseries. The only consolation for the Agricultural demonstrator in such cases is to remember the old saying “One

man can lead a horse to the water but a thousand cannot make it drink" and pass on to the neighbouring ryot who is less sceptical.

M. U. Vellodi.

Notes.

Koorkan (*Coleus parviflorus*)—a root crop of the West Coast.

One sees in almost every garden in the West Coast, more especially in the interior, a small area devoted to this root crop. The root is a very common vegetable in all house-holds, being prepared in as many ways, as we do with colocasia, or potato. The roots are small, not bigger than the shelled arecanuts, but produced in large quantities in each plant. It cannot be said to taste so well as the potato, but compares favourably with the local root crops. The method of cultivation is simple. High level gravelly soils are particularly selected, as good drainage is necessary there, where nearly 100 inches of rain falls during the period of its growth. About 7 cents to the acre is found necessary for seed bed, where the roots are first planted. Small shallow pits 6 inches deep and 1½ feet diameter are dug 2 feet apart, and filled with soil mixed with manure enough to make each pit slightly higher above ground level. Five tubers are planted in each pit 4 in 4 corners and one in the centre. Planting is done in June just after the monsoon bursts and no irrigation is necessary. Germination takes place in 10 days and in two months the seedlings grow up to nearly a foot with a number of branches. Manuring with ashes is done twice during the period. Meanwhile fresh land is prepared, and mounds are made in the same way as in the nursery, and the tops of the seedlings are planted 5 in each mound in the same way, as the tubers. Sheltering with leaves is done. Two manurings are done, a month after planting mainly with ashes. The crop will be ready for harvest in December. The roots are dug out by mammatties and the average yield per acre

would be about 40 bags. A bag of roots sells for Rs. 3 in Calicut. It will probably be worth testing in the hills of Nilgiris, where the potato is so seriously attacked by fungus disease, that the potato growers are recommended to abandon this and choose some other crops.

K. Raghavachari.

Baling Cholam fodder.

A trial was made recently in order to determine whether it would be practicable to send cholam fodder to Mesopotamia for the use of the horses and mules at work there. As regards its feeding value we have evidence in this District that it is an excellent fodder for horses, as the Pattagar of Palayakotta, for instance, keeps his ponies in excellent condition on this straw. The difficulty of course lay in getting it into a shape in which it could be easily transported, and for this, some kind of baling was necessary. Now in order to produce a good bale material must be both pliant and coherent. Dry cholam stalks do not possess either of these requisites. At the suggestion of the Director of Agriculture, Mr. Stuart, the experiment of crushing them in an ordinary sugarcane mill was tried and was fairly successful, though even with this preliminary treatment, they did not make up into a very satisfactory bale. A gunny covering was found necessary, though this is not used in baling hay, nor was the density sufficient, as the report of the Assistant Director of grass Farms was, that 160 lbs of cholam straw occupied as much space as 240 lbs. of hay. He expressed the opinion that it would not pay to export cholam hay unless we could get a bale of about 10 c. ft. to weigh 240 lbs. This may be compared with the figures given in the Note book of Facts and Figures on page 20, where the weight of cholam and paddy straw in the stack is given at about 134 lbs. per c. yard, at which rate, 10 c. ft. will weigh about 50 lbs.

R. C. W.

Hindu Law of Inheritance and scattered holdings.

"My great grand father was granted a Shotrium Inam patta of 14 Katties, roughly 200 acres.

This he selected as follows.

Village No. 1. 50 acres.

Village Nos. 2 and 3. Near to No. 1. 50 acres.

Villages 4 to 19, Roughly 14 acres each.

His reasons for adopting this scattered arrangement were apparently (1) that he had relatives in each of these villages and (2) that he got some land on lankas, some under irrigation and some dry land and therefore did not have "all his eggs in one basket."

He had three sons, who divided the property equally between them, each taking one third of each of the sections. My grandfather's two elder brothers got into debt and had to sell nearly half of their property. Neither had any male heirs, but each had two daughters, who divided what was left of this two thirds of the original property between them, which, of course, went to their husbands and away from the family.

My grand father got 15 acres as his wife's dowry and thus held altogether a little over 80 acres. He had two sons, each of them took their share in exactly the same way as their fathers had done before them. My father thus holds approximately 40 acres scattered about in ten different villages."

"Victim."

Outgrowths on the roots of Casuarina seedlings.

The roots of Casuarina seedlings in some of the Vizianagaram Estate plantations have been found to develop gall-like outgrowths. These are usually of the size and shape of a very young casuarina fruit, and are usually found at the tips of roots which cease to grow further. No appreciable difference, however, has been

found in the size and general look of the seedlings with or without such outgrowths, while in the nursery, but there is a local practice of removing the outgrowths before the seedlings are planted out in the field. Some specimens of seedlings with such outgrowths were forwarded to the Government Mycologist, Coimbatore, for examination but they did not enable him to find out the cause of their formation. Fresh specimens are being sent. G. Jogi Raju.

Individual manuring for paddy Crop.

I had an opportunity of witnessing an interesting method of manuring a transplanted paddy crop a month old, near Unjalur on the Railway line between Erode and Trichinopoly. About half a dozen women were standing in a line across the field just as they do for regular weeding, and each had a small chatti with well soaked groundnut cake in it. They went on pulling out the weeds which were particularly very few and at the same time putting in the soaked cake about the size of a good lime fruit underneath each clump. The clumps I noticed had not been put very close; they were nearly 9" to a foot apart. When questioned about it, the ryot informed me that he has been adopting this method with success for some years, his principal object being to prevent the manure from being washed away into his neighbour's field. This method is quite different from the one described in the Departmental leaflet No. 13 of 1910 about individual manuring for paddy.

Green manuring for Paddy.

Round about Trichinopoly town the ryots use to a very large extent the leaves and twigs of Ponciana elata tree (வாதாராயன்) for manuring their paddy fields. All the trees found on the roadsides get a severe pruning every year during the paddy season. Ryots pay up to Rs. 2 for the leaves of a single well grown tree. I was told that this year one of the Trichy landlords had purchased in auction for Rs. 150 from the municipality the right of cutting away the twigs and leaves of about 200 trees forming the avenue in one of the municipal roads.

K. Ramiah.

Students' Corner.

"A cultivator holding land (black cotton) in Bellary District, where the rainfall is between 20" and 30" per annum is desirous of growing a fodder crop, preferably leguminous, for feeding his cattle and sheep. The crop should be one which can be sown at the outbreak of the South West Monsoon, will continue to grow until the following hot weather or for more than one year, can be cut or grazed several times in the year, will give a heavy yield of green fodder and will have no ill effects at any time if fed in reasonable quantities. What crop should he grow."

We hope this question might interest some of the older students and officers in the Department and some useful suggestions might be made.

Departmental Notes.

1. The resignation of Mr. T. Ramiah, Assistant in Science section is accepted from 1st January 1918.
2. Assistant Manager Mr. C. R. Sreenivasa Ayyangar is appointed Assistant in Science section on Rs. 75 on probation, vice No. 1.
3. The privilege leave for 45 days granted to Mr. M. U. Vellodi from 15th October 1917 is commuted into leave on medical certificate and extended up to and inclusive of 27th January 1918.
4. Mr. W. Raghavachari is posted to Trichinopoly to be in charge of district work in the Fifth Circle and green manure works in Madura, in relief of Assistant Director Mr. A. V. Thirumuruganatham Pillai posted to First Circle.
5. Messrs A. Gopalan Nair, E. Kunhappa Nambiyar, K. Govindan Nambiyar, M. A. Balakrishna Ayyar, A. K. Ganesha Ayyar, Assistant Farm Managers on probation are confirmed from the dates of their entertainment in the Department.
6. Probationary period of Assistant Farm Manager Mr. Arulandam Pillai will be extended by another six months.
7. Mr. S. R. Venkatakrishna Mudaliar, Assistant in Mycology is granted privilege leave for three months from the date of relief.
8. Mr. S. Kuppuswami Ayyangar is appointed A. F. M. on probation and posted to Manganallur from 1st February 1918.

THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. VI.

February 1918.

No. 2.

Editorial Notes.

We see all around us a growing interest in matters—
Agricultural. For some time past we have been accustomed to see Agricultural and kindred subjects being discussed in the legislative councils, both Imperial and Provincial, and we now learn that, during the Congress week at Calcutta, the Bengal Agricultural Conference sat presided over by Mr. C. R. Das. We further learn that the Hon'ble Pandit Malaviya took a prominent part in the proceedings. This, we take, is a guarantee that this quickened interest in Agriculture is bound to get emphasized and grow in volume as time advances.

And what more, there was held during the same week 'The Cow Conference' under the Presidency of Sir John Woodroffe, Judge of the Calcutta High Court. The object of the Conference was, it is said, to bring about an improvement in the quantity and quality of the local cattle. We should like to have had it called 'The Cattle Conference' and the proceedings show that this title would have suited it better.

Awakened
interest in
Agriculture.

The Cow
Conference.

We take this opportunity to invite the attention of the members of the Union to the Munagala Prize essay, details regarding the award of which, we have been publishing for some time in the pages of the journal. The subject is an important one and one on which, we believe, every one of the students of the College is sure to have something to say. The choice between accepting service in one of the Departments under Government and taking to private farming on one's own account, must have presented itself to most of the members of the Union. We have often been condemned for the want of a spirit of enterprise; and a candid expression of the views will show, if there are any other reasons besides, which are responsible for the lack of Agricultural enterprise in our land. We hope that a very large number of members will compete.

The new year is in and we request each member to expedite his annual contribution to the journal.

Obituary.

News has been received from his brother, Mr. Mubamed Miran, of the death suddenly from pneumonia of P. M. Muhamad Abdur Rahim, who was a student of this College from June 1911, and in the following March. He was in charge of family estates in Tinnevely, and was interesting himself in rural and Agricultural matters as befitted his position as landlord.

Cultivation of Tobacco at Sivapuri.

Sivapuri is a village about 2 miles southeast of Chidambaram, South Arcot District. The soil is generally sandy loam. Village site lands are considered good, but a heavy application of sand is needed to make it grow good crops. Brackish water is considered bad. Sand is generally applied in very large quantities to clayey soils to make them more porous.

Tobacco is the only crop continuously grown on the same field year after year, the land remaining fallow after the harvest of the crop.

Nursery:—This is raised near the well in the field itself. One-eighth Madras measure of seed is sown over a bed 8 feet square over which cattle manure has been spread to a depth of half a foot. This will suffice to transplant 1.32 acres or a cawnie or occasionally even more. The seed is sown four times on the same bed at intervals of a week i.e., when the first sown seeds germinate some more seeds are sprinkled and when these germinate a third sowing is done and so on. The sowing is done in the month of Purattasi (September.) Rains at this time are highly prejudicial to the growth of seedlings. The cultivators are not always sure of their seedlings coming up well, so that, a larger area than what is necessary is usually sown. Soon after sowing, the seed bed is kept covered with coconut leaves or cumbu or cholam straw which are removed after a week. The seed beds are hand watered twice a day both morning and evening. Weeds are removed before the final sowing is done. In 45 days the seedlings are pulled out for transplanting.

The land is ploughed well and manured heavily with 200 to 300 cart loads or even more of cattle manure. Sheep penning is also in vogue; and this is usually done along with application of

tank silt. There is also a practice of tethering cattle in the field itself. Sometimes the manure is applied first and then it is well dug in with a mammatti of a peculiar shape to a depth of a foot. The land is then levelled and lines are marked out with ropes about three feet apart. After every four rows a space of $3\frac{1}{2}$ feet is left out for forming the irrigation channel. The fertility of the soil determines the spacing given. Ryots round about this village purchase seedlings from here which sometimes cost as much as Rs. 2½ per 1000. The price usually varies with the demand. The planting is done in the evenings and the plants are shaded in the next morning generally with leaves of konji (கொஞ்சி) and odiyan (ஒடியன்). The ryots are particular about the seedlings being transplanted on the same day on which they are pulled out. It is considered that the roots would bend if left over for a night, when they keep it spread over wet straw. The seedlings are planted carefully in depressions made with the finger. Certain advantages are claimed by using konji leaves for shading; konji leaves do not fade for 2 or 3 days and are not eaten by cattle. The leaves are also said to give a peculiar flavour to the tobacco! For 3 or 4 days, the plants are watered thrice a day by which time the plants strike roots. A fortnight after, weeding is done. In the third week, a good mammatti hoeing is given which is sometimes followed by another hoeing a week or two after. Every ryot attends to the mammatti hoeing and pot watering himself. He does the hoeing till 9-30 A. M. when he begins the watering and continues it till 11-30 A. M. In the evenings the hoeing is done till 3-30 P. M. when the watering is begun and continued till 6 P. M. When the plants are 45 days' old, another weeding is given and beds are formed for irrigation. Irrigation is done by the picotta once in 2 or 3 days. If the manure applied before planting is considered insufficient, a month later some more is applied and dug in with mammatti. The leaves are attacked by caterpillars which are generally hand picked and destroyed.

Topping and suckering are attended to when the plant puts forth 10 to 12 leaves. A week later, the plants are tied with paddy straw and the beds are irrigated every day. When about 10 such daily irrigations have been given, it is changed to once in two days. As suckers appear, they are removed. The white midrib and the appearance of yellow spots on the leaves are, taken as signs of maturity.

The crop is harvested in the evening after watering it in the morning and the plants are left in the field. Next morning before 9 A. M. the plants are collected and arranged in a heap one against another and the whole thing is covered with paddy straw. In the evening, the plants are spread out again. This process is continued every day for about 5 or 6 days after the harvest. The plants are then removed to the houses where they are hung on long bamboos with korai stalks without touching each other. After a week, the leaves are cut sorted out and tied into small bundles of 5 leaves each known as kunchams. These bundles are heaped in a closed room, now and then aerated and reheaped. This process is continued till the leaves are well cured which they know by experience. When this is over the leaves are tied into bigger bundles of 8 kunchams or 40 leaves.

Diseases:—The principal ones are:—(1) The seedlings rotting in the seedbed. This may be due to heavy rains or the seedlings being too close. (2) attack of plant lice. (3) The leaves curling up with white spots. (4) When the leaves become big, they die all on a sudden with wilted appearance. (5) attack of caterpillars. Which are handpicked and destroyed.

Padayachis, Pallars and Parayars are the chief cultivators. Generally 4 or 5 men join together and take on lease 4 or 5 cawnies for this cultivation. 12 Pothis of leaf are obtained for a cawnie (1.32 acres). The cultivation expenses may be put down as follows:—

	Rs.	A.	P.
300 cart loads of cattle manure at 10 as ...	187	8	0
4 ploughings	6	0	0
Seedbed, fencing, watering till pulling out seedlings	2	0	0
Manure spreading and mammatti digging and planting	15	0	0
Watering 5 men for 5 months at Rs. 7-8-0 per month	187	8	0
Picotta stand etc. 5-0-0 } 1-4-0 }			
Bamboos 3-8-0			
Ropes 0-4-0			
Bucket 4-0-0			
14-0-0 (lasts for 2 years) for one year ...	7	0	0
5 mammattis for 2 years—for one year ...	2	8	0
Weeding hoes 5 for 2 years ,, ...	0	3	9
Thatties 4 for two years ,, ...	0	4	0
	407	15	9

Yield per cawnie.—12 pothis of cured leaves.

1 Pothi is equal to 60 bundles and each bundle contains 40 leaves. Each Pothi sells at Rs. 120 to 180 or even more. Taking the price of a Pothi at Rs. 150 the gross value of produce is Rs. 1800. Lease amount payable to the landlord varies according to the nature of the soil from Rs. 200 to Rs. 600 say, Rs. 400. The gross outturn minus the lease amount is thus Rs. 1400. By deducting cultivation charges of Rs. 408 the net gain for a cawnie is Rs. 992; or Rs. 744 per acre.

The tobacco is exported to Penang, Singapur and other places. This is said to be used for chewing purposes, for cigars and for preparing snuff.

The whole secret of success seems to be in the heavy manuring and the mammatti digging to a depth of 1 to 1½ feet, thus keeping the land always 'friable'. The flavour of this tobacco is very much liked by the people. That sweet water produces such excellent tobacco is a fact which often astonishes the Coimbatore tobacco grower. In the Avanasi Taluk there is a place called Meenampaliyam noted very much for its tobacco crop. Here an acre of this crop only yields three pothis (a pothi=10 mds.) valued at Rs. 450. The manure that is usually applied here is cattle manure prepared in pit system very carefully with alternate layers of kolinji stalks and leaves cut into pieces. It is worth the while of the Coimbatore ryots to try and see how this Sivapuri tobacco thrives in their places.

W. Raghavachari.

Paddy Manuring.

Chorus:—Your lands with tilling weaker grow;
Manure them well before you sow.

1. Lands over cropped must needs go down
In yielding power, from crop to crop,
If nought is done to strengthen them
You know your profits too will drop. Chorus.
 2. What all we take we needs must give,
To equity we must conform,
Manure and give back what you take,
From the field, in straw and paddy form. Chorus.
 3. Pati earth is sound manure
And strengthens well the exhausted earth.
But then, sometimes supply doth fail;
Of Pati there is oft a dearth. Chorus.
- Pennings, manure of cattle too
Do pay you more as you apply,
But the stock is limited after all,
Holdings, large it can't supply. Chorus.

5. There are, again, prepared manures,
They all are 'costly' in a word,
So they are not in the reach of all
To purchase them but few can afford.

Chorus.

6. So learn to use some other manures
(For cheapness too should be your aim)
There are several good and cheap as well;
And some of these I now will name.

Chorus.

7. First, oil cakes you well may use,
But then, exclude the better sort,
Which you can use as cattle food;
You needs must look to their support.

Chorus.

8. Next fish manure is also good,
And bone meal too the crops relish;
For this increases yield of seed,
Beyond your wildest dream or wish.

Chorus.

9. And green stuff of which every sort,
Doth serve well for manuring, too;
While retting leaves is a useful plan
That well with gain repayeth you.

Chorus.

10. Manuring plants you well may grow,
Upon your fields and plough them in:
Now follow D. B. Murthi's hints,
Ere next your sowing you begin.

Chorus.

(Sd.) B. Pattabhiramiah.

The Mango Hopper Pest, and its control.

Chorus:—The mango flowers oft wither quite,
Learn thou to check the ruinous blight.

1. That cloudy skies and honey-dew,
Make mango flowers decay,
To idle fancy, wholly false,
Do put it quite away.

2. The sad decay of mango flowers
Is due to an insect pest,
In numbers large, the flower tree,
This insect doth infest.

3. Much smaller than the fly it is,
Grass-hopper-like doth skip.
It sucks the sap off blooming flowers,
Their stalks this pest doth nip.

4. If thou dost wish thy loss to check,
To what I say pay heed,
For many a tree is rescued thus,
The pest kept off indeed.

5. Mix gallons ten of water soft,
And fish-oil-soap, a pound;
And taking this in a fine holder pump,
Spray flowering trees all round.

6. For every ten days once at least,
Repeat this process sure.
From January till fruiting time,
Apply the liquid cure.

7. Fear not that the cost of this,
Thy purse can ill afford,
Not more than annas five it costs,
Per tree, upon my word.

8. The Government makes fish-oil-soap,
On the coast of Malabar,
From the factory that we can get it prompt,
If in need of it we are.

9. The Government Agriculture branch,
To better the ryot doth strive,
Pay heed to this its sound advice,
And act it out, and thrive.

Experiments on Grapevines.

During the course of the last ten years* the writer has interested himself in the cultivation of grape vines in the Ganeshkhind Botanical Gardens, Kirkee, and also in other parts of the Bombay Presidency. Experiments on the various aspects of culture, variety trials, treatment of diseases, use of proper tools &c were carried out both here and in the moffusil, principally at Nasik which is the chief grape growing country in the Presidency. The most abominable disease viz the powdery mildew (*Oidium Tuckerii*) which had been responsible for the annihilation of many vine yards at Nasik and Ahmednagar and which had made grape culture an extremely speculative concern naturally received first attention and measures were taken to combat it. Other problems were also taken up and tackled.

Propagandist work in connection with successful results was carried out in the cultivators' own fields in Nasik, Mundwa Satara and Junnar and cultivators' confidence was thus secured.

In order to take a review of all the work done so far and also to offer the details of the results in brief for the information of the members of the Board of Agriculture which met at Poona in December last the following statement was prepared. The same is now presented for the information of a wider public.

The following results have been obtained.

1. It has been proved that Grape vines can be successfully and profitably cultivated under Poona conditions.

2. Improvement of grape vine beds has been made. The cultivators' method is to have at the foot of each vine a trough 12 inches deep. The trough is filled with water at each irrigation. We make rings and give water more or less at surface level.

We economise water and reduce moisture in the atmosphere and thus indirectly check the spreading of the mildew.

3. The quantity of water required by grape vine plants in the fruiting season i. e. from October to April is measured. The total required is 306170 gallons per acre.

4. It has been found that the large cuttings or stumps of Pangaras* if planted at the outset along with young vines retard the growth of the latter. The young vines refuse to shoot upwards but remain stunted while the cutting of Pangara strikes roots and grows. Therefore it is absolutely necessary to drive in the ground, near a vine, soon after planting the later, slender stakes of wood for the vines to catch hold of, to be replaced later with thick stumps.

5. Bucko hand cultivator is used for stirring beds.

Training.

6. Training on the single stake system is more economical than training over-head or on four stake system in places where field conditions of culture prevail.

7. Training on the umbrella system has given an yield of 40 lbs of grapes per tree while one vine trained on single stake has given a minimum of 19 lbs of grapes per tree both trees of the same age.

8. It has been demonstrated in Poona, that, one grape vine 9 years old trained on the extension system on an overhead bower covering an area of about 350 sq. feet yielded 800 bunches of a total weight of about 250 lbs.

Diseases.

9. Powdery mildew (*Oidium*) can be successfully combated by 4-5 sprayings, in the year, of Bordeaux mixture three sprayings, with normal mixture, and two sprayings with half strength.

10. It costs Rs. 22-8-0 to spray one acre of vines and it saves Rs. 20 to Rs. 250 per acre which would otherwise be lost owing to the disease.

11. If the last spraying with Bordeaux of half strength is done in good time before actual harvesting of bunches, no stains—if at all a few faint ones—are left on the berries.

* (*Erythrina indica* Ed.)

The Nasik cultivators have felt no difficulty in marketing their crop. Similarly we are not confronted with any in the Ganeshkhind Gardens. If stains are found objectionable they are easily removed by just dipping the bunches and stirring them in water.

12. There is no danger from poisoning. The worst stained bunches contained an average of .007 grammes of copper in weight of bunch of 152.2 grammes. This means that in order to absorb 0.5 grammes of copper "which is the maximum amount that may with safety be absorbed daily" (vide 'spraying of plants by Lodeman page 232) the consumer could eat with impunity 25 lbs of grapes. Thus the excess of grapes would begin to trouble him earlier than any possible indications of copper poisoning. The most economically and carefully sprayed bunches of grapes (vide Ganeshkhind Garden Annual Report 1914-15) "contained 0.0014 per cent of copper or a minute trace." Considering this quantity as a basis one must eat 78 lbs of grapes before even the slightest symptom of copper.—poisoning becomes perceptible.

13. The possibility of any staining of the berries is removed by spraying once or twice with the mixture known as *Ammonium copper carbonate* mixture. This mixture is found efficacious both in Ganeshkhind Gardens and at Nasik and is offered to such cultivators as would take the trouble of preparing and spraying two mixtures in the season. The cost of *Ammonium copper carbonate* mixture is not more than that of Bordeaux.

Propagandist work.

14. The remedy against mildew has been very successfully demonstrated in tracts (Nasik) where grapes are cultivated by agriculturists. The demonstrations have been so effective that practically all the cultivators in Nasik have taken up the spraying and do it at their own cost as one of the regular routine operations in connection with grape vine cultivation.

15. Sprayers were unknown in the grape growing tracts in 1909. Now almost every cultivator has provided himself with one *Prize bucket sprayer* costing Rs. 16 and a few have bought *Knapsack* and *Autosprayer* costing Rs. 60 and Rs. 75 respectively.

The Munagala Prize Essay.

1. **A Gold Medal** (value Rs. 50) will be awarded for the best essay on the following subject :—

The disinclination of past Agricultural students to take up independent agricultural enterprise ; its causes and remedies.

2. The prize will be called "The Munagala Prize" and will be given by M. R. Ry. K. Ramasastrulu Naidu Garu, B. Sc., of the Madras Agricultural Department.

3. The competition is open to all the members of the Union, including Honorary Members and Associates.

4. The essay should not be more than 8 pages, typewritten on one side.

5. The essay should be sent in, so as to reach the President, Madras Agricultural Students' Union, not later than 30th April 1918, with a covering letter showing the full name and address. The essay itself should be subscribed *nom de plume*. Six typed copies of the essay should be sent, one for record and the other five to be sent to the judges.

6. The essays will be valued by a committee of five judges who will be selected by the Working Committee of the Union.

7. The result of the judging will be announced in the July issue of the Journal and the prize will be awarded at the Agricultural Conference in July 1918.

8. The Working Committee of the Union reserves to itself the right of publishing any of the essays in the Journal of the Union in the first instance.

9. All references to published books, reports or papers should be given as footnotes.

All members of the Union are invited to compete. For further particulars, apply to the General Secretary of the Union.

N.B.—The attention of members is drawn to the change in the wording of the subject for the Prize Essay.

(ii)

Rs. 3000 Cash in Prizes.

Two yearly Agricultural Competitions are instituted by the Delegation of THE CHILEAN NITRATE COMMITTEE, on the best essays on Indian Agriculture and original ideas how to improve it.

1st Competition.		2nd Competition.	
1st prize	Rs. 1000.	1st prize	Rs. 600.
2nd „	„ 500.	2nd „	„ 300.
3rd „	„ 250.	3rd „	„ 130.
		4th (2 prizes) „	60 each.
		5th (10 „) „	10 „

Rules.

Open to all interested in Agriculture. Two of the 3 judges to be elected by ballot. Names of competitors will not be known by the judges until all papers have been marked. Copies of prize essays and names and addresses of winners will be furnished on request. Commencing from July 1st, 1917. Closes June 1st, 1918.

Further details supplied by:—

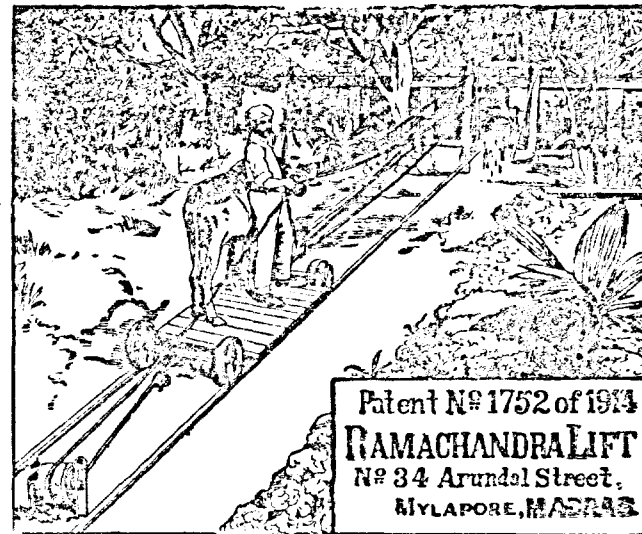
The Delegate,

Of the Chilean Nitrate Committee,

1, Royal Exchange Place.

CALCUTTA.

(iii)



RAMACHANDRA LIFT.

NOTES.

1. Sir V. C. Desikachariar's 109 full grown coconut trees, each with a watering bed of 7 feet square, are irrigated in 3 hours with one man, one buffalo and a 22 gallons bucket. (This was done before by a picottah and 4 men in 6 hours.)
2. Mr. G. Naraniah, Retired Tahsildar, irrigates 150 fruit bearing coconuts and 27 young plants with a watering bed of 6 feet square each, in 5 hours with one man, one bull and a 22 gallons bucket. (This was done before by a Kavalai, one man and two bulls in 12 hours).
3. Dr. Nanjunda Rao irrigates 2 acres of Ragi crop in 8 hours and $\frac{1}{2}$ acre of paddy in 5 hours with one man, one bull and a 22 gallons bucket.
4. The Honourable Mr. S. Srinivasa Iyengar, B. A. B. L., Advocate General certifies:—"It has been working for the last 10 months most satisfactorily."

COST

For a well up to 30 ft. in depth.

	Rs.
i. Lift to be worked by one big ox	200
ii. Lift to be worked by one ox	175
iii. Lift to be worked by one small bullock	150
iv. Lift to be worked by man	125

N. B.—(a) If a fitter is necessary, fitting charges to be paid in advance.

(b) Cost depends on the depth of the well and is subject to market fluctuations of the cost of iron and other materials.

Fertilisers for all Crops

SPECIALITIES FOR

**Paddy, Ragi, Sugarcane, Tobacco, Cotton,
Coconut, Tea, Coffee, Rubber, etc.**

Manufactured under European Expert Supervision.

(ANALYSIS GUARANTEED).

**Fertiliser Materials ground and mixed to order
or sold separately.**

BONE MEAL (Steamed and Unsteamed).

Superphosphates, Crushed Poonacs, Sulphate of Potash,
Muriate of Potash, Kainit, Basic Slag, Sulphate of
Ammonia, Saltpetre, Nitrate of Soda, Milled Fish, Fish
Guano, Blood Meal, Nitrolim, Etc.

**For Pamphlets on Manuring and quotations F. O. R.
any Station or. C. F. I. any Port in Southern India.**

APPLY TO :—

Messrs. PARRY & Co.,

MANAGING AGENTS,

The Presidency Manure Works, Ltd.,

CALICUT & MADRAS.

16. Secateurs were previously unknown. A sharp sickle called (Narkat) was used for pruning grape vines before 1909. Now almost 50 % of the pruners use secateurs.

17. Some of the agriculturists prune their vines themselves without engaging professional pruners. Use of Narkat requires greater skill than that of secateurs. Thus there is a saving to the agriculturists of the fees of the pruner which is about Rs. 4 per acre.

18. Recent enquiry made at Nasik shows that the agriculturists are buying the ingredients of Bordeaux mixture even though the prices have advanced by 150 %.

19. A spraying outfit (dress) has been devised and used.

G. B. Patwardhan.

Government Coconut farms on the West Coast.

Unlike the East Coast, the West Coast has not got many crops to fall back upon. The only food crop is paddy. The money crops are coconut, pepper and ginger. Next to paddy, by far the most important one is coconut. It is approximately estimated that in the Madras Presidency there are 794,000 acres under coconuts of which 81 per cent or 643,140 acres, are situated on the West Coast. Putting roughly a very moderate income of Rs. 30 per acre, the annual income will be over 192 lakhs of rupees. Again judging from the distance apart in which the coconuts are planted, it may be safely stated that the average number of trees per acre would be about 80. Calculating on this basis there will be over 514 lakhs of coconut trees. The difference in the yield of trees *in the same garden* due to different causes is so great that no body can ever dispute the possibility of increasing the yield per tree by 2 nuts (worth an anna). The total annual increase in the income would at this rate be 32 lakhs for the West Coast alone. Besides, the dried kernel which is commercially known as 'Copra' and exported from the West Coast has a world-wide reputation and largely commands a high price. Various articles of great economic

value such as soap, candle, butter, cheese, margarine etc., have been made from it. Coconut fibre, one of its byproducts is also of great value. It is thus evident that the coconut crop is one of great importance. The Government fully realising the great possibilities of this crop started 4 farms in Kasargod taluk, S. Kanara, last year and are spending large sums of money with the object of studying the crop from various standpoints.

In Malabar district proper typical lands along the railway line have already been filled up with coconuts whereas plenty of lands are still available in S. Kanara, and the people of the district know very little of its cultivation. Coconuts may be planted in all kinds of lands which are capable of being drained. But the typical lands worthy of being experimented upon are (1) sands (2) red loams (3) laterite. Suitable sites have been chosen accordingly.

No. 1 farm which represents the laterite soil is in Pilicode village about a mile from Cheruvathur railway station and is 15 acres in extent. No. 2 represents red loam and is situated within half a mile of Nileshwar railway station. It is 20 acres. No. 3 is in the same village about a mile off from the station. It is also 20 acres in area. Both these are on the road, which will soon be taken on to No. 1 station which is only 3 miles from No. 3. All the above are bare lands and planting has to be done a new. These have been protected after taking over with substantial fencings. In the case of 1 and 2 mud wall was found to be the cheapest and the best. They have been so protected at a cost of Rs. 340 and 312 respectively. No. 3 has been provided with ideal wire fencing. These have been suitably laid out; roads, buildings and wells made in each according to the requirements.

As it would take much time to get at the results of the manurial experiments on the above farms, a uniformly planted old garden of 25 acres was acquired within three miles from Kasargod railway station on the main coast road. (1). It was a neglected garden and not manured in recent years. (2). The soil is deep red loam quite uniform in texture and fairly level. (3). There are young and old trees fairly of

uniform age planted not too close. Thus the farm is fitted for manurial experiments. There were good many other kinds of trees in it, the coconut trees were affected and much smothered. The other trees have all been removed, the garden divided into suitable blocks, well ploughed repeatedly with monsoon plough, suitably terraced wherever necessary surface washings thus minimised, trees numbered (tree war) harvest, recorded and observed in detail and above all, the vacancies have all been filled up with excellent seedlings. The required quarters, store-shed, wells paths, and boundary walls have all been made. The results of these improvements are rapidly becoming manifest and are closely watched by the neighbouring ryots with interest. The field is thus prepared for starting manurial experiments next season.

Keeping in view the extreme importance of the selection of seed a prolonged tour was undertaken particularly in centres famous for coconut cultivation in Kurumbaranad and Calicut taluks. Gardens were first chosen and perfectly healthy trees of the middle age having excellent bearing capacities which were not subjected to abnormal manurial treatment were subsequently marked. Harvests of these in April and May were carefully taken and planted in the nursery in No. 3 station which is admirably suited for it (being perfectly free from white ants). The nuts have all germinated and the seedlings are coming up well. These will be planted out in portions of 1 to 3 stations in the ensuing season where the ground is being ploughed and kept ready.

The following problems have to be studied in detail.

1. Varieties, 2. system of planting, 3. spacing, 4. culture, 5. manures, 6. manuring, 7. their effects on the quality and quantity of copra, 8. fibre and retting. The cultural and manurial effects may vary in different stations.

Detailed enquiries and observations have been made which show that there are 4 common main good and typical varieties judging from the colour and shape of nuts. These do not entirely remain true to type in the succeeding generations probably due to cross fertilisation. They are planted deep in lands where the water level is low.

The coconut trees readily respond to heavy manuring, the most common manures applied are leaf and ashes cattle manure (in sands) fish (in recent years) salt and silt etc. The trees do not tolerate shade, they always go out in search of the sunlight and air and are immensely benefitted by them. They flourish well in well-ploughed lands free from weeds.

Even at this stage enquiries are received as to the result obtained at the coconut farms. But it must be said that the study of a perennial crop like coconut must take some time. The persons interested are invited to see the farms and note the progress made so far and to watch the further progress step by step. The work in all these farms is pushed on as expeditiously as the circumstances would permit.

M. Govindakidavu.

Extracts.

How shall farmers organise?

Farmers must feel the necessity of working together before any movement for their organization can succeed. It is true that, under the British Government, each individual has full liberty, as in political or religious faith, to do his farming and his marketing as he pleases, so long as he pays his kist to the Government. It has to be remembered that farming is business and requires apprenticeship as in any other business. Mere knowledge, mere possession of several hundreds of acres of land or mere wealth, each by itself, does not bring about successful business, while a combination of all the three makes for success. Collective business is an enterprise which our farmers require to be educated in. Thinking together and working together brings about better understanding and begets more confidence in each other.

In ordinary business co-operations, there is no effort to distribute profits to as many as possible. Great fortunes are made in them, not by the rank and file, but by the Directors, and this they do as a result of promotion, organization, consolidation and sale of securities generally,

and the wealth becomes centralized in a few financial centres, as in the United States.

In the co-operative organization of a farming business, leadership is not left to the self interests of a few, nor do the promoters get any special profits. Shares are allotted among a large number of growers with a view to present a united front in the market. Shares are made transferable only at the option of the growers, so as not to fall into the hands of the buyers. Shares may be allotted according to the acreage held by the growers and profits distributed according to the produce supplied. Large landholders must take up leadership in organization, on a democratic basis, to preserve their own interests and fulfil their obligations to the community. If they do not organize and thus obtain the economies of large scale business, it is only a question of time when they will see the profits, which they might make out of farming, made by agencies outside landholding interests--as several mirasdars of the absentee type can very well testify.

In the ordinary business organizations, stockholders do not care for what the Directors are doing, they only ask for their dividends. A Growers' organization requires a loyal membership and an intelligent participation in the work of the co-operative concern. (Abstract from Texas bulletin).
M. R. R.

News.

We notice the name of H. C. Javarayya (L. Ag. 1913) among the winners at the recent Horticultural Show at Mysore for an excellent show of vegetables from the Palace Madhu Vana Gardens, which are being worked so successfully. We offer him our congratulations.

We are glad to learn that Mr. J. R. Rang Raju is once again the recipient of medals and prizes at the Madras Horticultural Show for successful rose cultivation.

Students' Corner.

An appeal.

Arrangements are being made to open the proposed students' library in the Games Pavilion of the Students' Club and a special committee of students has been appointed to undertake the work. It is therefore requested that past students and well-wishers of the College will contribute their mite towards the library fund which will be acknowledged with thanks.

D. P. Chellam,
Honorary Secretary, Students' Club.

Social gathering.

The terminal social gathering of the students' club was held on the 14th December 1917. The students and their teachers spent an enjoyable evening in the Hostel Quadrangle when opportunity was taken to bid farewell to the outgoing students of Class IV. Refreshments, songs, comic recitations were some of the items of the function.

The Cecil Wood Tennis Cup Tournament.

The finals of the above tournament came off on Sunday the 3rd February at 4.45 P. M. when T. G. Muthuswami of Class III, the winner of the cup last year, met V. S. Viswanatha Rao of Class II. T. G. Muthuswami won the 1st set very easily and in the 2nd set Viswanatha Rao played a better game but in the end gave way, so leaving Muthuswami the winner of the cup for the second time. Mrs. MacRae kindly gave away the prizes to the winners.

Final examination of the short course.

It will begin on the 20th March and the certificates to the successful students will be given on the 27th at 5 P. M.

Debate in College Hall.

On the 18th February, there was a debate under the auspices of the Students' Club with Mr. D. Ananda Rao in the chair. Gaurisankara Ayyar of Class III opened the debate "that, in the

opinion of this House the Farm is using water as economically as possible". He gave various examples in support of his statement and he was seconded by Ayyaswami of class II. Kesavanunni Nambiar of Class III lead the opposition refuting some of the arguments put forward by the opener and Balaji Rao of Class II supported him. Ananthan, Viswam Avadinaickam, Ranganayakulu, Viswanatha Rao and others took part in the debate. In the end the proposition was put to the vote and passed by an overwhelming majority.

Departmental Notes.

Messrs: C. S. Madayya, K. T. Bandary, A. Chinnathambi Pillai, B. Shiva Rao, M. V. Vellodi, N. V. Viswanatha Ayyar, M. Veeraraghava Rao, S. Sitharama Patrudu have been confirmed in the upper division from the 1st April 1917.

Messrs: M. U. Raghavulu Nayadu, V. Ramanatha Ayyar, R. Swami Rao, K. S. Sankaram Pillai, L. Narashimachari and E. K. Nambiar have been promoted to the Upper Division from 1st February 1918.

Mr. C. V. Ramaswami Ayyar is appointed to act as Assistant in Chemistry on probation.

Mr. K. W. Chakrapani Marar to be Farm Manager, Fourth grade on probation, to join at Trichinopoly for special work under the Deputy Director of Agriculture, V and VII Circles.

Mr. S. Dharmalinga Mudaliar to be Farm Manager, Fourth grade on probation, to join at Palur for training.

Mr. R. Chokalingam Pillai, to be Farm Manager, Fourth grade on probation to join at Hagari for training.

Mr. K. Govinda Pai to be Assistant Farm Manager, on probation to join at Banthanahal Sheep Farm for training.

Mr. V. Ramachandra Ayyar to be Assistant Farm Manager on probation to join at Nandyal for training.

Mr. K. Sitharamayya to be Assistant Farm Manager on probation to join at Koilpatti for training.

Messrs: Kuppaswami Ayyangar, Govinda Pai and Ramachandra Ayyar are qualified for promotion to the Upper Division and may receive the same in due course as vacancies occur if their work justifies their promotion.

Mr. Sitharama Patrudu, Agricultural Demonstrator, Bellary, is granted privilege leave for 18 days from 15th January 1918.

Privilege leave for three months granted to Mr. S. R. Venkatakrishna Mudaliar, Assistant in Mycology is cancelled.

Mr. K. T. Bhandary, Agricultural Demonstrator, Mangalore is granted privilege leave for three weeks from the date of relief.

Privilege leave for one month granted to Mr. K. Cheriyan Jacob is extended by 14 days.

Mr. B. Viswanath, Assistant in Chemistry, is granted privilege leave for five weeks from or after the 21st instant.

Mr. S. Vedantham Ayyangar, a diplomate of the Agricultural College, is appointed to act on Rs. 75 per mensem vice Mr. Viswanath.

Mr. K. Ramanatha Ayyar, Assistant Farm Manager, Central Farm, has been granted privilege leave for 2½ months in continuation of Easter holidays.

Mr. N. Yegnanarayana Sastri, Supervisor, Pumping and Boring Section, is granted privilege leave for 3 months from 5th February 1918.

Important Notices.

Some of the copies of the January issues sent by V. P. P. have been returned. From past experience we know that these are often returned by mistake, especially if the subscriber happens to be away from the station. We are sending these out once again and hope that they will be accepted.

Members are reminded that all proposals for change of the rules of the Union should be communicated to the General Secretary before the 31st May 1918.

The Farm Managers are requested to send in their proposals for discussion in the Farm Managers' Conference to be held in July next to the address of the Farm Manager, Central Farm, Coimbatore, the Secretary of the above conference.

THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. VI.

March 1918.

No. 3.

Editorial Notes.

We commend to the earnest attention of our readers the speech given by our Director of Agriculture, at the recent Convocation at Coimbatore. That the ryot knows a good deal about his own business; and that, to influence him successfully, one has to approach him more as a friend and fellow-worker rather than as a "Theoretical Teacher," and, we might add, as an official; these are not always fully appreciated by the young enthusiasts going out of the college. Mr. Stuart's advice to the Junior men of the Department 'to sit at the feet of his Seniors' and learn the art of approaching the ryot—an art which the latter have come to learn after years of experience—is given, we understand, none too soon. And above all, we hope, that his declaration, that the ryot behind the plough is the real paymaster of the whole staff of this Department will sink deep into the hearts of all of us.

The Convocation Speech.

The Principal in opening the Convocation said :—

Mr. Stuart, Ladies and Gentlemen,

The present occasion marks a fresh step in the evolution of the college as it is the first time, when the new Diplomas for which 3½ years are needed instead of 3, are to be presented. The result of this departure may be called good. The number of students for the advanced course was kept down and this secured a better average in the quality of the students as is seen from the fact that, in the examination last December, all the candidates were considered fit to receive the Diploma. I hope, however, that the present third year will not take it amiss if I warn them that this is not to be taken as a precedent. The classification of the Diploma was also a new step and one first class was awarded. That this takes some getting may be seen from the scheme laid down in the Calendar, needing first class in 5 out of 7 subjects. We congratulate the winner, C. V. Ramaswami Ayyar, not only for this, but for carrying off the two college prizes.—The Robertson and the Keess'.

I regret that, for various reasons, partly my own remissness, it has not been possible for all these recipients to attend in person to obtain their Diplomas from the hands of the Director of Agriculture. It is an open question indeed whether the Diploma or even the Certificates should be given now at all. It has been suggested that Convocation and College Day might be roped into one. There are advantages but I think a college of this importance should not be content with a single day. It is big enough to run to two. It would be hard to postpone the certificates. We shall, however, be guided by circumstances.

Another change in the programme has been in the Mycology examination which has just been held. The subject is confined to a single term and it was thought it would not be an undue concession to the class to have the examination then and get it over.

Now for the short course which has just come to an end. It can only, I submit, be classed as extremely successful. It is possible this year, owing to the codification of the examination, to compare them

directly with last year's class. They are undeniably a better lot all round. I know of no reasons save themselves. I have been able to afford myself the pleasure of writing good character certificates for a great portion of the afternoon, and I can assure those, who are apt to think of a Principal as a hard-hearted slaughterer of innocents, that that pleasure is considerable, just as the writing of a bad character is unpleasant. The standard has been slightly raised from last year, which is after all a desirable thing, and one to be kept always in view, though, from what I have seen and am told, it will not be easy to maintain this standard for the coming year. There are one or two other things in the past year to which I must allude.

Five joined the India Defence Force from the college and I think we have reason to be proud of them. We have had an excellent example amongst the staff, but the students had after all more to lose as they were called up from January to April. I must also explain the presence on the table of this cup which I have had put there as a reminder of our victory in the Coimbatore Hockey Tournament last year. We owe much to Mr. Parnell and the other stalwart, Mr. Vittal Rao who both helped us to victory, not we, hope, for the last time. We have been most fortunate in again keeping the estate free of plague. The regulations have in the majority of cases been honourably observed, often at considerable inconvenience. I think the estate owes a good deal to its Sanitary Inspector.

Among the other presentations, I shall ask the Director of Agriculture to make, is the Parlakimidi Cup again won by S. Dharmalinga Mudaliar. It is for the best all round sportsman, and I could wish for no better student to win it. I am glad to see he is here in person to receive it.

We have been unable to get the College coats for this year's class, so we have had to go into khaki. That even was obtained with some difficulty but we now hold enough for some time.

It is probable that Mr. Narayana Ayyar will no longer be warden when you return and I should recommend you all, especially those who

are leaving, to thank him for the voluntary work he has done for you all. I am not going to read you a lecture on the benefits of discipline. You will learn them for yourselves. I have done. I will only ask Mr. Stuart to distribute the various medals and prizes."

Before presenting the Diplomas, the Director presented the gold medal awarded at the Industrial Exhibition to the Chemical section and the silver medal awarded to the Dairy and made felicitous references to the staffs concerned. Messrs: M. R. Ramaswami Sivan and R. C. Wood received the medals on behalf of their sections. The Director of Agriculture then addressed the students as follows:—

"A few days ago I had the pleasure of giving two lectures to the second year class about our system of land revenue and other matters connected with it, and I propose to take this as the text of my discourse to-day. In the first place the fact that I was, for the time being, identified with the teaching staff of this college made me realise very clearly what a privilege it is to be allowed to take a part in the education of the youth of this country. And I am sure that the members of the staff here, however weary they may sometimes become of repeating the same lessons to ever changing classes, must feel that they are engaged in a noble task the result of which amply repays them for the time and trouble they so ungrudgingly spend. To hand down the torch of learning to the younger generation who follow after us must always be a work which is well worth while. The immediate reward of the staff is seen to day when they are so justly entitled to our hearty congratulations on the very excellent results of the examinations. In the Diploma examination all candidates succeeded, and in the Certificate examination 32 passed out of 34 who appeared.

These are results which are easily recorded in the history of the College but the real reward of the staff will come in, after years, when they see this Presidency covered with a network of agricultural stations and endowed with an organised army of research workers and demonstrators steadily leading the Agricultural population along the paths of prosperity.

To the students who have been successful, and some of whom will now be coming into the ranks of the Agricultural Department, I have only to say what I have often said before. In the first place, do not think that your training here has taught you everything about Indian Agriculture and that you are therefore fit to go to a ryot in the field and teach him his business. I am afraid, that somewhat exaggerated ideas regarding the depth of the education imparted in the two year's course are held by some students, at least judging by the case of one, whom I heard of, as having informed a possible employer that he had undergone courses in Agricultural Chemistry, Botany, Mycology, Entomology, etc., etc., in addition to the practical course in Agriculture.

You will find, when you go out to the fields, that the ryot knows a good bit about his own business. His reasons for what he does may not be scientifically correct, but he has the habit of obtaining the right results in spite of it all. Still at the same time his methods are often capable of improvement. But to get him to realise this and take advice is not so easy as you might think. You must begin by studying carefully local crops and local methods of cultivation in the tract where you are employed, and you must get to know the ryots, so that they come to regard you as a friend and fellow worker rather than as a theoretical teacher. You will find that our senior men have learned the art of this; and it will be your first duty to sit at the feet of these men and learn their methods so that the knowledge and training that you have acquired here may be put to good use. Do not forget that an educated man must be learning all his life, and do not lose any opportunity of learning from the senior men in the Agricultural Department.

In the second place, I must repeat the old story of your duties to the ryots. I am not afraid of repeating it, as it is a matter which cannot be too clearly borne in mind by all of you. In my lectures to which I referred just now, I concluded by explaining briefly the functions of the Government of this country with reference to the collection and disbursement of the revenue. We sometimes hear amateur economists and reformers in this country advocating in the same

breath increased Government expenditure and the reduction of taxation, apparently oblivious of the fact that they are talking in contradictions.

I hope that you all realise that the money that the Government have spent on your education here and the pay that some of you will hereafter receive do not come out of a mysterious bottomless chest in Madras, but comes from the money collected from the people in the form of land revenue and taxes. And it is the ryot behind the plough who provides a very large share of this. It is to him that you owe your education and your subsequent careers, and you should never forget it; always do your utmost to repay that debt. This you can best do by devoting your lives to improving Madras Agriculture whether as members of the Madras Agricultural Department or as private farmers whose example will be copied by your neighbours.

In conclusion I wish you all a pleasant vacation."

Interesting Boreholes.

Thambikottai is a village situated in the Coconut belt region of the Tanjore District lying within a few miles of the sea coast. Between the line of the coconut topes which abound here and the sea, there lies a fringe of salt marsh subject to inundation in the rainy season and to a certain extent at high tide time. The village belongs to "Chatram Charities", founded by one of the Tanjore kings and now managed by the Government, the Collector of the District being the ex-officio president. In the year 1915, the president of the charities wanted to reclaim this marshy tract which extends to over hundreds of acres. Water is naturally the first desideratum in such a project. Surface springs in this locality are saline and generally of a very limited capacity. The president therefore decided to prospect for underground water. A hand boring set was accordingly sent to the place and a site was selected in the salt marsh close to the exterior line of the coconut gardens. The strata passed through during the first 50 or 60 consisted of fine loam with a good percentage of saline matter. Below

these loamy top soils, marls and coloured clays were met. Some of the samples obtained were indeed so fine that they were considered to be fit to be sent to the Madras Exhibition as samples of indigenous ochres. At some depth below these clayey strata, a thin layer of fine sand containing a rather poor supply of fresh water was found. It was decided to cover this over as its yield was considered to be of no practical value especially for the reason that it was situated at a comparatively shallow depth from the ground surface. The boring was continued amidst many mishaps which now continued to occur. These mishaps were due in the first instance to the great resistance offered to the sinking of pipes by the fine sandy loamy layers at top and secondly to the tough clays which used to clog the augur. The first bore hole which was sunk at this place was abandoned as all attempts to recover a broken augur from the bottom of the borehole proved futile. The Department was, as usual, wary and demanded the cost of the lining pipes for the whole depth in advance from the party and thus made him bear the whole risk. The risk as stated above lay chiefly in two directions. Either a tool might get broken at that great depth choking up the borehole and preventing thereby further progress or any joint in the lining pipes might give way and one cannot always be sure of recovering a disconnected section of pipes if the accident occurs below a thick intervening loamy stratum. The Department uses only 4" diameter pipe and the joints of these have been found to be of inadequate strength in certain situations. In the case of the Thambikottai bore hole, the ingenuity and practical skill of the masonry were more than once put to the test in fishing out detached sections of piping from considerable depths of the borehole. The worry due to the constant failure of the joints was indeed so great that work had to be stopped for weeks sometimes, expecting the arrival of fresh pipes with newly screwed couplings. The accidents that are almost inevitable in the case of such boreholes are not only a source of anxiety to those in charge of the boring operations but tend to enhance the bill of charges for sinking the borehole. In the present case, the expenditure incurred on the borehole on all accounts, excepting the value of pipes, amounted to nearly Rs. 400. A ryot of ordinary means and not of much enterprising spirit would have looked aghast at the bill and

would have probably stopped the work. The Collector, however, wanted to try the issues to the last. At a depth of 175' another sandy layer was struck. The sand was very fine and on account of its fineness it would rise up the tube and fill it to a height of 10' to 15'. The layer supported, however, only a saline spring to the great dismay of all concerned. The results of six months' costly and laborious prospecting had therefore been so far not in the least encouraging. The work was continued though with great diffidence on the part of the departmental officers as nobody could expect under such circumstances to light on a fresh water spring in the neighbouring strata. The report of the maistry which was sent a few weeks afterwards to the effect that a fresh water spring was struck at a depth of 182' from ground level was therefore received with great though pleasant surprise. The spring was moreover an artesian spring and overflowed $\frac{1}{2}$ " above top of pipe which projected 6" above ground level. The discharge was not much. It was about three gallons per minute. The static height i. e. the maximum height to which water raises and stands in a pipe introduced in continuation of the bore hole vertically upwards was measured and found to be only 4' 5". The artesian spring was therefore considered to be of no economic value as such and to be of use only as a possibly subartesian spring. No rules have been framed by the Department so far to show the relation that exists between the static head and the available supply from borehole. But the general fact is appreciated that as the depth at which water is pumped from the borehole is increased, the continuous supply that may be drawn from the borehole would also increase. Mr. Chatterton designed some ¹⁰ years ago a pump which he called the borehole test pump for testing the supply of water from boreholes. It is of the plunger type with a flap valve at the bottom of the suction pipe. The supply from the Thambikottai borehole was tested with this pump and the steady supplies at depths, 10½', 13½' and 16½' from ground level were gauged to be 2 gallons, 3 gallons and 10½ gallons per min. respectively. The values cannot be taken to be very accurate, for in the first instance the pump does not admit of a very accurate test to be made and secondly the rate of supply will obviously vary with the speed at which the pump is worked. But the figures given above enable one to have a rough idea of the capacity of

the borehole. The President of the charities was advised to construct a reservoir well 20 to 25' in diam. and 30' in depth and have its sides and floor paved so as to cut off all inflow from the surrounding saline strata, the well serving only to collect and store the outflow from the borehole. The history of the borehole sketched above is instructive. It shows that the sinuosity of the subterranean water courses at shallow depths up to 200' both in the vertical and horizontal planes is generally so great that it is well nigh impossible to predict the existence of water bearing strata and their depths in deltaic and alluvial tracts. The Boring Engineer's work under these conditions is therefore one which may be said to be 'groping in the dark.' But when once a water bearing stratum has been localised and the supply from it made available, the Engineer should be in a position to gauge the strength of the current and of its irrigational value. The conclusions which he may arrive at, should not, however, be founded on empirical grounds but should have the substratum of practical and scientific tests. The question of borehole yields is of great importance to the ryot of Southern India which appears to be rather poor in underground water supply at shallow depths. There are cases in which ryots have invested considerable sums of money on pumping installations and have tasted the bitter experience of the results of a faulty judgment of the supply from a borehole. The question of borehole yields will be discussed in the next article.

H. Venkataramanah.

Cultivation of the Rain tree for green leaves.

In South Arcot District the ryots find it very difficult to procure sufficient quantity of green leaves for their paddy fields as the wet area is increasing year after year and the supply of leaves from forest is getting poorer and dearer. An intelligent and enthusiastic ryot, by name Annamalai Pillai, of Nekkunam in Tirukoilur taluq has overcome this difficulty by planting rain trees in his backyard and waste lands for the purpose of ensuring a permanent supply of green leaves

for his wet lands. Such waste lands are very commonly seen in wet-land tracts of this district and so this may be of interest to owners of such plots.

The rain tree seed bed is raised in the months of December—January. When the seedlings are about 2 months old, they are planted out in pits made with mamutty 8 ft. apart in rows each way. Thus in about 50 cents of land 300 seedlings are planted. During the first year the plants are handwatered and every care is taken to keep the field clean and the soil round the plants is kept loose and friable. At the end of the first year, side branches, if there be any, are lopped down and the plants are allowed to grow straight. By the end of the third year they grow to a height of about 6 to 7 feet when the plants receive a severe pruning at the paddy season. During the first year the quantity of leaves obtained is of course not so much as in subsequent years. After the pruning, the trees put forth new shoots and branches. Eight trees yield about a cartload of leaves per year and 6 cartloads of these are quite enough for manuring an acre. So the income from 300 trees or from 50 cents of land is estimated at 37 cartloads of leaves or sufficient leaves to manure nearly 5 acres of wetland.

It will be clear from the above that the novel practice above described provides the ryots with a sure and permanent supply of green leaves for their wet lands. Calculating at the local rates paid for green leaves i.e., Rs. 1—3—0 per cart load the yield obtained from an acre of dry land works out at Rs. 112—8—0. The practice therefore needs adoption in other tracts where there are similar facilities.

C. Arulanandam Pillai.

Tobacco curing in Papanaikenpalayam.

Tobacco curing requires a good amount of skill and experience. The method followed varies in different places and, it being a laborious and purely technical affair, the ordinary tobacco grower

does not usually take the trouble of curing his tobacco, but sells the crop to professional men whose only business is curing tobacco. This village is a place where a number of such experts live who buy tobacco, cure them and sell them as cured tobacco getting a small profit for themselves.

The process of curing is quite interesting, though simple. When the plants are ripe enough, which is generally recognised by the appearance of a few yellow spots on the lower leaves, they are cut close to the ground early in the morning and left in the field exposed to the sun and dew for three consecutive days. On the 3rd day, very early in the morning, the leaves are carted to the curing ground. They are bulked up here, in circular pits 6 cubits in diameter and 4½ cubits deep, in a particular way facilitating easy removal afterwards. Sometimes the heaping goes on in the pit up to 12 feet above the ground level. A pit of this type generally holds about 40 to 50 cartloads of leaves (400 mds of cured leaves). The sides of the pit are generally protected with thick layers of cumbu straw. If the tobacco leaves brought in one day are enough to fill a pit, the pit is covered immediately after filling in with leaves, but in any case, when the heaping is once begun the covering should be finished before the third day. The covering is done with a layer of green Ipomea leaves plastered over with clay. The fermentation of the leaves inside the pits is allowed to go on from 12 to 15 days, for the fermentation depends upon the ripeness of the leaves i.e., if the leaves are tender they are removed earlier and the whole thing is a question of experience. When the fermentation is over, the heap is disturbed and the leaves removed from the pit. Each plant is taken separately, cut vertically into two halves by special knives and then each half is again cut into pieces horizontally, each piece containing two leaves. These pieces are then stitched into bundles, each bundle containing 20 such pieces. The bundles are hung up the next day early morning on a horizontal pole with the stalks pressed

close to each other and allowed to dry for 3 or 4 days until the mid ribs of the leaves become hard and dry; rain is supposed to be harmful during this drying process and they are protected.

After drying, these bundles are removed to a closed shed where they are heaped in a circle with a hollow (about 1½' in diameter) in the middle to facilitate rolling up later. Every morning the heap is removed and then reheaped in the same way for about 6 days, after which time the bundles are arranged in a rectangular form with ends coming in alternate layers. This daily heaping and removing goes on again for another 10 to 15 days. After this, the heap is disturbed twice at 2 days' interval, twice at 3 days' interval, twice at 4 days' interval and so on until the 45th day when the heaps are examined. If there is still any warmth inside the heap it means the fermentation is not complete and the heaping and reheaping goes on until no trace of warmth is found inside the heap.

When the curing is complete, the leaves are placed in a mat in two parallel layers with the butt ends away from each other and bundled very tight with coir ropes, each such bundle containing 4 mds. of leaves. These bundles keep for any length of time and about 100 such bundles are got from a pit, each bundle costing Rs. 19 to Rs. 20.

The expenses for the curing, as given by the curer, are about 4 annas a maund.

There are some disadvantages in the above method of curing. The leaves at the sides of the pit are not of so good a quality as those in the centre and hence fetch less; but the loss is not very much. Then, by not being able to ascertain the correct amount of fermentation needed in the pits, the covered leaves may go down a little in quality and hence also in value.

K. L. Ramakrishna Rao,
Student, Class I.

(i)

Rs. 3000 Cash in Prizes.

Two yearly Agricultural Competitions are instituted by the Delegation of THE CHILEAN NITRATE COMMITTEE, on the best essays on Indian Agriculture and original ideas how to improve it.

1st Competition.

1st prize	Rs. 1000.
2nd „	„ 500.
3rd „	„ 250.

2nd Competition.

1st prize	Rs. 600.
2nd „	„ 300.
3rd „	„ 130.
4th (2 prizes)	„ 60 each.
5th (10 „)	„ 10 „

Rules.

Open to all interested in Agriculture. Two of the 3 judges to be elected by ballot. Names of competitors will not be known by the judges until all papers have been marked. Copies of prize essays and names and addresses of winners will be furnished on request. Commencing from July 1st, 1917. Closes June 1st, 1918.

Further details supplied by:—

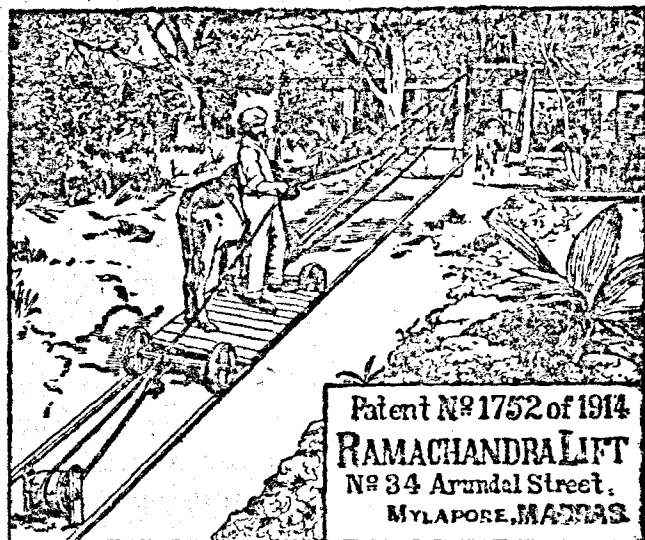
The Delegate,

Of the Chilean Nitrate Committee,

1, Royal Exchange Place.

CALCUTTA.

(ii)



RAMACHANDRA LIFT.

NOTES.

1. Sir V. C. Desikachariar's 109 full grown coconut trees each with a watering bed of 7 feet square, are irrigated in 3 hours with one man, one buffalo and a 22 gallons bucket. (This was done before by a picottah and 4 men in 6 hours.)
2. Mr. G. Naraniah, Retired Tahsildar, irrigates 159 fruit bearing coconuts and 27 young plants with a watering bed of 6 feet square each, in 5 hours with one man, one bull and a 22 gallons bucket. (This was done before by a Kavalai, one man and two bulls in 12 hours).
3. Dr. Nanjunda Rao irrigates 2 acres of Ragi crop in 8 hours and $\frac{1}{2}$ acre of paddy in 5 hours with one man, one bull and a 22 gallons bucket.
4. The Honourable Mr. S. Srinivasa Iyengar, B. A. B. L., Advocate General certifies:—"It has been working for the last 10 months most satisfactorily."

COST.

For a well up to 30 ft. in depth.

	Rs.
i. Lift to be worked by one big ox	200
ii. Lift to be worked by one ox	175
iii. Lift to be worked by one small bullock	150
iv. Lift to be worked by man	125

N. B.—(a) If a fitter is necessary, fitting charges to be paid in advance.

(b) Cost depends on the depth of the well and is subject to market fluctuations of the cost of iron and other materials.

(iii)

Fertilisers for all Crops

SPECIALITIES FOR

Paddy, Ragi, Sugarcane, Tobacco, Cotton,
Coconut, Tea, Coffee, Rubber, etc.

Manufactured under European Expert Supervision.

(ANALYSIS GUARANTEED).

Fertiliser Materials ground and mixed to order
or sold separately.

BONE MEAL (Steamed and Unsteamed).

Superphosphates, Crushed Poonacs, Sulphate of Potash,
Muriate of Potash, Kainit, Basic Slag, Sulphate of
Ammonia, Saltpetre, Nitrate of Soda, Milled Fish, Fish
Guano, Blood Meal, Nitrolim, Etc.

For Pamphlets on Manuring and quotations F. O. R.
any Station or. C. F. I. any Port in Southern India.

APPLY TO:—

Messrs. PARRY & Co.,

MANAGING AGENTS,

The Presidency Manure Works, Ltd.,

CALICUT & MADRAS.

Advertisement Rates.

This Journal is an excellent medium for advertising Agricultural and kindred subjects (Agricultural machinery, manures, seeds, plants, books etc.). The following is the schedule of rates:—

	Single insertion.	per annum.
	Rs.	Rs.
For full page ...	5	20
For half page ...	3	12
For quarter page ...	2	8

The rates of Advertisements of Trade, other than Agricultural subjects, will be one and a half times the above. Preparation of blocks, unless supplied by firms, extra.

N.B.—All advertisements are subject to the approval of the M. A. S. U. Working Committee before insertion, and the charges are payable in advance.

All business communications should be addressed to:—

The Manager, M. A. S. U. Journal,
Agricultural College, Lawley Road, P. O., Coimbatore.

SHOW GARDEN ** PLANTS AND SEEDS

Different kinds of Grafted Mango Plants 3 years old from Rs. 8 to 12
Different sorts of Grafted Fruit trees such as Guavas, Pomegranates, Oranges, Limes, etc., from Rs. 8 to 12. Varieties of English Vegetable Seeds in 20 packets Rs. 3-8-0. Varieties of English Flower Seeds in 20 packets Rs. 3-8-0. Varieties of Indian Vegetable Seeds in 20 packets Rs. 2-8-0.

Apply for the English and Tamil illustrated Catalogue.

S. K. I. Abdur Rahiman Sahib,
Nursery and Seedsman, **SALEM.**

WANTED.

A trained Agricultural teacher for Headmaster's place in Panagauti Agricultural Institute, Panagallu, near Kalahasti Railway Station, Kalahasti. Pay Rs. 50-5-100.

Apply with certificates etc., to the Manager, Panagallu Agricultural Institute, Kalahasti.

Demonstration Day on the Koilpatti Farm (30th March 1918).

The Koilpatti Farm was very busy on the 25th morning. From morning till noon ryots were gathering from different villages. At 3-30 P. M., after the arrival of the Mail train from the north, the number of ryots collected in the farm yard was nearly 400. Ryots from all the five departmental circles were well represented, the majority of the ryots being from the Koilpatti circle.

At 3-30 P. M. the Demonstrator and the Farm Staff with 400 ryots moved to the black soil where the working of all the improved implements (Disc plough, monsoon plough, Bhagar and Buck Scraper) were demonstrated. At the entrance, in Field No. 30, where the single plant selections and field plots were, the Agricultural Demonstrator VI Circle, explained to the ryots, in a few words, how the selections were being made and pointed out to them, how many years it would take for a particular type to be put into the market. The histories of Company No. 2 and Company No. 3 were also explained after which the crowd dispersed in batches headed by the Demonstrator or one of the Farm Staff who explained to the ryots the working of the implements and their uses.

The ryots were quite struck with the neatness with which the farm is maintained and with the good and promising crops of cotton—the effect of proper and timely after-cultivation. Of the implements that were worked—Disc plough, Monsoon plough and Buck Scraper attracted the attention of most of the ryots present. The cost of the Disc plough being very prohibitive, especially now on account of the War, several ryots have applied for a loan of the implement.

According to the programme, only half-an-hour was allotted to this item, but nearly two hours were spent—so enthusiastic were the ryots.

On returning to the red soil block, the ryots were seated in the store room and informal lectures on the following subjects were delivered.—

1. The advantages of growing Company cotton and ginning the same co-operatively, by Mr. K. Gopalakrishna Raju, Farm Manager, Koilpatti.

2. Uses of Fish-Guano as manure in garden and wet lands, by Mr. T. S. Venkatarama Ayyar, Assistant Agricultural Demonstrator, Kadambur.*

3. Boring and Dynamiting, by one of the mechanics of the Pumping and Boring Section.

All these were supplemented by remarks from of the Agricultural Demonstrator, VI Circle

The Tahsildar, Koilpatti, who takes a lot of interest in our work, presided over the meeting and, in a neat little speech, pointed out to the ryots the good that is being done by the Agricultural Department and exhorted them to follow the methods suggested by the officers of the Department.

At about 9 P. M. the ryots and visitors were entertained with farces enacted by the farm coolies and ably conducted by the Farm Staff. Before and during the enactment of the farces, subscriptions were collected from the ryots *in aid of the War Fund*.

A Brahmin Catering Agent was in attendance throughout the day and promptly attended to the needs of the ryots and visitors.

On the whole, the Demonstration day was a complete success which is very largely due to the arrangements made for, and entertainment given to the ryots by the energetic Farm Manager and his Colleagues.

N. S. Kulandai.

Ploughing competition at the Central Farm, Coimbatore.

There was a ploughing competition at the Central Farm, Coimbatore, on 8th March 1918. An entrance fee of 2 annas was levied and there were on the whole 26 entries,—20 from amongst the Farm Coolies and 6 from outside.

After a preliminary selection 8 Farm Coolies and 3 outsiders came up for the final competition. The following points were considered in judging :—

Thoroughness	...	15	marks.
Speed	...	10	„
Ends	...	5	„
Straightness	...	5	„
		Total	35 „

Below are given the list of prize winners.

Peria Goundan of the Central Farm—1st prize—one Monsoon plough.

Lakshmana Goundan of the Central Farm 2nd prize—one turban worth Rs. 6—11—0.

Of the outside men, Ranganna Goundan of Vellaikinar got the 1st prize—one turban worth Rs. 6—11—0.

Field No. 15-A was selected for the competition and Peria Goundan the 1st prizeman did 18 cents in 1 hour and 30 minutes.

Extracts.

Perennial rice.

The perennial rice in flower now at the Government Stock Garden, Peredeniya, was discovered by Paul Ammann in the

Richard Toll region in North Senegal. It differs from all other rice in that it has rhizomes and multiplies very much like our Mana grass. It is stated that the rice is considered so superior that the natives exchange one calabash of it for three of imported rice. The rice was found to grow on light soil rich in potash and nitrogen but poor in phosphoric acid and lime. The soils also contain about 0.1% of sodium chloride, so that it is thought probable that this rice would be suitable for saline soils. The results here appear to confirm the experiments in Queensland where the rice is recommended as a good forage crop but as being very poor in the yield of grain. The green stalks on analysis are recorded as containing about 3% proteins 50% carbohydrates 25% crude fibre and 0.75% fat.—W. R. Chari. (*From the Tropical Agriulturist*).

The cause of unfruitfulness in Mangoes.

Pope in his paper on "The Pollination of the Mango". (Bull. 542 U. S. Department of Agriculture) records his investigation made with the definite object of determining the cause or causes of mango sterility.

The common seedling mangoes of Tropical America are very heavy yielders but such choice introduced varieties as the Mulgoba, fruit very sparsely, a good crop of the Mulgoba variety is got only once in four years. Indian and West Indian writers suggest defective pollination as the cause of unfruitfulness.

This investigator after a very thorough study comes to the conclusion that this difficulty is not due to any morphological defects in the pollen or to defects in the mechanism of pollination. A lack of pollinating insects and loss of pollen through extensive rains may, at times, have an injurious effect, but from observations carried out extensively through several seasons the conclusion reached is, that the problem is a physiological one, connected principally, with soil moisture, and in a somewhat lesser degree, food supply. If the ground is loose and continuously moist, the

mango rarely flowers, while in districts, with a well defined dry season corresponding to the normal flowering season, flowers are produced abundantly.

It is noted that the Sandersha and the Julie of the grafted varieties and No. II race among the seedlings are less injuriously affected by a wet soil. The Mulgoba and numerous other varieties fail to flower until the wet weather is followed by about a fortnight of dry sunny weather. Fruit-buds in the Mango are not formed, as in temperate fruits, a long time in advance of the flowering season. If the soil can be thoroughly dried a few weeks prior to the flowering season or the growth checked by root pruning, ringing etc., then formation of fruit-buds can be encouraged. It will be thus seen that the investigator explains mango sterility as due to climatic conditions which appear to favour vegetative growth and not reproductive growth.

This conclusion is not by any means a new idea but it is important to note that it has been arrived at after attacking the problem of mango sterility from several points of view.—W. R. Chari. (*From the Tropical Agriulturists*).

Students' Corner.

On the 26th March 1918 the Students' Club held the Annual Social gathering in the quadrangle of the hostel. It was an enjoyable function and the following verses were composed for the occasion by K. E. Viswam.

1. 'From days when' Adam delved and Eve Span
Earth was cultivated by man
2. From rice for table and cotton cloth
He grew his every need—and never was loth

3. As more and more his wants do grow
Of specialisation he comes to know.
4. As ages roll, countries begin to lead,
When from ignorance by sciences are freed.
5. Science in cropping, sounds it well
So from America rings now the bell.
6. India too though in century twenty
Thinks it her duty to bring her land plenty.
7. So the College arose in Saidapet's Hall
When over it Robertson was first the Principal.
8. As soils were not sure and complete,
Coimbatore in excellence began to compete.
9. College and Research buildings reached completion
In 1909 with second Principal Shepperson.
10. Reorganisation in 1914 came instead
With Principal Wood to do us good,
11. Over field and Farm our head—is Stuart bright
Our Province through—the beacon light.

Correspondence.

To the Editor.

SIR,

In reading the report of the work of the Managanellore Farm, the following few lines occur among the first few sentences "There was practically no rain until the end of June and thus the paddy lands had well cracked and were quite dry when water was received in the channels." This condition of the land is generally known in the Tanjore District as "*Veppal*." There will be *Veppal* if there

is no rain in the months of Chitharai and Vygasi (15th April to 15th June) or only a little rain. It is the prevailing opinion, that, when there is *Veppal*, the land wants little tilling and little manuring and the produce will be plentiful. They say, that, even when there is enough rain to spoil this *Veppal*, if planting operations are begun immediately, by letting in water and the land not allowed to dry there is nothing to be feared. When the land is allowed to dry for want of seasonal water the revers happens.

Have any of your numerous readers devoted a little time, made necessary enquiries and observations in other districts and discussed the question in detail bringing forward the scientific explanation on the point? If the *Veppal* is spoiled by want of seasonal water, is there any chance of getting a bountiful harvest say, by raising a green manure crop, or by supplying manures (farm yard or artificial) or any other means? This is a question affecting the whole of the Tanjore District and is worth the trouble of enquiry and experiment.

S. Venkatatama Ayyer,
Mechanical Engineer.

Notes and News.

The College Convocation came off on the 26th March 1918.

During the latter half of March there was an outbreak of Rinderpest on the Central Farm and great anxiety prevailed. The anti-rinderpest serum was obtained after a series of telegrams and all the cattle were inoculated.

The cotton commission arrived at Coimbatore on the 13th March and stayed till the 17th inclusive. The evidence was taken in the big lecture Hall at the College and Messrs: H. C. Sampson, T. V. Ramakrishna Ayyar, F. R. Parnell, R. C. Wood and Dr. Barber were amongst the witnesses examined.

We understand that a new engine is going to be installed at the College Dairy and another, loaned from the Department of Industries, is being installed in the well near the brickfields.

There was a Ploughing competition at the Central Farm on 8th March 1918 and a Demonstration day at Koilpatti on the 25th March.

We understand that, of the students who recently passed out five have joined the *India Defence Force*. They are Messrs. M. Ramachandra Nayudu, P. Janakiramayyar, K. E. Visvam Ayyar, V. S. Viswanatha Rao, and C. S. Namasivaayam Pillai.

Mr. R. C. Wood left for Simla on the 5th April to attend the fruit and Jarm confereuce.

The working committee submits the following changes in the Rules of the Union.

The revision of rules:—

(a) Proposed by Mr. T. S. Venkataraman “That in view of our having received substantial financial help from non-members and with the object of enlisting the sympathy and increasing the number of subscribers from the land holding and cultivating classes the name of the journal be changed to “*The South Indian Farmer*”, keeping it at the same time the organ of the Madras Agricultural Students’ Union.

Seconded by Mr. M. R. Ramaswami Sivan and carried unanimously.

(b) Proposed by Mr. M. R. Ramaswami Sivan and seconded by Mr. K. Raghavachari:—Add to Rule No. 6 “But this shall not apply to students undergoing special courses.”

Carried unanimously.

(c) Proposed by Mr. M. R. Ramaswami Sivan.—Rule 11, line 6, Instead of ‘by all student members’, read ‘By all members, except-

ing the present students’”. Seconded by Mr. K. Krishnamurti Rao and carried unanimously.

(d) Proposed by Mr. T. S. Venkataraman, that the Rule 12 be changed as follows:—

“That the Resident Vice-President, and the seven resident members of council shall form a working committee, with four student members, one from each class, elected by the student members. The working committee so formed shall appoint an Assistant Secretary from the student members of the committee, and a Sub-Editor and Manager from amongst the rest.

Seconded by Mr. K. T. Alwa, and carried Unanimously.

(e) In Rule 16. Proposed by Mr. K. Ramiah.—Instead of “list of addresses of old students, read ‘list of members’” seconded by Mr. T. S. Venkataraman, and carried uananimously.

(f) Proposed by Mr. M. R. Ramaswami Sivan and Carried unanimously.

“The finances of the Union shall consist of *The Permanent Fund, College Day Account and Journal Account*.

The Permanent Fund shall consist of donotions from Honorary Member's and Life subscriptions from Patrons and benefactors, First class and ordinary members and associates and shall be utilised for awarding scholarships, on loan system, to students undergoing training in advanced agricultural courses, meeting charges of a permanent nature and for making temporary advances to College Day and Journal accounts.

The College Day Fund shall consist of donations and entrance fees for sports collected on the occasion of the College Day and shall be devoted to meeting the charges consequent on the celebration of the College Day, the running of sports, the holding of the Conference and the meeting of the past and present students.

The Journal Fund shall consist of subscriptions for the journal and advertisement charges and shall be utilised for the running of the journal which shall be self-supporting.

The Working Committee of the Union shall arrange to invest the several funds of the Union in fixed or current deposits in suitable banks.

The Accounts of the Union shall be audited by two members of the Union who are not members of the Working Committee and the financial statement together with the balance sheets under each fund as they stand on 30th May every year shall form an essential feature of the Annual Reports, the auditors for the purpose being selected by the Working Committee.

List of Students who obtained the certificates of Proficiency 1918.

- | | |
|-------------------------------|-------------------------------|
| 1. Ayyaswami, U. S. | 18. Ranganayakulu Pantulu, P. |
| 2. Balaji Rao, T. K. | 19. Ranga Reddi, C. M. |
| 3. Butchiraju, V. | 20. Rangayya Nayadu, G. |
| 4. Chidambaram Pillai, V. | 21. Satyanarayana, K. |
| 5. Gopala Chetti, M. | (Clogston medal). |
| 6. Hanumantha Rao, K. | 22. Sitaramayya, R. |
| 7. Janakirama Ayyar, E. | 23. Srinivasa Rao, N. |
| 8. Kondala Rao, M. V. | 24. Subrahmanya Ayyar, K. |
| 9. Krishnaswami Ayyangar, | 25. Subrahmanya Pillai, M. |
| 10. Lakshmayya, J. | 26. Varadarajan, V. S. |
| 11. Mahabala Rao, K. | 27. Venkataramana Ayyar, R. |
| 12. Muthuswami Ayyar, S. | 28. Venkatarangam, A. |
| 13. Namasivayam Pillai, C. S. | 29. Viswam Ayyar, K. R. |
| 14. Raghavan, K. K. | 30. Viswanatha Ayyar, E. S. |
| 15. Rajagopala Achari, P. V. | 31. Viswanatha Rao, V. S. |
| 16. Ramachandra Nayadu, M. | 32. Vittal Punja, A. |
| 17. Ramaswami Raju, K. A. | |

Departmental Notes.

Promotions and Appointments.

Mr. P. Janakirama Ayyar is appointed as lower subordinate, Agricultural section, 4th grade, on 35-2½-75 on probation and posted to Palur Agricultural Station as An Assistant Farm Manager under training.

Mr. V. S. Viswanatha Rao is appointed as lower subordinate, Agricultural section 4th grade, on 35-2½-75 on probation and posted to Managanallur Agricultural Station, as Assistant Farm Manager, under training.

Mr. C. S. Namasivayam Pillai, is appointed as lower subordinate, Agricultural section, 4th grade, on 35-2½-75 on probation and posted to Koilpatti Agricultural Station under training.

Mr. K. E. Viswam Ayyar is appointed as lower subordinate, Agricultural section, 4th grade, on 35-2½-75 on probation and posted to Koilpatti Agricultural Station as Assistant Farm Manager, for training.

Mr. M. Ramachandra Nayudu is appointed as lower subordinates, Agricultural section, 4th grade on 35-2½-75 on probation and posted to Coimbatore district work under training.

Mr. T. S. Venkataraman, Assistant in Botany from 3rd grade to 2nd grade.

Mr. B. Viswanath, Assistant in Chemistry from sub-pro-tem 3rd grade to 3rd grade permanent.

Mr. T. S. Ramasubrahmanya Ayyar, Assistant in Chemistry IV grade to be Assistant IV grade on probation.

Mr. K. Krishnamurti Rao, Assistant in Chemistry under the Government Sugarcane Expert from 4th grade to 3rd grade.

K. Ramiah from Assistant in Entomology IV grade to Assistant in Botany IV grade.

Mr. P. V. Isaac, Assistant in Entomology from IV grade on probation to IV grade permanent.

Mr. U. Vittala Rao, Assistant in Botany to IV grade on Rs. 75-5-125 permanent with effect from 9th March 1918.

Mr. G. Ganapathi Ayyar, Chemical Assistant to Indigo Expert to be Assistant in Chemistry under Government Sugarcane Expert IV grade on probation on Rs. 75, 75, 75-5-15 with effect from 1st April 1918.

Mr. R. Thomas from Fieldman on Rs. 25-5/2-50 to sub Assistant on Rs. 35-2½-75.

Mr. K. Rangaswami Pillai, from fieldman on Rs. 25-5/2-50 to sub Assistant on Rs. 25/2-50 till he reaches Rs. 35 and then on regular scale of Rs. 35-24-75.

Mr. T. A. Rangaswami Ayyangar from fieldman on Rs. 25-5/2-50 to sub assistant on Rs. 35-24-75. To remain on probation for one year from date of first appointment ie., from 5-7-1917.

Mr. V. G. Emmanuel Temporary artist on Rs. 25-2-35 to be artist on Rs. 25-24-50 permanent.

Mr. V. Seshadri Ayyangar, from 2nd clerk Assistant Director's Office I Circle to head clerk Government Sugarcane Expert's office permanent.

M. R. Ry., T. V. Rajagopala Achariya, Farm Manager, Hagari, to 3rd grade on Rs. 150.

M. R. Ry., K. T. Alwa, 2nd Teaching Assistant, College of Agriculture, to 3rd grade on Rs. 150.

Mr. S. Vedantham Ayyangar is appointed as 4th grade Upper Subordinate, Agricultural Section, on probation and posted to Coimbatore for training in Dairy work.

Transfers :—

Mr. C. Narayana Ayyar, Chief Teaching Assistant, is placed on Special duty under the Deputy Director of Agriculture, V & VII Circles for the purchase of Cambodia cotton seed with headquarters at Tiruppur.

Mr. K. T. Alwa, 2nd Teaching Assistant, College of Agriculture, to be Agricultural Demonstrator, South Kanara District, at Mangalore.

Mr. K. Gopalakrishna Raju, Farm Manager, Koilpatti, to be Teaching Assistant.

Mr. V. G. Dhanakoti Raju, Agricultural Demonstrator, Nandyal to be Farm Manager in charge of Koilpatti Agricultural Station.

Mr. K. Shakarayyar, Farm Manager, Manganallur, to be Agricultural Demonstrator in charge of Cambodia Cotton work with head-quarters at Coimbatore.

Mr. K. T. Bhandari, Agricultural Demonstrator, South Kanara, to be 4th Teaching Assistant, at Coimbatore.

Mr. S. Viravardha Raju, Assistant Farm Manager Manganallur, to be Assistant Agricultural Demonstrator, on district work, Coimbatore.

Mr. K. P. Sankunui Menon, Assistant Farm Manager, Coconut Station, is transferred to the Central Farm, Coimbatore, vice Assistant Farm Manager Mr. K. Ramanatha Ayyar, granted privilege leave.

(i)

7-JUN-1918

Rs. 3000 Cash in Prizes.

Two yearly Agricultural Competitions are instituted by the Delegation of THE CHILEAN NITRATE COMMITTEE, on the best essays on Indian Agriculture and original ideas how to improve it.

1st Competition.

1st prize	Rs. 1000.
2nd „	„ 500.
3rd „	„ 250.

2nd Competition.

1st prize	Rs. 600.
2nd „	„ 300.
3rd „	„ 130.
4th (2 prizes)	„ 60 each.
5th (10 „)	„ 10 „

Rules.

Open to all interested in Agriculture. Two of the 3 judges to be elected by ballot. Names of competitors will not be known by the judges until all papers have been marked. Copies of prize essays and names and addresses of winners will be furnished on request. Commencing from July 1st, 1917. Closes June 1st, 1918.

Further details supplied by :—

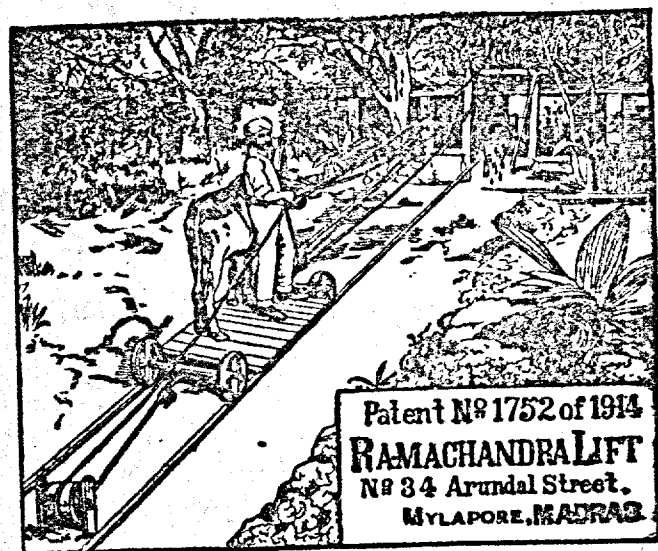
The Delegate,

Of the Chilean Nitrate Committee,

1, Royal Exchange Place.

CALCUTTA.

(ii)



RAMACHANDRA LIFT.

NOTES.

1. Sir V. C. Desikachariar's 109 full grown coconut trees each with a watering bed of 7 feet square, are irrigated in 3 hours with one man, one buffalo and a 22 gallons bucket. (This was done before by a picottah and 4 men in 6 hours.)

2. Mr. G. Naraniah, Retired Tahsildar, irrigates 150 fruit bearing coconuts and 27 young plants with a watering bed of 6 feet square each, in 5 hours with one man, one bull and a 22 gallons bucket. (This was done before by a Kavalal, one man and two bulls in 12 hours).

3. Dr. Nanjunda Rao irrigates 2 acres of Ragi crop in 8 hours and $\frac{1}{2}$ acre of paddy in 5 hours with one man, one bull and a 22 gallons bucket.

4. The Honourable Mr. S. Srinivasa Iyengar, B. A. B. L., Advocate General certifies:—"It has been working for the last 10 months most satisfactorily."

COST

For a well up to 30 ft. in depth.

		Rs.
i.	Lift to be worked by one big ox	200
ii.	Lift to be worked by one ox	175
iii.	Lift to be worked by one small bullock	150
iv.	Lift to be worked by man	125

N. B.—(a) If a fitter is necessary, fitting charges to be paid in advance.

(b) Cost depends on the depth of the well and is subject to market fluctuations of the cost of iron and other materials.

(iii)

Fertilisers for all Crops

SPECIALITIES FOR

Paddy, Ragi, Sugarcane, Tobacco, Cotton,
 Coconut, Tea, Coffee, Rubber, etc.

Manufactured under European Expert Supervision.

(ANALYSIS GUARANTEED).

Fertiliser Materials ground and mixed to order
 or sold separately.

BONE MEAL (Steamed and Unsteamed).

Superphosphates, Crushed Poonacs, Sulphate of Potash,
 Muriate of Potash, Kainit, Basic Slag, Sulphate of
 Ammonia, Saltpetre, Nitrate of Soda, Milled Fish, Fish
 Guano, Blood Meal, Nitrolim, Etc.

For Pamphlets on Manuring and quotations F. O. R.
 any Station or. C. F. I. any Port in Southern India.

APPLY TO:—

Messrs. PARRY & Co.,

MANAGING AGENTS,

The Presidency Manure Works, Ltd.,

CALICUT & MADRAS.

Advertisement Rates.

This Journal is an excellent medium for advertising Agricultural and kindred subjects (Agricultural machinery, manures, seeds, plants, books etc.). The following is the schedule of rates:—

	Single insertion.	per annum.
	Rs.	Rs.
For full page ...	5	20
For half page ...	3	12
For quarter page ...	2	8

The rates of Advertisements of Trade, other than Agricultural subjects, will be one and a half times the above. Preparation of blocks, unless supplied by firms, extra.

N.B.—All advertisements are subject to the approval of the M. A. S. U. Working Committee before insertion, and the charges are payable in advance.

All business communications should be addressed to:—

The Manager, M. A. S. U. Journal,
Agricultural College, Lawley Road, P. O., Coimbatore.

SHOW GARDEN ** PLANTS AND SEEDS

Different kinds of Grafted Mango Plants 3 years old from As. 8 to 12
Different sorts of Grafted Fruit trees such as Guavas, Pomegranates, Oranges, Limes, etc., from As. 8 to 12. Varieties of English Vegetable Seeds in 20 packets Rs. 3-8-0. Varieties of English Flower Seeds in 20 packets Rs. 3-8-0. Varieties of Indian Vegetable Seeds in 20 packets Rs. 2-8-0.

Apply for the English and Tamil illustrated Catalogue.

S. K. I. Abdur Rahiman Sahib,

Nursery and Seedsman, SALEM.

WANTED.

A trained Agricultural teacher for Headmaster's place in Panagauti Agricultural Institute, Panagallu, near Kalahasti Railway Station, Kalahasti. Pay Rs. 50-5-100.

Apply with certificates etc., to the Manager, Panagallu Agricultural Institute, Kalahasti.

THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. VI.

April 1918.

No. 4.

Editorial Notes.

Most of our readers will now be thoroughly familiar with the proceedings of the Conference which met at Delhi on the 27th of April 1918. The two main objects of the conference were to increase India's contribution to the War (1) in Man-power and (2) in Resources. Our Department has already contributed to a certain extent under each of these heads and it is hoped that in future this will be greatly augmented in response to the call from the Premier and His Majesty The King. As for Resources, which includes food production as a main item, our Department is sure to play a great part in its development and organization.

The Agricultural calendar for 1918-19 is out. It is similar to the previous one and is crammed with valuable matter. English and Vernacular editions are available at one anna and every reader must secure a copy.

The
Agricultural
Calendar
1918-19.

Though the dates for the College Day and Conference are not yet definitely fixed up, we know that they are rapidly approaching and we have begun to feel as at the approach of a great event. We have repeatedly, found, that a paper, in itself short, but with possibility is of an extensive discussion, is better appreciated and is more useful than a long drawn one. We are looking forward to have plenty of the former sort.

We understand that eight essays have been received for the Munagala Prize. This, we know, is by no means a large number but is certainly much higher than what we got in recent years. We are asked to announce that one was received without the name or the Non-de-plume. We are wondering who this selfless one could be. We are reminded of the mysterious 'Disinherited' Knight in Scott's Ivanhoe.

Of late we have had to devote more pages to 'Departmental Notes.' They contained some promotions, and to the recipients thereof, we offer our hearty congratulations. We are a rather selfish lot and hope that this tangible recognition of their work will be reflected in the pages of our journal in the form of a larger number of contributions.

We have mentioned before that our next life sketch is to be that of the late Rao Bahadur C. K. Subba Rao.

We regret to have to state that we have till this day received no material save a few notes which the Editorial Board has been able to gather. We know that, scattered throughout this Presidency

are men who have moved intimately with the subject of our sketch and hope that there will soon be a steady inflow of material.

The exchange of Agricultural produce in the Coimbatore District.

India is said to be in transition. In no field is it more perceivable than in its economic condition. People are impatient that India is not yet in line with the western countries in trade and manufactures and they are apt to find fault with the 'Unchanging' East and attribute the backwardness to the characteristic of our country connoted in the appellation 'Unchanging.' This appellation is as much justified as the one 'Benighted' some times attributed to our presidency. If we will only investigate into the history of the trade in our country we will be amazed at the progress made by our country within the last few decades and our surprise will be at the extreme adaptability of our countrymen.

Not long ago, even up to the end of the first half of the 19th century, the only means of conveyance available for distant trade consisted of packbulls. The trader started with his army of pack-bulls and servants armed with sticks and spears and wended his way on foot or on the back of a bull. Each locality had its big man who had to be paid some consideration, for allowing the trader to pass safely through the country over which he held sway. The penalty for non-payment was an attack on the road, by a set of ruffians kept for the purpose by the big man, and the trader lost all he brought. The armed servants of the trader can very rarely help him. Their use was only to ward off the stray thief or dacoit. There were also professional dacoits living like princes and distributing freely their ill gotten gains among the poor people in the locality and enjoying a reputation similar to that of the Robin Hoods in England. The trader from the Coimbatore District usually went to Yellicherry, or Cannanore. He sold his goods there, purchased in return pepper and the other products of the west coast and came back to sell the same in his place. The whole journey and the stay in the west coast would take him, ordinarily, two

or three months. If he came back without being despoiled of his gains by the big man or the professional dacoit he usually made a large profit and his capital was at least doubled in one venture.

In these days the produce of the cultivator was mostly consumed in his own place. The servants were paid in kind as also the landlord. The landlord and the big tenant usually stored their grains in underground pits and what they did not want for their own consumption they sold when the prices were highest. The small tenants and ryots kept what they wanted and sold the rest in the nearest market. The markets were held once a week in convenient centres. All the trade of those days was transacted in these markets. The professional traders also were very few and the big ryots who had money, lent to the small ryots on the understanding that they were to be paid back in grain at rates, fixed at the time the loans were advanced. In these transactions the ryots very rarely got more than 50% of the real value of the grains they undertook to supply. The ryot had very little staying power in those days and they had to sell what they did not want for their own consumption at the earliest opportunity. The price was fixed by competition among the purchasers. The money market was very tight and in the Kuri season the small ryots found it very difficult to get money.

The second stage was reached with the construction of metalled roads and the railroad. A class of professional traders came into existence. These had their shops at fixed places. They remained in their own places and goods were exported to other places and imported from there. The old unlucky markets also continued. These were still the chief centres of trade for the Agricultural produce of the District. The traders either by themselves or through a class of market traders which still existed purchased the goods and sent them outside. The prices were fixed by competition among the purchasers. The traders generally got orders from traders elsewhere and purchased for them. So they acted as Commission Agents. Sometimes they purchased on their own account and sent the goods to traders outside. They thus got profits as well as commission for purchase. The only class of people who competed with these trade-commission-agents were the people who purchased goods for storing them to sell them at a higher price later on. These last were led by the prices of the previous season and the nature

of the harvest. At this stage the trade was still within the country. All the imports came through the traders and were sold to retail traders who took them to the weekly markets and sold them there. So, far as the ryot is concerned the weekly market was still the only place of business for him. But money had become cheaper and his cultivation had begun to influence the markets of the world. He began to sow what are termed Industrial crops such as tobacco, cotton etc.,—as contrasted with food crops. He did not think of the requirements of his locality only. He began to depend for his needs on the imports from other places. The cultivator got more and more into the hands of the money lender as he no longer preserved the goods that were necessary for his requirements and his wants also increased. But the money market was better as money poured in from other places. Nattukottai chetties began to come in as also the Marvaries. The interests fell to about 24% per annum on landed securities.

The third or the modern stage is only a continuation of the last. The means of communication are improved. An extension of the railway system makes even remote villages accessible. Industrial crops are more extensively cultivated to the detriment of the food grains and the requirements of the locality. Cotton, groundnut, tobacco and sugar cane are grown wherever possible. The yield from the land has increased considerably as valued in money. But the ryot has to get his food grains and even fodder from outside. These in their turn rise in price. So though the ryot gets more he has to spend more. His wants have increased considerably. We find beautiful houses and carriages even in out of the way places. Thanks to the Madras Bank, the local Nidhis and the co-operative banks, the ryot can easily get money and even begins to speculate. This no doubt brings in its train the evils attendant upon it. When the war broke out a very large number of cotton dealers, who were also ryots, came to grief and some of them are absolutely ruined. In ordinary times the ryot can keep his goods until he gets proper price for it, as he can raise money easily at 12% for his mercantile needs and at 9% on landed security. The price of cotton and groundnut is no longer fixed by local conditions. For these the market is as wide as the world itself and the least disturbance in distant America is felt as keenly as if it were in the next village in the old days.

With the changes above mentioned the agency for exchange has changed also. European and American firms have got branches all through the country. The bigger ryots deal with these directly. The smaller ryots send their cotton to a ginner who gins the cotton for them and then sells it to the agent of the European firm or purchases it himself and then sells it to the firm. The local spinning and weaving companies have to compete with these firms. The groundnuts are purchased by mill-owners in the district or elsewhere who press them and sell the oil to exporting firms. In the case of these products the price is settled by the fluctuations in the worldmarket as a whole. The competition is no doubt among the purchasers only, but still it is so keen that the seller does not lose much or even if he loses (at times when he does not know any sudden fluctuations in the market) it is not for long. All that he now wants is better means of communication. Distant villages are still at a disadvantage as these villages are inaccessible and as he is not able to follow the fluctuations of the market easily. So when more railways are constructed and more roads and better ones are made in the district they will be able to get a greater portion of the price for their products.

As regards the other products also the means of exchange have changed. The weekly markets do not play the same part they used to play in the past. A class of commission agents have arisen. These take the goods of the ryots and advance a large percentage of the price to the ryots. Then they wait and sell the products in a few days. This gives to the ryots, for a small consideration, the services of a trained trader, who in addition finances him for his immediate needs. Some of these commission agents are exporting agents. The gin owners and the mill-owners also play the same part as these commission agents, but in addition they accommodate the product-owners for a longer time, sometimes even for months while the ordinary commission agent accommodates him for only a few days. The Madras Bank and some of the local Nidhis also advance money on these products. So the ryot is able to wait as long as he wants and reaps the full benefits of his industry.

These commission agents will in time ripen into the standing agents of the ryots. As it is, the ryot takes his goods in bulk to these agents and leaves them in their custody. But the cotton dealers generally take only samples to the agents of the European firms and when the price is settled the goods are sent at the appointed time. Also samples are often sent to the traders outside and on their approval the goods are despatched. As the ryot almost always wants an advance the goods are generally sent in bulk.

In all cases of export trade the price is settled by competition among the purchasers. But there are always capitalists available to purchase these and store them for selling at more opportune times. So at the harvest time there are always people of this class competing with the outside purchasers. A large quantity of the products is always purchased and stored by the capitalists.

The markets have not completely ceased to be places of exchange. The small ryots still take their produce to them. There, the wholesale merchants or the retail traders purchase them and take them to the towns for export, or for sale as the case may be. We can still find thousands of bags of groundnut or horse gram in the market at Pollachi during the season. As in these markets the purchasers are generally people from big towns and as they always compete keenly the prices always average to those in the town which again are settled by those for whom they are purchased. These last purchase for the world market and so the prices have a tendency to approximate to those prevailing in the big markets of the world.

As regards the imported goods and the produce intended for local consumption the weekly markets still serve as the principal medium of distribution. In places away from towns, the weekly markets are the only means of outlet and inlet.

T. A. Ramalinga Chettiar.

The author now goes on to give a detailed list of Agricultural products in the Coimbatore District and gives the means of exchange in each case. This will be published in the next issue. [Ed].

Selection of the site for the Agricultural College Coimbatore.

Dr. Barber has recently put into my hands a few notes which he made in July 1905, about the selection of a site for the Agricultural College, from which the following information is extracted:—

The neighbourhood of Coimbatore had been generally agreed on, from the conveniences it offered in the way of climate, healthiness (plague had not come to Coimbatore in those days) accessibility and availability of labour and variety. Mr. Bensen, who was then in charge of the Department under the Commissioner of Agriculture (a full time Director was not appointed until later) came to Coimbatore to select a site. There were five sites in all which commended themselves to him as being suitable, and these were inspected in July 1905 by the Commissioner, Mr. Bensen and Dr. Barber, and the present site decided on. Singanallur provided two sites, one three miles and one five miles from Coimbatore. The distant site was eminently suitable in all save distance. It would have cut the colony off entirely from all social intercourse with the town and might have caused difficulties in the way of obtaining supplies. Closer to Coimbatore the wet land was not good, and both these sites were given up. The third site was along the Avanashi road, in Savaripalayam and Pulamedu villages, some three or four miles out, where good building sites and water were available. There were also good typical black and red soils, but no wet land. Much nearer home was the site north of the Jail, stretching down from the Jail wall towards the Sangannurpallam

and beyond to the villages of Sangannur and Ganapathi. Again there was the difficulty of wet lands; it would have been possible to take up a block on the other side of the town but this would have been unsatisfactory. The last site inspected was the present one, and it is interesting to note how the advantages and disadvantages were noted at the time. The compactness of the wet land, the natural boundary on the west, the representative nature of the sites and cropping, the conveniences of the site for buildings for the College and the staff, were noted and considered against the distance from the Town, and the rather unsightly approach. It may be remembered that at that time there was not a motor car or even a motor bicycle in the District.

The notes also hint at a discussion which took place as to the construction of the College building. It was urged that the Teaching and the Research portion should be in separate blocks, while from another quarter came the suggestion that a two storeyed building would meet the case. The uplifting effect of the noble building which we now occupy is a most valuable asset, though possibly separate buildings, as in the Tata Institute would be more convenient and we are glad that a single building was ultimately decided. If one may prophesy, we shall probably in a few years, see much of the teaching moved out of the College, and class rooms, at any rate for the short course men, provided in a separate building.

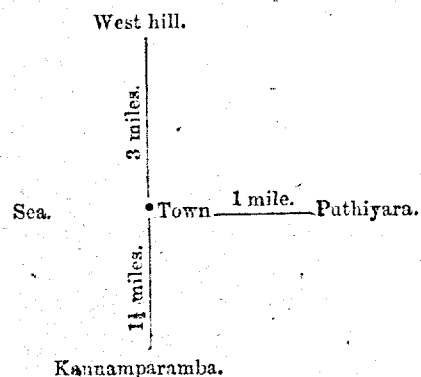
R. C. Wood.

Municipal Incinerators and Manure supply at Calicut.

The Calicut Municipality is certainly doing some good to the ryot by supplying him with good manure at a considerably cheap rate making at the same time a lucrative job of its duty of removing

the rubbish and night soil. The old practice was to pit the night soil in some out of the way place and cover the same with a thick layer of sand making no use of this most valuable manure. This has been replaced by the present system. A story goes that 21 years ago one Mr. Captain White hurrying to attend his morning drill slipped into a pit of the sort. After this incident till very recently—as late as 1912, the practice was to burn down both the rubbish and night soil and sell the ashes. During the last six years further improvement was effected and the following system of preparing manure was adopted.

Sites secluded in themselves and within easy reach of the heart of the town were selected on all the three sides—west being the Sea: the relative position of the three incinerators is sketched below. Each incinerator is in charge of a maistry two permanent



coolies helping him in burning etc. The Puthiyara and Kannamparamba incinerators which the writer had the occasion to visit are about 10 cents each in extent and have manure depots of about 200 cart loads capacity. Long pits—as long as the sites would permit—with a width and depth of $2\frac{1}{2}$ feet are filled, the first foot and a half with the night soil and the rest one foot with earth. When sawdust can be had cheap (the present rate being $3\frac{1}{2}$ annas per cart load,) a layer of sawdust also is spread. The rubbish is

spread here and there for want of space and it is very difficult to make out the pits. There was once a system of labelling the pits—now-a-days all such rules are not strictly adhered to. As a rule a period of six months is allowed and the manure sold at Re. 1 a cart load, (45 kerosine tin fulls make a cart load—one tin-full weighing 18 lbs.). The ryots purchase these municipal cartloads for Rs. 3 and take it in two carts. The puthiyara incinerator sells about 300 cartloads of manure—the rubbish and ashes excluded. The ryot appreciates this manure and he says that five cartloads of municipal manure gives better results than 10 cartloads of pitted cattle manure. The manure is jet black in colour and is soft and slightly spongy in texture. The ryot purchases the manure, heaps it in the open and rain water is allowed to soak in, through holes made in the crown of the heap. For about a month it is treated like this and then applied to the fields. Paddy, bananas and coconuts are the chief crops that receive this manure, the coconuts responding most to the treatment.

It is a loss to the Municipality to make ashes and sell, and this method is not popular with the present day ryot. All the same ashes are also made. The furnace is built up with bricks having air holes and iron grating. It is fed with rubbish mixed with sawdust. The ash is sold at Re. 1 a cart load which is rather cheap. But in the act of collecting and selling, it gets mixed up with a good percentage of sand and this makes it unpopular.

Ryots within a radius of 20—25 miles come down to purchase the manure and every year the Municipality gets about Rs. 700 on an average. Unfortunately the manure is not sufficiently advertised and there are ryots in very close vicinity who are still ignorant of this manure supply.

M. P. Sankaran Nambiyar.

Student.

Extracts.

Alamanda and its fruit culture (chiefly Mango).

Alamanda is a chief centre for fruit culture in this tract. The fruit and fruit products produced here travel over a large part of the country and are easily among the first in the Calcutta market. Alamanda and villages within a radius of about four miles are situated on a raised table-land surrounded, though irregularly, by a series of low hills. These hills act as a natural protection from the hot winds of the south in summer and the cold winds from the east in cold weather. The low altitude of these hills helps at the same time to bring down occasional light showers for the benefit of this crop but do not sufficiently intercept the passing clouds so as to precipitate heavy rain. The soil is well suited. The sub-soil is well drained. The fields are laid, and gardens are planted, in the form of terraces helping the natural drainage. This industry is chiefly in the hands of Razus who have, for generations, under the patronage of the Maharaja of Vizianagaram, been a leisured class with a propensity for easy and luxurious life. They have got a status possessed by no others in these villages and a control over local labour which others have not. For the past 70 years they have developed this industry to a great extent. From one seedling tree of Swarna-reka imported from Pimpali near Bimlipatam about 45 years ago and which is still in bearing as vigorously as ever, they have been able to evolve more than one kind of graft. The number of grafts manipulated are several and their social status accounts for the introduction and presence now of certain varieties as Razamani and Andrews which are now being slowly recognised by other classes. It is this caste that is responsible to a great extent for the developement of this industry in this district and a graft may generally be seen associated with a Razu family, whichever village we may visit in this district.

Some of the members who are keen in this trade are English knowing men with a keen insight into the details of the industry and a fund of knowledge in grafting. They have been working at it incessantly and have been able to produce different varieties to suit different conditions and tastes, colour and thickness of the skin also not escaping their attention. They can put on the market fruits early or late and are thus in a position to capture it. They have got a natural keenness in developing the desired colour of skin and at the same time improving the flesh also. They have evolved varieties which can stand a long sea-voyage. There are varieties which, even when injured do not get the other portions of the fruit spoiled as the result of the injury—in other words a wound does not develop or spread which is a vital point in the mango export trade. What surplus is left over, as unsaleable immediately, is converted into a marketable commodity known locally as "Thandra" (preserved mango pulp) and exported to towns. Each operation connected with the mango industry is in the hands of different sets of people so that any defect as it occurs is remedied then and there, the division of labour and the attention paid by each to details being perfect. (*From the February 1918 report of the Assistant Director of Agriculture Anakapalle*).

Motor cars as aids in the destruction of rats.

According to an article in the Farm Journal, November 1917, one of the easiest ways to kill rats is to run the exhaust fumes from a motor car into the rat holes. The plan is to close up all the rat holes except one, in a building, and having attached one end of a sufficient length of ordinary hose to the muffler of a motor car, to put the other end down the rat hole left open, and start the Engine. The method is said to have been very successful. T. S. V. (*From the Agricultural News, December 29, 1917*).

How to eradicate the nut grass.

Work on Japanese nut grass (*Cyperus rotundus*), a noxious weed in the West Indies has proved that spraying with arsenite

of soda is the most effective means of control, if the spray is applied when the grass is in full bloom. Ploughing with a disc plough is also effective, and is done at intervals of four or five weeks during exceedingly dry periods. The tubers found on the surface of the soil after effective ploughing can be raked together and destroyed. T. S. V.—(*From the Report of the Hawaii Agricultural Experiment Station, 1916*).

The recent Jam Conference at Delhi.

Even if a modern army does not "fight on its stomach", the importance of a liberal and varied diet for the fighting man has long been recognised. Especially has the necessity for some sweet food been found, not only for the actual feeding value of the sugar, but because it is an appetiser which assists in the digestion of other less interesting foods. The form in which this sweet food is usually given to British troops, is jam, which is simply fruit of various kinds boiled down with sugar to a certain consistency, when if properly sealed, it will keep for considerable period. The supply of jam to large numbers of troops in the Eastern areas, Mesopotamia, Egypt, Palestine and so on, is a considerable item which runs to many tons a day, and this has hitherto been met from Europe and Australia. Owing to the difficulty of transport, especially the shortage of ships, it was suggested that this supply could be obtained from India, whose varied conditions and enormous resources were thought capable of supplying both the quantity and quality required. To consider this question a conference of members of the Agricultural Department was called at Simla to meet representatives of the Quarter Master General's Department. The Madras representative was our Principal, who was away for a fortnight, the greater part of the time of course, being spent in the train. We believe that, though the conference was over sooner than was expected, the various difficulties which arose were completely settled, and that India has made yet another and not unimportant contribution to the business of winning the war.

Training of Practical Cultivators.

The following Press Communiqué has been issued:—

It does not appear to be generally known that the Agricultural Department is prepared to take a limited number of practical cultivators, maistries or field coolies, for training in particular works or in the use of simple agricultural machinery on the different farms,

2. Experience has shown that the most effective method of demonstrating improvements to ryots is to carry out such work on their own land. The department has done this to a considerable extent and will continue to do so; but a few men can at the same time be trained on the farms and it is possible that some land-owners may wish to send selected labourers for such training.

3. Men will only be taken for such training (1) who are actually working on the land and have experience of farm work, (2) who are prepared to work alongside and with the farm coolies.

Whilst on the farm they must obey the Farm Manager and Assistant Farm Managers in charge of the farm and must work diligently and regularly. If they do not do so the Principal or the Deputy Director will send them away even before their period of training is over. They must pay their own travelling expenses and arrange for accommodation but will receive wages for the work they do at the rates then being paid on the farm.

* * * * *

Applications for admission to Coimbatore should be addressed to the Principal, Agricultural College, Coimbatore; to Hagari, Nandyal and Samalkota, to the Deputy Director of Agriculture, I—III Circles, Bellary; and to Palur to the Deputy Director of Agriculture, IV Circle, St. Thomas' Mount; to Koilpatti, to the Deputy Director of Agriculture, VI Circle, Madura; and to Taliparamba and Kasaragod, to the Assistant Director of Agriculture, VII Circle, Tellicherry. These officers will also furnish

information about the time at which men can be taken and about possible accommodation if required.

This offer to train cultivators was first published in 1913, but very little advantage has been taken of it by landlords up to date less than ten men altogether having been sent for training at all farms except Kovilpatti. At Kovilpatti however, there has been a great demand for training in the use of drill cultivation implements. As accommodation on the farm was inadequate to meet this demand a system of training coolies in the villages under maistries trained on the farms has been in operation and over 800 men have been trained up to date.

For particulars re the courses which would be given at the various farms the Madras Agricultural Calendar for 1918—19 may be consulted. (Ed).

News and Notes.

1. The College reopens on the 15th June instead of on the 7th as usual.
2. It is understood that there is an out break of Rinderpest in the District of Coimbatore and that the Tiruppur cattle Show is likely to be suspended. At the Central Farm the cattle were all promptly inoculated with the anti Rinderpest serum and though we have had a certain number of casualties the risk has been considerably minimised.

Departmental Notes.

Promotions.

1. Mr. S. Subramania Ayyar, Farm Manager, 2nd grade to be Farm Manager 1st grade vice Mr. A. V. Thirumuruganatham Pillai promoted to Gazetted rank with effect from 17th April 1918.
2. Mr. T. V. Narayana Rao, Farm Manager, 4th grade on Rs. 150 to be Farm Manager, 2nd grade vice No. 1.

3. Rao Sahib Mr. A. Rama Rao, Farm Manager, 4th grade to be Farm Manager 3rd grade vice Mr. N. S. Kulandaswami Pillai promoted to gazetted rank with effect from 17th April 1918.

Mr. C. Venkobachar is confirmed as Assistant Farm Manager with effect from the date of his joining this department.

Leave.

1. Mr. S. Subramanya Ayyar, Farm Manager, Central Farm, Coimbatore is granted privilege leave for one month from date of relief.
2. Mr. K. T. Alwa, Teaching Assistant, College of Agriculture, Coimbatore, is granted privilege leave for one month from 1st May 1918.
3. Mr. K. Unnikrishna Menon, Farm Manager, Palur, is granted privilege leave for one month and 15 days from or after 1st May 1918.
4. Mr. V. G. Dhanakotti Raju is granted an extension of leave on medical certificate from 24th March 1918 to 24th June 1918.
5. The privilege leave for one month granted to Mr. K. Gopalakrishna Raju Farm Manager, Koilpatti, is cancelled.
6. Mr. C. S. Madayya, Farm Manager, is granted an extension of leave without allowance for one year from 3rd June 1918.
7. Mr. T. A. Krishna Ayyar, Assistant Demonstrator, is granted privilege leave for two months from date of relief.
9. Mr. G. Sitharama Sastri, Assistant Farm Manager, Sirvel, is granted privilege leave for one month on or after 1st May 1918.
9. Mr. C. Arulanandam Pillai, Assistant Farm Manager, Palur, is granted privilege leave for one month from or after 10th May 1918.

List of Honorary visitors for the Agricultural College and Research Institute Coimbatore, for 1918 to 1920.

1. The Hon'ble Sir E. F. Barber.
2. The Rev. Mr. Bawden.
3. M. R. Ry. Rai Bahadur N. Chakkarai Mandradiyar Avergal, Palayakottai.
4. The Zamindar of Chunampet.
5. M. R. Ry., Rao Sahib N. Krishnama Achariyar Avergal.
6. M. R. Ry, Vengayil K. Krishnan Nayanar Avergal.
7. M. R. Ry. Rao Sahib S. M. Rajaram Rao Garu.

The Madras Agricultural Students' Union.

Vol. VI.

May 1918.

No. 5.

Editorial Notes.

We are very glad to hear that the visit of His Excellency Lord Pentland, the Governor of Madras, at the College Day and the various celebrations held in connexion therewith, 11th to the 13th July both days, inclusive is now practically assured. It is probable, that there will, at the same time, be a gathering of the Rajahs and Zamindars of this Presidency. We can assure our visitors that we appreciate deeply the honour which is being done to the College, and hope that the consequent publicity of this year's proceedings, will stimulate contributors to offer their very best for the Conference and will encourage the College in the opinion that some of us, at any rate, hold, that it is "Second to None."

We are glad to be able to print in the pages of our Journal occasional contributions from the present students of the College. We are of opinion that such contributions besides enriching the journal are likely to prove a valuable training to the student. The pen has often the knack of compelling careful observation and clear thinking.

8. M. R. Ry. Diwan Bahadur P. Ramarayanlingar.
9. Hon'ble the Raja of Ramnad.
10. Mr. F. W. R. Robertson, I. C. S.
11. M. R. Ry. Dewan Bahadur D. Seshagiri Rao Pantulu Garu, B. A., B. L.
12. M. R. Ry. Rao Sahib A. Sethurama Ayyar Avergal.
13. M. R. Ry. Rao Bahadur P. Subbaraya Ayyar Avergal.
14. M. R. Ry. The Hon'ble Diwan Bahadur A. Subbarayulu Reddiyar, Avergal.
15. M. R. Ry. Kunnam S. Subrahmania Ayyar, Avergal.
16. M. R. Ry. Diwan Bahadur T. N. S. Tirthapathi Avergal.
17. Mr. J. B. Tothill.
18. M. R. Ry. Raja Venganad Vasudeva Raja Avergal, C. I. E.

We offer our hearty congratulations to Dr. C. A. Barber, who has been made a Companion of the order of the Indian Empire. He is one of the oldest officers in the Indian Agricultural Service and a prime organizer of the Madras Department. We take this as an indication that our Department is beginning to get the recognition which it all along deserved and hope that such recognitions will become more frequent in the future.

We offer a very cordial welcome to Mrs. Ananda Rao who arrived on the estate during the 1st week of May 1918. The marriage took place at Calcutta on the 1st April 1918 and the party spent a month at the Sherveroys before proceeding to Coimbatore.

The Exchange of Agricultural Produce in the Coimbatore District.

(Continued from last issue.)

The lands in the Coimbatore District are of three kinds:—wet, garden and dry. The wet lands are irrigated by the Bhavani, the Noyal and the Amaravathi rivers and their tributaries. The garden lands are watered by wells dug for the purpose. The dry lands depend wholly on rain.

The chief product from the wet lands is paddy. But, under the Bhavani, arecanut is also grown in the upper reaches and plantains near Erode. Under the Noyal, we have coconut cultivation near Coimbatore and betel and sugar-cane near Singanallur and Sulur. Sugar-cane is also grown under the Amaravathi in the Dharapuram Taluk. In the garden lands cholam and cumbu are the chief food grains. Cambodia cotton and groundnut are fast driving out the food grains. Tobacco is grown in garden lands wherever the soil and the water

are suitable. Ragi is grown in places. Wheat is grown in very small quantities near Coimbatore. In the dry lands, the chief products are cumbu, pulses especially horsegram and in some places cotton. Cambodia cotton is also sown in the dry lands, but owing to the failure of the monsoon this year, it has mostly failed.

Areca nut in Mettupalayam:—This is gathered and cured by the tenant himself. The small traders go to villages where arecanut is available as soon as they are harvested and purchase it. These either sell them at once to the bigger traders in towns or stock them, for sale some months later, when the prices are always higher. The bigger traders in their turn stock these for sale at the favourable season.

Plantain in Erode:—This crop is chiefly grown by tenant farmers. Dealers from Salem and Madras purchase the standing crops, harvest them and send the fruits to Salem and Madras.

Sugar-cane in Coimbatore is generally sold by tenants to professional jaggery makers. These purchase the standing crops, harvest them and prepare jaggery, which is then sold to the merchants.

I am told that, in Dharapuram, the tenants themselves make the jaggery and sell the same to petty traders who go to the villages for the purpose.

Betel in Singanallur and Sulur:—This is grown by tenants. Professional dealers, who are natives of the place, purchase from the tenants regularly and send them to Kumbakonam, Madras and other places.

Paddy, the chief wet crop in Gobichettipalayam Taluk, is grown and harvested by the tenants themselves. The richer among them and the land-lords, who generally get their rent in kind, keep the paddy necessary for their own consumption and stock the rest for sale at the favourable season. The poorer classes sell the paddy to people who go to their villages for the purpose.

The paddy in Erode is harvested by the tenants. The landlords sometimes take the rent in kind and sometimes in money. The paddy is generally sold to the merchants as soon as it is harvested.

Tobacco is raised by the tenants and the standing crops are generally sold to professional dealers. These harvest the crops and stock them themselves or sell them to merchants who stock them. At the favourable season these are exported to the West Coast.

Cholam, Cumbu:—These are raised by the tenants. A large percentage of the landlords who till their own lands also raise these. The land lords and tenants harvest the crops and retain whatever they want for their own use. Whatever is left is taken to the nearest market for sale. In the markets, petty traders purchase them and take them to towns for sale.

Of late fodder has become an important item of exchange.

Raji:—Is not retained so much for the personal use of the landlords and tenants. Its use is generally to give it to the lower class of servants—Oddars etc., in exchange for their labour. The balance left is sold in the same way as cholam and cumbu.

Cotton:—Is the chief produce exported. It is very widely grown in the district. The landowners themselves grow it in most cases. The tenants also try it when they have a chance. The kappas (கப்பா) is gathered by the grower. When the grower has not got a large quantity, he generally takes it to the nearest market or to a town like Tiruppur and sells it to the trader. The trader gins it in a factory and either sells it himself to one of the exporting companies who have got agencies all over the district or sells to merchants who sell, in their turn, to those companies. The big landowners get their cotton ginned by one of the factories which are spread all over the district and themselves sell the ginned cotton to one of the exporting companies. Some of these purchasing companies have themselves got ginning factories. Sometimes these companies also purchase cotton (kappas) and gin it themselves. There are two spinning factories in the district. They purchase most of the cotton they want in the district. They purchase in the same way as the exporting companies. There are a number of traders who contract with these companies at the beginning of the year to supply a stated amount of ginned cotton. These are

professional speculators. The cotton is, of all products, the most responsive to the demands of the markets of the world and very often these speculators come to grief for want of knowledge of the markets in other parts of the world.

The Cambodia cotton became very popular on account of the high price it fetched. Probably the failure of monsoon last year would make the ryot think twice before he ventures to raise it on the dry land. But the ryots, I had occasion to talk to about it, seem to think, that even if they could have a good crop once in 3 years, they would not be losers.

Groundnut:—Is next to cotton the chief produce exported. This is also grown very widely. The crop is harvested by the grower and taken to the nearest market or town. In Pollachi on the market day one could purchase several thousands of bags. Also a large amount of the crop is taken to towns like Tiruppur. We have just now got a few crushing factories which manufacture oil. But still by far the larger quantity is purchased by the merchants and sent outside. The popular port for this product is Pondichery. Tuticorin is also gaining ground in recent years.

Horse-gram:—This is the chief pulse grown in dry lands. This is grown where the soil is very poor. This and the other pulses are harvested by the growers who take them to the nearest market like the one at Pollachi or to a town like Coimbatore. The merchants purchase them and export them. A few of the merchants also stock these. Horsegram and green gram are generally the favourites of those who purchase agricultural products for stocking them. Sometime, they gain enormously. The risk in stocking these and tamarind is very little.

T. A. Ramalinga Chettiar.

Cultivation of Cucumber on the beds of the tanks near Coimbatore.

In January-February, after the paddy harvest is over and when the tanks get dry, cucumber is cultivated on the tank-beds by

pallars, the wet land labourers. The area cultivated by each family depends on the number of working people contained in the family, generally a man and a woman cultivating about 15 cents.

Small circular pits about 1' in diameter and 4" to 6" deep are dug with the mamatty in lines about 4' apart from each other both ways. In each of these pits 2, 3 or 4 seeds are sown. If there is moisture in the soil the pits are not watered after sowing; but it often happens that the cultivators apply to the Revenue authorities for permission for growing cucumber in tank beds and the order granting them permission reaches them only when the beds have dried to a considerable extent. In such cases the cultivators have to dig wells about 5' square and 8' to 12' deep, draw out water from these wells with pots and utilize it for watering the pits. If the area sown by each individual is small, two or three persons join together and sink a common well. Within three days after sowing, the seeds sprout and the cotyledons appear above the surface. A double handful of paddy chaff is now applied to each pit around the seedlings in order to protect them from certain insects living in the cracks in the tank bed which otherwise cut and damage the seedlings. The second watering is given on the 3rd day. Thereafter watering is given once in 4 or 5 days. The crop is watered 4 to 6 times in all. The plants gradually grow in trail and, in about 30 days after sowing, are in flowers. No watering is given thereafter. Green fruits are gathered and sold from about the 45th day; for about 1 month thereafter, 100 fruits, on the average worth 8 annas, are gathered daily from a plot of about 15 cents. When collecting green fruits, such of them as promise to make fine big ripe ones are left either for seed or for sale as ripe fruits. When the plants are about 75 days old, the early fruits that are left for ripening fully mature as indicated by the yellow colour and cracking of the rind. The fruits are then collected and sold at 4 pies to 1 anna each. From an area of 15 cents, 80 to 120 of the ripe fruits are obtained. 80 days after sowing, the flowering and the formation of green fruits

gradually come to a close and the nutriment that may be left is then drawn up and stored in the ripening fruits.

The quantity of seed used for sowing 15 cents is about $\frac{1}{4}$ Madras Measure. It would be better if the cucumber growers select their own seeds. They often purchase seeds for sowing and it so happens that the crops of some unlucky persons consist mostly of plants producing bitter fruits.

The Government charges *taram* assessment on the area cultivated which is Rs. 1-14-0 per acre here.

The charges of cultivation for, and outturn from, an area of 15 cents are noted below :—

Charges.			Rs.	A.	P.
Opening pits, 3 men	...	...	0	15	0
Sowing seeds in pits, 3 women	...	...	0	7	6
Watering 5 times, 2 men and 2 women each time			4	11	0
Cost of seed $\frac{1}{4}$ M. M.	...	...	0	4	0
Cost of sinking the well; proportion chargeable to the plot	...	...	1	4	0
Cost of paddy chaff	...	...	0	4	0
Assessment	...	...	0	4	6
Collecting fruits and selling and watching the crops etc.	...	...	5	0	0
Total			13	2	0

All the operations are done by the cultivators of the respective plots and their family, no hired labour being employed.

Outturn.					
4000 green fruits at 8 annas per 100	...	.	20	0	0
100 ripe fruits at 6 pies each	...	...	3	2	0
Total			23	2	0

Profit Rs. 10.

The tanks are all dried up now, but it is a pleasant sight to look at the beds covered over with verdant cucumber plants with a few humble sheds of the primitive style scattered here and there to offer shelter for the old women and children watching the plantations.

April 1918.

P. V. Raghavendra Rao.

"Pori making" in Cheyur, Avanashi Taluk, Coimbatore District.

Several cereals such as paddy, cholam and cumbu are used for this preparation. In this village, it is manufactured from paddy on a very large scale and this finds ready sale in shandies and in villages where festive occasions are celebrated in temples etc. The weaving class, called 'Kaikkala' was the first to take up this and a number of them have become rich and taken to garden and dry cultivation. Another class, called Uppiliya Naicken, has now taken up this work and a large business is seen taking place in shandies round about. Two varieties of paddy are principally used (1) Karuppu Nellu or black-glumed paddy from Bezwada side and (2) Kembothin Nellu, slightly red-glumed, from Mysore side. Coarser and longer paddies are preferred. The Mysore paddy sells at a higher price, one Rupee more than that of Bezwada paddy for every bag of 50 M. M. It is said, when husked, to give more rice by volume and to have a better taste. Its present price is Rs. 9—8—0 per bag.

There are three operations in this:—(1) boiling the paddy, drying and husking, (2) salting the rice and (3) frying.

Paddy is put in hot water and kept for three days. On the fourth day, it is well boiled until the glumes are partly open, when the paddy is dried in the sun and husked. Hand picking of whole

paddy grains is done after husking. The Mysore paddy gives 55% of rice by volume and the Bezwada paddy 50%. The paddy increases in volume after boiling by 20%. Salting is now done. A solution of salt (one M. M. to 4 M. M. of water sufficient to treat 30 M. M. of rice) is sprinkled over the rice kept in a thattu or wooden vessel and the mixture is well stirred and pressed. The resultant hard lump is kept in a basket and covered over with bracken and dried in shade. It is resalted with half the above solution and pressed. Frying is then done. This operation is repeated twice as in salting. Big earthenware pots are used. There are two hearths over which these are put. In the one about 2 M. M. of fine sand is put and the other is empty. The empty pan is heated gently and the other rather violently. Paddy husk is used as fuel. A few pieces of firewood are used in addition in the sand pan hearth. The second salted rice which is not dried is put in the empty pan at about a Madras Measure a time and stirred well with a big hard semicircular cow dung bratti (mixed with paddy husk). This is used because it does not get charred as quickly as a wooden material. After frying it in this way, it is next put in the sand pan which is heated rather violently, in handfuls and stirred as in the empty pan. The rice swells up and is removed with a portion of sand to a broad basket. The swollen rice which is called 'Pori' is then thrown over bamboo mats and the sand is winnowed. Uniformity of rice grains in this is of utmost importance because, if swollen grains and broken pieces are mixed up in the second frying, they get charred sooner than the whole grains and thus they are lost.

Cost of production of Pori from 50 Madras Measures of paddy.

	Rs.	As.	Ps.
Cost of 50 M. M. paddy	...	9	4 0
Firewood for boiling paddy	...	1	0 0
Husking 60 M. M. (increase 20% due to boiling)			
3 women @ an. 1 ps. 8 each		0	5 0

161760

600 000

Cost of salt 1st salting	...	0	5	4
Mixing and pressing	...	0	1	4
Cost of salt 2nd salting	...	0	2	8
Mixing and pressing 2nd time	...	0	0	8
Picking out whole paddy etc	...	0	0	3
Firewood for frying	...	0	8	0
Wages for 1st frying, one woman	...	0	2	8
" " 2nd " "	...	0	4	0
		12	1	11

Quantity of Pori obtained from 50 M. M. paddy is 250 M. M. to 260 M. M. This is sold at 10 pies per M. M. Hence value of Pori obtained is Rs. 13—8—8. Hence there is a gain of Rs. 1—6—9 to Rs. 1—8—0 for every 50 M. M. of paddy dealt with. When taken to shandies, a slightly higher price is got. Ash from the paddy husk sells at 4 to 6 annas a cartload in this village.

It is worth the attention of ryots in the Coimbatore District to try and cultivate the varieties of paddy referred to above, as they fetch a high price. As these are coarse paddies, the yield is bound to be satisfactory with good treatment. Large quantities of paddy are disposed of by Muhammadan merchants at the Vanjipalayam Railway Station S. I. Ry.

W. Raghavachari.

Fish Manure.

It is a general complaint everywhere in Malabar that there is a considerable fall in the outturn of crops year after year. But it is much to be regretted that there are only very few who would try to find out the reasons and endeavour to seek the remedy or take up any measures even when suggested and results clearly

shown to them. If some of the suggested improvements are adopted such complaints could be easily minimised. Due to excessive rainfall in Malabar much of the manurial ingredients are annually washed away from the soil. Besides, each and every crop grown in the land must remove a portion of the manure for its development. It is admitted by all that in former years cultivators were manuring the fields much better; they could also get much richer washings from the adjoining hills and mountains. Now that the fields are inadequately manured and that they get hardly anything from the hills and mountains in the way of manure as the result of the trees and shrubs on them becoming scanty, it is not to be wondered that the yield goes below expectation. To be brief, inadequate manuring is the chief reason for the comparatively low yield of crops in Malabar.

It would have been an excuse if suitable manures are not available locally, but it is never the case. Manures worth 8 to 10 lakhs of rupees are annually exported to foreign countries from the West Coast. The fish manure is the most important of them. An amount almost equal to the cost price is spent on transporting them to Japan, Ceylon, Malay States and other places. Even at such heavy outlay it is found profitable to go in for this. It is therefore undisputable that the manure is an excellent one. It gave complete satisfaction to those who tried in this district as well. Along the coast very large quantities of it are used for tobacco, vegetables, tapioca, plantains etc. If this valuable fish manure is used in manuring the lands here, there would be hardly any room for complaints regarding the reduction in the yield of crops.

2. Fish manure and its varieties.

Fish manure is of two kinds. One is the sun-dried *mathi*, and the other is the refuse after oil is extracted, known as 'Fish Guano.' The price of the latter is nearly double that of the former. Sun-dried fish is now sold at Rs. 35 and guano at Rs. 75

per ton of 2240 lbs. delivered in bags at the Railway station. This should not be considered too high. The price is regulated more or less according to the quality and supply available of each.

It contains Nitrogen and Phosphoric acid in high proportions as are required by plants. It can be used either alone or with cattle manure, ashes or any other manures locally used. However it would be better to apply it mixed with ashes.

3: *When and at what rate to be applied for the various crops.*

For *paddy*, 400 to 500 lbs. of sun-dried fish or 250 to 300 lbs. of fish guano are required per acre. For *coconut trees*, over 10 years, 10 lbs. of sun-dried fish or 5 lbs. of guano each; half of this for *arecanut trees*; for *sugarcanes*, about a ton plus as much ashes per acre, and for *pepper vines*, 1 lb per vine. If sun-dried fish is used, it should be powdered in mortar before application; otherwise, crows and other animals might eat them away and thus get wasted. In the case of paddy, wherever dry broadcasting is done, it should be uniformly spread in the fields and ploughed in just before the seeds are sown, and in the case of transplanting, after the fields are made ready it has to be uniformly spread and trampled down just before transplanting is begun, or, the manure may be spread at the last dry ploughing. In any case, care should be taken that the manure is not washed away from the soil. If applied at the time of transplantation water should not be allowed to flow away freely for about a week. When the manure is used for the second crop of paddy, there is not much fear of wastage in this direction. If the nursery is manured with fish, both the seedlings and the subsequent crop on the land would be benefited.

For coconuts and arecanuts the manure should be spread in trenches round the trees 3 or 4 feet from the bottom and half a foot deep and covered just at the burst of the South-West monsoon. It should be neither too near nor too far from the trees. If the

garden is entirely devoted to either coconuts or arecanuts there is no harm in spreading the manure evenly and digging it in. Fish manure was tried for paddy, sugarcanes, coconuts and pepper vines and other crops in the Government Agricultural Farms of Taliparamba, Coimbatore and other places, where it was found very profitable and an extensive use is made of it now. Through the influence of the Agricultural Department various cultivators in Coimbatore, Madura, Tinnevely, Tanjore and other districts also tried this manure with the result that applications are being received for very large quantities. Order for eight thousand rupees worth of it have been booked so far this year.

It is earnestly urged, therefore that everybody might try this manure. Arrangements will be made to supply if applications are sent to the undersigned. In the rainy season it would be difficult to get the manure and the price also would be much higher.

M. Govinda Kidavu.

Some beans of Burma.

Pachyrhizus angulatus.

This plant is known in Burma as "Pe'—sein—sa—u"—(Pron pe'—zen—za—vu) from Burmese, Pe' = bean, asenin = green or raw, sa = to eat u = root—literally meaning the bean the root of which is eaten raw. The roots are dull white in colour and have the appearance of specially stout radish roots. This plant is cultivated both as a rainfed and as an irrigated crop. As a rainfed crop the seeds are planted about a foot apart on ridges. In gardens it appears to be sown in beds about three feet square. After sowing the crop does not seem to require any further attention than occasional weeding and hoeing. In about two months, the plants cover up the whole ground. The beans and the seeds are not eaten as they are believed to be poisonous. The roots become fit

for being dug out in about 5 or 6 months. As they cannot be kept fresh for long under storage, they are usually collected in small lots and disposed off at once. The root has a thin fibrous skin which has to be peeled off before it can be eaten. The edible part of the root is firm and crisp though juicy, and sweet though tainted ever so slightly with the taste and smell of green beans. It forms a refreshing and welcome article of food in the hot months in Burma.

Psophocarpus tetragonolobus.—Goa Beans of Madras.

This bean known as Pe-myyit (Pron pey—myet) literally "Bean root" or root bean. Though this is common enough in Madras, I believe it is only the tender pods that are made use of. In Burma it is more for the sake of the roots than for the pods that the plant is cultivated. The cultivation of this plant is more or less similar to "Pe—sein—sa—u." The roots are dug out about six months after planting and when boiled forms a favourite article of food with the Burmans.

I am indebted for the above information to Mr. Sawyer, Assistant Botanist, Agricultural Department, Mandalay.

Y. Ramachandra Rao.

[We thank the contributor for kindly remembering our Journal in far off Burma. Ed.]

Extracts.

Value of Duck manure.

The high value of duck manure is recognised by those who have kept ducks, but does not appear to be appreciated by farmers generally. Upon this question scientific observation is needed, but those who kept large numbers of ducks bear testimony to the remarkable improvement in the herbage of

pastures upon which the ducks have been thickly kept for one season, and their practical experience leads to the conclusion that the manurial effect is felt for three or four years. In some instances the number of birds kept is so large that the grass appears to be entirely eaten off, and the earth is quite bare; the grass, however, springs up luxuriantly the following year, the manure apparently favouring the finer grasses. Hence ducks may have an economic value in the improvement of pastures, apart from any profit which they may yield. Upon farms where fresh ground can be used for the ducks annually they may take the place of larger stock, and avoid the necessity of using so much artificial fertilisers. (*From the International Review and practice of Agriculture 1917*).

C. T.

Bombay Annual Report 1916—17.

We have just received a copy of the Bombay Agricultural Department Report for the year 1916—17 and extract the following therefrom as it has a direct bearing on the subject for the Munagala Prize competition this year. (Ed).

An increasing number of old students take to farming on their own account, and the demand for our graduates is in excess of the supply. Some people appear to consider that the test of success of an Agricultural College is to be looked for in the number of its students who start farming with success on their own account when they leave College, and there is, no doubt, something in the argument. It must be recognized, however, that there are various causes which operate against students taking this course. Some of them have no capital and others have no suitable land, while many who might be in a position to obtain the capital and the land are diffident of starting unaided farming on a scale sufficient to support them in the style to which they are accustomed. This last reason is perhaps the most operative, and the feeling on the part of the students is natural and justified in cases where the family circumstances of the students do not bridge over the gap which exists

between the farming to which they have been accustomed under College conditions and the farming of which they are thinking as independent farmers. When students think of setting up for themselves as farmers they nearly always aim at growing sugarcane and other garden crops on a canal, and this is natural, since the chances of profit are higher, the risks less and the rewards for skill more assured under such conditions than in the case of dry farming. I found the same attitude prevalent amongst the students of Agricultural Colleges in the dry tracts of the United States of America where very successful colonies of students had been planted out on the canal areas. With the programme of canal development that we have before us in the Deccan I believe that there would be a great opening for our students on new canals where land can be obtained at easy rates, and to facilitate this we must try to bridge over the gap between College farming under supervision and business farming without assistance. I believe that this could be done if we had under a canal a compact area of (say) 200 acres equipped and ready for use, which we could temporarily lease out to suitable students in small areas suitable to their requirements. In such a colony would-be farmers could gain practical experience without undue risk, afford each other mutual assistance and obtain help from the Department when they require it. After a few years of farming under these conditions they would be in a position to make way for new comers and to pass on to independent farming on a larger scale.

Native Treatment of some common ailments of Cattle.

Cough.—Foment chest with hot water, and give milk with "bedumba." (*Trema orientalis* Bl., Pey Minnai (Tam).—

Cancer of the Ear.—Grind "pitawakka" (*Phyllanthus Niruri* L. Kizaha Nelli. (Tam) leaves and mix it with king coconut milk, and boil till an oil is formed. Apply this oil to the ear.

Diarrhoea.—Ginger, "tippili" (Tam) *Piper longum*, "lunuwarana" *Crataeva Roxburghii* Br. chinna mavilingam (Tam.) garlic. Grind the above ingredients and make small pills. Make the animal eat these pills with straw.

Dysentery.—Give an infusion of "athudayan" *Lagenandra lancifolia* Thw. "bamakiriya" (or "lunuwila" (*Herpestis monnieri* H. B. K. Nir pirami, Tam) coconut flowers "attikka" *Ficus glomerata* Roxb. Atti, Tam) "kaladuru" (*Cyperus rotundus* L. Korai Kizhangu, Tam) "kapprawalliya," (*Coleus aromaticus* Benth. Karpura valli, Tam).

Falling of hair.—Sarsaparilla, "bael" (*Aegle marmelos* Corr Vilvam, Tam), "nika" (*Vitex negundo* L. Nochi, Tam) "pamburu" *Atalantia Missionis* Oliv. Kattu Naranji or Kurundu (Tam) castor. Pound the roots of the above ingredients and extract the juice. Heat this with oil of "mi" tree (*Bassia longifolia* L. Iluppa Tam) and apply on the skin.

Fracture.—Pound "mediya" (*Hunteria corymbosa* Roxb) creeper with roots, turmeric and salt. Apply this and wrap.

Mouth disease.—Make it drink the juice of "kapprawaliya" (*Coleus aromaticus* karpura valli Tam) leaves with gingelly oil.

Hoof disease.—Make it drink the juice of "lolu" *Cordia myra* L. Naruvalli (Tam) bark with whey. Apply cloves, nutmeg and "margosa" (*Azadirachta indica* A Juss Veppa maram Tam) leaves on the hoofs.

Limping (Rheumatism):—Make it drink the juice of "loofa" *Luffa acutangula* Roxb Peerkam (Tam) leaves and lime fruit *Citrus medica* var *acida* Elimichai (Tam).

Stomach ache.—Ginger, garlic, "wada kaha" (*Acorus calamus* L. vasambu (Tam), "athdembata" (*Gmelina arborea* Roxb). Kumalam (Tam). Extract the juice of the above and make it drink with water left after washing rice.

Sores.—“Aralu” (*Terminalia chebula* Retz. Kadukkai (Tam) “kaippu (arecanut cutch), and cloves. Grind the above with cold water and apply on sore.

Worms in Calves.—Flagstaff (*Acorus calamus* L. Vasambu (Tam) kuppameniya (*Acalypha indica*, Kuppai meni (Tam) ginger, garlic. Give the above with gingelly oil.

(From the Perideniyan May 1917).

P. B. Kapuwatte.

Colour in cane juice.

Mr. M. A. Schneller, of the Louisiana Agricultural College, who has been investigating the colouring matter in cane juice contributes an interesting article on the subject to our American contemporary “Facts about Sugar.” His conclusions are summarised as follows:—(1) The eyes and tops of sugar cane contain polyphenols which pass into the juice. (2) Traces of iron are sufficient for the production of a very dark colour in such juice. (3) Reducing agents, such as SO_2 and hydrosulphites are only temporary remedies. The dark colour returns on oxidation or cooling of juices and syrups. (4) the dark shade of plantation white sugars, increasing in storage, is due to traces of phenol-iron compound. (5) A permanently light coloured juice may be obtained by:—(a) complete elimination of all traces of iron and complete avoidance of contact of liquors with iron during further stages of manufacture. (b) Elimination of polyphenols by boneblack vegetable charcoal, etc. (6) The polyphenol content of juices could be reduced by topping cane low, using tops for planting. This would result in a distinct improvement of the colour of juices.

(The Australian Sugar Journal, 11th April 1911).

T. S. V.

News and Notes.

A Sericultural School will be opened by the Mysore Silk Syndicate with effect from 1st July 1918, for imparting male and female students a course of instruction both practical and theoretical.

in mulberry cultivation, rearing of silk worms on rational methods for seed, reeling of Silk, and elementary principles of weaving.

The course as at present arranged extends from six months to one year. Each student is required to pay a nominal fee of Rs. 12 for the whole course, half of which should be paid on admission and the other half before January 1919.

Candidates for admission must be able to read and write English and should apply to the undersigned not later than the 25th June 1918.

Students showing sufficient aptitude will be employed by the Syndicate on salaries ranging from Rs. 15 to Rs. 50 per mensem.

The undermentioned exstudents have been selected for admission to the second course:—

- | | |
|--------------------------|-----------------------------|
| 1. Balaji Rao, T. K. | 5. Ranga Reddi, C. M. |
| 2. Gopala Chetti, M. | 6. Subrahmanya Ayyar, K. K. |
| 3. Raghavan, K. K. | 7. Subrahmanya Pillai, M. |
| 4. Ramaswami Raja, K. A. | 8. Venkatarangam, A. |
| | 9. Vittal Punja, A. |

Already in the Department and Deputed for the second course.

10. Govindan Nambiyar, K.
11. Kunni Kutti, P.

Mr. D. Ananda Rao left for Bellary and Anakapalle on the 1st of June in connection with the selection of students.

Mr T. S. Venkatraman Assistant to the Government Sugarcane Expert has accepted the Wardenship of the Students' Hostel.

Correspondence.

Dear Editor.—Now that interest is being evinced in the preparation of Jam from various kinds of fruits I wonder if the “Panchamiritham” which is prepared as an offering to the Hindu

God on the Palani hills almost every day is as widely known as it deserves. It can be kept for months without the necessity of careful sealing and appears to deserve investigation. "326"

We request one of our constituents near about Madura to oblige us with a contribution on the subject. We believe we have a right to look upon all our subscribers as "The Eyes and Ears" of our journal. [Ed.]

Dear Editor.—Ament the recent Jam Conference is it sufficiently known that a kind of raw jam is prepared from the fruits of the wood—apple and is a common article of food in the Indian household. This has a strong and attractive flavour.

"Wood apple."

Dear Editor:—Apropos of the recent 'Jam Conference' at Delhi may I suggest an experiment with prickly pear fruits, which are said to have cooling properties and have, from time out of mind, been serving as an occasional food to villagers in poor circumstances. The flavour surely is not disagreeable and several other fruits having a combined sweet and sour taste are considered conducive to health and command high prices, while the fruits in question are had for the mere collecting and in any quantity and almost everywhere in this country. In fact, it is this cheapness that has rendered them despicable. I am quite sure of a good Jam from them and, if the trial is successful, we shall have tapped a practically unlimited source of supply for Jam making.

C. N. Subramania Iyer,
Principal's Office.

Departmental Notes.

1. Mr. C. Arulanandam Pillai, Assistant Farm Manager, is confirmed in his post with retrospective effect as recommended by the Deputy Director of Agriculture, Fourth Circle, St. Thomas Mount.

2. Mr. V. V. S. Varadarajam is appointed as Assistant Farm Manager on Rs. 35-2½-75 on probation and posted to Samalkota Farm for training.

3. Mr. O. Tadulingam, Assistant in Botany and Acting Government Lecturing Botanist is, on relief on 17th May 1918, granted privilege leave for one month.

4. Mr. M. K. Nambiyar, Farm Manager, is granted privilege leave from 9th May 1918 to 19th May 1918 both days inclusive and will join duty at Taliparamba Farm on 20th May 1918 as already ordered.

5. The privilege leave for one month and 11 days granted to Mr. P. A. Subramanya Ayyar, Assistant in Chemistry is extended by 20 days so as to make it up to two months. The acting arrangement in his place will continue.

6. The privilege leave for two months and 15 days granted to Mr. K. Ramana Ayyar will take effect from 15th April 1918. After the expiry of his leave he will join at the Sirvel Agricultural Station on 9th July 1918 taking the joining time allowed under the rule.

7. Mr. N. V. Viswanatha Ayyar, Agricultural Demonstrator, South Arcot, is granted privilege leave for two months from or after 15th May 1918.

8. Mr. M. P. Kunhi Kutti, Assistant Farm Manager, Central Farm, is granted privilege leave for 25 days from or after 21st May 1918.

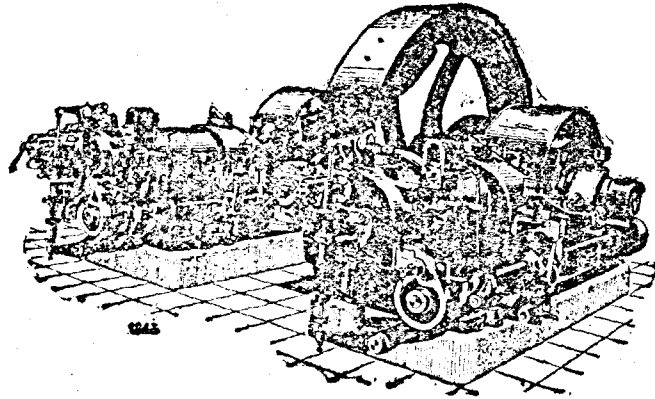
Correction.

On page 68 last sentence March issue read "by all ex-student members" for "by all student members."

(v)

THE
HORNSBY OIL ENGINE

AND THE
Hornsby Stock Port Suction Gas Engine.



Massey & Co., Ltd.,
MADRAS,
Sole Agents.

ALSO MANUFACTURERS OF

All Classes of

AGRICULTURAL MACHINERY

INCLUDING

Sugarcane Mills, Ploughs, Rice Hullers

Centrifugal Pumps, Oil Presses.

Price and particulars forwarded on application.

Printed at the Literary Sun Press, Coimbatore

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

Vol. VI.

June 1918.

No. 6.

Editorial Notes.

We offer a very cordial welcome to His Excellency as President of this year's Conference and College Day celebrations. We need hardly say we greatly appreciate the honour thus done to our Union. The great and sustained interest evinced by His Excellency in matters agricultural fits in very well with Indian ideas as to the functions of a Ruler. One of the most revered Queens in the past is said to have been born from a plough furrow, while a plough is said to have been the weapon of one of the mightiest of India's Kings.

The presence of the Zemindars and the Rajas at the year's Conference which, we understand, is now fairly well assured, is a source of pride and satisfaction to us and to them we offer again a hearty welcome.

We commend to their perusal a contribution entitled "Zemindars and agriculture," from a correspondent who happens to be acquainted fairly well with more than one Zemindari.

The new batch of students are in, and to them we offer our greetings as our future co-workers and colleagues.

To such of them as find the practical work rather taxing at the start, we give our assurance based on past experience that in the long run they will find it 'alright.' Many a student in the past has borne personal testimony to the thorough healthiness of the course and this is no wonder, for, the work of the students in the college lies not so much in crowded class rooms in-doors but in open fields "with the flowers and birds around."

Elsewhere will be found short notes on what the visitors can see at the College and round about. These are by no means exhaustive, but indicate the main items to be seen.

A word to
the Visitors.

Blast of paddy in Tanjore District.

In Papanasam Taluk of Tanjore District there has been a marked shortage of this year's crop on the variety of paddy called Korangu chamba. The cultivators attribute the short crop to unwonted rain at the end of December, but this is an after-thought remembered at harvest time to explain the shortness. As examples of how small the crop has been in particular fields the information got in Umaiyaipuram is interesting. Last year

Korangu chamba gave 280 Kallams per velei or 1008 Madras measures per acre. This year 300 Kurzhi gave 30 Kallams of which 4 Kallams remained after winnowing, i. e., 96 Madras measures per acre. Another field of 400 Kurzhi gave 8 Kallams of which 10 Marakkals remained after winnowing i. e., 20 Madras measures per acre. A ten cent plot in a badly infected field in the village of Umbalapadi was harvested and winnowed in my presence. The paddy consisted of $3\frac{3}{4}$ Madras measures weighing 308 tolas i. e., at the rate of $37\frac{1}{2}$ Madras measures per acre. The owner said the usual yield in a ten cent plot on this land was 120 Madras measures and the Tahsildar told me the average for the taluk was 72 Madras measures. On the first estimate the crop is $3\frac{1}{2}$ per cent of the normal or a $\frac{1}{2}$ anna crop while on the second it is $5\frac{1}{8}$ per cent of the average or a $\frac{5}{8}$ anna crop. Before I arrived most of the paddy had been harvested and of what still remained on the ground this field was by far the worst I saw. According from it no estimate can legitimately be made of the loss over any large area and such an estimate I had no means of making though figures given me by the Tahsildar from the Village Officers' reports show that over an area of 1,700 acres the average this year is 9 Kallams or 216 Madras measures per acre. From this plot the grains of 50 ear-heads that had a dark discolouration on the stalk just below the ear-head but that looked otherwise normal were counted. There were 7,275 paddy-grains but all of them were empty except 171 and these were found on 9 ear-heads i. e., 2.3 per cent of the grains contained rice-grains. When I say the ears were empty I mean that squeezed between the fingers they felt as if there was nothing inside. On opening the glumes a remnant of a rice-grain was present in each paddy-grain, but it was of no use as rice.

According to information given me by the Tahsildar the area sown in Korangu chamba as second-crop paddy in the villages of Ganapathi Agrabaram, Perumalkoil, Sarukkai, Kapistalam, Ramanyapuram, Umaiyaipuram, Thysgasamudram, Alavendia-

puram, Umbalapadi, Govindanattucheri, Ullikadai and Vichirapuram was 1687 acres. The yield varied from $1\frac{1}{2}$ to 21 Kallams per acre, the average being about 9, i.e., 216 Madras measures per acre. In these villages too about 428 acres of this variety was sown as first crop, three quarters of which was in the two villages of Ganapathi Agraharam and Umbalapadi. The yield varied from $1\frac{1}{2}$ to 30 Kallams per acre, the average being about 11 or 264 Madras measures. This shows that there was considerable shortage in the first crop. Outside these villages there does not seem to have been much talk of shortage crop and the variety is said not to be widely grown in the taluk as a second crop paddy.

According to the villagers Korangu chamba was first tried as a second-crop paddy in Ganapathi Agraharam and was brought in 1915 from Mannargudi, a village about 25 miles south where it is grown as a single-crop paddy. The 1915—16 crop in its new conditions was a very good one. Being well spoken of it was tried on a large scale next year and the crop was again good being 40 to 70 Kallams or 960 to 1680 Madras measures per acre. This year, however, it has caused much disappointment. To Umbalapadi and Umaiyalpuram it was brought in 1916 from Melalatur a village about 7 miles west where too it is a single crop paddy. The first year's crop was a heavy one but this year it is very poor. Several people have declared that they will not grow this variety again. There is little likelihood of its being used in these villages and a note of warning has been given to ryots generally in the delta to avoid this variety on double-crop land.

Characters of the disease.—Small spots 1 millimetre or more in size appear on the leaves. Each spot extends through the tissue of the leaf and appears equally on both upper and lower surfaces. Reddish or brownish at first, the centre soon becomes pale yellowish (khaki coloured). The spots extend more rapidly in the longitudinal direction and may become 2 centimetres long



HIS EXCELLENCY LORD PENTLAND, P.C., G.C.I.E., G.C.S.I.

*President-elect of the Madras Agricultural Students' Union
Conference 1918.*

in by 1 to 5 millimetres broad. By this time the edge of the spot to some distance beyond what is now a reddish line becomes pale brown and ultimately the whole area of the spot becomes brown. Adjacent spots coalesce. The brown areas sometimes extend along nearly the whole of one side of the leaf-blade or they may extend across it. The leaf gradually withers from the tip downwards. The central part of the spot assumes a soiled smoky appearance owing to the presence of the sporophores and spores in abundance, and this occurs on both surfaces of the leaf. Spots are found on the leaf-sheath as well as on the leaf blade and may also involve the ligule. When a spot is present at the junction of the blade and the sheath this part often becomes very dark brown. When that part of the leaf-sheath immediately outside a node is infected the stem below it is sometimes infected too, becoming almost black at the node and for 1 centimetre or more below or above it or both. The stem sometimes bends over at this infected node. When the leaf that encloses the ear-head is infected some of the glumes touching the spots become dark-brown and the region of the stem below the ear-head becomes brown and ultimately almost black for a distance of about 3 centimetres. This discolouration also extends upwards into the lowest branches of the ear-head. Not infrequently the stem collapses and breaks at this place and the ear-head hangs downwards. Apart from a few dark-brown glumes the ear-heads usually look quite normal yet the ears are seldom filled. They either have no rice-grains or very stunted grains though some of them may be filled normally. In many cases the people had no suspicion that the plants were abnormal and they expected a good yield. It was only when the coolies, paid in kind for their first day's work, complained that they got no rice from the paddy that the owners realised that their crop was short. The disease seems to have attacked the plants quite early in some places as the main tillers had matured and there was a considerable amount of secondary growth of branches from them. The ear-heads of the latter showed arrested developement and in

many cases their branches were not expanded, but had remained together as they were in the stage when they protruded from the sheath. The ears very seldom contained rice-grains. These young branches, as they were in all stages of development, showed well the various stages of the attack. When a young branch had been attacked early, i. e., before the ear-head had come out of its sheathing-leaf, the leaves had numerous spots and were dried up and the ears were empty. The empty ear-heads stand erect and are conspicuous in the field when the normally matured ear-heads all bend over with the weight of the grain. When a branch had been attacked later, the spots occupied a small proportion of the leaf-surface and the ear-heads were comparatively well filled though some contained stunted half-formed rice-grains, on the other hand some plants lightly attacked had well-filled ears. A considerable number of plants appear to have been attacked while in quite a young stage. The earliest formed leaves were covered with spots and were dried up as also were some of the later formed leaves. The plants were only about 30 centimetres high. They had very few stems with ear-heads and even these contained only empty glumes. The disease was found also on the young shoots that had grown from the stubble after harvesting. The characters of the disease found on Korangu chamba were also seen to a small extent on Kurun Kuruvai, Chinna cherumanian, Vellai cherumanian, Thogai chamba and Thanga chamba but not on Tillai chamba, but there is no complaint of short crop on any of these. Two plants of Chinna cherumanian were found in the field from which the ten cent plot was chosen but they did not have the disease.

The fungus *Piricularia oryzae* is found on the spots on all positions in which they are found on the plant viz., leaf, node, stem below and branches above the junction of the ear-head and stem, and ear-head and glumes and in all the varieties noted. Its hyphae penetrate the cells of the various tissues of the leaf and are found

in abundance. The sporophores protrude in groups of two to four from the stomata and nearly every stoma on a spot may have its quota. The spores are formed singly at the end of the sporophore. When one spore is shed the sporophore grows a little and produces another and five may be produced in all. When looked at through a lens the surface of the spot appears to be covered with a brown delicate network which consists of sporophores and spores. The spore is pale-yellow and pear-shaped, the broad end being attached to the sporophore and at the broad end is a slight protuberance that attached it to the sporophore. Each spore has two cross walls. They measure 18 to 37×8 to 12μ . They germinate readily in water. Two hours after immersion they begin to germinate and in 18 hours have produced long branching hyphae sometimes with spherical chlamydospores with slightly thickened walls and dense protoplasmic contents. These measure $8-14 \times 8-10\mu$.

Metcalf says that the three-celled spores rarely survive over three months, but that the chlamydospores may survive at least twenty months. There is thus ample opportunity for the fungus to live over the dry weather and infect the next crop. The fungus has been declared to be the cause of Brusone in Italy by Cavara and Farnetti, of rice-blast in the United States of America by Metcalf and Foulton and of imotsi in Japan by Kawakami. In these countries it has done a very great deal of damage.

Seeing that paddy as it is grown is not adaptable to ordinary preventive measures, any method of control of the disease will have to be along cultural and selective lines. The cultural and climatic conditions are factors for the investigation of agriculturists and any information on these points that is likely to have a bearing on the lack of accommodation of this paddy to its new conditions and the presumed acquired susceptibility to disease will be of the utmost value in dealing with it.

W. Mc Rae,
Government Mycologist.

Zemindars and Agriculture.

It may be taken for granted that, whatever may be the hoary traditions and wise experience of the actual cultivators in India, much more can be, and has to be, done in increasing the productivity of the soil to meet the needs of the growing population, and it may also be granted that the Departments of Agriculture in the different Provinces are generally proceeding on right lines in solving the problem. As the Honourable Mr. Butterworth remarked in his address at one of the earlier Agricultural Conferences, the Agricultural problem was being played with in Madras for 25 or 30 years and it was only about a dozen years ago that it was definitely decided to pursue a vigorous agricultural policy throughout India. During this short period much substantial progress has been made. The Governments of Native States have adopted similar vigorous measures for the improvement of agriculture; and the Agricultural Departments of Mysore and Travancore are not behind the Madras Agricultural Department in the work that they have done; and this is undoubtedly due to these Native States having staffs as well trained and as efficient as those in the Madras Presidency.

Occupying a third of the whole Presidency, the Zemindars of Madras, both of the impartible and partible estates, have yet to inaugurate a similar definite Agricultural policy. The officers of the Madras Agricultural Department have occasionally been helping the Zemindars with advice whenever they were asked, but in practice they have limited their operations to ryotwari villages. Self-interest demands that the Zemindars should have their own agricultural staff. Let us explain the position clearly. In ryotwari villages, resettlement of land occurs once in 30 years and increased taxation is levied not on improvements made by ryots out of their own resources, but on works executed by Government and on increased prices prevailing at the time of resettlement. The object of Government in instituting an Agricultural Department is, therefore, to make the cultivators' position happier and more comfortable and to ward off the cruel effects

of periodical famines in the country. On the other hand, Zemindars have most of their estates permanently settled and pay only a definite fixed amount as kist, whatever may be the gross revenue. The practice obtains in most estates of receiving the landlords' share in kind. There are also vast cultural wastes in most Zemindaries. They have thus ample opportunities of making more out of their land than the Government can out of ryotwari villages. It follows, therefore, that the fuller their lands are occupied and the better the methods of cultivation pursued therein, the greater the net profit to the Zemindars, let alone the increased comforts to their tenants. It is, therefore, surprising that, with the exception of a few isolated home farms in some of the Zemindaries,—some of them quite unsuccessful owing to inefficiency of staff or absence of a definite aim—no attempt has been made to tackle this question.

The Zemindars are said to be a privileged class, but the greater the privileges the greater are their responsibilities, to the paramount power above and to the tenants below. The obligations due to Government are more than fully met, as is evidenced by the great sacrifices which all of them have made in men and money in the present war crisis. The duties to the tenants cannot be said to have been always well discharged, barring some brilliant exceptions, as may be seen from the fact that the Zemindars as a class were not favourably disposed towards the Estate Land Act which was meant to safeguard the tenants. Almost all estates have their staff of Zemindari Vakils in every Munsif's Court and this is probably essential to safeguard their interests as against unscrupulous tenants. What we ask is "cannot a portion of the resources of the Estate be equally diverted for purely agricultural work?" After all, a Zemindar is but a landholder and derives his income from land, and it is to his advantage that his lands are all occupied and well cultivated.

Except probably a few very large Zemindars, it is not possible for each to have a well equipped Agricultural Department, and it is no good to have a badly organised, insufficient and inefficient staff. The Court of Wards had, several years ago, an Agricultural Expert, and we

believe that Mr. H. C. Sampson, now one of the most efficient Deputy Directors of Agriculture in Madras, first came out to India as Expert to the Court of Wards. We do not know why the post was abolished, but apparently it was due to the absence of any definite agricultural policy. A good Agricultural Department is what is wanted and, to start with, it may be attached to the Madras Landholders' Association or the Rajkumar College.

One pie per Rupee of kist payable to Government levied on all members of the Landholders' Association is probably enough to meet the charges of the establishment, and such Zemindaries as utilise the services of the agricultural party may be made to pay for them. The Rajkumar College is intended to teach the sons of Zemindars, but we do not consider that the College will be properly equipped unless it has as good a staff of agricultural experts as there are likely to be staff for teaching English and the sciences. The Madras Landholders' Association is comparable to the Royal Agricultural Society of England composed of the landed classes in that country, and that society has its own staff of eminent Chemists, Botanists, Entomologists and Agriculturists. The kind of staff employed by this private society may be gauged by the fact that it was its chemist, Dr. Voelcker, who was deputed to report on the improvement of Indian Agriculture nearly 20 years ago and whose report formed the basis for the present agricultural policy in India.

Lastly during the present war, the Governments of all allied countries have devoted more attention and diverted more funds than ever before for increased crop production which has been made, more or less, a Military question. The Zemindars have done much to help the British Flag. Have they increased crop production? In all good causes, rather than be gratified with what one has done, it is good to ask the question "Is this all that can be done?" Imperial necessity, self-interest and welfare of the cultivating classes, all seem to point to the desirability of the Zemindars inaugurating a vigorous agricultural policy and the sooner it is done the better.

M. R. Ramaswami Sivan.

We have since heard with deep regret that faction has crept into the Madras Landholders' Association and that it has been split into two. We hope that ere long the sections will join again into one solid body.

[Ed.]

Progress in Cane cultivation in Madras.

Although Madras possesses some of the very good varieties of sugarcanes, and the soil and climatic conditions are very favourable for the growth of cane, the profits realised by the cultivators are not big enough to induce them to increase the area. A study of the Report of the Operations of Department of Agriculture will show the various directions in which cane cultivation and the manufacture of jaggery can be improved.

Varieties.—From the comparative varietal tests made in the several Government Farms, it appears that some introduced varieties of cane fare better than the local ones. Some varieties come up well in some tracts, so that the Department is recommending certain special kinds of canes suited to each locality. In Samalkota Farm, B. 3412 gave a good yield of 4.6 tons of jaggery per acre, and gave an equally good yield in Palur Farm under very adverse conditions. This variety is however not a very suitable one in *delta tracts*, where the conditions, irrigation and drainage are not satisfactory. In such places J. 247 was found quite suitable, as was shown by its superior growth, best tillering capacity and wonderful power to withstand drought and water stagnation. At Anakapalli it was the only variety that was free from Redrot, while all others grown side by side were severely attacked. Red Mauritius is found to be quite suitable to the West Coast conditions and it grows very well there. Its hard rind is an advantage in minimising the jackal trouble.

The sugarcane breeding station at Coimbatore has produced a number of new varieties, giving a greater amount of cane, with a higher percentage of sucrose than the local ones. These are being put to

test on a field scale, and one of these M. 326 was found to give a very good yield. In the Central Farm, Coimbatore, a number of varieties were tested side by side, and Mauritius 55, gave the best yield of 55 tons of cane giving 4.8 tons of jaggery per acre.

Planting:—In many places the ryots plant too many setts, and plant also too closely in lines. Thus in Chittoor District, they use as many as 35,000 setts per acre, so also in Godavari Delta where they spread the setts broadcast in the mire and press them down. In addition to the large waste of money in the seed, intercultivation, which is very necessary for cane is made very difficult and consequently the yield goes down. The department is demonstrating the method of planting in lines, and using a lower seed rate. Thus in Chittoor District, the ryots have saved in seed rate alone Rs. 75 per acre. It is better to plant as much of the tops of canes, as possible as this saves a lot of useful canes, which will increase the output of jaggery. At the same time, the germination is much better, and the experience seems to be that the tops produce better canes than the middle and bottom setts.

Manures:—An experiment was conducted at Samalkota to test what quantity of castor cake would be necessary to apply, with a normal manuring with cattle manure at 10 carts per acre. For this purpose some plots were given 10 cartloads cattle manure and $7\frac{1}{2}$ bags of castor cake, while to another set of plots castor cake alone was applied at 10 bags per acre. The combination of Farm Yard manure and castor cake gave 1200 lbs. of jaggery more per acre than the application of 10 bags of castor cake alone.

It is wonderful how well the cane grows in the very saline soils of the sugarcane breeding station. The soil was improved by the continued digging in of green manure crops of daincha or lablab, the addition of tank silt and the contents of weed pits and the keeping of open surface drains at short intervals. Daincha is sown along the lines of cane immediately the shoots begin to appear above ground and is cut twice, when it overtakes the cane shoots and buried into the soil close to the plants and finally the whole plants are pulled out

and placed in the trench between the rows, when the cane leaves cover the ground. This prevents evaporation from the surface of the soil, and the bringing up of salts to the surface. The land is also kept well stirred and trash is also spread on the surface if necessary.

After cultivation:—An experiment in Samalkota on wrapping the leaves of cane round the canes themselves, and propping them with bamboos etc., to prevent their lodging resulted in an increase of 3640 lbs. of jaggery per acre, over the unwrapped plots.

Preparation of jaggery:—The furnace used by the ryots for preparing jaggery is wasteful, and the Department is recommending an improved furnace, the use of which involves no extra fuel, as the trash and megass of the cane alone are found sufficient to boil down the juice. This will effect a saving of about Rs. 20 per acre. These are being built for the ryots, by the maistries trained in the work.

The Agricultural Department is working two power crushing mills one at Pallapalayam in Coimbatore District and another at Hospet in Bellary District. The plants consist of an oil engine with a three roller mill suited to it, a set of improved furnaces, with sheds for storing jaggery, quarters for the driver etc. That the plants are working very satisfactorily can be seen from the fact that two private factories have already been opened on the same model one in Irungur and the other at Coimbatore.

The following data on the working of the crushing plant at Pallapalayam are very instructive:—

The engine worked for 164 days of 12 hours each in the season and 3106 cartloads of a ton each were crushed during the period. The outturn of jaggery was 1602 pothies (of 250 lbs. each) giving an average of 10 pothies a day. The estimated value of machinery is Rs. 10,500. The plant was given to a contractor at Rs. 333 a month, the cost of fuel and labour charges being met by himself.

His gross earnings were	Rs. 4985-14-9
His expenses Hire etc.	Rs. 1665-0-0
Labour charges	2373-9-0
	<u>4038-9-0</u>

His gain is 947-5-9

Which comes to 10 annas for every pothy of jaggery made.

K. Raghavachari.

Note on the cultivation of Cummin seed, Cuminum Cyminum.

This is said to be largely cultivated in Badiveli and other taluks of the Cuddapah District. It is to a small extent cultivated in three or four villages, Ramapuram, Anumalavidu, Gudimetta etc., in Cumbum Taluk Kurnool District. The cultivation of this crop is given up by the ryots of the aforesaid villages for the last three years on account of poor return they were getting from it which was due to the attack of a fungus disease, which it is invariably liable to. This is locally known as 'Budidathegulu'. The leaves become ashy in colour and gradually dry up. The ryots are willing to take up the cultivation again, provided they are assured that something will be done to prevent the attack of the pestilential disease. Thus there is a large field for the Mycologist to investigate the disease and to find out remedies for combating the disease successfully. The ryots are asked to grow the crop again with a view to find out whether it will get the same disease again, as it was out of cultivation for the last three or four years. If it gets the same disease again, the infected plants will be sent to the Government Mycologist for examining and suggesting remedies for the same.

Soil.—It is generally grown on garden soils under well irrigation. It thrives best on red and misrama (mixed neither red nor black) soils commanding good drainage. It does not require much water for its healthy and successful growth. The crop if grown well grows to a height of one to (1½) one and quarter foot in height.

Rotation.—It follows either Sajji or Jonna or Korra. It is also grown on lands solely reserved for this without growing any other crop—this kind of land is known as Kannyabhami in Telugu.

Preparatory cultivation.—The field is ploughed three or four times. The stubbles of the previous crops, if there be any, are carefully collected and burnt.

Manure.—After 2nd ploughing is given, 20 cart loads of cattle manure are applied per acre. Then after spreading the manure evenly the field is again ploughed twice and guntaka is worked twice to incorporate the manure well into the soil and to clear the field of weeds. The crop requires fine tilth and clear bed for its successful growth.

The field is then divided into small beds measuring 15'x 6' which are levelled with an implement called Choukattu 'Dantelu' provided with wooden planks instead of ordinary wooden pegs.

Sowing is done in the month of November (Anoradha Karti) when he is sure of getting no heavy rains. Fresh and good seed at the rate of 25 to 28 lbs., per acre is sown broadcast and brushes made of small twigs of Veluthrukatta a small shrub which is thought to possess the property of preventing the fungus disease Budidathegulu. The beds are then irrigated. Till it germinates well it is frequently irrigated. The germination begins on the 6th day and will be complete on the 9th day after sowing.

It is irrigated afterwards, once in 10 or 15 days according to the nature of the soil where it is cultivated.

Interculturing.—When the crop is 20 days old a hoeing is given with an implement known as parakola which is provided with a sharp blade of iron.

It commences flowering after two months it was sown, and a month or so after flowering it becomes fit for harvest. The harvest takes place generally at the end of February or at the beginning of March.

Harvest.—It is generally pulled out by hand just as bengal gram, horse gram, and variga crops are done. It is then transplanted to the thrashing floor where it is dried. It is either threshed by cattle or beaten with sticks if the produce is small.

Yield.—The average yield is about seven (7) maunds of 25 pounds each, 175 lbs.

Cost of cultivation and profit per acre.—

	No.	Rs. as. ps.
1. Ploughings 6 pairs.	4	6 0 0
2. Cattle manure	10 cart loads	10 0 0
3. Spreading manure.	8 men	3 0 0
4. Guntaka Working.	2 pairs.	2 0 0
5. Making beds.	6 men.	2 4 0
6. Hoeing once.	20 women.	3 12 0
7. Irrigations.	10	20 0 0
8. Harvesting charges.	10 women.	1 14 0
9. Threshing	4 men.	1 8 0
10. Seed 25 lbs.		14 0 0
11. Kist.		1 8 0
Total.		65 14 0

Total cost of cultivation per acre is Rs. 66.

Yield.—7 maunds at Rs. 14 per maund Rs. 98.

Less cost of cultivation. „ 66.

Net profit per acre. 32.

V. Rathnaji Rao.

To the Visitors.

We publish below short notes on what the visitors can see at the college and round about during the time of the College Day and Conference. Our thanks are due to the Heads of the various sections at the Institute for kindly helping us with material.

The College.

Visitors to the College during the festivities will not see much of the educational side of the work going on here, at least not the part that is usually associated with the use of this term. For, to the average man, education implies some kind of class work, the definite imparting of instruction at fixed hours and in fixed quantities. In a wider sense, education may be described as continuous, and concerning itself with everything with which an individual is brought into contact during the whole of his waking hours. It is for this reason that an education given in a residential institution is generally so superior to one in which the student is separated for a great portion of the time from educative and enlightening surroundings. The splendid proportions of our College, which greet the students almost the moment he opens his eyes in the morning, the lavish, I had almost said wasteful way, in which it is built with lofty halls and echoing corridors, are silently and continuously carrying on the educative work which is more apparent, though more intermittent in class hours. We would ask our visitors therefore to judge our students not so much by what they *know* but by what we hope they are and by what we are trying to make them, courteous and honest in their dealings with their fellowmen and observant and resourceful as regards the world around them. If the method of teaching appears at first somewhat unorthodox, we would ask our visitors to view it from this standpoint.

The Museum.

The museum at the college is well stocked with specimens bearing on Agriculture and allied subjects and is always worth a visit.

The Laboratory of the Government Agricultural Chemist

In this section the visitors can see the kind of work which students are doing and the various stages of analyses connected with agricultural problems which the members of the staff are tackling.

A fairly representative collection of fruits and seeds is also kept in the herbarium for ready reference.

The Botanical Laboratory.

This is well equipped for the study of the morphology and physiology of plants and is intended to accommodate ordinarily twenty students.

The equipment consists of:—

- (1) Herbarium specimens to illustrate morphology, specimens of grasses and weeds found growing on the estate.
- (2) A large and varied collection of specimens of fruits, flowers and parts of plants preserved in spirit and formaline which afford material for study at all times of the year.
- (3) Simple and compound microscopes.
- (4) Drawings illustrating the internal and external parts of plants of ordinary occurrence, crop-plants, weeds and common grasses.
- (5) Some water-culture experiments conducted by students may now be seen.

The laboratory of the Government Entomologist.

In the Entomological laboratory can be seen a large collection of insects of all kinds (dead of course) kept in show cases including many of Economic importance.

The Central Farm.

The fairly complete system of labels which the visitor will find, in his wanderings round the Estate, will enable him in most cases, readily to understand what is being done, but there is one point which at first may puzzle him. He will see in many crops, a number attached to the crop, or to the variety of the crop. Cholan 62, Sadai Samba 23, or more simply Paddy No. 25. This indicates that the seed sown in the field to which this label is attached, is from a "unit strain", that is, that it has descended from a common ancestor. A

single plant of paddy may produce easily 200 fertile seeds, and this if carefully grown will produce 40,000 seeds, or say a couple of pounds, which in the next year will give enough seed to cover quite a large area.

The object of this selection, is to take advantage of the great variation which is seen to exist between individual plants. A very casual examination of any field will soon show the presence of tall and short plants, plants with few or many leaves, thick and thin plants, plants with loose and plants with tight heads, plants of different colours, plants in short showing variation of every description. It follows then that some of the plants must be superior to the average, just as others must be equally inferior. It is the business of the selector to search the field thoroughly and find out by careful examination, which are these better plants, and having found them, to grow them carefully and compare them with each other and with the average in every possible aspect. As soon as he forms his conclusion that individual, or that individual's progeny is chosen and is used to the exclusion of all others.

As the number of plants selected may be very many, the serial number of the selected plants may be high; in more than one case over 100, which means that out of this large number, this one has finally been picked as the very best of all.

Cases will also be seen where two numbers of the same plant are found; both good in their own way, one perhaps for earliness and the other for heavy cropping.

Some useful Ploughs.

The ryots are now fairly well acquainted with the use of the "Monsoon plough" in garden and dry lands. The weight of the monsoon plough is 60 lbs. and it can easily be carried by a cooly from one field to another and like the country plough worked by a pair of animals. The draught of the monsoon plough is 3 cwts.; while that of the country plough is 2½ cwts., and the country

plough weighs 50 lbs. Though their weights and draught are almost the same, the work of the country plough is not comparable with that of the monsoon plough.

Monsoon plough can be had from the Central Farm, Coimbatore for Rs. 21-9-0 with wooden parts complete. Spare shares and points can also be had for Rs. 1-5-0 and 0-10-0 each respectively.

Chattanooga and Steel Eagle ploughs require two good pairs of animals to work them. They can be worked on both the red and black soils. Their work is quite superior to that of the monsoon plough. The area ploughed in a day of 8 hours may be about 60 cents, but the depth is quite 6 to 8 inches and one good ploughing with Chattanooga or Steel Eagle will suffice in preparing the land to receive a crop. Fields Nos. 1, 2, 3, 4, 6, 7, 10, 14, 17, 26, 28, 33 and 35 have been ploughed either with Chattanooga or Steel Eagle plough. Chattanooga can be had for Rs. 75/-F. O. R. Bombay, or from Messrs: Marshal and Sons, Madras. Steel Eagle is not available at present.

The Dairy.

This is situated in the vicinity of the Farm buildings and has attached to it a good dairy herd housed completely in stalls situated to the south east of the Farm office. The herd consists of a mixture of cows and buffaloes whose milk is intended for consumption as such. The local Kangyam animal is a poor milker though for draught purposes it is excellent. Any improvement in its milking capacity can only be done by careful selection, and any such work is necessarily very slow. This is being carried on systematically for the last 10 years, and as a result of the work, we have, at present, among the herd, a certain number of cows which have descended from parents reputed to be good milkers. As the Estate began to grow in number, and larger quantities of milk were required to meet

the demand, one was confronted with the problem of either adding to the herd an unlimited number of local cows of poor milking qualities, or strengthening the herd by the addition of a few half-bred cows of European extraction, which are famous not only for their being heavy milkers, but also for their steady milk supply for long periods, and as it costs almost the same to feed a bad cow as it is to feed a good one, the choice fell on the possession of halfbreds. Accordingly a number of valuable halfbred and pure bred animals were acquired, which for the time being, at all events, removed all trouble about the insufficiency of milk. Unfortunately, however, recent experience has taught us that these valuable animals are prone to disease, like Foot and Mouth, and Rinderpest and succumb to them more easily than the country breeds, as in spite of all prophylactic measures, many of the pure and halfbreds died in a recent severe attack of Rinderpest. The problem therefore remains still unsolved; but from the experience gained here the future of the halfbred cow in India is not very bright. Although it must be admitted that if one is prepared for the risks, the halfbred is by far the best animal for the Dairy Industry.

In the Dairy itself, the visitor will see the freshly drawn milk strained and sold to customers immediately both morning and evening. To meet the present needs the Dairy maintains 45 cows of whom 29 are in milk. The manufacture of butter on the most up-to-date and scientific lines is an important aspect of the activities of the Dairy, and it would interest the visitor to go through various processes of butter making, during all of which the butter remains untouched by hand. For the purpose of butter making, large quantities of buffalo milk are purchased, separated into cream by means of cream separators, pasteurised, and ripened by means of pure cultures, and then converted into butter. Skim milk which is a byproduct in the separation of cream finds a ready sale among hotels in Coimbatore. The demand for butter is always great among Europeans (about 25 to 30 lbs. being sold every day,) although not a little interest in it is of late being evinced throughout the Presidency by the Educated Indians.

A good deal of ice is necessary in the Butter manufacture and arrangements are in progress in the Dairy for the manufacture of ice. Cleanliness is the key note for success in all Dairy operations, and the presence of a boiler for sterilization of all utensils is a welcome improvement.

The Insectory.

It is perhaps not well known, that to devise practical and effective remedial measures to control the ravages of noxious insects on crops, it is almost essential to have an intimate knowledge of the habits and life histories of the different kinds of pests. A particular method which may be found quite impracticable and ineffective for one insect may prove quite useful when tried for another. In order therefore to study the habits and life histories of different insects and to note the exact stage in their lives which is vulnerable we have what may be called an insect rearing house or Insectory. In this building, which is situated to the North-West of the farm near the Botanical Garden, are studied alive numerous insects by being reared up like children. The insects are housed as far as possible under natural conditions and records are kept of the peculiarities in the structure, habits and all other facts connected with each particular insect. Around this building are numerous small plots in which are grown the various field crops to feed these insects and often to observe them *in situ* on these plants. These small areas also serve very often as experimental plots for the trial of different kinds of control methods on a small scale. Silkworms are also reared here on a small scale. It is believed that visitors who are interested in this aspect of agriculture might perhaps be able to observe certain new things and gather fresh information regarding insects with which they may be familiar in their fields.

The Botanic Garden.

This is not the best time for seeing the Botanic Garden owing to the heavy monsoon wind and dry season. Many of the

more delicate plants, except where they are well sheltered, look rather sorry for themselves. Given shelter, however, and water, even Coimbatore salt water, it is surprising what a number of beautiful trees, and shrubs and flowering plants can be grown here. It is now becoming, in many cases, more a matter of keeping them within bounds than of making them grow. Close planting was very necessary in the beginning, for mutual protection, but now they are beginning to crowd each other and the more exuberant species require constant checking.

Many of the common fruit trees are represented and some are doing well though the conditions are not ideal for fruit-growing. There is a fern-house containing ferns and other shade-demanding plants, mostly obtained locally from the neighbouring hills.

The Sugarcane Breeding Station.

This station is situated at Chettipalayam and is just under one mile from the Central Farm Office. As its name implies, its main object is to raise new kinds of sugarcane, and this is done by collecting arrows (flowers) of the cane each year in October and November and sowing the seeds contained in them. The resultant seedlings show great variation in all characters including tonnage, habit and sugar contents and the best of these are selected for propagation in the ordinary way.

This is not a good time for visiting the station because the ripe canes are off the land and the new crop is very young. Specimens of sugarcane flowers, sugarcane seeds and pans containing young and old seedlings can be seen in the field laboratory.

The system of sowing daincha in between the cane rows, with the object of keeping down evaporation which causes injurious

salts to rise to the surface from the deeper layers, will perhaps be of interest to those who have to deal with garden lands.

The various plots will all be found to be furnished with labels which often contain a certain amount of useful information.

The Paddy Breeding Station.

There is now a good road to the Paddy Breeding Station, as a new section has been made in continuation of the Cane Breeding Station road.

The present cultivable area is about 15 acres but it is hoped that this will be augmented by a further 10 or 12 acres shortly. The greater part of the area is good uniform land and has been laid out in regular plots making it very suitable for experimental work.

A small field laboratory has been built, also quarters for some of the staff. An engine and pump have been installed at a very good well that commands the whole area and it is possible to grow a crop at any season of the year.

There will be little on the ground at the time of the College Day. The early crop is in nurseries and will be about ready for planting, whilst the late second crop has mostly been harvested. Some varieties and crosses, however, put in as a second crop along with those now harvested, did not flower in May, as did the latter, though they were all of about the same duration. They may still be seen in vegetative growth and it remains to be seen at what season they will flower.

Extracts.

FROM THE BOMBAY ADMINISTRATION REPORT.

In the Kanara District it has been arranged to give free posts from the forests for wire fencing and to supply fuel for *gul* boiling

at Re. 0—1—0 per guntha to those who will use the Poona furnace.

This is a commendable way of pushing on propaganda work.

(Ed.)

The investigation of the whole question of the underground water supply in the trap area was continued during the present year, both by the accumulation of data as to the composition of such underground waters, and by continued work in detecting supplies by the water-finder. In the latter matter, the new water-finder referred to in the last report has been tested and found to be more sensitive than that previously in use. It is made by the "Schmid's Patent Automatic Water Finder and Engineering Co., of 64, Mark Lane, London, E. C., and has proved to give indications confirming the previous work on the subject.

We invite the attention of our readers to this water finder.

(Ed.)

Dr. H. H. Mann writes:—During the year a bulletin has been prepared and will be issued almost immediately by my assistant Mr. D. L. Sahasrabuddhe on the "Spice Gardens of Sirsi in Kanara" and their problems. This study which represents the first stage of what I hope will be an exhaustive inquiry into the many problems of this cultivation has been carried out with great capacity by Mr. Sahasrabuddhe, assisted by a group of students of the Poona Agricultural College.

The Italics are ours. [Ed]

Annatto Dye:—The colouring matter is easily removed from annatto seeds by washing them in a dilute solution of ammonium hydrate. The solution is strained off from the seeds and evaporated to a thick paste of greater brilliancy and colour than that obtained in the usual way. Should there be any future for this dye, it would be an easy matter in carrying out the process

suggested, to treat the annatto seed with ammonia and water in rotating churns, to strain off the liquid and evaporate this to a paste in steam heated copper pans, so that a factory for the purpose would be a simple affair. The residual seeds might possibly be used for oil production and for cattle food.

K. K. Rao.

(Agricultural news November 3, 1917).

Students' Corner.

The attention of the students is invited to the announcement in the December 1917 issue of the Journal about the award of two prizes of an aggregate value of Rs. 50 to two best contributions to the Journal during the year 1918.

Students who are anxious to have a complete set of Vol. VI of the Journal are requested to give in their names to the Manager of the Journal at an early date as we have but few copies of the back numbers.

We understand that 53 students have been selected this year instead of the usual 40.

Mr. K. T. Alwa received a nice send off from the students of 3rd and 4th year classes, on the eve of his transfer on promotion to the West Coast. The function showed that Mr. Alwa had completely won the hearts of his students.

Mr. K. T. Alwa was a very active member of the Editorial Board and his transfer creates a gap not easy to fill. We of course expect compensation in the shape of more contributions bearing on district agricultural experiences. (Ed).

Departmental Notes.

Appointments.

Mr. G. N. Rangaswami Ayyangar, Assistant, 4th grade, and sub pro-tem 3rd grade, to be permanent 3rd grade on Rs. 150 from 1st June 1918.

Mr. K. Mahabala Rao, is appointed as Assistant Farm Manager, 1st grade on Rs. 35-2½-75 on probation and is posted to the III Circle for Cholan smut work.

Assistant Farm Manager, Mr. S. Kuppuswami Ayyangar, will draw Rs. 40 from the date of his entertainment as Assistant Farm Manager as per a recent G. O. This G. O. (Miss. 1946 Rev. dated 17-5-18) enables Licentiates in Agriculture who may be appointed directly to the lower division of the subordinate service to start on Rs. 40 on the scale 35-2½-75.

Leave.

Mr. K. Krishnamurti Rao Assistant in Chemistry, Government sugarcane Expert's section is granted privilege leave for one month from or after 22nd July 1918.

Mr. W. Raghavachari Agricultural Demonstrator, Coimbatore, is granted extension of privilege leave for one month in continuation of 6 weeks' leave already granted.

Mr. Chokkalingam Pillai, Farm Manager, on probation, Hagari is granted leave without allowances for three weeks from 13th May 1918. This has since been extended to 25th June 1918.

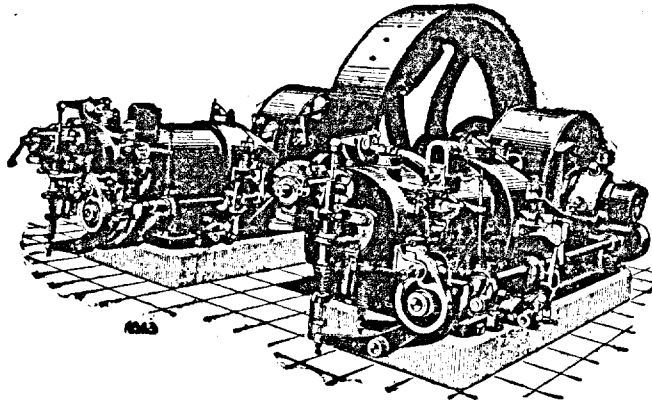
Advertisement.

Wanted for the Agricultural Department of the Uganda Protectorate, East Africa, a gardener, who has a good knowledge of Botanical and agricultural work such as budding, grafting and rubber tapping. The salary offered is Rs. 120-10-200 per mensem. The applicant should possess a Diploma of one of the Indian Agricultural Colleges. The selected candidate will have to execute an agreement for a period of 3 years' service in the Uganda protectorate. Further details can be ascertained from the undersigned.

G. A. D. STUART,
Director of Agriculture.

(v)

THE
HORNSBY OIL ENGINE
AND THE
Hornsby Stock Port Suction Gas Engine.



Massey & Co., Ltd.,
MADRAS,
Sole Agents.

ALSO MANUFACTURERS OF
All Classes of
AGRICULTURAL MACHINERY
INCLUDING
Sugarcane Mills, Ploughs, Rice Hullers
Centrifugal Pumps, Oil Presses.

Price and particulars forwarded on application.

Printed at the Literary Sun Press, Coimbatore.

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

Vol. VI.

July 1918.

No. 7.

Editorial Notes.

It will be but part of the truth to say that this year's College Day and Conference was a great success. The presence of His Excellency the Governor and the Nawab and the Zemindars made it a unique occasion and one which will long be remembered in the annals of the Union. The committees appointed for the different items were rather seriously handicapped because of limited funds but they all tried their best to make them go a long way. We are glad to be able to state that the balance of subscription for the College Day after meeting the expenses of the celebrations are to be diverted to funds which are intended to provide comforts for the troops in Mesopotamia.

Unlike previous years the College Day celebrations came off after the Conferences this year and it was a great convenience to have a Sunday immediately following the celebrations.

On the 11th morning His Excellency paid a visit to the Farm, but the actual celebrations began at 12 noon on the same day with the first session of the Conference. His Excellency was received at the entrance by the Director of Agriculture and the President of the Union. Some of the members of the Working Committee had the honour of an introduction and His Excellency made individual enquiries of the khaki clad I. D. F. students of the College who were arranged on one side of the entrance. The whole college felt proud of these young men and the introduction of this martial atmosphere into an institution which is essentially a temple for the arts of peace was not without its significance. After the welcome address by the President of the Union and the reading of the Annual Report by the General Secretary, a report which showed an all round progress during the year, the Governor delivered his presidential address.* In the speech the Governor drew pointed attention to the fact that unlike some other similar institutions the Union had a sustained programme of work right through the year and was meant to play a useful part in the development of agriculture in this Country.

He made a felicitous reference to our journal for which we feel greatly indebted and mentioned at length the important part which agriculture in general and Indian agriculture in particular is bound to play in the work of reconstruction which is to follow soon after the War. He pointed out the great importance of Research

*This will be published in *extenso* in the Conference number of the Journal.

in the future development of agriculture and paid a tribute to Dr. C. A. Barber C. I. E., the Government Sugarcane Expert.

The Munagala prize was then awarded to Mr. T. S. Venkataraman of the Government Sugarcane Expert's office.

The subject this year was "The disinclination of past agricultural students to take up independent agricultural enterprise ; its causes and remedies."

Before presenting the medal the President remarked as follows:—
 "A number of essays were received, but unfortunately several of the writers omitted to read the regulations, and were disqualified either because they had written more than the permitted number of pages, or because they did not submit their essays by the appointed time. Six essays were submitted to the judges' verdict and three of them, those by 'Onlooker,' 'Believer in agriculture,' and 'Optimist,' were of an extremely high order. "Believer in agriculture" was slightly above the proper length and lost marks over that, being placed third: "Onlooker" was first and "Optimist" second. "Onlooker" hardly describes the writer who will perhaps be recognised if I describe him as one of the busiest and most active members of the colony, Mr. T. S. Venkataraman of the Government Sugarcane Section."

After this a testimonial was presented to M. R. Ry., K. N. Swaminatha Ayyar, Proprietor, The Literary Sun Press, Coimbatore for good work done in connection with the Journal.

Three papers were then read (1) By Mr. M. R. Ramaswami Sivan on "The Phosphate Problem in South India," (2) By Mr. J. A. Thorne I. C. S., on "The Joys of a

Jennie" and (3) By Captain A. Guthrie on "Agriculture and Leather Trade."*

On the night of the 11th a Union dinner was arranged in which all the members of the Union including students took part.

The second day celebrations began with two group photographs (1) The Students, Working Committee and the Council of the Union (2) Members of the Union except current students, Honorary visitors, Rajahs, and Zemindars, in both of which His Excellency kindly sat.

Three papers were read at this session (1) By Mr. F. R. Hemingway I. C. S., on "Agriculture and Co-operation" (2) By Mr. A. Carruth on "Dairy Trade and its improvements" and (3) By Mr. V. C. Vellingiri Gounder on "My Experience in farming my new colony".

Before the close of the session the President announced a prize from Mr. D. Balakrishnamurthi on 'Ancient Indian Agriculture', details regarding which will be published in a future issue. This was followed by the announcement of a scholarship of Rs. 100 a year to a student of the college by Mr. Vengail K. Krishnan Nayanar. This will be called The Lord Pentland Scholarship the donor investing Rupees Two Thousand in War Bonds for the purpose. He is one of our first Patrons and takes a real interest in the Union and its activities.

On the 12th noon His Excellency and Zemindars went to Palayakottai to visit the famous Cattle Breeding

*All the papers read at the Conference will be published in *extenso* in the Conference issue together with a summary of the discussions that followed.

Farm belonging to the Pattagar. On the night of the 12th there was a dramatic entertainment given by the officers and the students and Mr. R. C. Wood took advantage of the occasion to make a silver collection in aid of the War Fund. Over Rs. 100 were collected. Our thanks are due to Messrs. R. C. Wood and B. V. Nath for making the entertainment a success.

The sports were held on the 13th July. Our thanks are due to Dr. C. A. Barber, C. I. E., Honorary Lieutenants the Rajah Sahib of Parlakimedi, Hon'ble Mooppil Nayar of Kavalapara, and the Zemindar of Teleprole and Messrs. F. L. C. Cowley Brown, V. Hart, H. C. Sampson, E. E. Berry, F. R. Parnell and D. Ananda Rao who acted in various capacities as Judges, Time-keepers and Starters. The President had remarked in 1915 about the sports:—"The entries were in nearly every case meagre and the winners of the prizes could be counted on the fingers of both hands. It is a pity that more do not enter and specialize in the events in which they think they would have chance instead of allowing a few to sweep the board." The above remarks apply all the more to the events of this year, A. V. Babi, K. K. Subrahmanyam and T. Seshachalam being the three who carried away the prizes for most of the events.

We congratulate A. V. Babi the winner of this year's Championship on his getting a total of 51 marks which probably is the highest record in the College. One interesting feature of this year's sports was that the prizes took the shape of certificates which were so kindly signed by His

Excellency. The champion was awarded a silver medal as usual and arrangements have been made to present the two runners up, K. K. Subrahmanyam and T. Seshachalam, getting 30 marks each, with suitable prizes kindly offered by Messrs. M. R. Ramaswami Sivan and F. R. Parnell. An interesting addition to this year's sports programme was the Indian Defence Force race specially arranged for those of our students who had come from the training camp at Trichinopoly.

The union's thanks are due to Mr. M. R. Ramaswami Sivan, (Chairman) and members of the Sports Committee mostly students, for making the function a thorough success and to Mr. K. Krishnamurti Rao, (Chairman) and the members of the Reception Committee for the Reception arrangements. Mrs. Barber assisted by Mrs. Sampson looked after the arrangements for the European guests. We offer our thanks to both these ladies for their kindness in undertaking the arrangements.

Mr. Arumugam Pillai of Sundakamputhur had kindly erected a decorated pandal in front of the students' pavilion and this greatly added to the beauty of the scene on the sports day.

At the close of the proceedings there was loud cheering the Governor himself calling for three cheers to the Director of Agriculture, the Principal, the winners at the sports and last but not least to the losers. As His Excellency was leaving it was quite clear that he had greatly endeared himself to both the students and the staff of the College by his kindness in presiding over the celebrations.

In the arrangements for guests the Reception Committee made an innovation this year by running a special mess for the guests at the College Day. Our thanks are due to the students occupying Hostel blocks Nos. I, II, and III for readily placing the rooms at the disposal of the guests at great personal inconvenience, and to Mr. Wilson for organising a band of volunteers who were of very great assistance during the whole of the celebrations. The work required of these young men is occasionally rather hard but they did it cheerfully under their genial Captain. We further thank Mr. C. Narayana Ayyar for the Rosettes, Mr. Sankunni Menon for undertaking the collection of donations for the College Day and Mr. S. Subramanya Ayyar and Mr. P. A. Raghunathaswami Ayyangar for kindly auditing the accounts of the previous year.

We offer a very cordial welcome to Dr. R. V. Norris, D. Sc., F. C. S., F. I. C., who has recently joined our Department as Government Agricultural Chemist. We are glad to be able to publish elsewhere in this issue a short sketch of his previous career.

The disinclination of past Agricultural Students to take up independent Agricultural enterprise; its causes and remedies.

Introduction. Meaning of the term.

Whatever may be the dictionary meaning of the word 'Enterprise' to the man in the street, it is associated with (1) a novelty of the scheme carrying with it a certain amount of uncertainty and risk

and (2) the possibility of very large profits consequent on the absence of all rivalry or competition. Very frequently also, it is further associated with, what, for want of a better word, we may call a 'Largeness' of the undertaking. The Tata's Hydro-Electric installation with its declared dividend of over 130% on deferred shares is an example of a successful enterprise, while the large number of closed up refineries, cotton mills, motor-bus companies and liquidated banks afford examples of the unsuccessful sort.

Requisites for a sound enterprise.

Talking in a general way the chief qualities required of the person starting a sound enterprise would appear to be (1) a certain amount of capital or an easy command of credit (2) a certain amount of nerve coupled, with a perennial attitude of hope to carry the enterprise through, in the face of all difficulties (3) power of organisation and thorough business habits and (4) a sound and detailed knowledge of the scheme with all its possibilities and limitations. On the other hand the venture should be of such a nature as to afford facilities for the striking out of various new lines and should bear distinct promise of fairly large profits—such profits as would amply repay for all the profitless waiting in the early days of the scheme.

The issues involved.

The disinclination, now displayed by past Agricultural students, to take to independent agricultural enterprise may be due, either to some deficiency in the type of men that are passed through our colleges, or to some inherent difficulties in agricultural enterprises as such. It will conduce a great deal to clearness of ideas and facilitate an easy running down of the causes, that underlie such a disinclination, if we make a careful study of such of the private enterprises as are now flourishing in our land, and examine the problem before us in the light of such a study.

There is a general lack of enterprise in our country and agriculture shares the general fate.

At the very outset of our enquiry we are confronted with the fact that very little private enterprise is noticeable in any line or

walk of life. It is true we occasionally hear of a cotton mill or gin started by a group of Nattukottai Chetties (a class of men who perhaps show the greatest amount of business capacity in South India), or a rice huller started by a rich mirasdar or a group of mirasdars in the Godavari or Kaveri deltas. But such enterprises are really 'very few and far between'. The Madras University Calendar for the year 1916 shows that over 12,500 graduates had been turned out upto and inclusive of 1916 and they should certainly have included a fair number of Physics, Chemistry and Geology graduates. What is the amount of private enterprise that has been shown by these men? The same calendar further tells us that over 140 Engineers were turned out during the period and we have yet to see the starting of any independent private enterprise by them. It is obviously beyond the limits of this paper to go into the causes which are responsible for this general disinclination to take to private enterprise. The above enquiry has not altogether been profitless, however, because it has shown that a disinclination to private enterprise is not confined to agricultural students alone but is widely prevalent.

Does Agriculture offer any special facilities for enterprise?

Such being the case we shall be justified in expecting independent private enterprise from agricultural students only if it can be proved that agriculture offers greater facilities for independent enterprise than any other walk of life. We shall now proceed to examine this statement.

Difficult to strike a new line in Agriculture.

As already mentioned enterprise is often associated with a novelty of the scheme, a novelty which by elimination of all rivalry holds promise of large profits. In an old agricultural country like ours where the ryot has already learnt a good deal about his own business in that best school of all—the school of hard experience—it is very difficult—(I shall not say impossible)—to start a new line. Many a practice and many a crop now grown in a particular locality is there after a long series of eliminations and it is very difficult to change it for anything better. This is amply borne out by the diffi-

culty experienced by agricultural departments throughout India in finding out real improvements.

The absence of large unexplored regions.

This being thus ruled out of court, the only other direction in which we could expect facilities for independent agricultural enterprises, lies in the existence of large unexplored regions. We are told that such regions do exist in the New World and there we do hear of gigantic agricultural enterprises. That the above is an important condition for the development of agricultural enterprise, is further evidenced by the fact, that, in all those places, where the country has been recently opened up by the creation of new sources of irrigation, such as the Periyar and the Kannambady schemes we already see the beginnings of such enterprise. We have a very good example of such a venture within a few miles of the College at a place called Semmedu. An enterprising ryot Mr. Vellingiri Gounder of Vellai-kinar has founded a new agricultural colony in this place. We hear of large unexplored tracts in the Central Provinces and Berar where the work of the irrigation department is said to be, largely of a missionary character, teaching the ryots the value and use of water. It is chiefly in places like the above that we should expect the beginnings of large agricultural enterprises in the future.

Scattered Holdings.

The subject of scattered holdings has been prominently before the public for some time and found a place on the agenda at the last meeting of the Board of Agriculture at Poona. To overcome this evil, even a recourse to legislation, has been suggested from some quarters; and it is not therefore thought necessary, here to go into full details. Suffice it to say that it is a serious obstacle to the development of any agricultural enterprise while the different agricultural departments have found it a serious obstacle to the introduction of any improvement.

The inadequacy and uncertainty of profits likely to be realised are deterrents of very great importance and have in the past turned many

an agricultural student from taking to private enterprise. Let us now consider this question under the two heads.

(a) Inadequacy of profits.

The agricultural student likeliest to take to private farming is the one who possesses a fair amount of land to serve as a ground work on which to build his venture. Imagine such a student discussing the question to himself at the end of his course. Naturally he will take to private farming only, if he finds, that, the enhanced income he is likely to get in that way is greater or at least equal to the income he is able to earn on his own account, by taking to some profession or occupation other than agriculture. As for the land itself there are people about him only too eager to take it up on lease. I have talked to some of the best men from the college and have been told that private farming is not sufficiently remunerative. My own experience tends to confirm the above. It is true, that absentee-landlordism steadily deteriorates the land and brings many other evils in its train, but so long as there exists this immediate prospect of a greater income by taking up some other profession, this lack of enterprise is bound to continue.

But let me not be misunderstood. I am not behind many others in my strong belief in the ultimate profits of scientific agriculture but I do know that my goddess is not over lavish with her bounties. She rather prefers to have the fruits taken from her by steady and laborious toil.

(b) Uncertainty of profits.

A far more serious deterrent is the uncertainty of profits. Unlike the banker the tradesman or the shopkeeper the profits of an agriculturist is dependent on factors over which man has little or no control. The land may be well prepared, the seed sound and well selected and the quantity of manure very satisfactory; yet the failure of rain at the proper season or an excess of it may completely ruin the whole crop. The man gets into debt, the lender gradually tightens his grasp, the story goes round, the man is pitied and but serves as a warning post to his co-villagers. The number of deaths in a

particular place or profession is calculable within certain limits and hence you have Life Insurance companies. We have also Fire Insurance companies and even Motor accident Insurance companies. But an agricultural insurance company to provide against bad years is still in the womb of the future and yet unborn. Is it too much to hope that the future students of this college will bring it into being?

Risk from Cattle epidemics.

The risk involved by epidemics among cattle may not appear to be of much consequence to us townfolk but to the villager it is a deterrent of great importance and very often it is mentioned as contributing largely to the uncertainty of profits derivable from private agricultural enterprise.

We shall now proceed to consider causes of minor importance :—

Distaste of country life.

We are steadily developing an apathy, if not a contempt, for the country life and all that it connotes. The town with its mad rush, its fashions and its pleasures is luring away many a young man from the country and private farming. I have personal knowledge of a number of young mirasdars, who though possessing houses and large estates in a village, go to the nearest town and live there paying an occasional visit to the village to satisfy a rebellious conscience. And during these visits he is only too eager to make much of his town bred refinements and all that they imply.

The 'Lack of dignity' argument.

We frequently come across a veiled 'Lack of dignity' argument in connection with the labour involved in agricultural pursuits. To the ordinary villager the belt and badge of a peon has greater attractions than the pleasures of mhothe driving under a cool portia shade. The calm but rather monotonous life of the ryot has no attractions for the present generation.

The existence of an efficient Agricultural class.

In the availability of cheap and efficient labour, and the existence of a class of agriculturists, who lead a hand to mouth existence

by working perpetually for their masters, we have a contributory cause of some importance. If such a class were non-existent every mirasdar will perforce take to private agricultural enterprise of some sort. But this is open to the criticism that it is arguing in a circle.

The educated class is not much represented in existing private enterprises and in the past the recruits to the agricultural college were from this class.

Let us now turn our attention to the class of men who at present conduct and control private enterprises of sorts; and compare them with those who passed out of the Agricultural Colleges in the past. We at once notice that the "Educated classes" are but little represented in such enterprises. The reasons for such a state of affairs are, fortunately, beyond the limits of the present paper and are of a rather contentious sort. To the educated poor want of sufficient capital has been a deterrent while to the educated rich the allurements of Government service and of the legal profession have been too powerful. The students of the Agricultural Colleges, in the past at least, have been largely recruited from such a class. Nay, in the days of Saidapet, clerks from the Collectorate were often taken into the College with stipends and it is no wonder that the course came to be thought of as a means for betterment of prospects. It is perhaps too soon to say, but even the Coimbatore men do not yet appear to have been much attracted by private farming.

Business men are required. Agriculture is as much a business as any other.

In other words the Agricultural College does not as yet appear to have attracted the right sort of men for private enterprise men who combine capital, with a born aptitude for business. In fact, one of the most promising line for improving the condition of the village ryot is to teach him business habits. The ryot is intelligent, industrious, shrewd, and responsive but as a business man he is not a very bright specimen. Perhaps his profession has made him so. There is so much room in his profession for the play of chance and fortune that he has ceased to have faith in the advantages of system and

business methods. This reacts on the whole village and they are all on a par—the village carpenter, the village blacksmith and the cobbler. But with the newly imposed quickening of life and all the competition that it involves he must soon change or shall have to go under.

Difficulty of suggesting remedies.

It is easy to see faults in a finished structure but infinitely more difficult to construct one; it is easy to bring forward a grievance but more difficult to redress one. Similarly we found it comparatively easy to indicate certain causes as responsible for disinclination among past agricultural students to take to private enterprise but when it comes to a suggestion of remedies difficulties are met with in all directions. It is found, however, that the causes themselves indicate certain remedies and these will now be considered.

Greater amount of Research in Agriculture and in the allied sciences.

In the first place many of the disabilities peculiar to agricultural enterprises as such (such as difficulty of striking a new line, uncertainty of profits and the like) are to some extent remediable by a more organised research in agriculture and in the sciences on which agriculture should for all time depend. Such research should be thorough, straight to the point and carried more or less in a true missionary spirit. Our land has not been wanting in religious missionaries in the past and it is hoped that it will not be wanting in agricultural missionaries in the future.

The spread of the Co-operative movement as a stimulus to private agricultural enterprise.

In the second place we can confidently look up to the co-operative movement to initiate and foster a greater amount of private enterprise among our agricultural graduates. A co-operative concern will not only command easy credit but besides distribute the risk and the consequent losses among a larger number of shareholders. Such a movement is specially necessary in a country like ours where the

ryots are extremely poor and frequently fall into the hands of the money-lenders.

Some special inducements.

Thirdly Government could hold out special inducements to private enterprise by offering 'darkhast' land on easy terms to some of the best men from the College and running some of the farms on a purely 'Profit and loss' basis. Though it is quite untrue, the ordinary ryot is often inclined to believe that the expenses on Government farms are much more lavish than a ryot can afford to. The suggested farms should rapidly dispel such an idea.

T. S. Venkataraman.

The Desiccation of vegetables with special reference to coconut.

In these days of pressure on the available space in railways and the demand for vegetables at such distant places as Mesopotamia there seems to be scope for the desiccation of vegetables as an industry. The despatch of vegetables to distant places necessarily takes a long time and this is detrimental to their keeping. Railways and steamers, provided with refrigerating apparatus are of course a good means of preserving in their own way but the cost is too prohibitive to adopt such methods in the case of the ordinary vegetables that are almost a necessity in the daily routine of every household.

An easier and more practicable method which could at once be employed close to the place of production seems to be that of desiccation. By desiccation is meant drying up. The reason why vegetables do not keep long is that they contain a good deal of water. About 70 to 80 per cent and sometimes even more may be taken as the average water content of most of the vegetables. This aided by the warmth of the surrounding atmosphere sets in decay so soon that it is not possible to preserve the

ordinary vegetables for more than a week at the most. But, if the water is removed by drying they can be preserved for a sufficiently long time and will thus be of great use to travellers, and could be easily transported to such out of the way places as military camps, and exploration parties.

It is true the system of drying is already in vogue in this presidency and readers of this journal are familiar with what is called Vathal (வத்தல்); but the drying is all done in the sun and takes several days to perfectly dry and the resulting product loses its fresh flavour and colour. The main object of this note is to set up a plea for desiccation according to modern methods as an industry. These methods consist in the rapid drying of a substance at a low temperature. For this purpose either drying in vacuo or in draught oven is resorted to and the whole process is over in a few hours. What is wanted from a culinary point of view is that the vegetables should keep, as much as possible, of their freshness and flavour when cooked and this, is more likely to be the case when quickly dried at a low temperature and kept sealed in airtight tins. We have no experimental evidence with regard to vegetables proper (cabbage, cauliflower, bringal, plantain etc.,) but coconut shredded and dried both in vacuo and the draught oven has kept perfectly well for over six months and is considerably superior to the bazar copra in point of view of taste and colour. Whatever may be the merits of desiccating vegetables as a non-wartime industry it might be useful during the period of war for the reason that it saves a large amount of freight and space besides keeping fit during transport by steamer or rail to long distances.

War or no war, the desiccation of coconut is worth the attention of both the planter and the capitalist. According to Watt (Dictionary of economic products of India) quite a large quantity of whole nuts besides copra and oil is being exported

from the Madras presidency. The same authority gives the following figures regarding trade in coconuts with foreign countries during the year 1906-1907.

Copra	126,454	cwts. valued at Rs.	18,95,341.
Oil	959,772	gallons	... „ 14,17,794.
Whole nuts	81,920,724	nuts	... „ 25,50,384.

He further adds that the exports of whole coconuts showed a tendency to increase. This wholesale export of nuts is a serious financial, food and manurial drain which could perhaps be prevented. The following analyses, relating to the composition of the Ceylon cocconut, (exhibited from the Ceylon Manual of Chemical analysis by M. Cochran) may be taken to apply to Madras also and will be of interest to coconut planters.

The coconut on an average consists of :—

Exterior fibre or coir	...	32.65
Shell		17.30
Flesh or edible portion	...	26.40
Milk		23.65
		100.00

Analysis of the kernel.

Proteids		5.48
Oil		67.11
Sugar and gum		5.89
Mineral matter		3.65
Cellulose etc.		9.76
Water and loss		7.11
		100.00

Analysis of the interior fluid or the milk.

Nitrogenous matter	...	0.712
Gum and traces of fatty matter...		0.315

Sugar ...	...	...	4.150
Mineral matter ...	...	...	0.261
Water ...	...	...	94.562
			100.000

Analysis of coconut poonac.

		Power mill.	Country mill.
Moisture, ...	...	11.7	12.4
Oil ...	...	11.6	15.0
Albuminoids ...	...	19.0	18.0
Carbohydrates ...	...	43.2	41.0
Woody fibre ...	...	6.0	5.6
Ash ...	...	8.5	8.0
		100.0	100.0
Nutrient ratio ...	...	1:3.75	1:4.36
Nutrient value ...	...	91.2	96.5

The figures show that in exporting whole coconuts not only a good deal of avoidable freight is paid but also good food material in the shape of poonac and milk is lost.

The table below gives an idea of the amount of mineral matter lost.

Total inorganic matter drawn up annually by the coconut trees from an acre of land by 75 trees bearing 80 nuts per tree.

	Troy pounds.						
	Peduncle.	Spathe.	Husk.	Shell.	Kernel.	Water.	Total.
Chloride of sodium ...	3.82	1.70	34.17	1.40	9.07	3.62	53.78
Salts of Potash ...	21.46	8.61	450.24	27.92	47.46	4.82	560.51
Phosphate of lime ...	5.54	4.20	6.03	0.70	18.84	2.01	37.32
Salts of lime ...	1.67	10.59	112.56	2.10	1.40	...	128.32
Salts of magnesia ...	2.67	...	...	...	...	...	2.67
Silica ...	0.22	4.20	8.34	...	...	...	12.46
	35.38	29.20	611.04	32.12	76.77	10.45	795.06

The figures speak for themselves. The amount of manurial matter lost is considerable. The ashes of the various parts of the coconut seem to be a fruitful source of potash in these days of dearth of potash salts and this valuable ingredient is lost.

We have now an idea of the extent of loss due to exporting whole nuts. It may be possible to prevent most of this loss if the kernel is desiccated locally and exported, if necessary, for extracting the oil. Speaking of copra for extracting oil, Thorpe (Dictionary of applied Chemistry) says "at present, however, notable improvements are being introduced in the kiln drying process, so that it may be expected that in the near future kiln dried copra will take its place next to or rank equally with, sun dried copra." Sun dried copra contains on an average 50% fat; in kiln dried copra the percentage rises to 63 or even 65%. Copra dried by means of hot air contains even as much as 74%. Desiccated coconut is also a valuable food product. The possibilities and the extent of this industry may thus be summed up, in the words of Watt (loc. cit). "The uses of desiccated coconut in cookery and confectionary etc., are well known and need not be particularised. This trade is comparatively a modern one and might almost be characterised as the chief aspect of European interest in the edible product of the palm. Many patent machines and processes have been brought out and large factories organised in Europe and America (none in India) for the production of desiccated coconut and the manufactures therefrom. It would appear that the growth of this special trade is so important that it is curtailing the exports of coconuts (entire fruits) from America."

B. V. Nath.

An attempt to increase the production of food grains in the Tanjore delta.

One of the recommendations of the Delhi Conference was that India could materially help the British Empire at the

present time by increasing the production of food stuffs. His Excellency Lord Pentland, G.C.I.E., G.C.S.I., laid emphasis on this in his Presidential address at the recent Agricultural College Conference, and the question to be decided was how could the Madras Presidency assist in this direction. In Madras the principal food grain is rice, and, to increase the production of this, it is either necessary to increase the area under rice or to increase the acre yield. As rice is an irrigated crop it is impossible, as an emergency measure, to increase the area. Therefore any increased production of rice must depend on an increased acre yield. The acre yield can be increased by better cultivation, better seed and better manuring. Better methods of cultivation have been advocated by the Department for many years and it is gratifying to note that these recommendations have in many cases been put into practice. But the root of all increased yield depends on the plant food available in the soil. If this is absent no amount of improved methods of cultivation will effect a permanent increase in yield. The solution of the problem therefore is primarily dependent on increasing the quantity of available plant food in the soil.

As it is impossible for the Agricultural Department to look after any attempt to supply plant food in the shape of manure to the rice crop throughout the Presidency, the next question to be decided was the selection of an area, where concentrated effort could be made to popularise a manure which it is anticipated will give an increased acre yield. The Tanjore delta was selected for the following reasons:—

1. This delta raises annually about one million acres of rice.
2. It is the oldest of the delta tracts where irrigation has been developed by the aid of man. That is to say, rice has been in general cultivation longer here than in any other rice tract of the Presidency. This means that the soils are, unless well manured, likely to be more exhausted of available plant food than elsewhere.

3. This Department has already made a soil survey of this Delta which has shown that the soils as a whole are markedly deficient in phosphates.

4. Agricultural enquiry in the past has shown that large areas of single crop land never receive any manure at all and that the acre yields from these are consistently low.

5. The Agricultural Department has an Agricultural Station at Manganallur where the manurial requirements of the paddy crop on these delta soils have been carefully studied, and where valuable results have been obtained. As a result of these experiments there is already an awakening desire in the district to adopt better methods of manuring.

6. There is probably a higher standard of general education in Tanjore District than in any of the east coast districts and therefore there is a greater possibility of appreciation of such an effort than elsewhere.

The next question to be decided was what manure should be distributed. The results of experiments at Manganallur have proved that soluble phosphates and organic and ammoniacal nitrogen give appreciable increased yields. It has also proved that insoluble phosphatic manures such as Bone meal and Flour phosphate become available in time in the paddy soil but not sufficiently quickly to be of much use to the paddy crop in the same year in which the manure was applied. It has also been proved that the phosphate in Fish guano becomes much more readily available in the paddy soil than the phosphate in Bone meal or Flour phosphate.

Now, soluble phosphates are made by treating insoluble phosphates with sulphuric acid and the price of this acid has risen so high on account of the difficulty in importing it, at the present time, that this form of phosphatic manure could not be considered. Considerable experimental work has been done within the last few years

in America and Japan, as well as by Mr. M. R. Ramaswami Sivan of the chemical section at the Coimbatore Agricultural College, on the effect of weaker organic acids on insoluble phosphates. Mr. Sivan's experiments have shown that insoluble phosphate when applied with a green manure crop to a paddy soil becomes soluble very quickly. This led me to consider the effect of oil cake on insoluble phosphate when rotted in puddled wetland soil and an experiment, recently made by Mr. Sivan for me, showed that about 60% of the phosphate in flour phosphate became soluble within ten days when mixed with oil cake and puddled with paddy soil. This has I trust solved the difficulty of providing a soluble phosphatic manure at a cheap cost and a manure mixture has been made up which contains fish guano, oil cake, bone meal and flour phosphate. This at 300 lbs. per acre supplies about 12 lbs. of organic nitrogen and 36 lbs. of phosphate and at a cost of between Rs. 9 and Rs. 10 per acre.

The next question to be decided was how to get the value of this manure generally known throughout the delta. The Tanjore ryot is well known to be very careful and frugal, and is rightly unwilling to incur expenditure on his cultivation unless he is sure of a direct monetary gain. A method of testing this manure has been borrowed from the United States Department of Agriculture. There the Agricultural Department carried out what are called Farmers' Co-operative Experiments. This may be briefly stated to be as follows:—

The Agricultural Department supplies the manure free and the farmer undertakes to give it a fair trial and gives the Department the results of the trial.

The Madras Government have approved of a similar scheme and have sanctioned the purchase of 100 tons of this manure mixture which will be applied at 300 lbs. per acre to the land. Any one who wishes to try this manure can do so up to one acre in area free of cost on the following conditions:—

1. That an officer of this Department sees the manure applied.
2. That an officer of this Department sees the crop harvested, the grain threshed and measured along with a definite area of adjoining land which has not been manured.
3. That, if the value of the increased grain yield exceeds the cost of the manure, the owner of the crop will purchase the manure for use on a more extended scale in the next year.

In this way it is hoped to have some 700 to 800 demonstration plots throughout the delta this season, and it is hoped that this will mean a very large extension of the use of this manure in the following year with a corresponding increase in the production of food grains.

This work means a concentration of effort during the samba planting and harvest time and it has only been rendered possible by the recruitment of temporary staff consisting of all the students who possess the Certificate of Agriculture of the Agricultural College, Coimbatore, and who are now studying for the advanced course at the Agricultural College. I am glad to say that all of them have loyally come forward and enlisted as temporary officers of the department. These will supplement the existing staff of the department who have been concentrated in the Tanjore District for this work.

H. C. Sampson.

Dr. R. V. Norris.

Dr. R. V. Norris graduated B. Sc., with second class honours in Chemistry from the Victoria University, Manchester. On graduation he was elected to a research studentship and continued research in organic chemistry in the University laboratory. In appreciation of the results of his research work he was granted in 1909 the M. Sc., degree by the University. He worked afterwards as private research assistant to Professor W. H. Perkin, F. R. S. He was selected fellow

of the Chemical Society about this time. In December 1909 he was elected to a research Fellowship at the Lister Institute of Preventive Medicine and it was during this period that he commenced his Bio-chemical Researches, chiefly on subjects connected with fermentation. He was next elected to the Bell Memorial Fellowship for Medical Research and continued his work at the Lister Institute. During the period of his work at this institute he passed the examination for the associateship of the Institute of Chemistry.

He was appointed in 1914 as Physiological Chemist in the Imperial Bacteriological Laboratory, Mukteswar, and came out to India in November 1914. In the same year he was elected fellow of the Institute of Chemistry of Great Britain and Ireland and his biological researches secured for him the degree of D. Sc., of the London University.

He obtained a commission in the Indian Army Reserve Officers in October 1915 and on completion of his military training was attached to 114 Maharattas. In February 1916 he was transferred to 110 Maharatta Light Infantry as Depot Adjutant. He was on the field service with the link battalion 103 Maharattas Light Infantry and returned in August 1916. After his return to India he was appointed adjutant Rest camp, Bombay, in January 1917 and in February 1917 he was appointed officer commanding Railway Camp, Bombay. In September 1917 he was appointed Assistant Commandant combined Labour Depots, Bombay, and was elevated to the rank of temporary Captain.

He was again sent to Mesopotamia in April 1918 in connection with the supply of labour to the Railways and Inland Water Transport. He was relieved of his Military duties in July 1918.

Extracts.

Fixation of atmospheric nitrogen on a commercial scale.

The fixation of atmospheric nitrogen has become a notable matter at the present time on account of the fact that those

countries which are subjected to a blockade in the present war have largely to depend upon this method for obtaining substitutes for Sodium Nitrate. The different methods of doing it are:—

1. Formation of Nitric acid from the nitrogen and oxygen of the atmosphere by forcing air through a chamber in which a very powerful electric lamp burns in a magnetic field.

2. The second method of fixing atmospheric nitrogen is the heating of Calcium carbide in a current of pure nitrogen gas. This gives rise to Calcium Cyanamide.

3. A third and interesting method consists in conducting a current of nitrogen over aluminium carbide which has previously been prepared in an electric furnace from aluminium oxide and carbon. The reactions which follow are, the aluminium is converted into aluminium nitride, while a current of carbon-monoxide escapes which may be used as fuel. The aluminium nitride in its turn is transferred into aluminium oxide and ammonia, of which the former may be used as a raw material for the manufacture of metallic aluminium while the latter is a nitrogenous material desired.

A new method which is based on another principle is the direct combination of nitrogen and hydrogen under pressure, at somewhat elevated temperature in the presence of a catalytic agent. Under favourable circumstances a mixture of both gases combine to a very small extent while the reaction does not go farther as it is reversible, and will cease as a certain equilibrium is attained. The mixture is sufficiently cooled to enable the ammonia to be tapped off in liquid form and then the remaining mixture is treated as before.

The source of energy used to bring about the desired combination is principally water power which is inexhaustible as well as cheap. At present only 10% of the nitrogenous substances used in the world are obtained synthetically. The German fermentation

Industry Institute has found a means of converting the nitrogen of ammonia into albuminoids by means of the growth of yeast in a liquid containing sugar, the yeast being induced to grow very vigorously and to form a large amount of organic matter. The dry substance formed is equal to the weight of the sugar employed, and about 40% of the dry substance formed, thus, consists of albumen. These remarks indicate that in the near future it will be possible to obtain plant food and plant material itself of a nitrogenous kind on an unlimited scale artificially. The establishment of an industry capable of gaining such achievements would constitute an enormously valuable asset to any country depending upon outside sources for its food supply. (*Agricultural news*).

K. Ramiah.

Students' Corner.

The students' club made a very good beginning for the year by starting with a lecture on 'My experience in Mesopotamia' by Dr. R. V. Norris, D. Sc., M. Sc., F. I. C., F. C. S. It was interesting to know of a land where the temperature goes up to 120 degrees and possesses an annual rainfall of 5 to 6". Dr. Norris is of opinion that the Agricultural possibilities in Mesopotamia are very great.

The Principal who presided at the meeting pointed out that Mesopotamia was a possible new field for students of the Agricultural College.

Over 40 students had an attack of influenza and for some time the regular classes were greatly interfered with. The opinion is widely held that the fever was brought into the estate by our college day guests.

Towards the end of July the students of Class III and IV left in connection with food campaign work in the Tanjore Delta.

News and Notes.

Officers' Club. The annual general body meeting was held in July and the following office bearers were elected for the year.

Mr. M. R. Ramaswami Sivan,	President.
„ P. S. Jeevana Rao,	Secretary.
„ P. A. Subramanya Ayyar,	} Committee members.
„ C. Tadulinga Mudaliar,	
„ K. S. Putta Ayyar,	

The college Mechanic Mr. K. Sankaranarayana Ayyar had a serious accident on the occasion of the marriage of his daughters by the explosion of one of the gas lights. He received serious injuries and is still in the hospital. His friends will be glad to know that he is steadily improving.

We have after all got a hospital near the estate. Towards the end of the last week of July a Dispensary common to this and the Forest College was opened. The out-break of influenza on the estate showed that the Dispensary has been opened none too soon.

Statement of receipts and expenditure of the Students' Club,

Receipts.	Rs. A. P.	Rs. A. P.
1. Balance of cash at Bank on 1st April 1917	93 7 2	
With Secretary	3 2 9	96 9 11
2. Subscriptions realised:—		
(a) From Donors	65 0 0	
(b) From members for membership... ..	598 0 0	
(c) Arrears of tennis subscription	16 0 0	679 0 0
3. Amounts realised by the sale of:		
(a) Old newspapers	32 0 0	
(b) Old games materials	10 4 0	
(c) Colour badges	5 0 0	47 4 0
4. Sundries		35 10 2
5. Profits realised in the construction of games pavilion		456 12 2
6. Over-payment in the Bank by the Secretary (kept under suspense)		5 0 0

Agriculture College, Coimbatore, for the year 1917—18.

Expenditure.	Rs. A. P.	Rs. A. P.
Games.		
(a) Tennis	53 1 0	
(b) Foot ball	37 0 0	
(c) Hockey	89 4 0	
(d) Cricket	103 5 0	
(e) Badminton	2 0 0	284 10 0
Matches.		
(a) Entrance fee for matches	9 0 0	
(b) Carriage to convey players to grounds	49 6 6	
(c) Drinks for match players	43 13 6	
(d) Colour badges for best players	16 6 0	118 10 0
Establishment		134 0 11
Miscellaneous		32 5 7
Improvements to the tennis courts		48 14 9
Literary section—supply of:—		
(a) Dailies	96 15 0	
(b) Periodicals	35 1 0	
(c) Books	28 12 0	160 12 0
Purchase and repairs to furniture		0 14 0
Lighting, postage and other contingent charges		51 9 0
Social gathering, etc.		58 8 9
Balance of cash with the Secretary on 1-4-1918	0 12 10	
At Bank	428 1 2	
With Hostel Manager	1 1 3	429 15 3
		1320 4 3

(Sd). K. S. SUBRAMANYAM.

Departmental Notes.

Appointments.

1. Mr. T. R. Ranganath is appointed S. P. T. 3rd grade on Rs. 150 vice Mr. Y. Ramachandra Rao on other duty at Pusa with effect from 1st June 1918, the date of confirmation of Mr. G. N. Rangaswami Ayyangar.

2. Mr. S. V. Venkatarayan is appointed assistant 4th grade on Rs. 75, 75, 75-5-125 on probation in the Mycology section to fill an existing vacancy.

3. Mr. S. Kuppusami Ayyangar, Assistant Manager, Mangauullur, is promoted to the 4th grade Upper Division on Rs. 50-5-125 on probation, with effect from 1st July 1918.

4. Mr. E. N. Rangasami Ayyangar, an ex-student of the college of Agriculture is appointed assistant Farm Manager on Rs. 35-2½-75 on probation and posted to the Palur Farm for training.

5. Assistant Farm Manager Mr. C. Arulanandam Pillai to district work, Kallakurichi.

6. Assistant Farm Manager, Mr. A. Ramaswami Ayyar to district work, Villupuram for training under the Agricultural Demonstrator when the latter returns from leave.

7. Mr. J. Lakshmaiyya is appointed to Lower division on Rs. 35-2½-75 on probation and posted to Nandyal for training.

Mr. P. Ranganayakulu is appointed to Lower division on Rs. 35-2½-75 on probation and posted to Akapalli for training.

Leave.

Mr. P. A. Raghunathasamy Ayyangar, Assistant in Chemistry privilege leave for four weeks from 22nd July 1918.

2. Mr. C. V. Ramaswami Ayyar, will act for the above.

3. Mr. T. S. Ramasubramanian, Assistant in Chemistry privilege leave for six weeks, to be availed off from the date of return of Mr. P. A. Raghunathasamy Ayyangar.

Mr. C. V. Ramaswami Iyer, will continue to act during this period.

4. Assistant Farm Manager Mr. L. S. Natesa Iyer, extension of privilege leave for 5 days in continuation of 2 months' leave already granted.

5. Mr. W. Eaghavachari, Agricultural Demonstrator, Coimbatore further extension of privilege leave for 10 days in continuation of 6 weeks and one month's leave already granted.

6. Mr. Krishnan Nair, Sub-Assistant in Mycology privilege leave for one month from 4th July 1918.

THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. VI.

August 1918.

No. 8.

Editorial Notes.

As in the preceding years we offer in this the Conference number of our Journal. The papers read at the Conference are published *in extenso* with a summary of the discussions that followed on each paper. We have had nearly half a dozen applications for copies of some of the papers read at the Conference and this may either be due to their having been of more than usual interest or to the Conference proceedings getting to receive a wider publicity.

We have already been accustomed to consider Mesopotamia as a possible future field for Indian Agriculturists and now comes the news that German East Africa is likely to become a second.

A possible new field for Indian agriculturists.

Address of welcome.

Mr. R. Cecil Wood, the President of the Union said :—

I see in the programme that I am allotted the duty of welcoming the visitors to the eighth annual Agricultural Conference. It is

hardly necessary for me to say how I personally welcome and appreciate these annual gatherings, and I hope that you can all from experience testify to the fact that every one here is glad to welcome you. The unkind, will no doubt say that we of the college enjoy the brief respite from our daily round of teaching and that we put up with the visitors as a necessary evil to the College Day holidays. It may, of course, be the case but I do not fancy it is in the great majority of cases. It is true that we welcome the break in the College routine, but for all of us these celebrations imply some extra work—the case of the officers, though not of the President—a good deal of extra hard voluntary work. But the question is wider than this. It is commonly said that “good wine needs no bush.” That may have been true once but in times when Departments of Publicity are the order of the day it does not hold true. We do feel that it is a good thing to interest the public in our work here. It is encouraging to think of the hundreds of readers who will tomorrow morning learn for the first time of the existence of a College of Agriculture, and of the honour which has been paid it by the visit of Your Excellency and the Rajahs and Zemindars of the Presidency. Coupled with that are, of course, the warm feelings with which we welcome old friends, and delight to accommodate them and make their stay here enjoyable, and, of course, as the College settles down into its stride, such meetings, such reunions of old friendships become more and more frequent.

It is indeed a great and memorable day for the College. I was present at the laying of the foundation stone by H. E. Sir Arthur Lawley of this building in the year 1906, and again at the opening of the College by the same Governor in 1909.

And it is a great privilege to see the work of the College appreciated by an official visit, on such a scale and from such distinguished visitors. I can assure the Rajahs and Zemindars who have come here to-day, that we appreciate thoroughly the honour which they have done us, and trust that this visit will mark the beginning of a closer association between the work of this College and all it implies to the cause of Agriculture in Madras, and themselves. For some

it is not the first visit but to all I would say that though this is rather a special occasion, I and those associated with me, want them to feel that at any time they will be welcome and that if they really wish to appreciate the nature of the quiet, steady work which more truly represents the real work of the college they should come again and spend a few days here.

We bid you welcome then, and trust you will find your stay, brief as it is, both a pleasant and instructive one. Our programme has been devised to suit all classes and all tastes. The papers to be read to-day and tomorrow are valuable contributions to our stock of Agricultural knowledge and experience. For relaxation we are giving a small dramatic performance on Friday evening, and there are the annual sports on Saturday.

H. E. The Governor's Speech.

H. E. The Governor then delivered the Presidential address as follows :—

Mr. Wood, Ladies and Gentlemen.—I must in the first place express my deep appreciation of the cordial welcome which I have received here to-day and I feel sure that the distinguished visitors who have come from all parts of the Presidency would wish me to express their sincere acknowledgments of the kindness of the College authorities in providing them with this opportunity to express their interest in, and to become more fully acquainted with the work of the College. I would also extend these acknowledgments to Mr. Cowley Brown, the Principal, and the authorities of the Forest College to whose hospitality so many of our visitors are indebted. Perhaps you were not all aware, ladies and gentlemen, that for the annual functions over which on this occasion I have the honour to preside the College is indebted to the Madras Agricultural Students Union, an Association of past and present members of the College and of resident members of the staff. In many cases functions of this kind represent the annual galvanising of an automaton into the semblance of life, but I think the report

to which you have just listened will convince you that the Union and the work it is doing have come to stay.

Further, this is, I think I am right in saying, the eighth annual Conference to be held under the auspices of the Union and its proceedings will I find be recorded in the eighth number of Volume VI of its journal. Both the Conference and the journal therefore have already attained a respectable maturity, but they do not represent the whole of the Union's activities or aims. In their fourth number of Volume I in which the proceedings of the conference of 1913 were recorded I find the following statement of its policy :—"The Committee begs to state that the Union has not been organised for running a *tamasha* once a year or for the purpose of merely publishing a journal. These are only means to an end and that end is to do some useful work towards the great goal of the agricultural improvement of the country and such a work can be done only by the concerted action of as many old students on one side and of the landed aristocracy on the other." The journal then—and here I would remark that the subscription is only Rs. 2 a year for which you get remarkably good value—is merely a means of bringing together and placing at the disposal of the subscribers the experience and knowledge and suggestions of members of the Union, of acknowledged experts and of private workers in the field of agriculture. The annual Conference affords an opportunity for friends and students of the college, past and present, to renew their acquaintance, to compare notes and to receive fresh stimulus and encouragement in the work upon which they are engaged. The full value and scope of this work however are not, I think, to be measured by the annual Conferences or by the journal, useful as they are, but by the services which the Union is rendering in enlisting throughout the Presidency the co-operation and sympathy of those who take an enlightened interest in the development and improvement of its agriculture. The increase in the membership of the Union, to which the committee have drawn attention in their report, is a satisfactory proof of their success in this branch of their work. From the extracts which I have just quoted it will also be seen that from the outset the Committee have

recognised how important it is to enlist the interest and help of the landed aristocracy, and the manner in which prominent Zemindars and landholders have responded to the invitation to attend this Conference is eloquent proof that their assistance and encouragement will not be wanting. We should gladly have invited more had it not been for possible difficulties as to accommodation and provision which rendered it necessary to observe caution.

It is usual for the President on these occasions to offer some general remarks on the aims and objects of the Agricultural Department and of the Agricultural College and Research Institute and the problems which they have to face. In view of the admirable review of this field by the Hon'ble Sir Alexander Cardew to which it was your privilege to listen last year, I do not propose to take up your time by any such general disquisition; and I shall confine my remarks to certain considerations of which the events of the past few years have emphasised the importance. In their report the Committee have called attention with legitimate pride to the manner in which the Union and its members have endeavoured to co-operate in measures arising out of the continuance of the great struggle in which we are engaged. But while all sincere friends of this country desire and confidently expect that India will continue to take a worthy share in repelling the grave menace by which civilisation is threatened already, it will also fall to her to assist in the work of reconstruction which must necessarily follow upon the conclusion of the war. It is in connection with this work that we expect the Department of Agriculture and the students of this College to play an important part.

Consider what the position will be when peace is again restored. Some of the fairest provinces of Europe will be left ravaged and desolate with their populations half-starved and ill-clothed; with their economic organisation so shattered that the labour of years will be required to enable them to resume in full those arts of peace on which their peoples must depend for their maintenance. Throughout large areas on the western front, from the North Sea to the Adriatic, crumbling walls and trenches and shell pits alone mark what were once the busy haunts of man and smiling corn

fields. Think of Belgium, Serbia and Roumania stripped of their wealth by the invader, and of Russia where the insanity of internecine strife has consummated the work of her external foes and spread famine and destruction throughout vast regions. In Asia too—in Palestine, in Mesopotamia and in Armenia—the retreating armies of the Hun leave nothing but privation and penury behind them. From all these lands the cry of starving millions will go up and we shall have to look to those countries which have been mercifully spared from the horrors of invasion and of civil war to supply less fortunate countries with the means of subsistence, until they can resume those industrial and other activities on which their economic life depended. Financial assistance will no doubt be readily forthcoming, but that will be useless unless of food, of wool, of cotton and other primary needs are ready to be brought. India is one of the granaries of the world to which we must look for these supplies. On this immediate and humanitarian ground alone therefore we are bound to welcome and encourage every effort to make two ears of corn grow in this country where only one grew before. Apart from these immediate needs and the benefits which will accrue to India from being in a position to meet them, there are more permanent considerations connected with the future progress of India itself with which this institution is primarily concerned. We have heard much—and rightly—in these days of the industrial possibilities of India and of the necessity of exploring and developing them. Even if her rich soils and great rivers do not constitute an inexhaustible source of wealth, agriculture must necessarily remain her principal industry. The fact that India has to maintain a vast population of over 300 million people places this beyond doubt. It may be possible, though the wisdom of the policy may be questioned, for smaller communities to subordinate agriculture to industrialism, but a continent such as India cannot afford to do so, or to depend to any large extent on external supplies to feed her people. Indeed, so far from its being possible for India to neglect agriculture for other pursuits, such industrial prosperity as she may hope to achieve is inextricably bound up with improvements in her agricultural methods.....

Like the giant who received fresh strength at every contact with mother earth, it is from constant contact with the results of research that the propaganda work of the department must derive fresh vigour. It is of the greatest importance ~~therefore~~ that research work should be vigorously carried on and that the number of workers in this field should be steadily augmented. Those of you who are acquainted with the lines on which work has been carried out at research centres such as Rothamsted will realise that improvements with which it may take only a few seasons to familiarise the farmers may have taken many years to work out.

Further, the methods, the aims and the possibilities of the agriculture of every country are determined by its climate, its soils, its seasons and those other natural and physical conditions which form the environment to which the farmer has to adapt his processes. I do not know if material exists on which to construct a history of Indian agriculture. I feel sure, however, that if it could be written one fascinating chapter would deal with the discovery of new products, their introduction from other countries—possibly both rice and coconut, now the two typical crops of Southern India are importations—and their diffusion throughout the tracts in which they are now found. But not less fascinating would be the story of the manner in which the ryot by the exercise of his natural shrewdness and assiduity, by utilising the garnered lore and experience of centuries, has brought the art of agriculture in this country to a standard which, in spite of obvious limitations, testifies to his capacity and adaptability. You will perhaps permit me to give one instance to show how complicated are the conditions and the accumulated experience with which the ryot and those who would teach him have to deal. On the occasion of my visit to Jeypore last year the Maharajah very kindly arranged a most instructive exhibition of the resources of the estate. Under the single head of paddy not less than 90 separate varieties known to the ryots were on view each with distinctive idiosyncracies and partialities as regards soils or seasons or methods of tillage. You will, I think, therefore agree that before we attempt to teach even simple and illiterate hill tribes how to improve their methods we must first carefully ascertain

what these methods are, and the conditions by which they have been determined. Text books are valuable, but they can only lay down general principles. They can teach how and what to investigate, but they cannot supply the place of investigation itself, upon which all improvement must depend. We must therefore know not only the principles but also the facts to which they are to be applied; in India for India, in Madras for Madras. The Agricultural Department has so far been able to study the practice of the Presidency only in respect of a few crops and that in selected areas. There is thus an immense field yet to be explored and numerous highly trained workers will be required to cope with it. It must be realised too that the rapidly increasing importance of India as a competitor in the world's markets renders it more and more essential that she should bring science and research to bear upon her processes in agriculture as in other spheres. To what is the success of great industrial concerns such as the Tata Steel Works in this country due? To a business capacity which recognised that success could only be ensured by securing the best trained brains available and by introducing the most modern methods and processes. The same applies to agriculture. The products of which India can claim an absolute monopoly are few. Her wheat, her cotton, her rice, her dyes, her tea, her coffee, her drugs, her oilseeds and oils have all to meet in the world's market to formidable competition of rivals who are constantly striving to improve methods and to cheapen production, and if India is to maintain her position she too must call science to her aid.

Research then is the first link in the chain and it is only from an adequate development of this branch of its activities that the Agricultural Department can expect to achieve a full measure of success. In support of this assertion and of my remark as to the laborious nature of the processes of research, I feel sure I can appeal to the great authority of Dr. Barber. The recent recognition of his services to the cause of agriculture during the past twenty years has, I am certain, given great pleasure to his numerous friends and to all connected with the Department. He has now I think for six years

devoted himself to the investigation of problems connected with a single crop, namely sugar cane. He has achieved valuable results but I dare say that he anticipates that many years will pass and more than one successor occupy his place before the possibilities of improvement which his results already indicate are fully exhausted. The field is vast, the workers are few and the funds are limited; I hope therefore that when benefactors arise, as I feel sure they will, to support the efforts of the Government to advance the great industry of agriculture, they will not forget the important part played by those who in the laboratory and in the field are with infinite patience, accuracy and concentration engaged upon the task of wresting from Nature her secrets.

One more appeal and I have done. The aim of institutions of this kind is not limited to training the men required to man the department. It is also to train practical cultivators who will turn the knowledge they have acquired here to good account in the management of their own land or that of others. The requirements of the Department are necessarily limited, but we have present here to-day distinguished representatives of the great landholders' community. I am sure they will be convinced during their visit to the College of the thoroughly practical nature of the training which the students receive. Are they satisfied that the most is being made of the potential agricultural wealth of their estates and properties? If not I would suggest for their consideration whether in the work of development and improvement trained students of this college could not play a valuable part and whether the training which it is in a position to impart would not be a most useful asset to those sons or relatives to whose assistance in the management of these properties they may have to look.

Ladies and gentlemen, I again thank you for your kindly welcome and the members of the Students' Union for the honour they have done me, and I will ask you to join me in expressing the heartiest good wishes for the continued success and prosperity of the Agricultural College and Research Institute.

The Phosphate Question in the Madras Presidency in relation to Crop Production.

Your Excellency, Rajahs, Ladies and Gentlemen,

One of the functions of the Madras Agricultural Students' Union, under whose auspices we have met to-day, is to organise an annual Agricultural Conference at which papers shall be read and discussions held on agricultural subjects. These are apparently for the benefit of the members, and we, members, therefore, prefer to hear what those not directly connected with the Agricultural Department have to tell us. At the same time the preparation of a paper involves time and trouble and the question may be asked why only outside gentlemen should spend their time and trouble. Some of the members, therefore, used to read papers in former years, but we believe that the members have scored a distinct gain this year by offering only one paper through me, as against half a dozen papers which will be contributed by non-members.

Next it was suggested to me that the subject of my paper might be "my work on phosphates in the chemical laboratory," but I thought that it was too technical for a general audience like the one I have the honour to address to-day and, with a view to make it generally popular, I chose as the subject of my paper "the phosphate question in general with regard to crop production"; and I am sure I will be benefited in my laboratory work very much by the suggestions which, I expect, will be made in the discussion which is to follow my paper.

Next to winning the war, rather as the best way to win the war, the general call everywhere is "to increase crop production." Increased cropping is required, apart from war requirements, to meet the needs of the growing population and this can only be achieved by more intensive cultivation adopted on a more extensive scale than is now in vogue. Intensive cultivation connotes, among other requirements, the wide application of suitable manures. Manures may be indirect or direct, indirect when they make the dormant plant food in the soil available to crops and direct when they supply the needed food-constituents only. Green manure and cowdung are

more or less, indirect in their action and have apparently to be applied in almost all cases to maintain the fertility of the land. Of the direct manures, nitrogenous and phosphatic manures are those most needed, especially in South India. I shall deal only with phosphatic manures.

Phosphorus exists in the soil chiefly in the form of tricalcic phosphate which is insoluble in pure water, but soluble in soil water containing carbonic acid, and salts in solution. Insoluble phosphates, before application, are usually converted into soluble superphosphates by mixing with sulphuric acid. Now it is a provision of nature that, even if a soluble phosphate is applied to the soil, it undergoes *reversion* in a few days and becomes comparatively insoluble until it is gradually dissolved out and absorbed by the roots of plants. In other words, the soil has a retentive power for phosphates and there is little danger of their being washed out of the soil by heavy rainfall or irrigation. In spite of this fact, South Indian soils in general, and paddy soils in particular, are rather deficient in their phosphate content.

The whole of this phosphate is not again soluble, and only a portion of it, sometimes one tenth to one hundredth of it, is immediately available to the crop. According to the official method of determining this availability, soils containing less than .01% of available phosphoric acid are considered to require a phosphatic manure.

Based on this standard, the soils of the Godavari and Kistna deltas are not so bad, but the soils of the Tanjore delta are found very defective.

TABLE I.
Tanjore Soil Survey (1).

	No.	Minimum.	Maximum.	Average.
Samples analysed ...	92	.0002	.0340	.0048
Above .01% P_2O_5 ...	14	.0102	.0340	.0170
Below .01% P_2O_5 ...	78	.0002	.009	.0027

(1) Soil Survey map of the Tanjore delta was explained (Vide Madras Bulletin No. 68).

Whenever phosphatic manures were recommended to cultivators, based on the chemical analysis of soils, the report has been that there has been an increased yield. Experiments done at the Manganallur Agricultural Station corroborate the statement.

TABLE II.
Average 1917 (2).

Manure.	Yield of paddy in lbs.		Proportionate increase.	
	Grain.	Straw.	Grain.	Straw.
No manure (check plot) ...	1910	2410	100	100
Bone meal 500 lbs. ...	2290	2590	120	108
Mineral phosphate 500 lbs. ...	2210	2770	116	115

Another series of experiments with the more available phosphatic manures brings out the same point.

TABLE III.
Average 1917 (3).

	Yield of paddy in lbs.		Proportionate increase.	
	Grain.	Straw.	Grain.	Straw.
Check plot (unmanured) ...	2620	2960	100	100
Superphosphate 333 lbs. ...	2940	3630	112	123
Basic Super 383 lbs. ...	2950	3460	113	117
Concentrated Super 132 lbs. ...	2990	3550	114	120
„ Basic Super 132 lbs. ...	3080	3820	118	129

(2) Report of the Manganallur Agricultural Station, 1917-18.

(3) Report of the Manganallur Agricultural Station, 1917-18.

While this deficiency of phosphoric acid is noticed in the paddy soils of Tanjore, the permanent manurial plots in the Central Farm, Coimbatore, situated on what may be termed garden soil, reveal the same story. Mr. Wood has forcibly pointed this out in his article in the Year Book of 1917 up to the 21st crop. Recently cholam grains from different plots of the 24th crop, were analysed in the laboratory with the following telling results:—

TABLE IV.
Permanent Manurial Plots, Coimbatore Farm. (4).

Nature of Experiment.	Yield of grain in lbs.	Amount removed by grain in lbs.		
		N.	P ₂ O ₅	K ₂ O.
No Manure ...	1125	21	5	4
Nitrogen (N) ...	950	18	4	3
Potash (K) ...	1000	19	5	4
Nitrogen + Potash (N + K) ...	850	16	4	3
Phosphoric Acid (P) ...	2075	34	15	9
Potash + Phosphoric Acid (K + P) ...	2325	38	18	11
Nitrogen + Phosphoric Acid (N + P)...	3075	53	23	13
Nitrogen + Potash + Phosphoric Acid (N + K + P) ...	2600	47	21	11
Cattle manure ...	2860	49	18	14

The results not only show that a phosphatic manure increases the yield of grain but that phosphorus is the primary limiting factor in crop production, which means that, even if other food-constituents, like nitrogen or potash, be present in the soil, they are not assimilated until the phosphatic ingredient is supplied.

Phosphoric acid is particularly essential for the formation of cereal grains. Taking paddy for an illustration, the paddy grain contains 63% of phosphoric acid and the straw 13% so that every 100 lbs. of grain and 100 lbs. of straw will remove from the soil $\frac{3}{4}$ lb. of phosphoric acid. Supposing, for the sake of argument, an average yield of 1,500 lbs. of grain and 1,500 lbs. of straw per acre, the amount of phosphoric acid which will be removed by the paddy crop per acre will be $11\frac{1}{4}$ lbs. According to the Agricultural Statistics of the Presidency for 1915-16, there were 11,229,635 acres under paddy and the quantity of phosphoric acid which will be removed from the soil is about 55,000 tons equivalent to about 300,000 tons of bonemeal. I have taken paddy crop for my illustration, because it is the most important and most widely grown food grain, but other cereal grains, the pulses and the industrial crops similarly remove from the soil enormous quantities of phosphoric acid; and the more the crops are sold off the land the greater does the land get exhausted.

Apart from nitrogen—requirements of soils, phosphatic manures being essential for increased crop production, the next question is “where to get them from.”

First and foremost I would say, “reserve cattle dung and urine”. Cattle manure contains only 3% phosphoric acid in an insoluble form, but as several tons are applied per acre, the fertility of the land is generally kept up, as will be seen from Table IV *supra*. Rothamstead experiments and practical experience of farmers all over the world have sufficiently shown that farmyard manure is a general all round manure, very well comparable with mixed fertilisers.

There are three important sources of phosphatic manures available in Southern India:—namely bones, Trichinopoly phosphatic nodules and fish manure.

As regards bones, there are according to the cattle census of the Madras Presidency for 1914-15, 6,748,684 bulls and bullocks, 5,381,525 cows, 1,370,540 buffalo, bulls and 2,380,846 buffalo cows, a total of 15,881,595 adult cattle and 5,878,807 calves; 10,705,543 sheep and 7,426,828 goats.

Let us take, for want of definite information, the average mortality among cattle from all causes to be 10% and among sheep and goats to be 25% (4).

Let us take, as an average, the live weight of cattle to be 500 lbs., that of calves 100 lbs., and of sheep and goats 50 lbs., and the % of bones to live weight to be 7, 7 and 6% respectively, the quantity of bones produced in the Presidency is 100,000 tons per year. The actual export from India in 1913-14, the year previous to the war, was 103,413 tons and, in 1914-15, 63,976 tons. Bones contain 22% of phosphoric acid in the form of tricalcic phosphate but, containing at the same time nearly 30% of organic matter which, in this tropical country, decays rapidly, the phosphate is rendered easily available. Bones also contain 4% of nitrogen and bone meal is thus a good manure for paddy lands.

The next important source of phosphatic manure is the *Trichinopoly phosphate* (5). It is present in nodular form, in a small locality of about 10 square miles of land, 25 miles north of Trichinopoly, spread on the surface of small conical heaps and imbedded in soft yellow clay to about 1200 feet in the Lower Cretaceous formation of Southern India. Exaggerated opinions about the quality of the material and the quantity available were held in earlier years and the nearest estimate, based on careful trial borings made all along the total breadth of the tract, is that of Dr. Warth who says that 8 million tons of nodules are present to a depth of 200 feet. No special mining operations seem to be necessary, at any rate in the beginning, and the stones have to be merely picked off the ground. These were being exported, off and on, for the last 25 years to European markets, ostensibly

(4) No reliable data are available regarding the mortality of live stock. Figures are available for mortality due to contagious diseases only in departmental reports, but animals are slaughtered for beef or mutton or die owing to natural causes or old age. It was roughly estimated that one in every ten heads of cattle and calves and one in every four of sheep and goats either died or were killed every year.

(5) Vide Year Book of the Madras Department of Agriculture, 1918 for fuller details.

for superphosphate manufacture, but with no good results, as they contain much impurities in the form of calcium carbonate (about 17%) and iron and alumina (about 7%) which use up more than half the quantity of sulphuric acid used in the manufacture. They contain 25 to 26% of phosphoric acid in the form of insoluble tricalcic phosphate. My work in the laboratory has chiefly been directed to determine the conditions under which these phosphatic nodules may be rendered available in the paddy soils of Tanjore. The manufacture of super being out of the question, there are two alternatives, one to precipitate the phosphate in the form of dicalcic phosphate by means of a recently discovered electrolytic process and the other to powder the material as fine as possible and apply the flour phosphate directly on to the land. The electrolytic process may be considered when we have a cheap electric supply. The application of flour phosphate has been found recently to give satisfactory results in the United States of America, when applied along with decaying organic matter like green manure or farmyard manure. The American experiments were, however, on what may be called arable lands and not under swampy conditions under which paddy is grown. The chemical reactions taking place in aerated arable soils and in swampy paddy soils have, however, been shown to be different and we could not say that the phosphates would be rendered available in the latter until actual experiments had been made. To a certain extent, my experiments of last year go to show that green manure increases the availability of flour phosphate under paddy soil conditions, but one or two points had to be cleared up and I am continuing the experiments in the laboratory and pot-culture house this year. At this stage several cases were brought to my notice that continuous green manuring decreased the yield of crops and that the application of super or bonemeal tended to restore normal cropping. At the suggestion of Mr. Sampson, co-operative experiments have been designed to be conducted this year on field scale, some in Government farms and some in cultivators' lands under departmental supervision, to see the efficiency of flour phosphate when applied to paddy lands along with green manures. Messrs. Sampson, Wood, Chelvaranga Raju Govinda Kidavu and Tirumuruganatham Pillai are co-operating with me in these experiments.

The third source is *fish manure*, which contains 6% of nitrogen and 5% of phosphoric acid. If the fish oil is extracted, the resulting fish guano becomes richer. Fish decomposes very quickly and both the nitrogen and phosphoric acid are available and ryots are generally satisfied with the results obtained with it. The price is comparatively cheap and, although only limited quantities are available now, the possibilities are apparently unlimited, as long as we have the deep wide ocean and the shallow backwaters to catch the fish.

These three forms of manure, along with oil-cakes which, by the bye, are used for their nitrogen rather than for the phosphoric acid, (which is usually $1\frac{1}{2}$ to 2 per cent. only) used to be exported out of India until before the war, but the Board of Agriculture, at its last meeting held at Poona, resolved to recommend to Government that phosphatic manures should be kept in the country and not allowed to be exported.

Most of the Tanjore soils are found to be benefited both by nitrogenous and phosphatic manures and Mr. Sampson recently conceived the idea of popularising a cheap mixed fertilizer amongst the ryots of Tanjore. Castor cake which contains 6% of nitrogen and flour phosphate which contains 25% of phosphoric Acid in an insoluble form were chosen as being the cheapest. The success of the mixture would depend largely on the rapidity with which the phosphate would become available by the decaying castor cake. An experiment started 10 days ago to test this point showed that 50 to 60% of the phosphate was soluble in neutral ammonium citrate, as a result of composting for 10 days and keeping the compost in a warm puddle.

Nitrogen is apparently the limiting factor in crop production in some places, while phosphorus is the limiting factor in others. Sulphuric acid, when available, may be used to manufacture super phosphate out of spent bone-char of sugar refineries, but, as far as I consider, the phosphates must be collected and used in their natural form, crushed as fine as possible, in this country, along with the simultaneous application of green manures or farmyard manure. The grinding needs powerful disintegrators but, apparently we have to

wait, until the war is over, to import the necessary machinery. Messrs. Stanes & Co, who kindly showed me over their Manure Works recently, are now supplying flour phosphate at Rs 50 per ton put up in double bags and delivered on rails at Coimbatore but, when the price of gunnies goes down and there is a steady increase of demand, they may be able to supply it at Rs. 40 or even less per ton.

It is not the purport of my paper to suggest who is to run the business. It may be the European Firms like Messrs. Stanes & Co., Messrs. Parry & Co., or Messrs. Peirce Leslie & Co.; it may be worked by Indians on co-operative basis or as a joint stock concern; or, in view of the pronouncement of His Excellency the Viceroy at the last Madras Industrial Exhibition, the industry may be worked as a departmental concern. Anyway, thanks to the late Messrs. Arbutnuth & Co., of Madras, who had done all the higgling with the Board of Revenue and the Government in earlier years, the mining blocks of Trichinopoly are available on exceedingly cheap terms for mining leases.

All that I want to press on the conference here is that there is sure to be a greater demand for phosphatic manures along with the increasing activities of the Agricultural department and it behoves those who own lands to see that they keep and utilise the phosphates as much as possible in the country.

M. R. Ramaswami Sivan,
Acting Government Agricultural Chemist.

Discussion:—As a piece of information in which the author of this paper is likely to feel interested Mr. Hemingway mentioned that in the Tanjore district there is one enthusiastic co-operator who is distributing phosphatic nodules to the ryots after passing them through a Disintegrator.

This is Mr. Sethurama Ayyar of Needamangalam about whom we wrote in the journal once before. He is an old Saidapet student and a member of our Union. (Ed.)

The joys of a Jenmi.

I feel a very natural diffidence in standing up to read this paper. Whereas the other papers at this conference are read by men who are acknowledged experts, I can claim to be only an amateur *Jenmi* and not an *agriculturist* at all. When I see in the audience representatives of such ancient Malabar landlord families as the Nayars of Kavalapara, the Nambidis of Venganad, and the Vengayil Nayanars, I feel an upstart and a parvenu. However I comfort myself with the reflection that I have come to learn, and not to instruct.

2. Now when I say that I am not an agriculturist at all, I mean that, as the whole of the cultivable land of the Zamorin's Estate has been leased to tenants, I have no land available for trying my own skill in husbandry. In fact, I am a mere rent collector. The Estate owns 40,000 acres of agricultural land, paying an assessment of over a lakh; it extends more than 100 miles from north to south, and fifty miles east to west: yet if I wanted 20 acres of good land to-morrow I could not get them except by civil suit, unless a tenant were good enough to give up the land of his own accord. The same is true though not to the same extent, of most of the big Estates in Malabar—a big jenmi is primarily a rent-collector, and in many cases does not farm any land himself at all. But we can go still further. The Zamorin's *tenants* also are to a very great extent mere rent-collectors and not farmers. My enquiries show that considerably more than half of the land in the Zamorin's Estate is sub-let to others by our tenants. I am not going to bewilder you with any account of Malabar land tenures: but you should know that the tenures in the Zamorin's Estate fall roughly into two classes—the *superior* leases in which the tenants pay very low rents and have the right to hold for 12 years: and the *inferior* leases under which the tenants pay higher rents and have in theory no right to hold their lands for more than a year.

Now the *first* class of tenants—the superior ones are for the most part middle class people, Nayars and such, with a considerable sprinkling of Rajahs, Nambudiries and other members of the landed aristocracy. These tenants for the most part sub-let their lands: and ultimately the persons who cultivate them (with the assistance of the humble agricultural-labour castes) are comparatively poor people paying comparatively high rents to the middle-men. From this it follows that the big profits derived from these superior tenures do not, speaking generally, go back into the land as capital. They go towards maintaining those comfortable country residences—Nambudiri Illams, Nayar Tarwad houses, and so forth which add so much to the dignity and beauty of the Malabar landscape. It is, I think, obvious that under such conditions the higher branches of agriculture—heavy manuring, costly irrigation or protective works, proper care of cattle and so on, are somewhat neglected: nor are the cultivators men who have the means or the inclination to try expensive and risky experiments.

3. The *Second* class of tenants in the Zamorin's Estate the inferior ones—are mostly Mappilas and Hindus of the lower castes. Even these make fair profits, but sub-letting is comparatively rare because the tenants belong to the cultivating classes. I said just now that in this class of lease, the tenants in theory have possession only for a year. But as a matter of fact they are not disturbed so long as they pay their rents: and they have in practice just as much security of tenure as the superior tenants enjoy buying, selling and mortgaging their rights with perfect freedom. One might therefore under these favourable conditions,—direct lease from the landlord, fairly easy rents, and security of tenure—expect excellent agricultural results. But these results are not altogether achieved. One cause is that this class of tenant is naturally conservative and of undeveloped intelligence. Another cause is that the Mappilas, who constitute the majority of these tenants, are cursed with a system of inheritance which may be in accord with

the law of Islam, but is certainly unsuited to an agricultural community. When a Mappila dies all his property is divided up among his widows and children. Now the average Mappila has as many children as the proverbial curate, and more wives. Therefore we see good prosperous holdings split up into plots inadequate for a living. The result is bad agriculture, and sometimes starvation for the widow and the orphan—though the latter consequence does not follow as frequently as one would expect, for the Mappila will turn his hand to anything and supplements his agricultural income by cooly work, petty trade or dacoity.

4. Such, briefly is the state of things in the Zamorin's Estate i. e. practically all the land is leased out to tenants; our *superior* tenants for the most part sub-let their lands and the great majority of our *inferior* tenants cultivate their lands themselves. In neither case would an agricultural expert be satisfied that the most is being made out of the lands. Well, we have to take things as we find them and it would appear that scope for agricultural enterprise on the part of the Estate management is rather limited—especially when our finances are such as to preclude any costly outlay.

5. At this stage I would like to point out two facts. The first is that the Court of Wards does not profess much enthusiasm for direct agricultural experiments in the Estates under its charge. When the Court of Wards Manual was framed, the Court had great ideas of the possibility of improvement of Agricultural conditions in its estates: a Deputy Director of Agriculture was specially deputed to look after the Estates; and the Manual contains a valuable memorandum on the subject prepared by, I believe, Mr. Sampson. But the Court's attitude has changed—why, I don't know—possibly fingers were burnt, and it was realised that Agricultural reform is a somewhat expensive, as well as a very difficult matter.

The second fact I want to point out is that we in South Malabar are—I will not say neglected—but at any rate left very much to our own devices, by the Agricultural Department. I was for about a year a Divisional Officer in South Malabar, and one of my duties was to keep a fatherly eye on the amateur Agricultural Associations which are supposed to exist in the country parts. I found it a rather depressing task. In the first place a Divisional Officer has little time for such hobbies. In the second place, these Agricultural Associations are, so far as my experience goes mostly eye-wash and window-dressing. In my Division there was only one association that ever showed any signs of life—and that association consisted of one man, and he was the sort of man whose enthusiasm for Agriculture is strictly dependent on his retaining a seat on the Taluk Board. The truth is, that in South Malabar the Agricultural Department might almost as well not exist. There is of course the Taliparamba farm situated in a remote corner of North Malabar: but for all the influence that is spread to our part of the world from that centre of research and experiment Taliparamba might be Timbuctoo. I am not presuming for a moment to find fault. All I mean is that there is such a big field and such a limited staff to work in it, that parts of the Presidency are inevitably left alone—and that I imagine, is a complaint which every Agricultural officer would most feelingly endorse. I look forward to the day when Deputy Directors of Agriculture shall be regarded as a no less valuable officials than, say, District Munsifs—but that day is probably as far off as the millenium.

6. It follows from these two facts that we, in South Malabar have to work very much on our own initiative—the Court of Wards is not prepared to show the way and the Agricultural Department has not yet turned its attention to us. Well in these circumstances what can we jemmys, and the Zamorin's Estate in particular, do? That is what I have come here to learn. One fact I am certain of; that we—and by “we” I mean both jemmys and the

officers of the Agricultural Department—cannot set out to teach the cultivator how to cultivate unless we have good practical knowledge of the matter ourselves. I must say that when I took over the Estate nearly 3 years ago and found myself completely ignorant of all that a landlord should know about his land and his tenants, I would have given a great deal for a book describing the agricultural customs, crops, climatic influences, conventions of speech with regard to seed and sowing, and so forth for the various localities of South Malabar. Such a book does not exist: and I hope that when the Department turns its attention to us, its first work will be to provide this information. Even now the Malayali Students who go out from this College can do something: a few pamphlets containing the material I have mentioned—and with as many illustrations as possible from local speech and proverbs—would be an invaluable addition to the literature of the district. Just as an instance of the variety that prevails I may mention that in the Zamorin's Estate I have paras—(the para is the ordinary rice measure of Malabar)—of 60 nazhis, 54 nazhis, 50 nazhis, 42 nazhis, 40 nazhis, 38 nazhis, 36 nazhis, 35 nazhis, 32 nazhis, 30 nazhis, 29 nazhis, 26 nazhis, 25 nazhis and 24 nazhis,—not to mention some which are calculated in seers! This confusion should have been ended long ago. But all Government's efforts at standardisation have been stultified by almost total ignorance of the actual state of affairs. Well, that's a digression.

7. What can we do? One thing I am doing. I am going to utilise some of the paddy land which we are recovering from bad tenants for a Home Farm on a modest scale—say 10 acres to begin with. My object is not to increase the Estate's profits nor in the first place to introduce experiments—but first of all by following the methods of the ordinary cultivator to gather from direct experience information as to the financial side of agriculture as practised by our tenants and sub-tenants. After that it will be time enough to set out to teach the cultivator his own business.

The experiment has already been tried, of course—at Kavalappara and elsewhere; and it would be very interesting to hear the results from the gentlemen here present.

8. You will perhaps have noticed that my remarks in this paper have not been directed to gardens i.e., the fenced-in dry lands where coconuts, arecanuts, pepper vines, betel, jack trees and so forth are grown. About these I know little and have nothing to say. No Malabar jenmi is interested in gardens. They are for the most part made by the exertions, and with the capital, of the tenants, who pay only nominal rent to the jennies. The jenmi looks uncomfortably on—meditating ruefully on the Tenants' Improvements Compensation Act, and knowing that, as the garden grows, the tenant, full of pride at his handiwork and conscious of the jenmi's difficulty in finding the capital necessary to evict him, will probably neglect to pay rent and do all he can to obliterate the distinction of *meum* and *tuum*.

9. In conclusion I will very briefly indicate one or two subjects on which I should like guidance.

- (1) Can we make anything of the laterite hills and parambas which are so plentiful in Malabar—the land which the Revenue Authorities call Unoccupied Dry, and which is now cultivated here and there with modan paddy, gingelly, chama, and other similar crops in rotation? There is a vast extent of these lands in Malabar, and we get very little out of them at present.
- (2) Why is the paddy outturn of Malabar so low? The Malabar Gazetteer gives figures which unfortunately I have not noted down, but which show that Malabar's outturn per acre compares very unfavourably with the Eastern districts. Is this incurable, being due to the climatic conditions? Or is there any remedy?

- (3) Is paddy the most profitable crop we can grow on wet land? It is practically the only wet crop in Malabar. In many places single crop land has been converted into gardens: but this is being discouraged in recent years by the low prices of coconuts and coconut products. Is it possible to grow on such land other crops—sugarcanes perhaps, or betel in the fashion popular in the Eastern Districts?

These are subjects on which many jennies like myself would welcome enlightenment.

J. A. Thorne.

Discussion:—Mr. V. K. Krishna Nayanar remarked that he was not able to get a copy of the paper before he heard it actually read though he tried to do so. He is greatly interested in the question and would be glad to offer remarks the next day.

Mr. Ramachandra Ayyar, suggested that a collection of the local proverbs be made and their merits and applicability fully discussed in the pages of the Union Journal. He referred to such a collection made by the late M. R. Ry. C. K. Subba Rao and published as a bulletin of the Department.

To the accusations made in the paper by Mr. Thorne that the Jennies are not keen about trying to improve the cultivators the Honorable Mr. Moopil Nayar of Kavalapara remarked that even the Government was slow to realise the need for improvement and that the Jennies may well be excused for their tardiness. He tried an old agricultural graduate for a time for managing his estate but later found he could not get on with him. He deplored the fact that at present all the best men of the college seek Government service and said that so long as this state of affairs continued the Jennies were at a great disadvantage.

Mr. G. A. D. Stuart said that he was surprised to hear from Mr. Thorne that the West Coast was comparatively neglected. He

was of opinion, that too much attention was being paid to this part of the Presidency. As for the questions raised at the end of the paper he pointed out that they have been answered on the Taliparamba Farm for some years. With reference to the difficulty expressed by the Hon'ble Mr. Moopil Nayar of Kavalapara he said, that, all the Jenmi had to do was to offer better prospects. Government are starting the successful candidates on Rs. 35 and if only a sufficiently high salary were offered to compensate for the comparative instability of private service and all that such service implies he was sure the Jenmi would be able to attract very good men. For comparison he mentioned two advertisements, one from Madagascar offering an Agricultural graduate £ 500 per annum and another from Uganda offering a gardener Rs. 120-20-200. If good men are wanted they must be adequately paid.

The Dairy Trade and its Improvement.

The dairy trade as it is carried on in the city of Madras is fully described in the "Survey of the Madras Dairy Trade" published last year. This is being taken as read, thus only brief references are made to it. While these investigations were confined to the city, they may be taken as also giving a general idea of the state of the industry in the larger towns of the Presidency. There is little doubt that the problem in Madras city is the most difficult one in connection with the milk supply, but it seems to me that more is to be gained by solving it than that of any other Presidency town, as here the best milking stock in the Presidency is located.

2. In an enquiry of this kind, which is undertaken with a special view to suggest improvements, and at the same time to make the industry more prosperous, stress must be laid on determining as exactly as possible the economic position. In this case the economics are the most difficult part to deal with, but they provide the most valuable information. No step can be properly

taken to improve any industry except at the outset due weight is given to economic fact.

3. In the Survey of the Madras Dairy Trade, which consists of eight parts, Part III—Economics on the basis of pure milk—is the most important. The summary of paragraph 40 shows that during the economic life of a cow in the city, there is a loss of Rs. 166 during the six years. Turning again to the summary of income and expenditure in connection with buffaloes, it is seen that the account just balances. This shows that the Dairy Industry in the city on the pure milk basis is in a bankrupt condition. Industries which continue to exist in a bankrupt or semi-bankrupt condition are always inefficient, pay poor wages, and do not in a general way, attract the more progressive men. The uneconomic condition of the industry very largely explains the unsatisfactory condition of the cattle yards (Part I); the want of cleanliness (Part II); the adulteration (Parts IV and V); and the small quantity of milk produced in the city (Part IV). This shows that if something can be done to improve the economics, many of the other problems will solve themselves.

4. It also follows from this that the root cause of this unsatisfactory state of affairs is the first thing to deal with. The other items mentioned above are the effects of unsound economic position. To the casual observer some of the effects, such as bad cattle yards, and adulteration, are even more prominent than the real cause. All attempts therefore to solve the dairy trade problems by dealing with the effects of an over mastering cause are doomed to failure. Such measures may give the appearance of something being done, but they will never solve the dairy problem. In other words, it is misdirected policy to attempt to remedy a cause by dealing with effects.

5. The main cause of the present bankrupt condition of the city dairy trade is the low efficiency of the present average cows

and buffaloes as milk producers. All cows and buffaloes which give milk do not leave profit. In the case of every milk cow and buffalo, a certain quantity of milk must be set off against the costs of production, which are in Madras, depreciation, interest on capital, death rate, barrenness, loss of produce during attacks of disease, sickness charges, crossing fees, cost of foods during the milking and dry periods, cost of labour, rent on stalls, plant charges and general contingencies. The higher these items of cost, and the lower the price of the milk, the larger is the amount of milk which must be produced to balance. It is instructive to note that the production of the average cow falls under the balance line, while in the case of the buffalo the average line is just touched.

6. After the balance line is touched a certain proportion of the value of milk produced is profit. It will now be interesting to take two supposed cases (a) a cow and (b) a buffalo to demonstrate this economic problem. Suppose, for example, that the milk yield of the present average cow, 2 measures per day, was increased to 4 measures per day. The present yield during six years is 2390 Madras measures; thus the improved cow would give 4780 measures. To enable the cow to reach the economic balance line, 665 measures over the present yield are required for the whole economic life. Thus from the 4780 measures 3055 measures are required as offset against the cost of production in reaching the balance line, leaving a balance of 1725 measures, a certain proportion of the value of which will accrue as profit. Under these conditions even with improved cows the large proportion of the milk which disappears as an offset against production, before profit begins to accrue, should be noted. In this particular example the profit which will accrue during the six years of economic life is Rs. 400 or allowing five calvings during the economic life of about six years, the profit following each calving is Rs. 80. This estimate is made on the basis of para 40 undisturbed, except where

plus figures are required in the cost items, and is therefore a very conservative estimate. It will be clear from the above that there is no solution of the dairy problem by increasing the number of the present average milk cows. The point is to increase their utility.

7. *Buffaloes.*

Taking the average buffalo in para 57 during the economic life of 6 years with 5 calvings, the account just balances. The present yield of milk by the average buffalo is 2000 measures during the six years. This is calculated from the average daily yield of $1\frac{1}{3}$ Madras measures per day during the milking period. Suppose that the milk yield could be increased on the average by 1 measure per day, that would bring the total yield of the improved buffalo up to 3525 measures during the economic life. Of this yield 2000 measures would disappear as an offset against the cost of production in reaching the balance line, leaving 1525 measures, which falls to be dealt with under the economics of accruing profit. In this particular case the profit during each period would be Rs. 86 or Rs. 430 during the economic life. In the case of both cows and buffaloes, loss due to contagious diseases must be deducted from such profits. With improved cows and buffaloes, the above estimated profits show that the industry would attract capital, and also that healthy competition would be introduced. The milk supply would also increase, and the reason for adulteration would disappear. At this stage stringent legislation could be applied to the industry without crippling the supply. It may be here noted that if the increased yields named above in these examples for both cows and buffaloes are taken at half, the figures given for the profits would also be reduced by one half. In all cases unit calculations are adopted.

8. *Improvement of cows.*

The question now is how to improve the efficiency of the cow. That can be done by systematic cross breeding and good manage-

ment. In the City of Madras at present the milk cows are chiefly Ongoles and cross-breds. The price of the cross-breds is from 2 to 3 times higher than for Ongole. This indicates that the cross-bred is very strongly in favour, being on the average a much better milker. Taking the Ongole as a breed no definite facts are available to show that at any time it ever was famous for milk qualities. That being so, an attempt to grade up by breeding and selection only would be an extremely slow process, as the striking of a special milking strain is unlikely. Under these circumstances the milking qualities have first to be graded up and then established as a character. In breeding of this kind the percentage failures would be abnormally high. The difference between a breed which was at one time famous for milk and had deteriorated for some reason or another, and one that never was a milk breed, has a very important bearing on breeding and breeding problems.

9. *Crossing as a means of improvement.*

I am of opinion that the improvement of the dairy trade in this Presidency is closely associated with cross breeding, the end in view being to establish a special breed of dairy cattle from the cross breeds. I am further of opinion that there are no breeds in India suitable to form the male side of a parentage of this special breed. This now raises the question of importing.

10. Amongst the British deep milking breeds the Ayrshire from Scotland is in my opinion the most suitable for crossing with the Ongole. Ayrshires are extremely hardy, thrifty, animals and are able to thrive on comparatively poor keep. They are also very active and docile. This breed has always been famous for milk, and hardiness. The best milking strains reach 12,000 to 15,000 lbs., per annum, and calve every year during the economic life; 10,000 lbs., per year is quite common in good herds.

11. The effect of crossing Hancy, Saniwal and Scindi cows at the Military Dairy Farm, Bangalore has been to about double in

the cross-breds the yield of milk and butter fat produced during the lactation period. So far as I can see, crossing in Madras with Ayrshire bulls should not be less successful.

12. Having obtained the first cross, the problem of building up a special breed of dairy cattle may be considered. The first thing to note is how the imported sire endures the climate. I have observed that whether bulls are imported from Scotland or Australia, and placed on the plains, there is a well marked deterioration in physical fitness. This observation shows that it would be practically impossible to import and establish Australian or Western breeds on the plains as a pure breed, as breeding cows suffer much more than the bulls. I have studied several cases of imported cows from Australia and Great Britain to the plains in India, and in some of these large numbers were involved. Such herds were practically wiped out by disease etc., etc., in about a year from the date of landing.

13. It may now be observed that the general term frequently used namely "acclimatisation" of such imported stock on the plains is quite incorrect. When as a result of a change from one country to another an animal deteriorates in physical fitness, the term acclimatisation should not be used. An animal may be taken to another country where its health is not interfered with. Under such circumstances the term acclimatisation may be applied.

14. I have observed that the physical unfitness of imported sires is in part transmitted to the offspring; thus in physical fitness the half-bred comes between the imported sire and the native dam. For this and other reasons, the half-bred is more susceptible to and suffers more from diseases such as rinderpest, foot and mouth etc., than the native cattle.

15. Under these circumstances, taking only two characteristics of the cross bred (a) susceptibility to disease and (b) improved milk yield, these are contributed by the Ayrshire. On

account of susceptibility to disease for one thing, I am of opinion that the Ayrshire sires cannot be used on the crosses in succeeding generations, as that would result in stock extremely susceptible to disease. There is also some evidence to show that other undesirable characters which do not appear in the half-bred are found in the three quarter bred, also that the above undesirable character has strengthened its hold.

16. Continued crossing with Ayrshire sires develops, for example, two characters which are in contradiction. These are a lowering of the physical fitness and deep milking qualities. A three quarter bred, for example, has the milking qualities more highly developed, but the physical fitness further reduced when compared with the half-bred. This reduction in physical fitness prevents the animal from consuming and properly digesting the amount of food which is required to enable the cow to produce her maximum milk supply. Therefore when characters are mutually destructive, the balance in animal economy is upset. The system craves food for milk and body maintenance at the same time. Owing to the diminished fitness the cow may only be able to consume enough food to maintain the body and to develop the milking possibilities by say 60%. It may also be that the system is developed on the milking side. In this case the cow would give a full yield but fail to maintain the body. The result of this would be an early breakdown in health and failure to breed. While it is important to breed a large yielding cow, it is of quite as much importance to have a continuous supply of milk and calves that are easily reared; two things that are quite incompatible with a delicate breed of stock. I am of opinion that a bull with a very good milking pedigree will not transmit to the crosses any more of the undesirable characters than a bull from a bad milking line, while he will produce crosses much more satisfactory as regards milk, and at the same time have a most important influence on subsequent generations.

17. Under circumstances of this kind, the most hopeful line is to attempt to establish a special breed of dairy cattle from the half-breds. In such a case the very greatest care must be taken to secure bulls for crossing from the best milking strains. This then is a policy of using imported sires once and for all. Indeed it seems to me the only course which promises of finality. Even using the very best Ayrshire bulls, the percentage failures, especially in the early generations, will be fairly high; this is due to the absence of milking qualities in the Ongole, and is therefore quite inevitable. Only adult bulls should be imported, as the strain of the climate prevents normal growth, thus reducing the constitution and impairing the vigour of the offspring.

18. Seeing that for these reasons the policy of continuous breeding from imported sires cannot continue, the lines to be followed in breeding out from the crosses may be considered. The cross-bred has desirable and undesirable characters. Therefore this problem is to eliminate the undesirable and further develop the desirable ones. It is in accordance with natural law to expect that when breeding from half-breds, the conditions of climate etc., will develop the fitness character with each generation that passes, until it approaches or equals that of the native stock. The same may also be taken as applying to diseases. The increasing fitness will enable the increased food required for increased yield of milk to be consumed by the cow without any danger to health. The problem is therefore quite as much one of breeding for fitness as breeding for milk records. Artificial means adopted to attempt to supplement fitness only tends to increase delicacy, and in practice is impossible. The development of the milking body type, and the modifications of the digestive system to meet the special requirement will also progress with the generations.

19. The improved milking qualities may be developed by the liberal treatment of stock so as to secure the first calving at a moderately early age. This no doubt imposes a strain on the system

of the heifer but at the same time it develops the milking qualities. The first lactation should be fairly prolonged, and udder manipulations practised. Bringing a heifer to the first calving before her growth is quite completed, stimulates special type development, as well as adds to the mysterious character which enables the cow to convert a large amount of food into milk without becoming fat.

20. To provide suitable sires from amongst the crosses to establish a special breed of dairy stock, a breeding farm will be required. In addition to that all unsuitable male stock for breeding must be compulsorily castrated.

21. The carrying through of a scheme of this kind will not only solve the dairy problem in Madras but in other towns as well. During the early generations, when the numbers involved are small, the undesirable characters will be considerably reduced or eliminated. As the numbers increase, they will be available for other districts. In my opinion this is the only way to solve the dairy problem and it will be observed that to reach this stage many years of progressive patient work will be required. These proposals do not introduce any new danger, regarding diseases etc., as all these are there already, but without anything like the advantages that will follow systematic crossing and grading under this scheme.

22. The establishment of a special breed for dairy purposes must go hand in hand with providing facilities for the dairymen to breed with their own stock. This amounts to settling dairy farmers in large groups where they may be able to avail themselves of all the benefits of co-operation. This foreshadows the removal of the dairy trade from the city to the country, and conveying the milk to Madras by rail or motor. Rich cattle manure will be available for the land, and the fodder difficulty will be solved by the dairymen growing fodder crops.

23. *Buffaloes.*

The improvement of buffaloes is quite as important as the improvement of cows. While the average buffalo in the city reaches the balance line, that cannot be considered satisfactory, as

no profit is left to the producer. The improvement of buffaloes should begin with the best Presidency breed in the Vizagapatam and other northern districts. These are the buffaloes that are at present purchased by the Madras dairymen. I am of opinion that systematic breeding, grading, and selection will show a marked improvement of this breed in a comparatively short time. Good milking cows are few in number but it should be possible to get enough for a buffalo breeding farm. It seems to me that the improvement of this breed can be made within itself. As a stock breeder, I have always been exceedingly reluctant to cross breed to attain an object if there seemed to be a reasonable hope of securing the object by grading the pure breed. It is therefore a matter of much interest to me that the improvement of milk cows should fall inside those problems which require crossing in the initial stages to attain the desired object, while Vizagapatam buffaloes fall in the category where grading the pure breed appears to be quite hopeful.

24. While the remarks in this paper have been confined to the improvement of dairy stock; mainly to improve the milk supply of towns and cities, a very important matter, I should like to say in order to give the proper perspective to the live stock schemes, that there are two problems of even greater importance. These are (1) the improvement of draft cattle combined with an attempt to also improve the milking capacity of the cows (2) the improvement of buffaloes for both milk and draft. These two problems affect the whole Presidency generally. Thus they are simply mentioned to show that such are not being overlooked.

A. Carruth.

*Discussion :—*For crossing with the local cattle Mr. H. C. Sampson said some strain from a more tropical climate than that of the Ayrshire may be tried. For such a strain he will not go so far north of Scotland but confine his search to the coasts of the Mediterranean and especially the North coast of Africa.

Mr. Robertson of Saidapet used to get his animals from Aden.

The use of a strain from a country vary from that of India carries with it a great amount of risk when any disease breaks out. The introduced strain is frequently very liable to catch tropical diseases and often a whole herd of cross bred gets completely destroyed.

He mentioned an example in South Africa where a whole herd of cross bred between the local cattle and Dutch strain was completely wiped out on the outbreak of a cattle epidemic called 'The East Coast Fever.'

Mr. Parnell said that the liability to any particular disease does not matter as such a character could be eliminated by careful breeding on a large scale. The breeding work is easier in plants because of the possibility of dealing with very large numbers. With animals the work of breeding becomes very expensive.

Mr. Aranda Rao said that in the Ongole cow and the Delhi buffalo our Presidency possesses fairly promising strains for purposes of crossing.

He mentioned that in the Central Farm during a recent attack of rinderpest almost all cross bred were practically wiped out.

Mr. Carruth replied that his selection of Ayrshire for cattle breeding in India was justified by the fair amount of knowledge that has been accumulated in the past on this particular strain. We have satisfactory milk records for a large number of generations.

Every breeder will easily endorse his opinion that for breeding a thorough knowledge of the parent strains is essential.

Agriculture and the Leather Trade.

The Leather Industry is one of the many industries that depends entirely on Agriculture for its raw materials whilst the agriculturist is one of the chief users of the finished article.

In the case of the textile trades the Indian Agriculturist has shown a desire to improve the raw materials and has in many cases

succeeded to do so, whereas in the case of the raw material for the leather trade he usually shows either total indifference or in some cases goes so far as to purposely damage it.

In countries where cattle are kept chiefly for their value as food a good deal has been done in the way of improving hides, especially by either abolishing branding or doing it in such a way as to cause as little damage as possible. Many Indian hides are made practically valueless by this practice, for instance, the samples shown are worth only Rs. 9 and Rs. 3 whereas without brands they would have been worth Rs. 21 and Rs. 7-8-0. As the charges connected with the manufacture are the same in each case, say 0-7-0 per lb., it will be seen that the hides as taken off the animals would have only been worth Rs. 2-8-0 and Rs. 0-12-0 instead of Rs. 14-8-0 and Rs. 5-0-0. These are not a really bad cases of branding and in certain cases I have seen, the tanned hides have actually been of less value than the cost of tanning it. Branding is done in India chiefly for the following reasons:

- (i) Identification,
- (ii) Medical,
- (iii) Ceremonial,
- (iv) To avert the evil eye,
- (v) To render the hide valueless so as to stop any chance of the animal being poisoned for the sake of its skin.

For identification purposes branding is usually much overdone. If it is necessary a small brand on the cheek or neck would be quite effective and would not perceptibly reduce the value of the hides. Heavy branding is certainly effective in making the hide valueless but whether it stops poisoning, I very much doubt, and the value of branding for the other reasons mentioned is to my mind very doubtful.

Indian hides are often very much damaged by carelessness in taking the hides off the carcase. When an animal is dead and to be skinned there is no reason why this should not be done as well as possible, and not in such a way as to reduce the value 25-50 per cent which is often the case. The best way to skin is as follows:—

"The carcase should be placed on the ground on its back and an incision made through the hide exactly along the middle line of its brisket and abdomen from the lower jaw to the root of the tail. Other incisions through the hide should be made from the brisket along the middle of the inner surface of each fore leg and from the scrotum or under along the middle of the inner surface of each hind leg.

The hide can then be removed first from one side of the carcase and then from the other, the two processes meeting at the middle line of the back. The greatest care should be taken to see that the inner surface of the hide is not cut in any way during removal."

Most insects that cause irritation to animals cause damage to hide either by causing the animal to rub itself and so tear the surface of its skin with the thorn, nails or barbed wire or by directly biting or stinging the animal leaving more or less permanent marks. The worst insect for this is the warble fly which is luckily, I believe, not known in Southern India. The sample shown is the hide of an animal that has been badly branded and it will be evident to all that this is of very little value.

As far as the use of leather is concerned in farm implement, harness etc. the one thing to be remembered is the best preservative for leather is oil or grease. This should be applied to the leather when wet and not after drying. I have here two samples of leather cut from the same piece. In one case the leather was oiled when wet then dried, in the other the leather was dried and then oiled. In the case of boots this is of particular importance; if the boots are dried before oiling they will dry hard and generally lead to blisters when again worn even if oiled afterwards, whereas, if oiled when wet this will keep their shape better and dry much softer.

A very large proportion of the British armies are wearing boots made from leather tanned in South India and at present the amount we can send home depends on the supplies of tanning materials available. The bark of the Avaram (*Cassia auriculata*) plant is the easiest used and one of the best of all tanning materials but unfortunately the supplies have run so low as to make it impossible to further increase

supplies of leather from South India. This shrub grows almost anywhere and with practically no attention and I should like to ask anyone who has any waste lands to spend a very small amount on sowing Avaram seed. Even if the demand for bark falls off the shrub is always valuable as a green manure and after once being planted costs nothing to look after as animals rarely ever touch it and it is extremely hardy and does not interfere with the grazing value of the land. The cost of planting this shrub is extremely small as all that is necessary is for a single furrow to be made by a plough say at yard intervals and a certain amount of seed dropped in and the plough then run along again so as to cover the seeds. I saw a forest area the other day where the seed had been sown broadcast after ploughing last November and the plants were very numerous and in many cases 6-9 inches in height whilst a large number that had seemed to die off in the dry weather were now resprouting and looked like doing quite well.

I have been asked to make an estimate of the total loss due to branding in the Madras Presidency and as my figures were rather large, I was somewhat doubtful in placing them before this meeting before being able to verify them, but as the figures shown by Mr. Sivan in his paper on Phosphates almost exactly coincide with my estimate I consider it safe to give them. Hides from the Madras Presidency being tanned and then sent to Madras for purchase by Government amount to about 100,000 per month, and as fully half of these are more or less branded, this gives 50,000 branded hides per month. A fairly rough estimate of the damage is say Rs. 4 per hide or two lakhs of Rupees per month. In addition to this the very badly branded hides are sold locally to chucklers by the tanners and not sent to Madras so that I consider this figure well below the actual figure.

A. Guthrie.

Discussion:—With a view to increasing the amount of tanning material in the country Mr. Kolandaswami Pillai suggested an extensive cultivation of the Divi Divi. The Department has been able to grow this tree successfully in the Koilpatti Farm.

Mr. Carruth observed that Branding is an efficient treatment when an animal becomes lame and said that till we are able to discover some other remedy it will be difficult to stop branding done with the above object. He said that late branding does not do much harm and that such branding often adds 2 to 3 years to the life of the animal.

The author of the paper said that owners of cattle sometimes have recourse to what may be called a railway brand which runs along the whole back of the animal rendering the leather useless for many purposes.

Mr. Thirumurganatham Pillai mentioned that each tract possesses a particular type of branding and that it is possible to say, wherefrom an animal comes, merely by looking at the branding.

Mr. Hemingway regretted that another reason for the spoiling of hides for the market was the prevailing practice of allowing the skinning to be done by a cooly who has no interest at all in the leather. If skilled men could be employed for this work, the hide would leave the animal in a far more marketable condition than it does at present.

Rao Sahib A. Rama Rao stated extensive branding is sometimes resorted to, to spoil the value of the leather. He said that in villages cattle are occasionally poisoned by the chucklers for the hide or the flesh and branding is done to make the cattle less attractive to such agents of mischief. He said that there will be a perceptible improvement in the situation if only owners of cattle would take an interest in the skin. At present when an animal is dead his only further consideration is to have the carcass removed as quickly as possible and the village chucklers know that it is theirs.

He once tried the experiment of not handing the carcass over to the chucklers by burying it somewhere in the farm itself or in an adjoining poramboke and the death rate of cattle went down.

But the Chucklers formed a combine among themselves not to supply him leather articles and he had to get his shoes from outside.

He has also come across cases where branding was resorted to for the sake of ornament.

"Agriculture and Co-operation."

At the Coimbatore Agricultural Conference, last year I ventured to read a paper on "Co-operation" in which I attempted to describe the various methods by which co-operation might be expected to assist the farmer in this Presidency. It has been suggested to me that I should now attempt to describe what has so far been done in this direction. Though our actual achievements are not all that could be hoped, I think that it may be of interest to hear what precisely has been done, discussed and contemplated.

It was felt last year that there had been a want of adequate co-ordination of the efforts of the co-operative and agricultural departments and that in a good many directions the agriculturists and the co-operators could assist each other. A Conference was accordingly held last year just after your agricultural conference at which some of the officers of the two departments discussed the situation; and the results of the conference were tabulated and issued in a circular by the Director of Agriculture. It was decided that there should be far more constant direct consultation between Assistant Registrars and Deputy Directors as to all matters in which the two departments were jointly interested. Assistant Registrars were required to consult the agricultural department with regard to all non-credit agricultural work taken up including all proposals to make joint purchase of agricultural requirements or proposals for the joint sale of produce. At the same time agricultural officers were required to inform Assistant Registrars of any openings for the extension

of co-operative work of an agricultural nature; and to inform the Assistant Registrars of the cases in which the work of the agricultural department could be facilitated by the development of co-operative societies. It was recognised at the same time that primary societies can with great advantage be used as vehicles for the diffusion of improved methods of agriculture, and that agriculture especially in the case of poorer tenants can be enormously benefited by the mere provision of cheap credit through the medium of ordinary credit societies. These instructions have been recently further developed by requiring the lower subordinates of the two departments, the inspectors, demonstrators and farm managers to get into communication with each other as far as possible with a view to obtain the above results.

Of course, while co-operative officers have so much work to do which is not agricultural and agricultural officers have so much work to do which is not connected with co-operation it is impossible to expect perfection in the co-ordination of the two departments. But, I think it would be fair to say that there has been a very distinct advance in the degree to which the officers of the two departments have kept in touch with each other, sought each other's advice and facilitated each other's work. I have been myself in frequent consultation with the Director and his subordinate officers, whether Deputy Directors, Farm Superintendents or Demonstrators and the reports from my section officers show that they have followed the same policy in many parts of the country. I might mention as an illustration that the Assistant Director at Calicut attended agricultural conferences in the Malabar and Coimbatore districts and gave valuable advice to the co-operators present as well as demonstrating the use of an improved plough. Again the Assistant Director in the Northern Circars travelled for several days with my Assistant Registrar and gave valuable advice to various co-operative societies about the purchase of agricultural requirements and Mr. Sampson and Mr.

Thomas have taken a great deal of pains to advise societies as to the purchase of agricultural requirements and to use them for the distribution of improved seed and manure. There is of course a great deal of scope for further co-ordination of our work but I think we can feel that some improvement has been attained during the past year. And in this connection, I think I should mention the assistance that co-operators have received from the Director of Industries in matters connected with Agricultural machinery. I have frequently written to him on behalf of co-operative societies, and I have received cordial assistance and advice from himself and his assistants. And I cannot omit to mention the great interest and the cordial co-operation in these and similar activities manifested by leading co-operators such as M. R. Ry., Rao Sahib K. Ramaswami Ayyar Avl., Secretary of the Madura District Bank, Mr. Ananda Rao, Secretary of the South Kanara District Bank, Mr. Seshachala Ayyar, Secretary of the Tiruvannamalai co-operative union and Rao Sahib A. Seturama Ayyar, Secretary of the Nidamangalam Society.

I must confess to a considerable feeling of diffidence when I approach the answer to the question "what precisely have the co-operative department succeeded in doing for the benefit of agriculture"? and I would venture to urge in advance, the extenuation, that co-operators are at present faced with a great many difficult problems which are wholly unconnected with agriculture. There have been great difficulties of finance and of the organization of our credit and supervision systems: and the Urban Stores also present difficult problems. Furthermore, the weavers in some parts of the country have suffered cruelly from the enhanced prices of yarn which has not been attended by anything like a commensurate rise in the price of cloths and their difficulties have imposed a great deal of work on the part of the officers of my department. Furthermore, the dislocation of trade owing to the war, want of freight and want of machinery have

rendered difficult, the development of joint sale, joint purchase and joint production and the adoption of improved agricultural methods.

I pointed out last year, that arguing from English and Irish analogies, the following are the main lines in which co-operation could be expected to help the farmer. Firstly the mere provision of credit, secondly, the joint purchase of household and agricultural requirements, thirdly, the joint sale of agricultural produce, fourthly the joint production of agricultural requirements, fifthly the joint preparation of Agricultural produce for market, sixthly, the joint purchase of expensive implements for hire and seventhly, joint insurance of cattle or produce against loss or damage. I might have added that eighthly, the co-operative societies might be expected as noted above to prove themselves useful as vehicles for the diffusion of improved methods of agriculture.

With regard to credit, I doubt if it has always been adequately realised in this presidency how valuable short credit may be to enable the ryot to get the best value out of his land. It is not only that ryots frequently have to borrow for the expenses of their cultivation or for paying kist on extremely laborious terms, sometimes on condition of selling their produce to the sowcar at an absurdly low price. It is also the fact, I am afraid, that most of our poorer ryots and it is they who chiefly need our help, almost invariably sell their produce directly after harvest without taking advantage of the rise in prices which so often occurs a month or two later and which generally adds anything from four to twenty rupees per acre to the value of a crop. Attention, this year, has been devoted to encouraging societies to give loans of this class to their members and I believe a great improvement has been effected in this respect. Furthermore, societies have been encouraged to take a good deal more

pains in fixing the periods of repayment for the short term loans to meet the best interests of their members. I notice too, in going through the books of primary societies that a good deal of money is being lent for the purchase of cattle and the improvement of land. A large number of new societies have been formed during the year, I think between 400 and 500; and special exertions have been made to form societies in those areas pointed out by the agricultural officers in which credit will facilitate the work of that department.

Before passing on to co-operative buying and selling I might briefly state the theory of them. The trade of the world is done in large quantities. No merchant sends a measure of Nellore rice to be sold in Coimbatore or a single Manchester cloth to be sold in Madras. It is therefore the business of someone or other to collect in small quantities from the various producers of it any article required for export and to supply it in larger quantities to the merchant who exports it in larger quantities still. And equally in dealing with imported articles it is the business of someone or other to take them over from the wholesale importer and to distribute them to those willing to buy. The "some one or other" in each case is a shop-keeper or petty trader or middleman of some kind or another; and he rightly expects a reward for his trouble. Unfortunately he often gets far too much. And when a co-operative society is prepared to take the same amount of trouble as the middleman to sell its members' produce and to buy its members' requirements, it can legitimately expect the middleman's reward the amount of which will depend to a large extent on the skill with which the business is done.

When I addressed you last year, I had only just joined the department and was not aware of the progress that had already been made in the purchase of requirements and the sale of produce. I found later, that last year there were 7 societies which made purchase of seed and manure for sale to their members

and in one of the societies, the Uttangudi society in the Ramnad district, the joint purchases included ploughs and plough shares. There has been a considerable extension of this activity in this year and a large amount of propaganda has been undertaken by leading co-operators and by the co-operative department to popularise it. The purchases by societies were not entirely confined to agricultural requirements, and societies were encouraged to purchase jointly articles required for household purposes also. In the purchase of agricultural requirements, the agricultural department was invariably or almost invariably consulted and many of the purchases of seed and manure were definitely undertaken on their initiative. Two societies purchased 23 tons of fish guano worth about Rs. 1900. 524 bags of cotton seed worth Rs. 980 were purchased by two societies and distributed among affiliated societies and individuals. 6600 maunds of oil cake manure were purchased by three other societies at a total cost of Rs. 3400. Hemp seed was purchased for Rs. 4819 by 9 societies, the quantity purchased being 96,440 lbs. approximately. Bone meal costing Rs. 510 was bought by two societies. 125 kalams of paddy seed at a cost of Rs. 312, two bags of daincha seed worth Rs. 75 and 14 bags of wild indigo seed worth Rs. 135 were purchased by the Nidamangalam society in the Tanjore district for distribution among its members. Another society purchased 1000 lbs. of daincha seed for Rs. 125. Two other societies are reported to have purchased cotton seeds and oil cake but their value has not been reported. Another society has purchased super-phosphates but the quantity and value are not known. Another society purchased Rs. 75 worth of agricultural implements and Rs. 95 worth of Cuddapah indigo seeds, besides oil cake. In all these cases the initiative was, I believe, taken by the agricultural department. In addition to these, 7 societies purchased Rs. 1578 worth of articles required for household purposes.

From the information furnished to me I am unable to estimate

correctly the profits derived in all these cases. But it is reasonable to suppose that the purchases have been profitable and that the profit depends to a large extent on the quantities ordered and the saving of freight. And apart from the actual profit the societies must ordinarily have benefited considerably by the superior quality of the goods.

I might perhaps mention in this connection the instances where arrangements have already been made or are contemplated for joint purchase in the coming year. All the 30 Badaga societies in the Nilgris have agreed to buy jointly the potato seeds required by their members from the Government farm at Nanjanad. The societies affiliated to the Vijiamangalam Union have indented for 100 pothis of cotton seed. And it is hoped that arrangements may shortly be made for the joint purchase of ragi and other household requirements for most if not all of the Badaga societies. Thanks again to the kindness of the Kerosine oil companies of Madras, arrangements have been made to supply oil to co-operative societies at contract prices. 31 societies with a membership of 6,224 have applied for the supply of oil and arrangements have already been made in some cases. It is hoped that this movement will be successful as it is undoubtedly both popular and beneficial. The Government have been pleased to permit the sale of salt to co-operators through their societies. Several of them have already applied for this concession, which I think will be highly valued, and it is hoped that many more will avail themselves of it and that this work will be successful.

8. In joint sale also, some progress had been made last year. A society in Kistna took 100 bags of paddy to market on behalf of its members and sold them wholesale at a profit of 3%. The Hindupur Credit Society similarly sold over a thousand rupees worth of its members' paddy by public auction and the margin of profits secured above the price obtainable through the ordinary

channels was estimated at 11 per cent; and a similar margin of 3 per cent. was secured for some of the members of societies affiliated to the Ketti Union on the Nilgris by the President of the Union who disposed wholesale of their potatoes to the value of Rs. 15,000. There has been some development of this activity this year. The idea, however, is a new one and the progress is disappointing. It does not appear to be the case that merchants are always prepared to give better prices for large consignments than for small consignments. Indeed I was told in the Northern Circars that the introduction of a large consignment into a market would probably depress prices. I cannot help thinking that further enquiries will show that, if we deal in a sufficiently large scale and with reputable merchants, our co-operators will be able to obtain a substantial discount on quantity. Doubts have also been expressed whether a really adequate profit could be obtained by taking pains to maintain the purity of the article sold; as for example, in the case of cotton. I cannot help believing that here also, we shall find it possible to get into touch with reputable dealers who are prepared to pay a good price for a good article. Indeed, I hope that we shall be able to place our co-operator into communication with such dealers and that they would be able to satisfy the dealers that their produce is pure and worth a decent price and to satisfy their members that it is worth while to make special efforts to keep their cotton pure. Another difficulty suggested to me at several places, and this difficulty would apply also to any proposal to enable individual members to hold up their crop for a rise in prices, is that the poorer ryots may find it difficult to store their produce after harvest. Practice seems to vary very considerably in different parts of the country and I hope that the difficulties urged may be found to be less serious than they are represented to be; but, I am afraid it may be necessary for societies in some parts of the country to go to the expense of building storehouses for the preservation of

produce whether for a deferred sale by the members themselves or for a joint sale by the society. At present we have not enough material for judging whether such storehouses would be of sufficient use to members to enable them to pay their way. And in any case, the present time of high prices for all building materials is not a good time for commencing such experiments.

The actual work of joint sale done and contemplated this year is as follows. Seven societies have been reported to have resorted to joint selling. Neither the exact quantity of produce sold nor its value is given in the case of one society. The total amount realised by the other societies came to Rs. 7598. In the case of the Tallarevu agricultural society, the profit realised viz., Rs. 71 on a sale price of Rs. 514 was due to holding up the produce till better prices prevailed. In the case of another society (Kukkudakandi) the profit realised viz., Rs. 127 was due to taking the produce jointly to a distant and better market. The profit in the case of another society is said to be one rupee per Kunchan. Attempts were made last September to arrange for the supply of produce required for the army through co-operative societies. But before arrangements could be completed owing to the change of headquarters the military authorities were compelled to drop negotiations. Quite recently, however, the Ketti Union in the Nilgris has arranged to sell 5000 bags of potatoes, the produce of the members of its affiliated societies, at Rs. 8 a bag to the military department. It is anticipated that this contract will be eminently profitable to both parties. The seed unions of the Tinnevely district in addition to the joint production of good seed often effect joint sales of the cotton cultivated by their members. The cotton is given a certificate (to the effect that it has been grown from Government seed under the superintendence of the agricultural department) and is ginned separately by the firms with whom the agricultural department has made special arrangements for the purpose, and a considerable premium is paid for such cotton. We

have lately been considering the desirability of establishing a society at Tiruppur in this district to undertake the joint sale of the cotton of members of co-operative societies. Some of the leading societies have already expressed approval of the scheme and our discussions with Mr. Steele, Mr. Ramalinga Chettiar, Mr. Rao Sahib Vital Das Sait, Mr. Muruganada Chettiar and Mr. Muttukumara Chettiar encourage us to hope that this may be feasible. It would seem however that better market facilities are needed in Tiruppur before we can confidently count on success.

The only society which did anything in the nature of production of agricultural requirements is the Nidamangalam society in the Tanjore district, whose energetic secretary Rao Sahib A. Seturama Ayyar has taken great interest in agricultural improvement. This society which includes individual agriculturists all over the Tanjore district, and has since included seven ordinary credit societies as members, undertook last year the manufacture of bone and phosphate manure using a disintegrator and an oil engine hired to it for the purpose by the secretary of the society. The manure was produced at a rate cheaper than that obtainable in the open market and was sold at a small profit to their members. The society also purchased other kinds of manure wholesale and passed them on to their members at a small profit. The business done was, however, not on a very large scale and amounted only to about a thousand rupees. This society continued these activities this year, manufacturing and selling to its members 15 tons of bone-meal and one ton of phosphate. It also did a very considerable trade in seed and manure which has been included in the figures given under the head of joint purchase.

Nothing, I am afraid, has been done in the direction of the joint preparation of produce for the market with the single exception of the joint ginning of their cotton by the seed unions

in Tinnevely district. There has been a good deal of discussion about the possibilities of extending the joint ginning to co-operative societies who are prepared to keep their cotton pure and sell their seeds jointly. And there has been a similar discussion about the possibility of purchasing decorticators and an engine to work them for the cleaning of groundnut in South Arcot. Apart from the difficulties of organizing the latter activity, we are faced by the high prices of the machinery and by the difficulty of marketing the produce on a large scale. The matter like so many others is under correspondence. There has also been a discussion about the possibility of the joint crushing of sugarcane with the use of expensive machinery; but, I understand that experience at Singanallur has gone to show that unless done on a very large scale, this is hardly a paying proposition, and co-operators are not yet prepared to embark on anything involving any very large purchase of machinery.

Under the heading of joint preparation of produce for the market, we might perhaps include the enquiries that are being made at present for the improvement of the milk supply in Madras. Mr. Carruth has recently published a note in which the lamentable condition of the Madras milk industry is described. He has corresponded and conferred about it with my Assistant Registrar at Madras and myself, and enquiries are now being made as to whether it is not possible to improve the position of the milkman and the quality of his milk through a co-operative society. The co-operative purchase of condensed foods seems to be fairly feasible and profitable; and one would like to be able to see the possibility of co-operative ownership and use of good breeding bulls of a proper milking strain, as well as the joint ownership of suitable cattle sheds and the joint hiring and use of good grazing grounds outside Madras. The chief difficulty at present encountered is that the milkmen not only have little property but are also widely scattered in every

portion of the city and are, generally speaking, not personally known to each other. These are rather discouraging conditions for the formation of a co-operative society on ordinary lines. The matter is being carefully investigated and I think there is a very fair chance of our being able to effect something. The success which has attended the dairy at Nagpur in the Central Provinces will be borne in mind. A society on that model with necessary modifications might, I think, be made really co-operative.

The joint purchase of expensive implements for joint use was illustrated last year by the Avalnattam society in the Tinnevely district, which bought a disc plough for Rs. 190 and hired it out to its members, receiving Rs. 57 in fees for its use during the year; and a society was formed in the Ganjam district with the object of purchasing improved sugarcane crushers for hire. The latter society has not, owing to dissensions, succeeded in obtaining any improved crushers during the year. Five credit societies were formed for sugarcane growers during this year on the west coast at the instance of the Agricultural department and they were encouraged to buy crushers for hire to their members. The prices are, however, abnormally high, and it has been decided to defer purchase till they are reduced.

I have noticed occasionally in the public press regrets expressed that we have not so far done anything in this presidency in the direction of cattle insurance. The matter was raised at a conference at Srivilliputtur a few months ago in which a co-operator formulated and recommended a scheme for co-operative cattle insurance. There were a number of ryots present and the matter was fully discussed; and the opinion of the ryots was that cattle owners are not sufficiently impressed with the benefits of insurance to be willing to pay the necessary

premium. I have thought about the matter pretty often and have been a little discouraged by the above and other difficulties. In theory, if you make a small society of cattle owners personally known to each other, you may work it with success in ordinary times; but any considerable disaster to the cattle such as an epidemic of rinderpest like the one suffered from recently in Coimbatore will completely ruin your society and make it impossible for it to pay any of the losses. On the other hand, if your society is a large one covering a big area so as to level out your risks, there is a very considerable danger of the individual cattle owner trying to deceive you by fictitious accounts of deaths. There is no danger of such malpractices in a small society; but it would be very difficult for a large society to detect that kind of thing and I am afraid it is not possible to be absolutely confident that the ryots would not attempt it. Perhaps some large system of federation by which small societies could reinsure themselves with a big society against exceptional disasters might be found possible. But it would obviously take a great deal of care and thought and an enormous amount of propaganda and organisation to create such a federation. At the same time such occasional disasters as the one you have recently met with in Coimbatore seems to indicate that some method of insurance for cattle ought to be found.

A possible co-operative activity which I did not mention last year is the co-operative breeding of cattle. We have at present a scheme under investigation which was proposed by the secretary of the Puttur Co-operative Union asking for starting a co-operative breeding farm in the neighbourhood of that town, something on the lines of the breeding farm maintained by the agricultural department in Nawagoan in the Central Provinces. The Director and Deputy Director of Agriculture have given considerable thought to the scheme and Mr. Curruth hopes soon to be able to go to South Kanara and to investigate the possibilities of it on the spot.

I think both the Director of Agriculture and myself regret that we have not been able to use agricultural societies more fully as vehicles of improved agriculture. The societies are keen to learn new methods; and it is a common to get requests from societies to send down some agricultural expert to see if he could advise them how to improve their cultivation. It has not been possible to do much in this direction chiefly, I understand, owing to the shortness of the agricultural establishment and their concentration on other work. Further, the high price of iron and the difficulty of obtaining improved agricultural implements has prevented us from attempting the useful and comparatively simple method of stimulating the introduction of improved implements by encouraging financial banks to keep them in stock for exhibition to societies and encouraging members of primary societies to buy them. Still the purchase of improved manure and seed by societies already described and amounting to over Rs. 11,000 in value do constitute a considerable step in the right direction. And we have recently taken steps to see whether our co-operative societies cannot be used for facilitating the formation of seed unions in this district. I understand that the prospects are promising.

There has been a good deal of discussion as to what is the proper organisation to be used for joint sale and purchase. Briefly, the question is whether you should use your credit societies, unions and financing banks for operations of that kind or whether you need a separate organisation. There are considerable advantages in using the primary credit societies for much purpose. In the first place, they have a large number of members and so can distribute the benefits of such activities to a large number of people. Secondly, it would be a little confusing to the ordinary villager to have to be a member of more than one society, and it will be a little difficult for a village to find the personnel of more than one panchayat. Again it is an advantage to use the existing solidarity of feeling created by credit societies for all co-operative purposes in the village. In fact, there are great attractions in the general purpose society which confers on its members all the advantages

which can be obtained by joint action. I need hardly add that the credit society will gain by the addition of these other functions since they could provide what is too often lacking in an ordinary credit society namely continued activity and interest which extend over the greater part of the year. It is for instance, a little difficult for a member to take a great interest in his society if he borrowed from it 5 years ago and his only connection with it ever since has been the annual payment of an instalment, a phenomenon, I am afraid, only too common in some of our Tamil societies. On the other hand, there are some real as well as some technical objections to the credit societies undertaking these other functions. In the first place, there is the theoretical danger that in case of mismanagement or loss, the financial stability of the credit society itself will be threatened; and indeed it is generally undesirable that banking institutions should engage in trade. There is secondly the fact that our villagers are not particularly good business men and need outside advice in what, where and when they will purchase and sell. And in some of the districts, the supervising unions have undertaken to order the articles required by their affiliated societies. This again has the theoretical disadvantage that a supervising union has even less financial stability than a primary society and is therefore theoretically in greater danger of disaster in case of mismanagement or malpractices. And the general objection to banker's trading renders it undesirable that the financing banks should engage directly in these operations. I am at present inclined to think that the best organisation for purchase etc., is a federation with share capital consisting partly of affiliated primary societies and partly of substantial intelligent ryots who would be able to provide a reasonably large share capital and good management. Such an organisation exists in the recently established Kallakurichi agricultural union and in the Nidamangalam society referred to above. The credit societies can obtain the requirements of their members through these central unions and need, if they are careful, accept no considerable risk. They should, I think, obtain indents from their members of the articles required and should only

order those amounts for which they have a certainty that they can obtain from the members payment in cash or give to the member a loan *ad hoc* from the societies' funds. In such a transaction, they at no point own the articles themselves but merely act as the agents for the members. The financing banks, will, it is hoped, be able to facilitate these arrangements by giving the necessary credit to the agricultural unions for the purchase of the articles and the necessary loans to the primary societies to enable their members to pay promptly for what they have received, besides stimulating these activities with good advice and wise propaganda. We have been a little diffident of forming any definite organisation for these purposes until we have obtained sufficient experience of what kind of things the villager wants and what kind of things he is prepared to purchase and sell jointly. And indeed our experience at Kullakurichi (where we are keeping a considerable capital idle for want of an outlet) points to the wisdom of our caution. But the procedure generally so far followed in joint purchase has been more or less on the lines described above. We hope shortly to be able to frame by-laws permitting and safeguarding these activities and to be able as time goes on to provide the necessary organisation.

F. R. Hemingway.

Discussion:—Mr. Chelvaranga Raju mentioned that the Secretary of the co-operative society at Kalladakurichi purchased from him during the year 3 candies of Cambodia cotton seed for purposes of sowing. The society is about to install a disintegrator.

He said that the purchase and maintenance of a good breeding bull is an item on which any co-operative society may invest its money with great advantage to its members and invited attention to the special facilities now offered by Government for cattle breeding farms in the Presidency.

Mr. M. R. Ramaswami Sivan pointed out that the secretary of the Needamangalam society whom Mr. Hemingway had described

as an enthusiastic co-operator was an old student of Saidapet and had taken to private farming in preference to Government service.

To the difficulty raised by Mr. Hemingway in his paper that any system of cattle insurance will have to be confined generally to a small locality in which the residents have an intimate knowledge of one another, Mr. Carruth replied that it can easily be overcome by insisting upon the production of a death certificate signed by a few farmers of the village.

Mr. Hemingway said that in practice it will be difficult for the ryots on a large area to protect themselves from being cheated. It is just possible that a society at Pollachi, for instance, will work at any action of its members to the disadvantage of a neighbouring society. To this Mr. Carruth said that this can be met by insisting on 5 men to certify that a dead animal will mean some money out of the pocket of each member of the society.

Mr. P. V. Rajagopalachari pointed out that the prices of paddy soon after harvest are attributable to the fact that it is the time for the collection of Govt. kist and a ryot has often to part with the paddy at a comparatively low price to avoid going to a money lender for the loan of the kist amount.

An organised attempt to lend money to the ryot for payment of kist at reasonable interest is sure to go a long way towards ameliorating the present chronic indebtedness of the ryot.

Mr. Hemingway strongly endorsed the above recommendation.

Mr. Venkataramaniah mentioned that there is considerable scope for co-operative activity in the improvement of water supply for instance, well-boring. There exist in this Presidency vast areas of uncultivated land which could all be brought under good cultivation by the creation of a good water supply. Well-boring and the establishment of pumping installations on a co-operative basis are plainly indicated in such localities.

As an illustration he mentioned the conversion of 40 acres of waste land with valuable cultivated lands by the striking of an artesian spring in the village of Kurichi in the Tanjore District. He did the boring under the Department of Industries.

Mr. H. Subbraya Ayyar advocated a rapid expansion of the co-operative movement and said that it is desirable there should be a society in every village. The people should be induced to take a personal interest with society. If people could be found in every village for forming the village Panchayat he failed to see the difficulty in obtaining men to run a co-operative society.

He held that any additional expenditure involved in the development of such societies are rightly debitable to the various Department concerned inclusive of agriculture. The new Unions about to be found and the existing District banks could easily find the capital for the running of these societies.

Experience of a New Colony.

New Colony means cheap land, cheap land means generally, the place must be unhealthy, unsafe, difficult of easy access, inhabited by lazy people and such causes. Persons who wish to cultivate in these open tracts, find it almost impossible to do so in case their crop becomes a prey to the herds of cattle which will devastate the crops in no time even with all fencings. Rearing of cattle, especially goat and sheep becomes the chief occupation. These are the important conditions of the land on which I have begun my new colony. To begin with the land has to be got in compact block. There were two ways of making the place compact as far as possible.

The one was, I had to make purchases of those lands which lie in the middle and adjacent to my lands. Sometimes the rates would go much higher when the owners understand my own object. The other was getting adjacent government assessed waste lands on darkast.

This was a very hard and anxious task to me. Ordinary darkast rules do not permit such convenient blocks to an individual. The difficulties were immense to get through the same; for the nature of my darkast application drew innumerable objection petitions of many sorts from the ryots of the place. But I had a great belief of final success and stood firmly to meet all obstacles in any possible forms, hoping that a proper enquiry into my case by higher authorities would give me favourable results. Accordingly after a very long time the matter came to that stage as described above, and ended justly and in my favour. Thus to make short of the long story, I got through the same successfully.

As the nature of this land was stiff clay and black cotton soil land, the dwelling site was fixed on a suitable well drained land and a few sheds were first constructed and also a draw-well. Such of those lands which were near the sheds and which did not cost much to bring under plough were first brought under cultivation. Employing a few servants under a responsible person, I began to work, first, the land had to be cleared of its jungle and stumps, bundled, allowing drainage channels and pathways.

As a number of men were necessary, whoever came expressing willingness to cultivate, I accepted to some extent, taking them first in service providing shed and food. The extent of the colony consisted of about 500 acres comprising all sorts of lands wet, garden and dry. Half a dozen pair of bullocks I employed for the work. As the major portion of the land was dry grazing ground, the cost of bringing them suitable to the plough was ten to forty rupees per acre; and thus an average of hundred acres were brought under cultivation every year.

Doing own cultivation work with these servants on this new land, was no easy matter to me. I had to study carefully the local conditions, the seasons and the kinds of crops raised in the neighbourhood. As this land is nearly three miles away from villages servants and coolies attend work only after 8 A. M. and go back at 5 P. M. and in rainy weather they begin even later and finish off earlier. So in busy ploughing and sowing seasons the work suffers much.

This land being close to hills and reserve forest, there is much damage to grain crop, paddy, kambu, cholam etc., by the wild animals such as pigs, deers etc. Unless one is very careful in watching the crops, with dogs etc., one is sure to lose his crop. This I found to be a very difficult and laborious task and so there is no use in asking these servants to take care of the crops, as there is no personal interest in them and thus I have suffered these crop damages many a time.

After experiencing these difficulties I began cultivation of cotton to a large extent on the borders of reserve forests, and also gingelly and Bengal gram thinking that these will not be eaten or damaged by wild beasts. For the first year there was no such damage except stealing of the matured Bengal gram crops by cattle drivers, to whom although a way is marked and fenced they drive their cattle recklessly for they entertain a grudge towards this new farming (with all our smooth dealings with them) on account of their free grazing area being diminished.

During the next year I noticed damages to these crops also especially to cotton and Bengal gram by the same wild beasts as they become accustomed to eat young bolls of cotton and young ears of the gram. Further wild rats climbing cotton plants, carried away kappas from open bolls, to a large extent, to holes near hedges and in cotton land itself. There will be no such damage in cotton as soon as the opened bolls are picked.

But the difficulty of getting female coolies was very great, for the cotton picking work, unless trained to it, is very difficult and so required some sort of inducement in the beginning. For this I raised the wages from two annas to three annas a day, with instructions to begin the work early in the morning. Now they have come to know the value of doing quick work on account of high income.

From the few years of my own cultivation, employing servants of the above type, I found I was working at a loss.

Then I induced some ryots of those places and some who have come there willing to take up land for cultivation to work in partner-

ship,—myself undertaking to provide cattle, plough, feeding, housing and all other charges. During the period many showed themselves to be interested. But after the harvest of this year's crop I found them wanting in their honesty; however I could not but trust them.

The next year, selecting a few of them I tried a different method giving them a great amount of independence, fixing them a nominal rent that is double the Government assessment of the land, and giving them every help as before, but debiting interest for the amount advanced, in the shape of bullocks, sowing and other charges.

Here again by the end of this year I found in the majority of them, their ways, were not such as to be allowed to continue as tenants; for the chances of improving the land becoming nil, they began to use the bullocks for getting hires. Hence the condition of the bullocks entrusted to their care began to deteriorate and they were not found showing any feeling of responsibility, except saying that they would repay from next year's crop.

During harvest times, when I kept strict guards all round to find out their actual returns they were detected of concealing crops, especially paddy and cotton in some way or other; and a few were actually caught red-handed carrying cotton after midnight, for, a market was established for receiving such petty trade at nights. As the main dry crop is cotton and when I did not interfere with their freedom of selecting crops, they preferred to sow the whole extent with cotton, saying that they would discharge their debts by this money-crop. By allowing them like this it proved to be the reserve. For they had to spend a lot to meet their household expenditure and also to buy fodder at a dear rate for their cattle. Besides they had to incur heavy weeding charges on account of sudden demand for labour all round at one season. For every week payments should be made to them to meet expenditure.

Further I find that, by having this one view namely to bring extensive lands under plough, with so much trouble and expenditure, the strength of bullocks deteriorates, on account of the decrease in grazing area year by year, and also due to increased work

Where land is cheap and far off and where there is the difficulty of getting good farm servants and tenants, I find it is highly necessary that cattle should be reared with great care and in abundance of its natural food, by reserving enough of land for pasture; and this rearing is necessary at least to produce from its own stock sufficient bulls for the farmer operations without any additional expenditure of purchasing bullocks in future.

As this colony is near hills and the lands were all waste before servants and tenants suffered much from malarial fevers. For about two years in the beginning the above disease was very virulent. But now I find, by giving more attention to their comforts their position is much improved. Jungles in the neighbourhood of living sheds were removed and pure drinking water also was provided. Servants should never be allowed to be overworked and they should take timely meals in these places, otherwise they got sickness especially in the month of December, January and February. All servants are compelled to take only warm food, but not the food cooked during the previous night, as this is found to be one of the chief causes of illness.

The majority of persons, who like to come and live in this new colony are generally found to be highly wanting in their morals. This characteristic in them was not known in the beginning. At first every incoming tenant poses himself to be honest and well-versed in Agriculture. But still by keeping these different sorts of people in a bond of union, I find to some extent they keep their level and although found degraded in old village societies, they try to improve their present positions as if to observe a new civilisation to suit a new colony. The trouble comes all the more, whenever these people are found that they come to this new and isolated place more with the object of living a joyous life than to take sincere desire in agriculture. In almost all cases only spendthrifts, paupers, and men with families of questionable characters choose to leave their native soils with a desire to colonies elsewhere and to eke out their livelihood.

Studying the social conditions of villages it may be observed that in the majority of cases each village forms more or less one community

with bonds of kinship. Hence the conservatism of the village ryot keeps him bound to his own paternal soil, however poor his means may be. For I found that my tenants who are suffering in villages, with all my inducement do not at all consent to leave their place.

Regarding investment, generally I find there will be always an increase of expenditure over the proposed allotment for there happens something unexpected in new undertakings. Unless good and trustworthy men, with some means of their own, are employed as tenants and giving them timely assistance, I think there will be no end of this over expenditure which only goes to be debited to their accounts which become irrecoverable.

It is this method which I intend adopting hereafter. Until this stage is found possible which I think will take a pretty long time to attain I do not want to make a show of extensive cultivation with all the difficulties described above. But on the other hand if I could get honest and intelligent farm servants in the vicinity I am quite willing to take up the cultivation myself over the whole area, which I am sure will pay well and that I feel a great pleasure in so doing.

V. C. Vellingiri Gounder.

Discussion:—There was no discussion on this paper as it was too late.

Athletic Records.

The following are the *Records* for the various events in the College sports, that is, the best performances by students of the College. They are of interest, partly as indicating whether the standard of athletics is going up or down, and partly as a stimulus for future competitors.

Event.	Record.	Year.	Name.
100 yds. race.	11½ sec.	1916	K. S. Ramana Rai.
Long jump.	16'—11"	1918	T. Seshachalam.
High jump.	5'	1913 or 14	U. Vittal Rao.
¼ mile race.	61½ sec.	1915	Venkatachalam Mudaliar.
½ mile race.	2 min. 30 sec.	1918	A. V. Babi.
¾ mile race.	5 " 25 "	1915	K. Audinarayana Rao.
Hurdle race.	18½ sec.	1918	T. Seshachalam.
Throwing the cricket ball.	97 yds.	1918	A. V. Babi.
Putting the shot.	23'—4½"	1918	A. V. Babi.

Sports Champion-ship and Nayanar's cup.

It is also interesting to note the relative superiority of the sports Champion and Winner of the Vengail Krishnan Nayanar Cup, over his fellow competitors. The table below shows the marks obtained by the winners since the year 1911; the cup was instituted in 1914.

Year.	Total No. of marks obtained.	Name of Winner.
1911	39	K. M. Gururaja Rao.
1912	39	R. G. Mal.
1913	36	R. G. Mal.
1914	33	Venkatachala Mudaliar (Winner of Nayanar's cup).
1915	32	Do.
1916	53	K. S. Ramana Rai.
1917	39	S. Dharmalingam.
1918	51	A. V. Babi.

College Day Sports 1918.

	List of Winners.	RECORD.
Hundred Yards Race.	I. T. Seshachalam. II. A. V. Babi. III. M. M. Belliappa.	11½ sec.
Long Jump.	I. T. Seshachalam. II. M. M. Belliappa. III. A. V. Babi.	16'—11"
High Jump.	I. K. V. Seshagiri Rao. II. A. V. Babi. III. M. M. Belliappa.	4'—8"
Putting the Shot.	I. A. V. Babi. II. K. S. Bhandary.	23'—4½"
Quarter Mile Race.	I. A. V. Babi. II. K. K. Subrahmanyam. III. T. Seshachalam.	
Throwing the Cricket Ball.	I. A. V. Babi. II. Vittal Punja.	97 yards.

I. D. F. Race.	{ I. C. Appadurai.	
	{ II. V. S. Viswanatha Rao.	
Hurdle Race.	{ I. T. Seshachalam.	18½ sec.
	{ II. A. V. Babi.	
Half Mile Race.	{ I. A. V. Babi.	2 min. 30 sec.
	{ II. K. K. Subrahmanyam.	
	{ III. K. S. Bhandary.	
Half Mile Race (open).	{ I. T. Rathnavelu.	(Coimbatore College)
	{ II. W. Cresswell.	(Stanley High School).
	{ III. Subrahmanyam.	(London Mission School).
One Mile Race.	{ I. K. K. Subrahmanyam.	5 m. 49½ sec.
	{ II. S. Ramachandran.	
	{ III. K. S. Krishnamurthi.	
Obstacle Race.	{ I. K. V. Seshagiri Rao.	
	{ II. K. S. Bhandary.	
Cross Country Race.	{ I. K. K. Subrahmanyam.	
	{ II. K. S. Krishnamurthi.	
	{ III. S. Ramachandran.	

Notes and News.

Cultivation of Railway Waste Lands.

The following G. O.—No. 185, Revenue (Special), dated 13th August 1918, has been issued:—

With a view to stimulate the production of foodstuffs and castor in this Presidency the Government are pleased to permit during the continuance of the war and for six months thereafter the cultivation with food crops and castor on waste lands classed as railway poramboke. This permission is subject to the consent of the railway authorities in each case and will not be given when the lands are required for other purposes. Such cultivation will be subject to land revenue assessment and the usual charge for the use of the Government water and will confer no

occupancy right on the cultivator. The cultivation of non-food crops except castor will be liable to be treated as an encroachment. The previous permission of the revenue authorities should be obtained for the use of Government water.

2. Applications for permission should be submitted to the local Revenue Divisional officer through District Engineer of the Railway company. Preference will be given to applications from Railway employees.

Students' Corner.

The term reopens on the 24th September for the I and II year Students and on 30th September for the III and IV year Students.

Departmental Notes.

Appointments:—

1. Mr. N. Srinivasa Rao, Assistant Agricultural Demonstrator, is posted to the Agricultural College Dairy.

2. Mr. G. Sitharama Sastri, Assistant Farm Manager, is confirmed in his appointment with effect from the date of his joining the appointment on 4th July 1916 on the expiry of the two years probationary period.

3. Messrs: K. Vasudaya Shetty, K. Kondappa Sarma, M. Chinnaswami Naidu, A. Ramaswami Ayyar, K. Balaji Rao, T. G. Anantharama Ayyar, A. Ramalinga Ayyar and A. Maria Susai, Assistant Farm Managers, and Assistant Agricultural Demonstrators are confirmed in the Lower Division of the Agricultural Section with effect from the date of their appointment as such after the completion of one year's probation.

4. Mr. T. A. Rangaswami Ayyangar, Sub Assistant, Sugar Cane station is confirmed with retrospective effect from 5th July 1917.

Leave:—

1. Mr. W. Raghavachari, Agricultural Demonstrator, Coimbatore, extension of privilege leave for 7 days.

2. Mr. N. V. Viswanatha Ayyar, Agricultural Demonstrator, South Arcot, extension of privilege leave for 8 days.

3. The leave granted to Mr. T. S. Ramasubrahmanya Ayyar, Assistant in Chemistry, is hereby cancelled. Mr. C. V. Ramaswami Ayyar, will continue to act from the 19th August 1918 in the place of Mr. P. A. Subramanya Ayyar, Assistant in Chemistry on other duty as Ag. Senior Assistant in Chemistry.

4. Mr. G. Sitharama Sastri, Assistant Farm Manager, extension of privilege leave for 15 days.

Advertisement.

Applications are invited from candidates holding "Certificate of Proficiency in Practical Agriculture" for the post of an Agriculturist in the Kangundi Zemindary with effect from 1-1-1919. Pay Rs. 35—2½—75 (annual increment). Further increment of Rs. 5 per annum after the maximum is reached up to the Salary limit of Rs. 90 as in Government.

(Sd.) K. G. Venkatapathe Naidu,
Zemindar of Kangundi,
Kuppam (Post),
North Arcot District.

THE JOURNAL

The Madras Agricultural Students' Union.

Vol. VI.

September 1918.

No. 9.

Editorial Notes.

We invite the attention of our readers to the address which Dr. Coleman delivered at Lahore in January 1918 as President of the Agricultural section of the Indian Science Congress. Examining the development in Indian Agriculture during the past 10 years the Doctor finds, the two lines of work which appear to have yielded the most striking tangible results to be

- (1) The improvement of the staple crops of the country by selection and the organised distribution of the improved seed obtained; and
- (2) The transfer of the best indigenous methods of cultivation and the best indigenous implements so widely and cheaply used to other more backward parts of the country.

This success is attributed firstly to the comparatively low expenditure involved on the part of the ryot in carrying out such improvements and secondly to the ease with which results are achievable under the conditions of low produc-

tion now prevalent in our land. He is of opinion that plant breeding promises to do rather more for the Indian ryot than it has done for the European farmer.

The development of the manurial resources of our country, he considers, to have been comparatively neglected in the past and points out that the present war with the consequent restriction of exports has given our country a splendid opportunity for development in this direction.

He sees evidence that the condition of the Indian ryot as regards capital is steadily improving and the ryot shows a steadily increasing tendency to spend more on his land. The number of rural schools is rapidly increasing and he is of opinion that the spread of rural education is bound to have a most beneficent effect upon the development of Indian agriculture.

The agricultural department is rapidly getting its due recognition both at the hands of the Government and the public. He feels strongly that there should be a large and better organised staff of Researchers and that the foundation for future development should be laid both broad and deep.

He is of opinion that experimental Farms should not be run on a profit and loss basis and that the Researchers should not be handicapped by having to confine themselves to problems of the immediately practical character.

"I am not prepared" says he "to assert categorically that an experimental farm which shows a profit stands thereby condemned of masquerading under a false name, but I am prepared to assert that if the time of the farm staff and the

land on the farm are devoted, as they should be, to accurate experimental work, such a farm cannot be worked at a profit. The desire of the general public to see the results of experiments rather than the processes by which those results are obtained is a natural one. It should be satisfied by the only rational method, namely demonstration on special farms or on the fields of cultivators. An experimental farm should be looked upon as an out-door laboratory, not as a model for demonstration."

We publish with great pleasure the following extract from G. O. No. 235 P. dated 12-5-17. The credit goes to our Principal for the effective precautionary measures.

"An instance of the protection afforded to a once infected place by stringent precautions with regard to the importation of all grains and food stuffs is to be found at the Agricultural College, Coimbatore which has remained free during the year and although plague has existed all round the place this locality has escaped."

The 1918 Year Book of the Madras Agricultural is out and is a fairly bulky volume running to nearly 150 pages with a large number of illustrations. It is priced Re. 1 and annas 2 and contains valuable reading matter.

The Deputy Director of Agriculture V and VII circles has shifted his head quarters to Coimbatore under orders of Government and his office is located in one of the rooms in the main college building.

The Agri-
cultural
College
and plague.

The 1918
Year Book.

Change of
Head
quarters.

We regret the great delay caused in the issue of our Journal on account of Influenza both among ourselves, the Editorial and the Press Staff. It was inevitable and the best is being done to make up for the delay.

Obituary.

We very much regret to record the death due to Influenza of three of our junior members, two in the mess hall and one in the College estate.

A. Mariasusai joined the college in 1915 and passed out in 1917 with the certificate of proficiency. He was considered one of the good students of his batch. He was a good amateur actor and people who attended the dramatic performances by the students during 1915 and 1916 college days cannot easily forget him. After passing out he was appointed Assistant Manager at Mangannallur. He was there till very recently, when he was taken over for district work in Mayavaram circle. He was not keeping good health and he had come on leave to his home at Coimbatore a few months ago to improve his health. He went back to Mayavaram and there got the attack of Influenza to which he succumbed.

K. Satyanarayana joined the college in 1916 and passed out only last March with the Proficiency certificate. As a student he was considered by all the teachers as one of the best students and a very well behaved young man. He passed first in the certificate examination and won the Clogston prize. Soon after he passed out he was appointed

Assistant Manager at Hagari. He was selected for the higher course but he chose service in the department at once. By his death the department has lost one of its very promising subordinates.

C. K. Venkatesha Ayyar underwent his training during the years 1915—17 but failed to get the certificate of Proficiency. He was sometime ago taken as a Dairyman in the College Dairy which post he filled till his death. He was a sociable and obliging young man.

We offer our heartfelt condolences to the members of the bereaved families.

An old man's view about the coconut cultivation of the West coast.

One of the chief Agricultural pursuits of the West Coast which ranks only second in importance to paddy cultivation is coconut planting which is considered so profitable a speculation that the mania for getting possession of reclaimed lands and lands along the river side favourable for the above purpose is ever on the increase; and if it is cultivated on scientific lines the profit will be ten-fold more than under existing arrangements. Those who are interested in the promotion of this branch of industry will do well to pay particular attention to the following few points:—

In the first place great care is taken in the selection of nuts for growing. Only large-scarred nuts of trees that have passed their middle age will be fit for the same and these when they have attained their full maturity, have to be gently let down in baskets and not violently dropped on the hard ground like ordinary nuts but some consider this process rather too troublesome and so they generally

select trees growing on the banks of tanks so that the fully ripe nuts might drop down into the water which is considered less injurious.

These nuts are then planted on the ground only half covered at a distance of one foot from each other. In some cases they are simply slung two by two over a large horizontal pole, but the more common one is to place them on house tops in a similar manner. In each case they are fully exposed to the weather and remaining thus for about three months they generally begin to germinate and when four leaves are seen or when they are about four or five months old they are carefully transplanted, while on high roads only plants three years old are considered fit for transplanting.

The pits into which these young seedlings are to be transplanted must be prepared with due care and they should be prepared at least six months before they are to be used. One chief point in the preparation of these pits is observing a proper distance between two and this must necessarily vary according to the nature of the soil. A distance of 24 feet in low grounds and a distance of 30 to 40 feet in high regions are considered to be fairly sufficient and in each case they must be two feet square by two feet deep. Then these pits are thoroughly burnt which practice is restricted to high grounds only. After this, marine shells are put in to form the first layer, on which comes another layer of sand. This serves a double purpose. It not only adds to the fertility of the soil, but prevents the encroachment of white ants, the strong pungent smell of which having a very destructive influence upon the injurious insects. The plants require to be watered till they are firmly rooted and throughout the hot season and this will have to be continued even in the case of grown up trees especially if they are on a purely sandy soil. A sandy clayey soil is best suited for its growth. Filth and refuse form the chief manures while ashes and sand are also commonly used for the same purpose. The deposits of rivers considered highly fertilizing are largely used. In addition to all these, the base of the young plant is yearly dug up and covered with a thick coating of sand which practice is kept up even after they become trees and this tends to benefit them much.

The time at which the tree blossoms, varies according to the nature of the soil, the earliest instance being of five years from the time of planting and the latest twelve years. There is a special variety which begins to bear when it is 18 months old but this is not of much use as it does not live long.

A tree in a favourable locality produces between 90 and 100 nuts per year and under favourable circumstances will go on for thus bearing about 80 or 90 years and live to the age of 120 years though by this time the produce will dwindle considerably. Toddy drawing for the first three or four months after blossoming is considered beneficial, because the treading down of branches is calculated to give them fresh life.

Diseases and insect pests are not wanting in this case also. Beetles and insects sometimes eat up the tender shoots of the young coconut tree. These are carefully removed by means of a sickle-shaped pointed iron instrument and the part affected well stuffed with salt, ashes, and sand which cure it in no time. If this means is not resorted to, the tree will wither and die. There are no other baneful agencies to the trees except the natural causes as lightning and excessive drought, over which human precautions however, great have no control.

K. L. Ramakrishna Rao,
Student II Class.

A valued correspondent from the West Coast has made the following remarks on the above article:—

Good cultivators invariably lower the nuts intended for seed in baskets or nets or by means of ropes. This is the best practice. The trees on the banks of rivers along the coast are not selected for seed purposes, because they are generally short-lived. The most important point to be borne in mind in selecting gardens from where the trees are to be chosen for seed nuts is that they should be favourably situated in point of drainage, i. e., they must be very well drained.

The seedlings from 6 months to 36 months old are planted out in their permanent homes. The age of the seedlings is a question of the locality where it is planted out.

Some of the practices alluded to in the article seem to be very rare, particularly the one regarding filling up pits with marine shells.

Reviews.

1. *Planting Sugarcane sets.*

In the Science Congress number of the Pusa Journal we find an interesting article about the planting of Sugarcane sets by Mr. Kulkarani, Deputy Director of Agriculture Bombay.

He says that by the ordinary method of planting, the sets produce a smaller number of plants than they are capable of, giving also uneven germination because the eye buds are placed in different directions in the ground, those on the top germinating first, those on the sides later and those at the bottom dying out altogether. So an experiment was started in Dharwar of planting sets so as to contain only one eye bud each and that being placed upwards. The experiment has been found successful on a field scale with the following inferences:—

(1) Sets with a single eye-bud planted as above have given a higher percentage of germination than in the local method of planting. The germination by this system was above 80%.

(2) The germination in the single eye-bud method was earlier by one week and all the plants germinated simultaneously. Thus a uniform crop was secured.

(3) The eye bud being placed upwards, the plants go straight up, and if planted deep there is less liability of the cane lodging when grown up, and also there is greater facility for work between the rows namely interculture, earthing up etc.

Since the percentage of germination is high in this system all the tillers are removed and only the mother canes are allowed to develop. Hence all the manure given becomes available to the mother canes only, and consequently they develop into long thick canes of uniform age, and ripen all at the same time, by which a higher percentage of sugar is expected than in cases of uneven age at harvest time.

The writer has by the above method got above 32,000 canes per acre of good size, the average weight of each cane being 5 lbs. It is expected by the author that the tonnage of cane would be over 130,000 lbs. per acre. There are good photographs given along with the article showing the uniformity of the crop and the height and thickness of the canes grown by the above method.

K. Ramiah.

2. *The mango hopper pest and its control in South India.*
By T. V. Ramakrishna Ayyar, Acting Government Entomologist, Madras.

In this article the author gives a lucid picture of the damage caused by the mango hopper pest to mango crops. The insect is described and its life history and habits are delineated. It is also shown how by spraying an insecticide the pest may be controlled and precise directions are given about the machinery required, the most effective poisons and the time to spray. The cost of spraying is dealt with and from tabular statement recording the results of spraying in a number of gardens, it is clear that it pays abundantly.

“Poochi”.

3. *Leaflets of the Department of Agriculture, Bombay.*

I. *Obtaining good seeds in cholam.* It has been shown by actual experiment in one of the farms that selected big grains used as seed give a better germination and a heavier yield of both grain and straw than unselected seed. The method of selection adopted was

as follows. Good well filled ears were selected in the threshing floor and separately threshed. The seed thus obtained was passed through suitable small sieves 24" x 18" made either of perforated zinc sheets or tin, taking only the big grains and rejecting the rest. The sieve made of zinc sheet is said to cost 10 to 12 annas each whereas a tin one will cost about 6 annas.

II. *Stone roller for the threshing of cholam.* The leaflet recommends the use of small stone rollers drawn by a pair of animals for threshing cholam instead of the usual method of treading under the feet of cattle. Details are given about the construction of the roller and also how it is worked. There is also a good illustration of the roller given. The relative efficiency of threshing by the roller and that by treading of cattle is shown by figures from an actual experiment. Hiring the cattle and coolies the cost of threshing 1000 lbs. of cholam by the ordinary method works out at 17½ annas whereas it costs only 2½ annas (about ¼), to thresh the same quantity by using the roller. The grain threshed by means of the roller has been found to be as sound as that obtained by the ordinary method and could be used for seed purposes as well. The Government Farm in Belgaum district undertakes to get the roller made and supply at the cost price of about Rs. 30 to ryots who order for them.

III. *Chaffing cholam fodder before stacking.* Some of the important advantages claimed by adopting this method are (1) less wastage of fodder when feeding, (2) the stacking does not require any skilled labour and (3) a larger quantity of chaffed fodder can be stacked in a given place than of whole. The leaflet recommends in general the use of chaff cutters either small ones worked by hand-power or big ones that could be worked by engines.

IV. *Making hay with spear grass.* This grass makes good fodder when very young but as soon as the heads develop they become exceedingly injurious to the mouths of the animals which

eat them either in the green or dry condition. For making hay out of this the grass is allowed to mature until it begins to dry and an implement 'Comb' has been devised to remove the heads covered with the spears completely. The leaflet gives details of the construction and working of the comb. The implement can be obtained for Rs. 20 by applying to the superintendent Dharwar Agricultural Station.

K. Ramiah.

Extracts.

PICKLY PEAR FOR PAPER PULP.

From an experiment conducted in Mysore, it would seem that prickly pear might be profitably used for paper pulp if the spines and massive flesh could be removed by some cheap and easy method. The remaining fibres produced pulp suitable for paper, when mixed with longer-fibred pulp of some other raw material. (The Wealth of India, February 1918).

T. S. V.

INDIAN INDIGO.

One of the most notable war developments of Indian Agriculture has been the revival of the natural indigo industry. With the cessation of supplies of synthetic indigo from Germany, the area under indigo increased from 1,48,400 acres in 1914—15 to 7,56,400 acres in 1916—17. Every effort is being made to give the present revival of the natural dye a permanent character. (The Field, May 4, 1918).

T. S. V.

GOAT'S MILK.

The advantages of using goat's milk are:—(1) that the goat eats about one-sixth the quantity of food required by a milch cow; (2) that for nine or ten months it yields 3 to 5 litres of milk which can be safely taken uncooked; because (3) goats are very

seldom affected by tuberculosis; and (4) that the fat in the milk, being in very fine emulsion, is easily digested. (The Wealth of India, February 1918).
T. S. V.

THE WORLD'S CLIMATE.

More than one independent line of argument will be found to point to the conclusion that in a period of 2,000 years there has been no appreciable change of climate in the world. Therefore the balance of the heat exchanges between the earth's income from the solar radiation, and its expenditure in terrestrial radiation in space, may be regarded as only fluctuating between narrow limits. (Nature, May 2, 1918).
T. S. V.

STORING SEED COCONUTS.

The tropical Agriculturist, March 1918, refers to experiments made in Ceylon on the preservation of coconuts by storing them under different conditions. These experiments showed that nuts in the husk stored in the open, lost their water in nine months, and all germinated between the seventh and ninth month. Nuts, however, stored under shade in a dry place, lost their water in six months, and were all sound at the end of twelve months. It is pointed out that in storing nuts care must be taken that no heating takes place by over-heaping, and that the husks should be perfectly dry before storing. (The Agricultural News, 15th June, 1918).

T. S. V.

THE ESTATE WRITERS' CLASS AT COIMBATORE.

On several estates the Writers who took the special class at Coimbatore early in the year were seen at work with their pest gangs and the benefits of the class were very apparent. In several cases the estate managers expressed their satisfaction and said the training received had "saved hundreds of rupees." The class of work being done under the control and supervision of these men showed a high order of merit and as more are trained I feel

confident that the experiment is going to prove a great success. A number of candidates are awaiting the new class which will be easily filled. (July report Dy. Director of Agriculture Planting Districts).
T. S. V.

SUPPLIES FOR MESOPOTAMIA.

Great strides are being made in the Agricultural development of Mesopotamia and India, states a Publicity Board communique, under the influence of the Food-stuffs Committee. Arrangements are in hand for the intensive utilization of waste lands lying alongside railways and canals in India, and much useful work is being done in the control and distribution, between provinces, of civil supplies and of exports from India.

To a student of agriculture, or even to any one who has any knowledge of agriculture, it is evident that Mesopotamia must be developing at a very rapid rate, if a judgment can be based upon the agricultural machinery and supplies which are being sent both from India and England. India is supplying ploughs, pump-sets, harrows, horse rakes, seed-drilling machines in large numbers and also quantities of potatoes, peas, oats and grass seed. All these are being produced in India, so that the development of Mesopotamia is very favourably affecting Indian industries, manufactures, and agriculture. England is sending Bamford mills, chaffcutters, engines, mowers, refrigerating machines, separators, incubators, and foster mothers, and other things which it has been found impossible to obtain from India.

The efforts of Mesopotamian authorities are not confined solely to the production of grain, but are also developing the dairy and poultry branches of agricultural life. India is supplying draught oxen in large numbers, whilst the Arab cultivator is being encouraged in the matter of transport and seed facilities. (From the Hindu).

T. S. V.

Notes and News.

ELICITING INFORMATION FROM RYOTS.

Our readers will remember that, at the time of the last College Day His Excellency the Governor accompanied by the Zemindars and some of the Departmental officers made a visit to the cattle farms of the Pattagar of Palayakottai. In his monthly report for July Mr. Carruth states that the Pattagar had lately made a small beginning to cross the Kangayam and the Mysore breed and that his object in doing so was not at present clear and ascribes the failure to elicit the point to be mainly due to (1) the very large number of questions asked by the visitors in a very short time and (2) the failure of interpreters to understand the questions asked in English and, therefore, to the failure of conveying to the Pattagar the correct impression in Tamil, the obvious result being an incorrect reply to the questions asked.

This candid statement is one which we would commend to the attention of our younger officers who cannot be too careful in the matter of eliciting information from ryots and submitting reports of their enquiry which may ultimately find their way into a blue book. Talk to the ryots in their own colloquial language and you will generally get a straight answer to the straight question, although occasionally you may have to put a number of apparently irrelevant questions to elicit your point.

M. R. R.

KANGAYAM AND MYSORE BREEDS.

Mr. Carruth has carefully gone into the question of the relative merits of Kangayam and Mysore cattle in the districts and finds a larger percentage of Mysore cattle than he expected. The reasons for purchasing Mysore were on the whole due to the Kangayam not being sufficiently available. The ryots generally preferred the Kangayam to the Mysore, because they were hardier, required less

care and not so much good food, and were more spirited and enduring on long journeys, especially when travelling conditions were adverse. Mr. Carruth is glad to find that the ryots do make intelligent observations on these points.

M. R. R.

SCARCITY OF KOLINGI SEED.

Mr. Kulandaiswami Pillai, after touring in Watrap and Vasudevanallur tracts thinks that there will be a great shortage of kolinji seed this year for green manuring purposes. The chief sources of supply are from tank beds, foot of hills and harvested fields. First of all, there was sufficient water in the tanks for a second crop of paddy. Then the dry and garden lands which used to be under short duration crops like cholam and ragi are now replaced by the longer duration crop of Cambodia cotton wherein the kolinji plants are pulled out by the roots like a weed. Kolinji leaves are cut and carted to distant places in some cases. There have sprung up men whose sole business during the seasons seems to cut and cart away leaves, selling cart loads at from Rs. 3 to Rs. 5 themselves paying to the owners of the pattah lands Re. 1 to Rs. 2 for the right of collecting the leaves. This practice of cutting the leaves before the plants are in pod or before the pods open has nearly exterminated the kolinji crop for purposes of collecting seed. The cooly labour has also increased, as the picking of Cambodia cotton pays better. Not more than 400 bags are estimated to be obtained from this tract at a cost of Rs. 7 per bag, provided, after all, that rainfall conditions are favourable.

M. R. R.

AGENCY FOR MONSOON PLOUGHS A POSSIBLE NEW LINE FOR BUSINESS MEN.

In spite of the dislocation of the business during the War, the agency of Monsoon ploughs in this and other districts is worth keeping an eye on. It is not pretended that even a smart would yet be living out of it, but the figures up to date, i. e., from January 1916 to June 1913 show that over Rs. 500 worth of ploughs, shares

and points have been sold, and this sum, at an anna in the rupee, the commission which the firm is willing to offer, means a profit of Rs. 33. It must be remembered that though this is not very much, it necessitates no capital, the minimum of godown accommodation, and little time, while the chances of expansion, with judicious advertisement would seem favourable.

R. C. Wood.

POULTRY.

What the teetotaler thinks of it is not stated but the story of the experiment of the winefed hens is something to arrest attention. A professor of Agriculture at Fontainebleau has simply revolutionised poultry keeping by means of an experiment which has proved that the more drunk they are the more eggs the hens lay. He selected a dozen young hens and divided them into two indiscriminate lots of size each. Both were fed on exactly the same diet but to the food of one half a dozen there was added a daily ration of a glass of wine per head. The results were surprising. From the hens which got no wine Mr. Joubert had in October four eggs, in November one, and in December none and in January twenty two. The fowls which drank their glass of wine daily, responded nobly to the stimulant. In October they produced twenty seven, in November 28, in December 44 and in January 46, so that the toppers showed an excess of production over the teetotalers of 118 eggs. The wine is stated to have not only increased the output of eggs but also to have greatly improved its quality. What wine was used is not given but if it was Vin ordinaire, the experiment will be a commercial success. "This is an experiment worth trying." (Industry).

S. Sitharam Pathrudu.

Estate Notes.

Dr. Barber's son, Geoffrey Osborn Barber (aged 13¹/₂ years) obtained the Francis Wilmer Macaulay Scholarship of £150 per

annum at the Leys School Cambridge. He was bracketted second, gained Honour's marks in English, Latin, Mathematics and Essay, and was one of the youngest who sat at the examination. He is said to have won the highest distinction obtained by any boy from Caldicott, his preparatory school. In this school he won the swimming championship and was in all the teams of cricket, football and hockey.

The influenza, mystery fever or Bombay fever, whatever it may be called, proved in every way to be worse than the plague. The latter gave warning of its approach by the death of rats and people could evacuate their houses and migrate to detached lonely places. The new fever was often times mild in its attack and there was the tendency for patients to ignore its often-fatal effects. It was no respecter of persons and healthy and unhealthy surroundings and people were as easily attacked. While the casualty everywhere in India has been high, the college colony did not escape from it. So many who were attacked have got on very well, though many are still very weak. Absentees from classes were often 50% during the last month, and the classes are getting into nearly normal conditions just now.

We are sorry to have to report the deaths of the following so far as the Agricultural College is concerned and we offer our heartfelt condolence to the bereaved families:—

Mrs. Venkataramanayya, wife of Mr. H. Venkataramanayya, Engineering Assistant.

Mrs. Raghavendra Rao, wife of Mr. P. V. Raghavendra Rao, Assistant Farm Manager.

Sundaresan a lad of 14, son of Mr. S. Subramanya Ayyar, Farm Manager.

Mulkmen, Ramana Goundan and Marutha Goundan.

Peons, Venkataswami of the Government Economic Botanist's Office and Mumman of the Principal's section.

Butler of Mr. Ananda Rao.

The Dispensary was not opened too soon and the new Sub-Assistant Surgeon rendered valuable service.

Correspondence.

LETTERS TO THE EDITOR.

SIR,

I do not at all approve of the native treatment for common ailments in cattle published on pages 108 and 109 May issue of your journal. There are some drugs which are harmless such as the Carminatives viz., ginger, garlic etc., which might do good in cases of diarrhoea due to indigestion. Again there are some harmful drugs such as Sweet-flag which cannot be given inside unless their active principles are standardised. It is simply absurd to think that a case of fracture can be cured by the application of the juice of some herbs.

A. J. Wilson.

Students' Corner.

Games.

In the beginning of the month our college played two hockey matches one with the Coimbatore united club and the other with the Forest College in both of which we got defeated. The defeats were primarily due to our not being able to put in a stronger team as some of our good players were away in the district engaged in food campaign work.

Hockey Tournament.

This began on the 28th and the college met the London Mission School first. Though the ball was near their goal for the greater part of the time, they played unusually well and when time

was up, neither of the team was left the winners. The match was continued again and we managed to put in a goal. Just at this time Dr. Norris who was playing in the forward got a bad hit near his eye and was incapacitated. Although we continued to play with ten, the opposing team was not able to equalise which left us winners of the day by a goal.

The next day we met the Forest College who had defeated the united club in the first round. The play was well contested and the ball was visiting both the goals in turns but neither of the teams scoring anything. Just before half time was about to be over Mr. Vittal Rao carried the ball into the ring and ably shot a goal; but the foresters very soon equalised it so that when half time was up the score was one all. When play began again the foresters put in another goal. We got several chances near their goal but our forwards could not score anything. Though it must be said to the credit of the defence that they played well, the offence was rather weak. It was then that the absence of Mr. Parnell from the offence was very badly felt. When time was up the foresters were left winners by two to one.

Departmental Notes.

Appointments:—

Mr. Thos. Tharyan supervisor, posted to Trichinopoly circle after the expiry of the 3 months' leave.

Mr. M. Satyanarayanamurti, appointed supervisor, 1st grade on Rs. 125, 125, 125-124-201, on probation to fill an existing vacancy.

Mr. Ch. Ranga Rao, is appointed supervisor, 2nd grade, on Rs. 75, 75, 75-5-125 on probation to fill an existing vacancy.

Mr. A. Lakshmayya Naidu, mechanic 2nd grade to be sub protom mechanic, 1st grade, vice Mr. P. N. Natesa Nayakar on deputation.

Mr. C. Subrahmanyam B. A., appointed Assist. 4th grade on Rs. 75, 75, 75-5-125 on probation in the Mycology section, Agricultural College, Coimbatore, to fill an existing vacancy.

Mr. G. V. Ramaswami Ayyar, L. Ag., appointed Chemical Assist. (Temporary) on Rs. 75, 75, 75-5-125, for U. P. A. S. I. analytical work but to continue to undergo training at Coimbatore for the present under the Govt. Agricultural Chemist.

Mr. T. Lakshman. Rao, Assist. in Chemistry, transferred to Bangalore for analytical work for the U. P. A. S. I. until Mr. G. V. Ramaswami Ayyar has completed his training.

Leave:—

The leave granted to Assist. Agri. Demonstrator Mr. C. Arulanandam Pillai, is cancelled.

Mr. A. Ramaswami Ayyar, Assist. Farm Manager, Palur, privilege leave for one month from 1st September 1918.

Mr. K. Cherian Jacob, Assist. in Botany of the Lecturing Botanist's section privilege leave for one month from or after 6th September 1918.

Mr. R. Swami Rao, Farm Manager, Hagari, privilege leave for one month from or after 11th September 1918.

Mr. J. G. Rodrigues, Inspector of Agricultural Offices, privilege leave for one month from 17th September 1918.

Mr. K. E. Viswam Ayyar, Assist. Agri. Demonstrator, leave on loss of pay for 11 days from 9th August 1918.

Mr. T. A. Krishua Ayyar, Assist. Agri. Demonstrator, having been compulsorily recalled to duty from his 2 months' privilege leave the unexpired portion of 14 days leave is cancelled.

Mr. M. Ramachandra Naidu, Assist. Agri. Demonstrator, Tellicherry, 16 days leave on loss of pay from or after 10th September 1918.

The leave on loss of pay granted to Mr. Ramachandra Naidu, is hereby cancelled.

Mr. P. V. Raghavendra Rao, Assist. Farm Manager, privilege leave for 3 months with effect from 17th September 1918.

Mr. S. Dharmalinga Mudaliar, Farm Manager, is transferred from Palur to Central Farm to charge of wet lands.

Mr. K. Cherian Jacob, Assist. in Botany, extension of privilege leave for 13 days from 6-10-1918,

Mr. Maria Susai, Assist. Farm Manager, extension of leave from 25-8 1918 to 4-9-1918.

Mr. K. Ramiah, Assist. in Economic Botany combined privilege leave and leave on medical certificate for 5 weeks from 2-10-1918.

Mr. R. Swami Rao, Farm Manager, extension of privilege leave for one month and two days from 11th October 1918.

Mr. T. S. Ramasubramanyam, Assist. in Chemistry privilege leave for two months from or after 30th September 1918.

Mr. K. Narayana Ayyangar, Agri. Demonstrator is posted to be in charge of the Paddy Breeding Station after expiry of his leave.

Mr. A. Gopalakrishnayya, Assist. Farm Manager, Chintaladevi one month's privilege leave from 26th September 1918.

Mr. R. Thomas, Sub Assist. Sugarcane Breeding Station privilege leave for one and a half months from 23rd September 1918.

Mr. K. M. Jacob, Assist. Farm Manager, Samalkota Agri. Station privilege leave for 2 months and 20 days from date of relief.

Mr. H. Venkataramanayya, Engineering Assist. Agri. College Coimbatore, one month's privilege leave from 8th October 1918.

Mr. A. K. Subramanya Ayyar, Supervisor 7th Circle Coimbatore, posted to the Agricultural College to do the duties of the Engineering Assistant.

Mr. S. T. M. Venugopal Naidu, Mechanic 1st grade appointed to be in charge of the 7th circle, Coimbatore, in addition to supervising the sugarcane Experiments at Pallapalayam during the absence of Mr. A. K. Subrahmanyam Ayyar.

Mr. A. Venkobaachar, Assist. Farm Manager, privilege leave for one month after the return of the Assist. Managers temporarily transferred to I and III circles.

MACMILLAN'S Agricultural Handbooks.

A Text Book of Tropical Agriculture, By H. A. Nicholls,
M. D., F. L. S., Rs. 5-11-0.

Agriculture in the Tropics; An Elementary Treatise, By
J. C. Willis, M. A., Sc. D., Rs. 8-2-0.

First Book of Agriculture, By C. Benson, M. R. A. C.,
12 annas, also in Tamil & Telugu each 8 annas.

Sylviculture in the Tropics, By A. F. Brown, Rs. 2-8-0.

Soils, By E. W. Hilgard, Ph. D., L. L. D., Rs. 17-1-0.

The Soil, By F. H. King, Rs. 6-8-0.

Lessons on Soil, By E. J. Russell, D. Sc., Rs. 1-6-6.

Soils and Fertilizers, By H. Snyder, B. S. Rs. 4-7-6.

A Student's Book of Soils and Manures, By E. J. Russell,
D. Sc., Rs. 3-4-0.

The Principles of Soil Management, By T. L. Lyon, and
E. O. Fippin Rs. 8-2-0.

Soils, Their Properties, and Management, By T. L. Lyon,
E. O. Fippin and H. O. Buckman Rs. 8-8-6.

Manuring for Higher Crop Production, By E. J. Russell,
D. Sc., Rs. 2-7-0.

The Food of Plants, By A. P. Laurie, M. A., D. Sc., Re. 1/-

The Farm and Garden Rule Book, L. H. Bailey, Rs. 8-8-6.

Manual of Practical Farming, By J. McLennan, Ph. M.,
Rs. 2-0-6.

Dairy Chemistry, By H. Snyder, B. S., Rs. 3-10-6.

Manual of Dairy Work, By J. Muir, M. R. A. C., Re. 1/-

Milk and Its Products, By H. H. Wing, Rs. 6-8-0.

The Principle of Fruit Growing with Applications to
Practice, By L. H. Bailey Rs. 8-2-0.

Rubber and Rubber Planting, By R. H. Lock, Rs. 4-1-0.

The Coconut, By C. B. Copeland, Rs.

Fungoid and Insect Pests, By F. R. L.
Rs. 2-2-6.

All these publications are in stock in our

Macmillan & Co.,

(Incorporated in England)

Madras, Bombay, Calcutta.

A Note on Tobacco cultivation in South Kanara.

Tobacco is grown on sandy soils near the coast on an extensive scale. The strip of land between the hills and the sea near the Pallikara Railway Station produces tobacco which fetches a higher price than that grown in other places. The tobacco grown in these parts, is used for chewing and for snuff making. There are two varieties grown in this place. The variety used for making snuff is known by the name of "Panan," and that used for chewing is called "Kuthapidian." The leaves of the former are broad and those of the latter narrow and long. The veins of the latter are also very thin, and the tips of the leaves hang down. The Kuthapidian variety is grown in places to the east of Pallikera and Hosdrug at a distance of about 6 miles from the sea and is used only for chewing, while the Panan variety which is grown near the sea coast, although used for snuff chiefly, is also used for chewing.

Seed beds:—Seed beds are prepared in the compounds of the ryots. The plot selected is first dug with mammatti in the month of July. The soil is then ploughed and levelled, stones and other rubbish picked out and raised seed beds made. About 10 days before sowing, the bed is very heavily manured with a mixture of finely powdered cattle manure, ashes and old fish. The ryots say that ashes obtained by burning parts of the coconut tree are harmful.

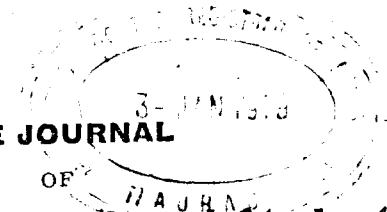
Sowing in seed beds:—In the month of August the seed is sown broadcast evenly mixed with about 3 or 4 times its quantity of ashes. The ashy colour of the seed beds helps to find out if portions of the seedbed have been sown uniformly. The seed bed is immediately hand watered. The beds are then covered with plaited coconut leaves and are watered regularly unless there is rain. The ryot sows usually all the seed he possesses, so that any excess seedlings could be given to the neighbouring ryots who require them.

Care of seed beds:—Within about 12 days after sowing the seedlings germinate, and then the coconut leaves are removed

whenever there is no rain. The young plants make very slow growth in the initial stages and have to be attended to with great care. The seed bed is very carefully weeded after a fortnight. After a month if the seedlings appear to be too thick they are pulled out carefully and planted, after they have put forth 2 or 3 leaves, at a distance of about 3 to 4 inches in similarly prepared beds. The seedlings will be ready for transplantation in about 60 days.

Preparation of the land for planting :—In the month of October when the harvest of paddy is over and the fields are sufficiently dry, the paddy stubbles are removed and the land ploughed two or three times or dug once with mammatti so as to expose the soil to the action of sun and air. Long beds and channels are then made with mammatties. The channels are one foot wide and 9 inches deep. The beds are made 4' and 3' wide alternately so that water may be carried in mud pots conveniently through the 4' wide beds, when the plants are grown up. By walking through the 4' wide beds watering can be done to the two rows on either side. By this method of forming beds and channels there is economy of space. The channels are then nearly filled with well rotten cattle-manure and decayed paddy-stubble and covered with a layer of earth.

Manure :—Any one who has once travelled from Nileshwar to Mangalore by rail during the months of October and December, will never forget the unpleasant smell of the decomposing fish manure from the paddy fields on either side of the railway line. The swarms of restless flies constitute a second feature. In the month of October when the sea gives a good harvest of sardines, fish is purchased at a cheap rate and stored in paddy fields in large pits close to the place of planting. Some ryots mix ashes along with the fish and bury in pits to help decomposition. These pits are covered with earth or wooden planks. Thorns are spread over the pits to make them inaccessible to jackals during nights. 25 baskets of decomposed fish manure are required for 1000 plants. Cattle manure is chiefly used in the beginning. Green leaves and paddy stubbles scraped off from the paddy fields after harvest are put in



THE JOURNAL

The Madras Agricultural Students' Union.

Vol. VI.

October 1918.

No. 10.

Editorial Notes.

Though the news that Bulgaria has capitulated will appear stale to many of our readers by the time the Journal reaches them, we cannot but record in these pages the very joyful news that the beginning of the end of this gigantic struggle has after all been brought about by the cessation of hostilities with Bulgaria at the beginning of October. This world-war owes its origin in the Balkans and it is appropriate that the first signal of the end should also come from there. Bulgaria's defection from the central powers means that the line from Berlin to Bagdad is broken and that Turkey will not wait long to follow suit. The southern frontier of Austria is also threatened. In other words, the "German Middle East" that Germany was longing to create is but an idle dream, and her position in the west is extremely perilous. It is indeed a matter for great thankfulness that the end is not far distant and we rejoice in the certain hope that the cause for righteousness will prevail in the end.

Exit
Bulgaria.

During this month, after serving in the Madras Agricultural Department as Veterinary Assistant at the Agricultural College, for over three years, Mr. A. J. Wilson, G. M. V. C., reverted to the Civil Veterinary Department as Deputy Superintendent. The hearty support he gave to the Union and to the various activities of the College is well known and what the College Day Celebrations of 1917 and 1918 owe to his untiring efforts and genial personality will always be remembered. We congratulate Mr. Wilson on the promotion, which he more than deserved. We are not very sorry he has left Coimbatore, for having known Mr. Wilson as we have, we are sure that he will always evince a constant interest in the affairs and prosperity of our Union.

We are glad to learn that Mr. H. C. Javarayya, L. Ag., who passed out of this College in 1913 has been raised to the position of Assistant Superintendent, Govt. Gardens, Mysore, with a salary of Rs. 200 per mensem. We further understand that in appreciation of his services, the Maharaja was pleased to present him with a gold watch and a photo of His Highness with his autograph. We offer him our hearty congratulations.

We invite the attention of our readers to the letter from the Principal about the change in the time of the College Day published elsewhere in this issue. The General Secretary M. A. S. Union will be glad to receive the opinions of the mofussil members.

Farewell to
Mr. A. J.
Wilson.

Mr. H. C.
Javarayya
L. Ag.

The College
Day.

the cattle sheds as litter. Nearly 3 cart-loads of cattle-manure are applied to 1000 plants.

Sometimes ryots experience great difficulty in getting fish manure at a cheap rate as the supply of fish from the sea is not always certain. Nitrate of soda which is obtainable at Mangalore is slowly taking the place of fish manure. This manure is applied in small doses round each plant.

Method of planting and irrigation:—About 2 months after sowing the seed, the seedlings are ready for transplantation. Before the removal of the seedlings from the nursery, the beds are watered so that the seedlings may come out easily without any injury to the roots. The planting is always done in the evening, so that the plants have the benefit of the coolness of the night. The best seedlings from the nursery are pulled out with great care and planted in the channels a cubit apart. Soon after planting, the plants are watered. Whenever the plants are found in a wilted condition, watering is resorted to very regularly, even at intervals of 3 or 4 hours for the next 4 or 5 days. Any blanks due to deaths of seedlings, are filled in. The frequency of watering is lessened as the plants get themselves established.

Hand watering by means of mud pots is the method usually adopted. Circular pits with an inclined slope at one end are made very easily in the sands to take water from. The water-table is very high in these places. Water is poured over the leaves and the ryots say that there are two advantages in doing so. Firstly the leaves which would otherwise grow erect and narrow are forced to bend a little and are broadened. Secondly the bitter taste of the tobacco leaves is lessened by pouring the water over the leaves. Watering is done very early in the mornings with the idea that the leaves should not be allowed to absorb the dew.

After-cultivation:—About 15 days after planting, when the plants have established themselves the earth round each plant is removed by hand and a handful of fish manure is applied and the

whole covered with earth. Every time the manure is applied, a watering is given. This operation is called "Nullivekal." After another 15 days the plants are manured in the same way with a mixture of cattle and fish manure each plant receiving two handfuls. This is called the first operation. The second operation begins after another 15 days when about 3 handfuls are applied to each plant. The plants are watered regularly every day. After the second operation, earthing up is done from both sides of the channel. The third operation begins only after topping. About four handfuls of fish manure are used this time. The final earthing up is done after the third operation. After topping, the plants are irrigated thrice daily for a few days. The first formed beds are now converted into one foot wide channels by earthing up. The ryots think that the success of the crop depends a good deal on the care and regularity with which the above operations are done.

Topping and suckering :—Topping is done only when the plants have begun to flower and when the terminal bud is fully seen. From 12 to 16 leaves are kept in each plant and the topping is done with knives. One or two of the best plants in the field are now selected and left without topping for seed purposes. These plants are cut only in the month of February when the pods attain maturity. The bunches of pods are cut and dried in the sun for about 3 or 4 days. The pods are then removed from the bunches, tied up in a piece of cloth and hung from the ceiling of the house. The seeds are removed from the pods only at the time of sowing. Suckering is done only after the last manuring, i. e., after the third operation. Suckers are removed in most cases only when they have produced 6 or 7 leaves. The terminal bud and the suckers after removal from the plant are allowed to decay. They form an excellent manure for cucumber, chillies and other vegetables.

Harvesting :—This is done when the leaves become brittle. A day previous to harvest watering is stopped. Sand is sprinkled over the leaves of the plant both before and after cutting. This is done to increase the weight of the cured leaves for marketing.

Harvesting is done when the sun is not too hot, either in the morning or evening by cutting the plants as a whole close to the ground. After cutting they are left in the field for about an hour or two by which time the leaves get wilted and this facilitates bundling.

Drying and curing :—Before they begin to harvest, pandals are erected in the fields or near the houses of ryots. For about 3 days the plants are heaped in the pandal, and kept in an erect position very close together. On the third day the plants are taken and hung in the pandal by means of aloe strings. The leaves remain hanging for about 25 days. About 10 days previous to their removal from the shed, the plaited coconut leaves are removed to allow sun and air. When the leaves are copper-coloured they are removed from the sheds, the leaves peeled off from the stalks and tied into bundles, each containing about 200 leaves. This is the method of curing tobacco used for snuff making. While removing the leaves from the stalk, a sort of grading is also done. Four or five of the lower-most leaves are bundled separate. These are used for making *Beedies* and are sold at a lower price. The tobacco used for chewing is subjected to further treatment in some places near Hosdrug. After removing them from the shed and peeling them off, they are bundled and heaped in plaited coconut leaves. Thatching grass is spread over the tobacco leaves and some weight placed over these for three or four days. By thus spreading grass over these bundles a fine aroma and a good colour are obtained. The stalks of the tobacco plant are cut into small pieces and when decayed are used as manure for coconut palms.

Marketing :—It is very rarely that Coimbatore tobacco is patronised by the South Kanara ryot. The tobacco grown here is consumed locally and large quantities are exported to Mangalore. Merchants come from Mangalore—generally the middlemen—and purchase wholesale from the ryots. Cured tobacco is sold at Rs. 10 to Rs. 12 per thulam (30 lbs.); 1000 plants will yield on an average 10 to 12 thulams of cured tobacco.

K. Govindan Nambiar,
Student, Class III.

Land and Labour in a Deccan Village. A Review.

To us the subject of Indian Economics is of ever engrossing interest. Anything which tends to affect the economic condition of the ryot affects us as workers in the advancement of Indian agriculture. Unfortunately though much has been said on the subject little has been written on it, and the little so written is so diffused, that the information given is not of much practical utility. We have, however, great pleasure in commending to our readers the book written by Dr. Mann, Principal, Agricultural College, Poona, and his assistants on "Land and Labour in a Deccan Village".

The outstanding feature of the work is that the enquiry is confined to a typical village in the Bombay Deccan, instead of the usual attempt to cursorily describe some of the economics of a tract or district. The obvious result of such an investigation is that it is of a high order, and is exceptionally thorough. It deals exhaustively with the physical characters of the village, the land, its divisions and holdings, the crops that are commonly grown and the grasses and weeds that abound in it. The live and dead stock of the village are not forgotten, nor the people and their economic condition. More than its being exhaustive, the enquiry goes into details. To cite one instance out of many:—writing about the trees of the village, Dr. Mann says; "the total number of trees is 1747 or slightly under two per acre.....Out of the total number no less than 1502 or 86% are babul trees." We admit that the information given, is in itself nothing very important but it only argues that nothing was considered by the investigators to be too small to come under their purview.

The soils of the village are classified according to their chemical composition and to the assessment paid and occupy a number of pages of the book. The waters of the village claim even a closer examination. The number of wells, their capacity, depth, water analyses are carefully recorded, and the report on them concludes that although

the waters are suitable for irrigation, and are sufficient for cold weather crops, they are not being used at present owing to the minute divisions of the land with the result that a well might belong to a number of cultivators, and that the cultivators have not yet considered it a paying concern to keep necessary bullocks for irrigating the small areas they possess.

Chapter III deals with the land question, and its history is traced to the modern times from as early a period as 1699 A. D. The land revenue is also included in the survey and Dr. Mann points out that it has steadily though slowly increased thus:—

In 1720-21 the nett revenue was Rs. 727	
1811-12	846
1849-50	1115
1914-15	1660

Turning their attention to the holdings of the village, the authors find that there has been a steadily growing inclination towards division of land. "In the pre-British days and in the early days of British rule, the holdings were usually of a fair size most frequently more than nine or ten acres, while individual holdings of less than two acres were hardly known. Now, the number of holdings is more than doubled, and 81% of these holdings are under 10 acres in size, while no less than 60% are less than 5 acres". To show how far the fragmentation of land has proceeded, a tabular statement is made which shows that in the whole village there is only one plot which is over 20 acres in area. There are 21 plots of 5-10 acres, 164 plots of 1-2 acres and no less than 136 plots of $\frac{1}{2}$ to $\frac{3}{4}$ of an acre. The result of such a fragmentation of land is that they are not economic holdings, and the people, therefore, turn their attention to other occupations. As a matter of fact only 64% are said to actually cultivate the land, and the rest are labourers.

The chapter which deals with crops is full of local information and a detailed plant survey is made which forms an appendix to the book. We would, in passing, mention one or two items of interest.

It is demonstrated, as it has been elsewhere, that cultivators do adapt their cropping to changing conditions. This is demonstrated in the Jowar (*Sorghum*) crop which owing to the importance of its fodder has largely replaced the Kharif Bajri (*Pennisetum typhoideum*). Again, wheat was till recently a crop which gave money into the cultivators' hands, but conditions having altered, vegetables and groundnuts have taken its place. A similar case is found in this Presidency where Cambodia cotton has largely replaced the cereals of the locality.

Dr. Mann and his co-workers have experienced the same difficulties that other agricultural enquirers have, in trying to find out the profit that a cultivator makes of his farming. "In an Indian cultivator's holding" say they, "it is very difficult to judge the profit and loss, where part or all the labour is supplied by the cultivator himself, and the materials are largely consumed by him, his family and his stock." The authors, however, estimate the cost of production of each crop firstly if all the labour had to be paid for, and secondly if all the labour is that of the cultivator or his family. On the average the cultivators seem to make about Rs. 10—15 profit per acre from cereals, Rs. 10—26 from pulses, Rs. 24 from groundnuts, and Rs. 100 from sugarcane. The authors consider that cleaner and better cultivation, introduction of more paying crops and application of green manure crops, would decidedly give better results, as such practices on the Poona Government Farm have been tried with profit. It is, however, a fact which cannot be blinked, that the effect of the Agricultural Farm on the cultivation of this village has been practically nil. Dr. Mann hopes what other district workers have hoped that when they are "once introduced by one of the leading successful cultivators of the village, they spread like wild fire." Our own point of view is that one has to count upon the less successful cultivators for taking to departmental recommendations because the more successful ones do not often feel the need to come and learn to improve their methods.

There is nothing particularly interesting or striking in the chapter which deals with the Agricultural stock of the village. They are in

fact typical of all Indian live-stock. The grazing is poor in most cases, their condition is not all that is desired and they are maintained at a high cost. It would come home to all the cultivators, that they ought to take better care of them if they only realise that the total stock consisting of 226 cattle, 58 buffaloes and 11 goats is worth to the village Rs. 10,588.

Chapter VI is most interesting because it deals with the people of the village. The authors go into great details with regard to the classification of the village population according to their sexes, castes, occupations etc. From the glimpses one has of the houses pictured to us in the photographs, we find that the villagers of Pimpla Soudagar are more comfortably housed than many villagers in South India. A good many of the labourers (89 out of 121) go out to Kirkee—a distance of 5 miles—as ammunition factory labourers, 4 are cartmen, 4 are artisans, 14 are labourers in the village itself. Besides these, there are ten people who go to Poona every day for selling milk each carrying 12 lbs. per day, and it is calculated from the wages prevalent that the transport charges come to $\frac{1}{2}$ anna for every pound of milk carried. This certainly is an alarming waste of labour!

The resources of the village are considered next and they conclude that the total income from various sources comes to Rs. 22,459 or Rs. 43--3--0 per head. Against this, is the expenditure of the village. The Government assessment, local rates and charges, food, clothing and miscellaneous items of expenditure on vessels, oil, festivals etc., make a total of Rs. 200 per family, but the actual expenses per family are Rs. 212--2--6 or Rs. 42--14--0 per head as the proportion of adults is greater actually than in the ideal family of five. In other words, in normal years the village ought to be self-supporting, but unfortunately the village has a heavy burden in the shape of a debt of Rs. 13,314 among the 103 families. It means that there is no chance of their paying the interest unless they stint themselves of the bare necessities of life. The villagers reckon that one year out of three is a year of scarcity, and one can imagine the plight of these people in such years. The authors go further to

investigate the actual number of the families whose holdings are economic, and find that there are only 8 such families. There are 28 others whose position cannot be considered economic, unless they supplement the income from their holdings by wages obtained as labourers working outside, and the remaining 67 families eke out a sort of an existence below the standard of comfort—a standard fixed by themselves. The debts as said before are no doubt a heavy item. The interest ranges from 12—24% on land security and 12—72% on personal security. But the authors state that even if this heavy item of debt is somehow wiped off, of the 67 families there are only 9 that could be said to be in comfort. It is therefore evident that the cause that keeps 56% of the villagers in this miserable condition must be due to something more than the exactions of the money lender. The authors tell their tale in these forcible words “More than half the families in the village are insolvent according to their own standard of life, and they must either have less food than they themselves think is absolutely necessary, or less clothes than they themselves feel are required, at least for self-respect—or they must increase their debt.”

The authors consider the two chief causes, among others, for such state of things are partly social and partly agricultural. The social cause is attributed to the division of land into such fragments that any improvements are absolutely impossible. Agriculturally there has been little evidence of progress. On the other hand they hold that during the last 25 years agriculture has deteriorated, and they cite as evidence the absence of new wells, of newly planted fruit and other trees, and the general decrease of double cropped land.

The result of all this enquiry tends to show that the condition of the dry land agriculturist in the Bombay Deccan, at least in the area represented by Pimpla Soudagar, is less satisfactory than has been hitherto considered, and the authors conclude in a truly scientific spirit that they must not be content with this opinion but push on with “further enquiry”.

We wish the authors had included in their exhaustive enquiry something about the bird and insect life of the village, and that they had bound the book more securely, as it is already showing signs of wear, however carefully we tried to use it.

D. Ananda Rao.

How to Improve Crops.

Chorus :—The War, the War ! What a terrible War !
How scarce is food both wide and far.

1. No goods arrive. There's hardly a train.
And ships don't ply across the main.
2. The crops have failed for want of rain.
While food and cloths are hard to obtain.
3. The kuncham yieldeth place to the seer.
All things are high-priced every where.
4. For lighting, kerosine can't be got.
We should grow the castor. Should we not ?
5. Piece goods from England don't arrive.
To grow our cotton, we should strive.
6. The rains did fail. The yield too fell.
Let's strive to make our crops grow well.
7. To get fresh land to till and sow
Is good no doubt ; but difficult now.
8. So let us well manure our own.
That richer crops thereon be grown.
9. All hope of the first crop let us drop.
Too late let's better the second crop.
10. You can easily treat the paddy field.
With castor-cake, which strength doth yield.

11. If you cannot get the castor cake.
Some groundnut, next best doth make.
12. Per acre this costs twelve rupees.
The rich can add bone-meal with ease.
13. Yet other ways for you to know,
The Government Farms will gladly show.
14. O'er the delta, the Government staff do go.
What else you want, they 'll let you know.

B. Pattabhiramayya, B. A., L. T.

Notes.

Paddy experiments at Sakour by S. N. Sil, M. Sc., A. (Cornell).
Behar Agricultural Journal Volume V, No. 8.

Extensive trials of manures, varieties and culture are described, and the results so far obtained are related. The article is freely illustrated by photographs. The results of cultural experiments so far obtained indicate :—

1. That transplanting is better than broad-casting.
2. That as the date of transplanting advances the yield goes down, and that 4 to 6 seedlings give better results than two seedlings.
3. That there is not much difference in the performance of seedlings from different seed-beds sown at different dates and treated differently.
4. That different grades of seedlings are obtained from the same seed-bed.
5. That the tillerings can be transplanted successfully.

6. That the uprooted paddy seedlings can be very well kept alive for 10 days or more if the roots are placed in water and that they can even be kept in iron bins for 10 days with only 20% damage, thus making it possible to transport seedlings to long distances by rail.

7. That the root pruning of seedlings does not do the paddy seedlings any harm, while on the other hand it appears to stimulate growth.

8. That cuttings may be very effectively made from very old seedlings provided they are considerably noded, otherwise the cuttings will die.

Some of the foregoing results are particularly valuable to us this year when the seasonal rains have failed and wetland cultivation is at a stand still. In many places the ryots have not yet been able to raise seedlings for want of water in the channels, while in others where there were facilities for raising seedlings in time, the seedlings have become too old for planting. Under such adverse circumstances, agriculturists might try to import seedlings from long distances, if available, and thus they can save a month's time. Where very old seedlings are available the pruning of the seedlings, and planting them may also be tried on a small scale. The cutting must evidently be made below the growing point, which will make the stumps only about an inch and a half high. Planting such seedlings will be a difficult task, and water should be regulated for some days after planting, and the land must also be quite level. All the same, this system is worth a trial.

About root pruning it will be interesting to note that there is a practice observed in South Malabar which brings about the same effect though in an indirect way. The uprooted seedlings are bundled with all the roots outside and the shoots inside, and the

bundles are kept exposed from about 3 to 7 days, with occasional sprinkling of water. The seedlings are then transplanted and the local opinion is that these seedlings come up more vigorously than those pulled out and transplanted on the same date. Probably while keeping, the old roots lose their vitality and fresh adventitious roots develop which bring about a vigorous growth.

It is also believed that these seedlings are less liable to insect pests. Probably the insects and their eggs get destroyed in the heating heap, and the seedlings get a good start.

K. Raghavachari.

We have received from "K. R. Sankar of Pudukotah" a short note on "Temple gardens." The maintenance of a small flower garden near to or inside each temple compound in this Presidency is an ancient institution and such gardens used to be looked after by a special class of people called the "Pandaram." These gardens though primarily maintained for the sake of the flowers used in worship served also as "beauty spots" in the place. They further helped to open up the air in crowded cities and to some extent served the purpose of parks now so frequently advocated by Health and Sanitary officers. The author deplors that such gardens are gradually dying out and pleads for a revival of these useful institutions. To big Devasthanams like Madura, Tirupathi and Trichinopoly he considers that small schools may be attached for teaching the elementary principles of Horticulture, the attached gardens being sufficient for any practical training that may be required.

(Ed.)

We hear that M. Krishnaswami, a short course student of the College who passed only in the year -1918, is now working in the Government Military Dairy Farm, Bangalore. (Ed.)

Calf rearing. To those who are accustomed to feed calves with their dams' milk till they are weaned, it will probably come as a surprise, to learn that it has been found in an experiment made at WOBURN in calf feeding (Report of the Royal Agricultural Society of England for 1917) that whole milk is not necessary for calves more than a fortnight old. After this period, other foods could be given. In separated milk a good substitute is found, and if this is supplemented by crushed oats, it forms an excellent substitute, and is as good as, and certainly cheaper than, whole milk fed throughout. If separated milk is not available, water could be substituted along with meals. This would certainly reduce the cost a good deal but the gains in live weight are naturally not so high. In such a case a mixture of foods like Beans, Maize, Palm oil is better than a single food like crushed oats. They are best given dry and gruels are generally considered undesirable. It is also found that Fish meal with maize makes a good and economical food for calves. Purchased calf meals are generally condemned because they are not generally economical and in many cases are not so good as they are said to be. In these days of milk scarcity, dairymen are well advised to think of suitable substitutes for calf feeding, so that they might strip the cows entirely,—a practice which is practically unknown in this country.

D. A. R.

Extracts.

Manurial value of cotton-seed meal.—Oil-pressing mills for the extraction of cotton seed exist in a number of the British West India Islands, notably in Barbados, St. Vincent and St. Kitts. The oil is mostly exported, but the residual meal or cake is almost entirely used locally either as a feeding stuff for cattle or as a manure. In the Agricultural News (1916, 15, 273) an account is given of the manurial value of the meal when applied directly to the land, and reference is made to experiments which have

been conducted in the West Indies. In Barbados, when the price is reasonably low and there is an adequate supply, the planters use the meal as manure for sugarcane at the rate of about half a ton per acre, apparently with satisfactory results. Experiments conducted for eight years in Dominica have shown that it is also of considerable value for Cocoa; a plot manured with half a ton of cotton seed meal per acre gave an average yield of 1776 lbs. of cured cocoa per acre as compared with 1264 lbs. in the case of an unmanured plot, and it is believed that even better results would have been obtained with a heavier dressing. In Nevis it has been used as a manure for coconut, and although the results have been satisfactory so far, it is considered that the experiments have not been conducted long enough to definitely determine its value for this crop. It has also been tried for cotton in St. Kitts, but no remunerative return has been obtained after many years' trials. In this case, however the soil is of an open and fertile nature, and the use of other manures has resulted in no appreciable gain.

(Bulletin of the Imperial Institute).

W. R.

Sugar.—Planters in Jamaica are now considering a revision of their major industry,—banana cultivation—in favour of sugar. In the Annual Report of the Department of Agriculture, Jamaica 1915—16, it is stated that banana planters in St. Catherine and St. Thomas have expressed a desire to give up the whole or a portion of their cultivation and plant sugarcane instead. The irrigable area of St. Catherine is the finest agricultural region of the island, and planters in the district consider that sugarcane is the best rotation crop for bananas on these lands. The danger of exhaustion of the soil with production of second class fruits, owing to loss of humus from prolonged banana cultivation, would be well met, it is thought, by equal proportions. A project for a sugar factory for St. Catherine has been considered for many years past, and the present time appears favourable for its fruition.

The value of the produce of the maple syrup and sugar industry in the province of Quebec is estimated at two million dollars a year. In the Agri. Journal of Canada (1916, 3—742) the Deputy Minister of Agriculture for Quebec expresses the opinion that a great future lies before this branch of Agriculture. Improvements have been made during the last two or three years, largely with funds provided under the Agricultural Instruction Act. Mention is made of the means taken by the Quebec Cheese makers' Co-operative Society to encourage the production of sugar and syrup of high quality and of the practical demonstration given in the sugar making schools, of which there are now four, and in the sugar cabins, to producers in the various sugar-making localities.

(Bulletin of the Imperial Institute).

W. R.

Fly papers. In view of the present high price of imported fly papers the following method of making them locally, devised by Mr. L. D. Cleare, jr. is given.

Manilla wrapping paper 9 inches wide and weighing about 15 lbs. per roll of 150 yards is used. The paper is marked off into lengths of 12 inches, the end of one sheet being the commencement of the next, and a rectangular space of 10 × 8 inches is marked out on each sheet. A cardboard mask will be found convenient for this purpose. The paper is then cut up into lengths of ten (or other convenient number) sheets.

These strips are now made oil-proof by the application of a solution consisting of one oz. ordinary glue in 3 ozs. water. The glue is dissolved in the water by heating and finally, if necessary, water is added to make up the full 3 ozs. The solution is applied with a fine brush and must completely and evenly cover the entire surface. The strips are then allowed to dry.

After the paper has dried it is cut up into single sheets and the adhesive mixture consisting of 3½ ozs. resin and 1½ ozs.

engine oil is brought to the boiling point and immediately applied to the paper. The mixture must be kept within the 10x8 rectangle. Two sheets are now placed face to face and stored thus until required for use. *The papers must be stored flat and for preference in a cool dry place. They should not be stored for longer than two weeks.*

(The journal of the Board of Agriculture of British Guiana Vol. XI No. 2, April 1918). P. V. I.

Guava jelly in war-time. The guava jelly takes first rank among tropical fruits. The most suitable preserving pan is an enamelled one. For stewing the fruit should be carefully peeled, cut into halves or quarters with a sharp knife, the seeds extracted with an enamelled or silver spoon. The seeds and peels may be soaked or boiled in water, and the strained water used for cooking the fruit. To every 2 lbs. of peeled and cleaned fruit allow one pint of water, boil slowly till tender, taking care in stirring not to crush the fruit. When soft, add 1½ lbs. of best granulated sugar and boil quickly for 15 to 20 minutes. If this be put into wide-mouthed screw-topped bottles and covered immediately it will keep good for a long time.

In war-time yellow sugar may be substituted for the best granulated. If this is used it requires a little longer stewing and would need to be skimmed.

(Eleanor Waby. The Journal of the Board of Agriculture of British Guiana Volume XI No. 2 April 1918.) P. V. I.

Students' Corner.

CLASS II. STUDENTS' TOUR TO SOUTH MALABAR.

During the first week of October we were taken on tour to South Malabar by the Principal and we were fortunate in having

the company of Dr. Norris. Malabar presents a varied scenery. In no country are the charms of Nature more prodigally lavished. Her many lakes like pools of liquid silver, her mountains with their bright aerial tints, her valleys teeming with wild fertility, her tremendous cataracts thundering in solitudes, her boundless plains waving with spontaneous verdure, her deep rivers rolling in solemn silence to the ocean, and her tractless forests where vegetation puts forth all its luxury, are all magnificent.

First we had our camp at Ottapalam a place of importance in the Walluvanad Taluq of the Malabar District. Here the party was met by the Assistant Director of Agriculture and the Agricultural Demonstrator who showed the students large areas of paddy lands which very much varied in fertility. Distinct terrace cultivation of paddy with better and more economic types of the same was observed. Besides this, extensive coconut gardens and various new crops such as pepper, banana, ginger and tapioca, colocasia and certain other root crops occupied our attention. One peculiarity that may be mentioned is that a marked difference can be seen between the dwellings on the west and east coasts. On the West coast the houses nestle singly among shady trees and do not huddle together as in the eastern villages. Each house has its own compound surrounded by a strong thorny fence. Here tall arecanut palms, mango, and jack trees, all sorts of root crops, and pepper and betel vines may be seen. After four days halt here we went to Tirur, a place noted for its coir industry. The typical coconut gardens of this tract clearly show that Malabar is the land of palms. Here we had a very instructive and interesting practical demonstration on coconut cultivation. From here we went to Tanur which is well known for its fish industry. The extraction of fish oil and the curing of fish are carried on here very successfully both by Government and private factories. The Manager of the Government factory explained to the students the various processes connected with the extraction of oil and curing of fish.

Another matter that may be alluded to in this small note is that Malabar affords a good example of the fact that a moist climate is unsuited to cattle. The indigenous cattle are weak and stunted in growth and the climate is directly responsible for this, although negligence in feeding has an indirect influence. A word more may be said with reference to the cheerful hospitality of the Malayali who invariably served us with tender coconuts wherever we went. Moreover we all appreciated the tour with unique pleasure due mainly to the company of M. R. Ry., Govinda Kidavu Avl., and M. R. Ry., Vellodi who rendered us all possible help, although the latter due to unavoidable circumstances had to leave us on one or two occasions.

K. L. Ramakrishna Rao.
Student, Class II.

Games.

Football :—

22nd. A football match was played with the London Mission High School in the Mission Compound. Though the homsters had put in a strong team the match resulted in an easy victory for us by four goals to nil.

29th. Another match was played with the Town Eleven in our grounds. As the opposing team consisted of the pick of the Coimbatore players we were beaten by three goals to two.

Cricket :—

20th. *A. C. & R. I. versus Coimbatore College.* The match was played on our grounds. Our players entering first were able to score only 65 runs, for all the 10 wickets. The opposing team entering later was easily disposed of by the effective bowlings of students Soans and Seshagiri Rao of class I for a total score of only 33 which left us winners by 32 runs.

27th. *A. C. & R. I. versus Coimbatore United Eleven.* This was played on the Coronation park grounds. The homsters

entering first put up a total score of 105 runs. Among our bowlers Soans was in good form and was responsible for most of the wickets. Our players entering later made rather a poor show in the beginning, the first three wickets falling for a total of 9 runs. Then Mr. K. T. Bhandary entering later played his usual brilliant game and the score steadily went up to 120 when his wicket fell. He was responsible for 59 runs including 8 boundaries and one sixer. When the last wicket fell the score was at 123 which left us winners of the day by 18 runs. Besides Mr. Bhandary, others whose scores got into double figures are Mr. Raman and students Bhandary and Samuel.

Estate News.

The farm School. The Government recently sanctioned the starting of several schools for boys working in the various agricultural stations of the Presidency, and one such has been in existence at the Central Farm for some time. The idea is to teach the boys the three R's and the boys are half timers, i. e., they work for half the day only. Although there are no classes, the boys have been divided into two sets, one containing those who have had already some little schooling in village schools previously, and the other set, of boys who are comparatively beginners. The teacher is drawn from the ryot's class and is competent to teach up to the standard. The Principal is aided by a committee of 4 voluntary workers who suggest improvements or criticisms on the working of the school. The selection of boys is made twice a year and boys are not expected to stay longer than two years. There are twenty boys in the rolls of whom, we are glad to note, one is a chukli by caste. The teacher is accommodated in a wing attached to the school, and in addition to the 6 hours day teaching, he runs a night school for the illiterate adults and boys. We wish the school all the success that it deserves.

Sanitary Committee. It was thought advisable to have a committee which would act as an advisory body to the College Board in all Sanitary matters.

The members of the Sanitary Committee are to represent the various types of quarters occupied in the estate. The following were elected by ballot held in October and they will carry on the work till the end of the present official year: Dr. R. V. Norris, and Messrs. P. A. Raghunathaswami Ayyangar, K. Ramaswami Raju and Chandrasekharan Pillai.

Correspondence.

COLLEGE DAY.

Letter from the Principal Agricultural College to the General Secretary M. A. S. Union.

For various reasons, it has been found that July is not a convenient time for the celebration of College Day. Some are given below:—

1. Bad time of year for visitors to see the Farm.
2. Early in the year for the new students to get their uniforms and settle down generally.
3. Rather a busy time for early sowings in some tracts.

It has been suggested that these difficulties would be avoided if College Day were fixed sometime in November. We should run the risk of bad weather, but in other ways it would be more suitable. I should be glad to be favoured with your views.

A. C. R. I. Lawley Road,
Coimbatore, dated 28-9-1918. }

R. Cecil Wood,
Principal.

Departmental Notes.

Appointments:—

The services of Rao Sahib Mr. A. Ruma Rao, Farm Manager, Manganallar, have been extended for one year from 20-3-1920 when he will attain the age of 55 years.

This office order R. Dis. 298 dated 12-9-1918 appointing Mr. C. Subrahmanyam as Assistant in Mycology is hereby cancelled as the applicant has not joined the appointment.

Leave:—

Mr. S. Sundaravaman, Assistant in Mycology, two weeks' privilege leave from 21-10-1918.

Mr. S. Sithrama Patrudu, Agricultural Demonstrator, one month's privilege leave from 15-10-1918.

Mr. S. Vedantham Ayyangar, Farm Manager, Agricultural College Dairy, leave on medical certificate for 26 days from 18-10-1918.

Mr. K. Hanumantha Rao, Assistant Farm Manager, one month's leave on medical certificate from 10-10-1918.

Mr. K. Vasudeva Shenoi, Assistant Farm Manager, leave on medical certificate for one month from 9-10-1918.

Mr. U. S. Ayyaswami Ayyar, Assistant Farm Manager, leave on loss of pay for 15 days from 16-10-1918.

Mr. A. Gopalan Nair, Assistant Agricultural Demonstrator, privilege leave for 2 weeks from 1-12-1918.

Mr. K. Sakarama Rao, Head clerk to the Government Mycologist, privilege leave for 2 months and 8 days from 15-10-1918 with permission to affix the Christmas holidays.

Mr. K. Vasudeva Shenoi, Assistant Farm Manager, extension of leave by one week to one month's leave already sanctioned.

Advertisement.

Applications are invited from candidates holding "Certificate of Proficiency in Practical Agriculture" for the post of an Agriculturist in the Kangundi Zemindary with effect from 1-1-1919. Pay Rs. 35—2½—75 (annual increment). Further increment of Rs. 5 per annum after the maximum is reached up to the Salary limit of Rs. 90 as in Government.

(Sd.) K. G. Venkatapathe Naidu,
Zemindar of Kangundi,
Kuppam (Post),
North Arcot District.

(v)

HATHI

SUGAR-CANE MILLS.

This Mill is very strongly constructed, the top and bottom castings being extremely massive. The bearings are of special quality Cast Iron. The Mill is fitted with two large rollers 8"×7" and one small or splitting roller 6"×5". The "Hathi" Mill has been officially tested against other Iron Framed Mills and in all cases the percentage of juice extracted has been equal to, and in many cases considerably higher than its competitors, whilst the "Hathi" Mill is offered at a *Lower Price*.

Write for our Agricultural Catalogue.

BURN & Co., Ltd., CALCUTTA
&
HOWRAH.

THE JOURNAL
OF
The Madras Agricultural Students'
Union.

Vol. VI.

November 1918.

No. 11.

Editorial Notes.

We very much regret to record the untimely death, at the early age of 35, of Mr. K. Ramasastrulu Naidu, Assistant Director of Agriculture, at Nandyal on the 2nd November, as a result of Pneumonia supervening Influenza. As he was blessed with a robust constitution, the news of his death came as a shock to all who knew him.

Mr. Ramasastrulu's early life was spent at Masulipatam. He passed his First Arts examination from the Noble College, and went to Madras and joined the Christian College to prosecute his studies for the B. A. degree which, however, he did not take. As a student at Masulipatam, his genial personality endeared him to a host of friends, among whom was the Zamindar of Munagala, who took particular interest in him. Through his munificence, he left for Japan to study some industry, with the object of starting on his return a soap, glass or match factory.

Late Mr.
K. Rama-
sastrulu
Naidu.

The language difficulty, however, came in his way, but he persuaded the Zamindar to permit him to go to America to study Agriculture. After a stay of a few years, Mr. Sastrulu took the degree of B. Sc., at the University of California, specialising in fruit culture. In America, he had a most chequered career. In this democratic country, he soon learnt the dignity of labour. Like most American students, he had to earn his own bread, specially when the remittances from India stopped for a time. He knew the culinary art, and also worked at a timber sawing yard. We believe he was all the better for such experience.

Early in 1910, he returned to India, and in those days when sedition was rampant and every foreign travelled man, was viewed with suspicion, at the risk of underselling his degree, he at once accepted the post of a Manager at the Central Farm on a salary of Rs. 50. Within 8 months, however, he was promoted to the Gazetted rank as Assistant Director of Agriculture, Southern Division and posted to Trichinopoly where he worked for about 3 years during which time he also acted as Deputy Director on more than one occasion. In July 1914 he was transferred to Northern Division with a semi-independent charge of four districts. Before long, however, he came back to Trichinopoly, but he was not kept there long, as the exigencies of service demanded him in the North, where he worked till his death. He was an efficient officer and did very useful work to the department.

In private life, Mr. Ramasastrulu was a very jovial person. He made friends wherever he went, and his

visits to the Central Farm, whether in the capacity of a touring officer or a visitor to the College Day, were always most welcome. We believe the College Day rosette was his inception.

This notice cannot be complete without briefly alluding to what the Union owes to Mr. Ramasastrulu. He was the founder of the Munagala Prize Medal, named after his benefactor, and he gave the medal worth Rs. 50 for 6 years continuously. The object underlying this gift was most laudable. His interest in the Union and the Journal was so sincere, that realising that the contributors to the latter were so few, he offered the prize as an encouragement to young contributors. Notwithstanding the disappointment due to the smallness of contributions occasionally, he faithfully continued the prize till his death.

A useful life has been so suddenly cut off, and in his death, the department has lost an efficient officer, and the Madras Agricultural Students' Union, a benevolent friend. It is indeed a great pity that Mrs. Ramasastrulu also took ill about the same time, and passed away two days later, leaving three young children to bemoan the loss of both the parents.

As earnestly hoped in our last issue, the world-war has at last come to an end by the signing of the Armistice by Turkey, Austria and Germany, which followed one another in rapid succession.

The signing
of the
Armistice.

The Central powers fought with all the strength and vehemence of the Demon King Ravana of old and the Allied armies had to pass through many a dark hour very similar to those experienced by the brave Kshathrya brothers Rama and Lakshmana of the Solar race. Such a war could have but one end, viz., the complete subjugation of the Powers of Evil and their votaries.

It is often said that such *occasional vindications* of "Right and Justice" are needed to counteract any rank outgrowth of materialism. It is to be hoped that the final conclusion of peace will inaugurate a new era in which the arbitration of international disputes will be done by a more civilized organization than the one represented by the sabre and the shot.

Besides the intense joy we all feel as citizens of the Empire on which the sun never sets, in the great success of the Allied arms, we are proud of the fact that the Indian armies not only did their best during the beginning of the war in checking the mighty rush of the German armies, but materially helped in the final breakdown of our enemies by their brilliant victories in Mesopotamia and Palestine.

There is one aspect of the result of the war in which we cannot but feel an absorbing interest. We see clear indications that Agriculture is bound to play a great part in the programme for the future reconstruction of the world. The world will certainly put on a different appearance if the energies that have till now been devoted to acquiring skill in the art of killing one another were diverted to the nobler art of feeding one another.

We are extremely glad to notice the following promotions in the superior service of the Madras Agricultural Department. Coming as they did on the heels of the Armistice celebrations, the news only augmented our joyousness. We offer our heartfelt congratulations to Messrs. Rai Bahadur K. Rangachary, and J. Chelva Ranga Raju on their promotion to the Imperial service, and to Messrs. C. Tadulingam and T. S. Venkataraman, to the Provincial cadre. The promotions of the two former are unique in the annals of the Madras Agricultural Department, as they are the first recipients of such an honour. We congratulate them, not only for their own sakes, but on behalf of all the Indian members of the service, because by their ability they have proved that Indians are capable of becoming members of a service which appears to be so difficult to get into.

The disinclination of the past Agricultural Students to take to independent Agricultural enterprise; its causes and remedies.

India is a country having a very old civilisation and as such agriculture has been the occupation of its people for ages past, and the agricultural practices are the result of the experience of so many generations of farmers handed over, in many cases, in the form of pithy vernacular sayings.

Thus almost every agriculturist knows his business well, and he is almost sure what the result will be if he does an operation in such and such a way. However, various forces which have been

operating as a result of increasing population and greater commercial facilities have tended to alter the cropping and agricultural practices of the country. The benign Government in their solicitude to improve the agriculture of the country founded the Department of Agriculture, opened some farms to study the conditions of agriculture and the needs of the ryots and also a College of Agriculture where young men are taught the various sciences connected with agriculture and the practical application of the principles to the art. Many of the trained men are being taken into the Department of Agriculture which is now rapidly expanding while a good many in the earlier stages of the College were taken into the departments of Land Records, Survey, and Irrigation, as it was then thought that they could induce the ryots to do better cultivation whenever they came in contact with them in their official work. And now in the light of previous experience a change for the better in the method of teaching has been adopted, a greater stress being laid upon the practical side of agriculture. Along with this the various openings in Government service except in the Department of Agriculture are closed for the agricultural diplomates. Preference in selection for training is given to young men who wish to farm of their own accord. A greater number of farms have been opened, and demonstration work on a large scale has been started. For all these the College at Coimbatore has been training young men most of whom have been taken into service and a few have taken to private farming. The question now is why a greater number of them have not taken to farming or other private agricultural enterprise. The answer to the question depends on various factors *viz.*, (1) the student, (2) the agricultural education (3) the agriculture of the Country; and (4) the various openings for the agricultural student.

The Student. Notwithstanding the preference in admission given to those who wish to do private farming, the average type of student that seeks admission to the College is a service seeking school final or a failed intermediate who finds that there is no use of his continuing further in the arts course, but wishes to get trained

in any of the professional institutions and get into service. Of these the College of Agriculture has the least charm, and in many cases, it is the last resort because it is a new and narrow department, where the prospects of service are not so good nor attractive as compared with other departments. So most of the students get into the College with the idea of getting into service, as they find in the prospectus, that the qualified men have the chance of a footing in the department on a decent pay; and there are at present enough vacancies to take up the most or all the trained men.

There do also come students with the sole object of farming and a few such have taken to it and it appears that they have been successful in their business. It is these sort of people that have to be encouraged to get an agricultural training, if agricultural enterprise is to extend. It will be useful to find out the reasons why these have taken to farming while there is the Government service open to them. They had generally a previous acquaintance with farming, a natural desire for rural life, a free hand and encouragement after College education to farm of their own accord, and a conviction that the farm well managed will pay well.

There is still another type of students that join the College; men with a genuine interest to farm and improve rural life without the essential requisities such as enough land or capital. These find rather late that they could not take to farming and then seek Government service, but hope one day to farm after making some money or when their family affairs are settled. Others get fossilized and never think of anything except service. All the same, if they keep up the genuine interest to improve rural life, they are a real asset to the department and they do a great service to the cause of the agriculture of the country.

The Agricultural Education. We shall now see why the College education should not induce a greater number of the diplomates to take to private agricultural enterprise. A two or three years education in the Agricultural College alone cannot make any one a practical farmer, especially the mediocre type of student that

comes with very little acquaintance of local agriculture or even the elementary principles of the sciences connected with it. The student is there taught how a crop is raised, what various operations are necessary to get a good crop, what scientific principles are involved in crop production, stock raising and such other subjects allied to agriculture. He learns all these in the College and has excellent facilities to apply the scientific knowledge he gains there to the practical agriculture within the sphere of the College farm. He is also taken outside the farm to see how the ryots raise crops. He himself raises some crops in the field; still all this is not quite sufficient to make him a real farmer and enable him to take to farm management immediately on leaving the College. The first essential thing is wanting and that is the love for rural life. The rural and secondary education given to the boys, in the words of Dr. Coleman, "in no sense fits the ryot's son to his life of work, but if it has any effect at all rather unfits him for it." The text books in the rural schools deal with anything but rural life and the boys are bred to get a contempt for the father's calling. The school holidays are in the slack agricultural season and so the boys cannot take any part in helping their parents in agriculture in any small way. The teachers also worry the boys by giving them a hundred sums, so much copying and writing work to be done during the holidays that the boys do not really enjoy them. Nature study has been entirely neglected till very recently. The village life where they can learn something of nature is never put to use and thus the holidays are a burden upon the boys. Manual labour is held in contempt by the farmers themselves and their sons that receive the English education cannot dream of doing any manual work and even if by force of circumstances they do anything at home, they feel so much lowered in the eyes of others, that they wish to do it in secret. When such a young man comes to an Agricultural College it is really a task to make him shake off his prejudices against rural life and manual labour, and it takes a long time before he is made to take to it without protest. Of such students only a few get at the end of the course, a real liking for agricultural work, while others take to it simply because there is no other go.

So a great deal of destructive work has got to be done before any constructive work is taken up in the College training. The student thus in his 2 or 3½ years training, is made to cast away his prejudices against manual labour, is taught to raise crops, how to treat them when they get diseased or attacked by insects, how to select seed and how to keep land in condition. He also learns the principles of farm management but not the practical art of it. In the Agricultural College he starts with fine crops, good level fields in large blocks all connected by good roads and everything in good working order not affected by the surroundings, the scattered nature of the holdings and the various evils in the Indian Agriculture. To make him realise these and to improve upon them requires a special training and this cannot be given to the students in the College. This is why a good many boys on leaving the College say, that they will gain some experience in a Government farm and then take to private farming. Training in a Government farm is not however training to be a farmer as the conditions are quite different. Hence the young men who go with the intention of taking to farming later never do so as they find that that training would not help them to make more money in a private farm. Unfortunately, we have not as yet among us many successful agriculturists having a good scientific knowledge and practical experience combined and who can train the College diplomates in private farming. We thus see that the College trained student without previous acquaintance of rural life and the subsequent apprenticeship under a successful agriculturist cannot be expected to have the courage to take to farming.

The Agricultural Condition of the Country has no very great attraction for the college trained student. During his few months stay in his village after his taking the diploma, he finds his parents and villagers going to him and advising him to take up a Government appointment. Agriculture can never pay, it has not paid them yet. With all their experience and toilsome work many of them are in great debt. If farming was the intention of the student he need not have wasted so many years of life in school and college and also so much money which made the parent a debtor. After all

the advice if he still persists he is asked in what respects he can make the farm more profitable. It is there that every argument is met with a counter argument and many of the improvements suggested by the students cannot be easily effected and the others can be done by the parents themselves at his suggestion without his presence and need not therefore lose his Government pay. If the student can earn 8 per cent out of his land where only 4 or 5 per cent is now realised and if the land is made to pay 6 per cent with his advice and he gets a salary in addition, the latter course is preferable.

The lands are so very scattered that many possible improvements cannot be effected easily on account of the disturbance of the neighbours. Special improvements such as draining, fencing, introduction of new crops and various others are all impossible.

The College student finds his ancestral home uncongenial and in some cases unpleasant, and he wishes therefore to be away from his people. This is due to the opposing spirit of the Western and Eastern civilisation in which the two sets of people have been bred. About the various draw-backs in rural life a very able treatise is written styled "Training of Farmers" by L. H. Bailey. The author, the head of the Cornell University wrote a circular letter to ex-students of the College who had not taken to private farming, why they did not. The replies showed that 40% of the people did not take to farming because it does not pay. The other points worthy of note mentioned in the letters were difficulty to manage a farm without a start, farming requires too much capital, work is too hard, too long hours and too monotonous, no social advantages and activities, more opportunities for advancement or natural bent elsewhere, parental influence and so on. If in America, with best land, large farms, with much money, and a large part of the work done by machinery, these obstacles stand in the way of private farming, it must be all the greater here where the holdings are small, the ryots poor, all valuable land is under cultivation of a very intensive type and all the work is to be done by manual labour. The ryots are satisfied with the barest

wages for the work, and the prospective young man cannot compete with them except under very favourable conditions.

The openings for the college student are not very many. The Agricultural department has been reorganised and a large number of posts have been sanctioned for the filling of which there are not enough trained hands, and all the students turned out of the College for the next 2 or 3 years will be needed. The diplomates except the few taking to farming naturally prefer government service, where with a decent start the prospects are good and secure. One can rise up to Rs. 700 according to the present scale if he does well, and this is sufficient attraction for him to get into the department. The educational department is taking up some of them but few like to go as the prospects are not good. A few Zamindars and Landlords are employing the college students while most of them have not yet realised their value in improving their agriculture. Most of the estates are managed by poorly paid agents with their pay varying from Rs. 5 to 30. And it is hardly possible for them to think of employing agricultural men with prospects as good or even half as good as the government service. Big trading concerns are managed on a partnership scale one providing funds and the other doing the work and the latter getting so much percentage of the profits in addition to a fixed pay. Such a system may be introduced into the estates with great advantage. Dairying, Market gardening, Horticulture, Seedsmen, and the lending on hire and selling of agricultural and dairying machinery are the various other openings for the college trained men, and for these there is not yet a sufficient demand and so no special training is yet given in the college. For the first essential need of the improvement of crops, the department is shorthanded and it must take some time more before these subjects are taken up.

Remedies. It cannot be said to be a real evil that more of the agricultural students have not yet taken to private farming. A large number of Agricultural Demonstrators going about in the districts and showing the ryots the various improvements in the agricultural practices will awake the fatalist ryots to the real state of affairs and will induce them to be more active, and ask for more improvement

and in the course of time to send in one of their sons to be trained for farming. Thus the attraction of the right type of student is a question of time. The landholding community must be made to understand by means of demonstration that there are vast possibilities of improvement and that agricultural training is essential to their sons. The student must also come in with a real interest in his work. This is possible by reorganising the rural education of which much has been said in the public and the government is taking a very active interest. During the meeting of the Board of agriculture in 1917 one of the most important resolutions passed was "that for the rapid development of agriculture in India a sound system of rural education, based on rural needs is essential, and that the present system is wholly inadequate in respect of provision of suitable text books and premises and above all the training and pay of teachers." It is certainly very important that in a vast agricultural country like this the general education must of necessity be agricultural. Syllabuses have been framed for the rural and secondary schools and the whole subject of agricultural education is being critically examined and it is trusted that the result will be a net work of rural and secondary schools each with a small garden of its own. When the students go to the High schools a vocational course in agriculture may be given to special students from among whom the Agricultural College may select men for advanced training.

The training of the College student in a private farm is also a question of time. An ex-student here, another there and a retired officer elsewhere are starting their own farming, and the numbers must increase. These with some encouragement may be made to train the College student in farm management and thus education must be perfected. With greater activity in demonstration work coupled with rural education a demand for special courses will be created and various unexplored openings in the allied agricultural subjects mentioned above will be very much sought after by the college student as these will pay better than the raising of crops alone.

A certain amount of improvement in the condition of rural life has got to be made such as better sanitation, good roads, greater facilities for education of children. Co-operative societies, co-operation among villagers and government help will set the matters right, and make rural life pleasant. A rural development scheme must be worked out and effected and people retired from service must spend the rest of their life in the village and contribute to make rural life attractive.

These are all a question of time and it is quite certain that at the present rate of progress there will be a demand for more agricultural colleges in the near future which will train men for farming alone.

"Optimist."

The Armistice celebrations at the Agricultural College.

If the beginning of the great European war came like a "bolt from the blue," its end came like the bursting of a monsoon. The vicissitudes through which we passed during the last four years do not concern us here. But early in November there came a whisper that Germany had been so battered that she could not put up a fight any longer and would ask for an armistice.

A meeting of all the officers of the college was thereupon convened by the Principal on Saturday the 9th. Assembled in the college hall, in an atmosphere highly charged with the potentialities which the cessation of the great world-war would switch on for the benefit and progress of mankind, everyone expressed his eagerness to spend and be spent in celebrating the success of the efforts of Great Britain and her allies. Plans were discussed, expenses were estimated and executive committees were appointed. The result was a glorious week of crowded jollity.

At noon on the 12th news of Germany's final collapse came, perhaps more suddenly than was expected and as pre-arranged the fire-alarm bell in the college premises announced it. Everyone rushed to the college, not alarmed but hilarious because the days of fire and blood had ceased and the victory was won. Felicitations and congratulations were passed all round. On the maidan in front of the college porch a platform was improvised and from this Mr. R. C. Wood explained to those assembled the happy news. The Union Jack was then hoisted on the flag-staff of the College amid lusty cheers—such cheers as must express one's feeling when one beholds with uplifted heart and hope, the emblem that has kept the soldier firm, the statesman pure and proclaimed in every land and through every clime that the path of duty is the way of glory.

This was prefatory to the other events in our programme—events requiring thought, preparation and money. A huge bonfire was lit on the night and along with it there was a display of fire-works.

On the 18th night, in one of the farm buildings, a picked troupe consisting of peons and farm coolies staged in Tamil a very fascinating drama entitled "Kovilan Charitram."

The next day saw the children's sports and amusements specially arranged for them. At night there was a torch-light procession carrying the flags of the allies and on the farm trolley drawn by students the portraits of Their Majesties King George and Queen Mary. It left the southern gate of the college at 7-45 P. M., and after going round the maidan drew up at about 9-30 P. M., near the front porch of the college. The procession halted at convenient places along the route for short speeches by selected speakers.

Mr. M. R. Ramaswami Sivan was the first to address the gathering. He ascended the hind part of the trolley which had been prepared to serve as a *rostra* and spoke on "The causes of

the war." Following him Dr. R. V. Norris spoke on "The progress of the war" and after him Mr. R. C. Wood on "The end of the war." The concluding speech on "Reconstruction after the war" was delivered by Dr. C. A. Barber who alluded to the peaceful penetration methods of Germany, the sports-manlike spirit and individuality of the Britisher—qualities sadly lacking in the Germans, but decisive factors in any national or international affairs. Next he indicated the duties ahead of us, the necessity of helping those who have suffered in the struggle now over and of shaping the material of fallen Germany into something desirable and useful.

Musical entertainments were held in the college hall on the 20th and 21st. The feeding of the poor took place on the 23rd and 2800 men, women and children were fed sumptuously.

On the night of the 23rd the students gave a variety entertainment and on the 27th cloths were distributed to the deserving poor in and round the estate. Several photographs were taken of the different events and it is proposed to make copies available for sale.

There remains nothing more to be chronicled. The pleasure derived from the amusements and other events referred to have become a thing of the past, but the occasion which knit us together in fresh bonds of citizenship in the great and mighty British Empire will long be remembered.

Review.

P. V. Isaac.

161760

Tanjore District Co-operative Manure Society—We have just received a copy of the administration report of the above society for the year 1917—18. We are glad to note that there has been progress in all directions. During the year under report the

number of members went up from 44 to 63 and the paid up share capital from Rs. 445 to Rs. 660. During the year under review, about 10 tons of bones and 1 ton of Phosphoric nodules were collected, crushed with a disintegrator and the finished products sold to the members at a nominal profit. A ton of bone meal costs to the society less than Rs. 55 and a ton of the flour phosphate less than Rs. 30 which we should think are definitely cheap. Besides the above, other kinds of manures purchased by the society were: oil cakes, wild indigo seeds to the extent of 14 bags, daincha about 3 bags and fish guano about 21 tons altogether costing Rs. 1986—7—3. In addition to these the society purchased 125 kalams of selected paddy seeds from the Manganallur farm and cambodia cotton seeds worth over Rs. 850 to be used as cattle food. By the sale of all the above products to the members, the society made a profit of Rs. 390—7—0. Besides this profit, there was an income of another Rs. 58—14—1 in the way of entrance fees, interest on current account etc. Thus the total profits amounted to Rs. 449—5—1. Deducting from this, the establishment and contingent charges, debts written off etc., which amounted in all to Rs. 134—1—7, the net profits for the year were Rs. 315—3—6. The President closes up the report with the following remarks:—"Not only the manure society undersells all the manures such as bone meal, flour phosphate, fish guano etc., but its members have realised great benefits by the application of these manures. As per market value, members have profited to the extent of Rs. 600 in addition to 9% dividend-ready for distribution on the amount of the subscribed share capital. On the investment of manure they get 25% profit. This is the general result arrived at by experiments made by members. This year a rebate can be given according to the purchases made." The energetic Secretary Rai Sahib A. Sethurama Ayyar ought to be congratulated on such a successful year.

K. R.

Extracts.

Propagation of the Papaya. The Papaya is, in the ordinary way, raised from seed. These seeds should be selected from the best and largest fruits. They may be sown as soon as gathered in pans or boxes in loose, friable soil, such as old potting material. When the young plants are large enough to handle they should be transplanted into prepared beds or placed in pots. It is desirable that the young plants shall be sturdy and strong at the time they are planted out in their permanent quarters, hence they should not be coddled and should be kept steadily growing.

Watering should be carefully done, as the young seedlings are very succulent and rot away rapidly if the soil is too wet.

It has been noted that plants raised from seed do not reproduce the good qualities of their parents in a proportion of more than one-fourth of the number raised. Again one-fourth to one-half of the number may turn out to be male trees. This being the case, it may be readily understood that to prevent disappointment and to ensure that only female trees will result, recourse must be had to grafting.

This is done by decapitating the old female trees and encouraging them to produce lateral shoots. These will appear from the old leaf-buds. When they are about a foot long they may be removed. In the meantime a number of young seedlings should have been raised and when these have attained the thickness of a man's little finger, grafting may take place. The seedlings will be about two months old and the young shoot from the female tree should have the same thickness of stem as the seedling, to enable union to take place uniformly.

Grafting:—Grafting is done early in the rains by cutting off the top of the seedling and making a "V" shaped opening at the

top. The slips from the female tree should have their ends cut into a "V" to fit into the seedling "V." Tie both together firmly, but not too tight, with some yielding material like plantain fibre or bast and protect them for a few days. Union quickly takes place and the season for planting is only slightly shortened. The operation of grafting is easily performed by any ordinary *mali* after being once shown.

Cutting:—Cuttings taken as small side shoots from the old plants will root if the operation be performed in the hot season. They should be placed in sand under a bell glass or closed glass frame and watered very sparingly until rooted.

(U. P. Buletin No. 37).

K. R.

The destruction of weeds by Sodium Bisulphate.

Experiments have been undertaken in France with the object of destroying weeds among cereal crops by means of Sodium-Bisulphate.

It was found that suitable proportions to use were:—

About 80 gallons per acre of a 45% Sodium Bisulphate solution (99 lbs. of bisulphate dissolved in 22 gallons of water) or 360 lbs. of bisulphate per acre to be treated.

Sodium bisulphate is much easier to use and requires fewer precautions than Sulphuric acid, which is so often used for the same purpose. The Bisulphate is produced in large quantities by powder-works which supply farmers with 5 or 10 truck loads at 9½d. per 220 lbs. free on rail put in wooden tubs provided by the buyer.

(International Journal of Agriculture Vol. IX. No. 6). K. R.

The Role of water in a Dairy Cow's ration; Investigations made in United States of America.

Results. 1. Food consumed.—When the cows are watered once in 24 hours instead of two or three times there is a slight decrease in the total amount of food taken and in the quantity of milk produced but this second decrease is not proportionate to the first. During the periods in which the cows received a full ration of water at long intervals, the expected decrease in milk production was not obtained. If the slight decrease in the amount of food consumed and loss in weight be considered it must be concluded that cows can utilise the water stored in their systems for milk production and other functions. When the cows received half the normal quantity of water there was a marked decrease in the quantity of hay consumed, milk produced, and in body weight.

2. Digestion of rations:—It is probable that an increased amount of water retards bacterial action in digesting crude fibre, and that a decreased amount leaves the digestive juices more concentrated and therefore for more efficient digestion of food it is wise not to water the animals too abundantly at feeding time or immediately before or after a heavy meal.

3. Effect of the quantity of water ingested on the composition of the excreta:—Frequent watering seems to have no appreciable effect on the composition of the faeces except that lengthening the intervals between drinking slightly reduces the crude fibre. When the cows only received half the normal ration of water there was an increase in the protein, nitrogen free extract and crude fibre contained in the faeces.

4. Effect of the quantity of water ingested on the quantity and composition of the milk:—The composition of the milk and butter fat remained absolutely unchanged. A cow receiving insufficient water goes dry without there being any modification

the composition of her milk. Frequent watering has little influence on the quantity of milk produced.

5. Effect of water on the body temperature of the cow:—The temperature of cows receiving half the normal ration of water was $^{\circ}$ F. higher than when they received a normal amount, but there was no increase in the fat content of the milk.

6. Physical condition of the cow:—The abnormal conditions brought about by withholding water were nervousness, gauntness and high body temperature. When the animals were watered every 24 hours and when they received half the normal ration of water a larger amount of energy was required to accomplish the body production.

7. Chief functions of water in a dairy cow's ration:—A good dairy cow probably requires more water than any other domestic animal. Water dissolves food, distributes it to different parts of the body and removes the waste products. The authors show that more than 12% of the total water drunk is eliminated through the skin in winter and 27% in August; 56% of water drunk is eliminated in the faeces and 15% in the urine. On an average 15% of the water drunk passes into the milk; (in good milkers this percentage is higher). Water regulates the body temperature. The loss of water through the body was twice as great in August as in January.

(International Journal of Agriculture Vol. IX. No. 6). K. R.

It is of interest to note that Avasara Samba paddy, reported to be a very short duration paddy by the Deputy Director of Agriculture IV Circle, and for the monthly cultivation of which a prize was offered by Messrs. Ranga Raju Brothers, has become a very long term paddy when planted in June in the Samalkota farm. When varieties change places they behave quite differently.

When I was transferred from Samalkota to Central Farm as Farm Manager, I took with me from Samalkota short and long duration paddies which when planted in the Central Farm became reversed. Rasangi a four months' variety in Godavari became a 5½ months' one at Coimbatore while Turuppu Sanna Akkulu a 5½ months' variety became 3½ months' variety on the Central Farm. Kishu, a Japanese variety was flowering in the seed bed itself. The behaviour of the paddy varieties to place and season will have to be borne in mind when they are transferred to other places.

(Monthly report for September of the acting Deputy Director of Agriculture, First Circle).

News and Notes.

Peace celebration at the Koilpatti Farm.

The peace holiday was celebrated at the Koilpatti Farm in a pompous manner. Being invited by the Farm Manager, the district staff in the sixth circle were all present on the occasion with the permission of the Assistant Director. The Union Jack was hoisted on the top of the store buildings. Sports for coolies such as 100 yards race, quarter mile race, obstacle race, three-legged race, blindman's buff, long jump etc., occupied major portion of the merry hours in the afternoon. After the sports were over, the Assistant Director of Agriculture, Mr. N. S. Kolandaswami Pillai presided and distributed prizes to the winners. A number of visitors from the town as well as crowds from the neighbouring villages witnessed the occasion. At night, the farm coolies were given a sumptuous dinner.

The Farm Manager, Mr. Danakoti Raju who aided by his staff conducted the proceedings of the day successfully deserves to be congratulated.

A. Ramalingayya.

Such of the candidates as competed for the 1919 Munagala Prize medal, if they wish to get their essays back, are requested to write to the President of the Madras Agricultural Students' Union. They are requested to mention their *nom-de-plumes*.

We learn that it has been decided to engage Prof. Maxwell Lefroy, of the Imperial College of Science and Technology, to investigate the blowfly pest, and to report on methods for combating grain weevils, the woolly aphis in prickly pear, and the St. John's wort pest, and to investigate the possibility of establishing the silk industry in Australia. The term of his engagement is for twelve months at a salary of £ 3000.

Mr. C. S. Gopalswami Rao, Sub-Assistant in Mycology and Mr. S. Nagoji Rao, Farm clerk, Chettypalayam returned after their military training in the Indian Defence Force, Trichinopoly. We congratulate Mr. Gopalswami Rao on his promotion as a Havildar Major of the Company he was in.

Students' Corner.

The chief feature of this year's sporting activities of the students is the periodical competitions between batches of students attached to the different tutors of the College. The first of such inter-tutorial competitions was held on the 19th November when a relay race consisting of 12 students from each batch was run. We are glad to announce that the wards of Mr. D. Ananda Rao were successful in the competition. The winning team consisted of (1) A. Vittal Punja, (2) Vasudeva Rao, (3) K. Rama Rao, (4) Kunhi Kutti, (5) T. G. Muthuswami Ayyar, (6) Ponnuswami Naidu, (7) Padmanabha Ayyar, (8) Appadurai, (9) Venkatasubba Reddy,

(10) Rudrakumaraswami Pillai, (11) Narasimham Ayyar and (12) Krishna Menon. We understand that the Rajah of Ramnad is very generously giving a shield to the winners.

Games.

Football 2nd:—A. C. and R. I. *versus* Town eleven. This was played on our grounds. Our team was rather handicapped by the absence of some of our good players, and there was practically no combination amongst our forwards. The opposing team being fairly strong defeated us by three goals to one.

Abraham's football tournament:—We met the Stanes High School in the first round on the 11th. Although the Stanes School played a good game we defeated them easily by four goals to nil. We met next the L. M. High School on the 14th and the match was played on the Coronation Park grounds. In the first half time our centre forward, Samuel pluckily put in a goal but the opponents very soon equalised it by putting a goal in their turn so that when half time was up the score was one all. In the second half time Samuel took several balls to the opposite goal but their goal keeper was all the time defending them beautifully till at last he missed one and we were able to score a goal which left us winners of the day by two goals to one. Having defeated two of the teams we met the Coimbatore College on the 16th in the finals. The match was played in the London Mission Compound. Both the teams being equally strong the game was very interesting. Towards the end of the first half, however, they managed to put in a goal over us. When play began again our forwards rushed well and very soon scored a goal, but soon afterwards our opponents scored a second goal and were thus leading by one goal. Although our forwards tried their best to equalise could not succeed. The opponents taking advantage of the favourable wind blowing at the time, rushed to our goal many a time and would have scored several goals but for the able defence of K. K. Subrahmanyam, Babi and Muthuswamy. We thus lost the day by two goals to one.

Cricket 10th:—The Principal arranged for a match in cricket between the officers and students of the College. The officers entering first put up a total score of 147 runs for the 10 wickets. The Students entering later, the play was rather dull in the beginning two of their best wickets falling before the score reached 20. It was expected then that the officers would win the day; but student Babi entering as the 4th began to play a very steady game hitting several boundaries. The score went up to 140 when his wicket fell. The closing time also was fast approaching and there was a good deal of excitement on both the sides. When the last man was still playing the time was up and the score was at 149 which left the students winners of the day by one wicket and 2 runs. On the officers' side Mr. Bhandary was responsible for 37 runs, Dr. Norris for 34 and Dr. Barber for 26. Out of the students, Babi alone scored 78 the next man Bhandary getting only 17.

17th:—There was another match between the College and the Coimbatore United eleven on our grounds. The town team entering first scored 111 runs in all. Mr. Bhandary was not in good form and did not score much. The others all played their usual game. Mr. Vittal Rao and student Babi were responsible for most of the runs. When our last player was batting the score was at 103 and it was thought he will manage to stick on and make the match a draw; but he, in his anxiety to score something, hit a wrong ball and gave a catch which left us losers of the day by 3 runs.

24th:—This was with the Coimbatore College and was played on the Coronation park grounds. Our team batting first managed to score 118 runs for 5 wickets. Students Bhandary and Punja were responsible for most of the runs. At about 4 p. m. we declared our innings closed. The Coimbatore College team entering second exhibited a very poor show and all the ten wickets were down for a poor total of 29 runs which left us winners of the day. Our bowlers Soans and Babi were in excellent form.

Hockey 26th:—A match was played against the Coimbatore Reserve Police team on our grounds. The opposite team was the one

which had won in the recent tournament. Our team was at its best strengthened by the return of Mr. Parnell and Mr. Dharmalingam. In the first half time each side put in a goal so that the score was one all. In the second half time student Rama Rao was brought to the forward line in place of Samuel and there was an excellent combination amongst the forwards. The ball was always near their goal and Mr. Vittal Rao took the ball single handed twice into the ring and scored two goals. Rama Rao put one to his credit so that when time was up we were left winners by 4 goals to one.

Six students from the first year and three students from the second year returned after their military training in the Indian Defence Force. We are glad one of the students, Seshachalam got a promotion as Lance Corporal.

Correspondence.

Improvement of Colour in Jaggery.

To

The Editor,

The Journal of the Madras Agricultural Students' Union,
Coimbatore.

Dear Sir,

As regards the manufacture of jaggery, the colour problem is one which is most to be reckoned with. To attain a perfect colour, the ordinary process allows of a straining and an addition of a small quantity of liquid lime. Now, if the addition of lime is either above or below the requisite quantity, the jaggery produced is sure to lose its colour, which reduces the market value of the product. To remedy this evil, I would suggest a process, which has, it appears, been found to be effective in

removing the impurities in the juice considerably. Mr. S. M. Hadi of the United Provinces Department of Agriculture, in his improvement in native methods of sugar manufacture, recommends the addition of Hibiscus water (ஹிஸ்கஸ்) in the place of liquid lime when the scum is about to be removed. "To prepare Hibiscus water, about one lb. of Hibiscus stalks is washed, pounded and immersed in a tinful of clean water. The stuff is well rubbed till the liquid acquires a thick mucilaginous consistency." By this process, nothing is to be feared by either over or under dose and the resulting liquid is as transparent as glass. The Department will do well to try this method so that the average sugarcane grower may be able to produce a pretty coloured jaggery and thereby enhance his profits.

Yours faithfully,

M. V. Appadurai Ayyar,
Planter, Purakadi Estate.

28 September 1918.

Departmental Notes.

Appointments :—

Mr. P. A. Subramania Ayyar, Assistant in Chemistry, Second Grade, to be Assistant, First Grade on Rs. 200—vice Mr. C. Tadulingam promoted with effect from 9th November 1918.

Mr. S. Sundararaman, Assistant in Mycology third grade, to be Assistant second grade on Rs. 175.

Mr. B. Viswanath, Assistant in Chemistry, third grade, to be Assistant second grade on Rs. 175 vice Mr. T. S. Venkatraman promoted with effect from 9th November 1918.

Mr. S. Ramaswamy Pillai, Agricultural Demonstrator, third grade, to be Agricultural Demonstrator, second grade on Rs. 175 vice Mr. R. Ramaswamy Ayyar retired. To take effect from the date on which he returns from long leave.

Mr. M. Mangesha Rao, Farm Manager, fourth grade to be Farm Manager third grade on Rs. 150 with effect from 1st December 1918.

Mr. T. V. Rajagopalachariyar, Farm Manager, third grade to be Farm Manager, second grade on Rs. 175 with effect from 15th December 1918 vice Mr. C. Narayana Ayyar promoted as Assistant Director of Agriculture.

Mr. V. Muthuswamy Ayyar, Farm Manager, fourth grade, to be first teaching Assistant Agricultural College in the third grade on Rs. 150 with effect from 15th, December 1918.

Mr. C. S. Madayya will be required to return from leave on 1st April 1919 and will be posted to the Coffee Experimental Station, Siddapur.

Mr. C. V. Sundaram, Sub-Assistant in Entomology is confirmed with retrospective effect from the date of his appointment as such.

Leave :—

Mr. N. S. Kolandaswami Pillai, Assistant Director of Agriculture, VI Circle, privilege leave for two months and a half from or after 15th December 1918.

Mr. O. V. Ramaswami Ayyar, Assistant in Chemistry IV Grade, leave on medical certificate for 20 days from 2nd December 1918.

Mr. K. S. Sankaran Pillai, Farm Manager, Koilpatti Agricultural Station, privilege leave for two months from 3rd January 1919.

Mr. T. A. Krishna Ayyar, Assistant Agricultural Demonstrator, privilege leave for one month from 30th October 1918.

The unexpired portion of one day's leave granted to Mr. S. Narayaniah, Farm Manager, Nandiyal, is cancelled.

Mr. K. Ramanujachari, Sub-assistant in Economic Botany, privilege leave for one month.

Mr. S. Ramaswami Raju, Sub-assistant to the Govt. Lecturing Botanist privilege leave for six weeks and permission to affix Xmas holidays.

Mr. T. R. Ranganath, Assistant in Mycology, privilege leave for one month from 28th October.

Mr. K. Hanumantha Rao, Assistant Farm Manager, extension of leave on Medical Certificate for a fortnight.

Mr. M. Vira Raghava Rao, Farm Manager, privilege leave for 11 days from 6th November.

HATHI

SUGAR-CANE MILL.

This Mill is very strongly constructed, the top and bottom castings being extremely massive. The bearings are of special quality Cast Iron. The Mill is fitted with two large rollers 8"×7" and one small or splitting roller 6"×5". The "Hathi" Mill has been officially tested against other Iron Framed Mills and in all cases the percentage of juice extracted has been equal to, and in many cases considerably higher than its competitors, whilst the "Hathi" Mill is offered at a *Lower Price*.

Write for our Agricultural Catalogue.

BURN & Co., Ltd., CALCUTTA
&
HOWRAH.

Advertisement.

Applications are invited from candidates holding "Certificate of Proficiency in Practical Agriculture" for the post of an Agriculturist in the Kangundi Zemindary with effect from 1-1-1919. Pay Rs. 35—2½—75 (annual increment). Further increment of Rs. 5 per annum after the maximum is reached up to the Salary limit of Rs. 90 as in Government.

(Sd.) K. G. Venkatapathé Naidu,
Zemindar of Kangundi,
Kuppam (Post),
North Arcot District.

THE JOURNAL
OF
The Madras Agricultural Students'
Union.

Vol. VI.	December 1918.	No. 12.
----------	----------------	---------

Editorial Notes.

With the December issue, another year has been completed. We do not propose to take a retrospect of the year's events, but wish to bring to the notice of our readers what the year has been to those who have had to do with the publishing of the Journal. This has been a year of continual strain, as they did not receive from the members of the Union that hearty support in the shape of contributions, that they expected. If we are not incorrect in our assumptions, there are three types among our members. There are some who take an abiding interest in the Journal and do their best for it. We are thankful for their help and support. There are others who are for various reasons not in sympathy with the Journal. We respect them for the courage of their convictions. There is still another section we regret to state, which forms not an insignificant number which contents itself to be mere lookers-on, leaving the work

entirely to be done by the Committee. It is to this class of members that we had to appeal before, with no avail. The Journal must be run as a monthly and we are certain that it will be kept up. But the Committee are rather getting tired of reading their own productions oftener than they wish. We do not know what it is that keeps the members from exhibiting that living interest required of all those who have the cause of Agriculture at heart. We shall always welcome any constructive criticism, and would like to improve the journal in the light of such suggestions. Would that each member realises the responsibility of keeping up to the traditions of the only agricultural journal of the province worth the name, and we earnestly request each to do his 'bit' every year. We would like to have original articles, but short notes are none the less welcome. We rely on the mofussil customers for any interesting particulars of the agricultural practices in the areas they traverse. At present the journal is not in such affluent circumstances as to be able to pay its contributors. Those who contribute, must do so as a labour of love. We repeat here what we have said before that twelve separates will be given away free to all those who contribute articles. We trust sincerely in the good faith of our members, and we have no doubt that this appeal will not be in vain.

We congratulate Mr. D. Ananda Rao, Assistant Principal of the College and our Resident Vice-President, on his well-deserved promotion to the higher grade of the Provincial Agricultural service.
Promotions. Mr. C. Narayanayyar, Senior Teaching Assistant at the

College was gazetted Assistant Director of Agriculture recently. He was, some time ago the honorary editor of this journal and did useful work to the Union. We heartily congratulate him on his promotion which he richly deserved and wish him all success in his new and wider responsibilities.

We have much pleasure in publishing elsewhere in our columns an able article contributed by an authority, on the subject of Rural Education. The subject is of such absorbing interest and is so very much before the public eye at this juncture, that we trust our readers will bestow on it the careful attention it deserves. For ourselves we believe that India will continue for years to come to be a pre-eminently an agricultural country. The war has however more than proved to us that it is foolish to drive this theory too hard, and we expect a great future for India's development industrially too. At any rate, the vast populations being rural, we welcome rural education to the children with a rural bias. It almost seems hackneyed to speak of the lack of intelligent observation in Indian children. We decidedly disagree with this view. If they appear to be so, we rather blame the training given than the children themselves. If the children in their early life are trained to take interest in the surroundings they live in, if they are taught to be interested in the plant and animal life of the villages, we hope for a great future for the coming generation. As to how far the Agricultural and Educational Departments should help each other in the education of

the rural boy we think that nature-study and school gardening, and even the teaching of Agriculture in rural schools should be within the province of the Educational Department, while the Agricultural Department should in the main confine itself to teaching in Agricultural Colleges and doing research work. It goes without saying, that the men in the Educational Department who are deputed to this work should themselves have had a thorough agricultural training.

Rural Education.

India is predominantly an Agricultural country and the system of education given therein should be predominantly suitable to an Agricultural community. Thus far, we imagine, the readers of this journal will be in entire agreement with us, and indeed it is not until we get to the next stage and try to decide what kind of an education is suitable for an agriculturist that we find any real divergence of opinion.

It is held by some that there need be no difference between the education arranged for and suitable to the *urban* boy or youth, and that suitable to his rural cousin: that education is merely a training of the faculties and that roughly the same faculties are needed for both. Others claim that education should be influenced by the conditions in which it is given and the qualities it is desired to stimulate and this school urges the necessity of providing definite rural education where definite rural conditions exist.

This journal and its readers stand presumably as the champions of the country against the town, and if it is desirable that the *rural* school boy should be specially catered for, and then it is from us that the first step should rightly come.

We welcome therefore with special satisfaction the recent appointment of a strong committee to discuss the question of Rural Education in Madras, in the light of the resolutions which have been passed by recent committees, especially that of the Board of Agriculture which met at Poona in January 1918. It must be remembered that in the past the 'Townsmen' had had things pretty much his own way. The 'Countryman' has been largely inarticulate. Face to face with nature and the unaltering procession of the seasons, he puts little faith in rhetoric and is content to live his own life without troubling himself about politics. Consequently the educational policy of all states,—India is not an exceptional case—has been formulated and carried out mainly if not entirely from the point of view of the urban community, though in as much as the boarding system is practically unknown in the Indian Educational scheme, the urbanization of education is more pronounced than in countries where large resident educational institutions are for purposes of health situated usually in absolutely rural conditions. The result could have been foretold. The agriculturist who can afford to spend money on his sons' education does so, only to discover that the learning they have acquired has made them essentially urban in their outlook, and divorced them entirely from rural matters and their father's profession.

It is now desired to change all this. For one thing the position of the Farmer in the state has received fuller recognition than ever before during the progress of the past great war. He is an important person in the community; as was sung in the Kural of Tiruvalluvar many years ago.

* "The ploughers are the linch-pin of the world, they bear"

"Them up who other works perform"
and more and more the State is coming round to the point of view that it must do more for him than it has in the past, and especially in the way of education.

* "Pope's translation: quoted in Bull. No. 34 of the Madras Agri. Deptt.

What then is the education best adapted to the needs of rural youth? Is it to be distinct from that given to the urban boy? Is it to be vocational? i.e., is it to be specially adapted to train the boy for a particular business or profession, or is it to be general, and aim at making him (or her) as far as possible able to hold his (or her) own in any walk of life? It is round these points that the greatest discussion has in the past taken place, and it is these points that will no doubt largely engage the consideration of the Committee. There is general unanimity that specialisation i.e., vocational education should not take place at too early a stage; it is agreed that every boy should start with a common stock of knowledge, to which can be superadded the special knowledge necessary to him as a carpenter, a doctor or a farmer, but even here, the age at which the change is to be made, excites considerable diversity of opinion.

There are those who say that agriculture *cannot* be taught as a subject at all, but must be picked up by the boy from actual experience. There are others who hold that the erection of a college wherein the highest possible course in Agriculture can be given is a matter presenting no more difficulty than the construction of a bridge or the opening of a hospital. No doubt the scorn of the practical farmer for the half trained product of the Agricultural school has at times been justified, but at the same time, it cannot be expected that such a *local* subject as Agriculture can be taught without a prolonged period of local study.

We look forward then to the findings of this Committee with feelings of the most *lively* interest, though we feel it necessary to sound a note of warning. The imparting of the highly technical course given in the Agricultural College is undoubtedly the work of the Agricultural Department and is recognised as such in most countries. The imparting of a general education, with or without a rural bias, in elementary schools is the duty of the Educational Department, and that this must be so is evident with a little thought. If the Agricultural Department were to take this work over, they would quickly absorb the Educational Department, so important is rural education going to become. We have heard it prophesied by an ex-

perienced officer, that the Agricultural Department will by a process of absorption be the only department left in ten years' time, but whether this is so or not, definitely agricultural work should be its chief *metier*, and it would be calamitous if the careful and painstaking investigation it is now pursuing, and the researches which such investigation suggests, were to be elbowed out for other more showy but less real lines of work.

The Committee met for the first time in Madras, before the Christmas holidays, and it is to meet again, we understand, at Coimbatore early in February. Mr. Stuart, (the President) and Messrs: Sampson and Wood belong to us. We shall welcome Mr. Champion of the Educational Service, to which also belong Mr. Parthasarathy Ayyangar, whom we remember when he was here for a few months in 1915, and Mr. Ramunni Menon, the Professor of Zoology in the Presidency College.

Short leases and their bearing on agricultural improvements.

The system of land tenure varies in different districts; but the broad principles on which it is based remain more or less the same. This note refers specially to the tenancy existing in Malabar and its influence on agriculture. Malabar is a land of anomalies and her land tenure is one of the anomalous institutions she has to labour under.

The lands in Malabar were originally the undisputed sole property of a few as Jenmum,—birth right or hereditary proprietorship. They gave them out to others in big tracts on hereditary rights for specified purposes on agreements written on copper sheets which are still left in some families. The period of the lease then was 'as long as the sun and the moon shall last.' The old order of things and conditions have changed.

Even now the real land owners are comparatively few, but the lands are actually cultivated by innumerable small farmers who hold them on various tenures of different degrees of stability, varying from tenancy in perpetuity to those of tenancy at will.

There are different methods in which the transfer of property is made of which the most common are:—

(a) *Verumpattom*. This is the simplest and most widely resorted to. The tenants get about a third of the income. This includes the seed and the cost of cultivation. The term of the lease is generally for one year. There are modifications of this in which the tenant is allowed 6 to 12 years, at the end of which he has to pay the renewal fees and have the lease renewed.

(b) *Kuzhikanum*. Under this the waste lands are leased out on rent generally for a period of 12 years at the end of which the land has to be surrendered after receiving the value of improvements.

(c) *Kanom*. This may be defined as usufructuary mortgage for 12 years or more. A definite portion of the rent of the land is reserved as interest for the mortgaged amount. There are numerous other leases called *Otti*, *Peruvarthum*, *Cowls*, *Attiperu*, perpetual leases etc., which are modifications of the above.

Having said so far, we shall now examine the different kinds of lands and how each is managed by the aforesaid classes of tenants. Wet, garden, and dry are the main agricultural divisions of the land. In wet land, paddy is the chief crop. Garden lands are devoted either entirely to coconuts, arecanuts or pepper or mixture of all these and fruit trees such as, mango, jack etc. Dry land includes all hill and modan paddy areas.

The landholders generally lease out all their lands on any one of the above systems. The needy landholders resort to *Kanom*. The *Kanomdars* either farm the lands directly or lease

them out piecemeal to small farmers. Ultimately the bulk of the lands falls into the hands of the poor people. The wet lands are generally held on *Verumpattom*. To meet the first demand namely the free gift or *Manushom*, i. e., the lease fee, the man has to borrow money. Besides, he has to meet all the initial expenses of cultivation. Generally he himself and his family work in the field. After meeting the rent, interest on capital and the expenses of cultivation very little is left to keep him on till the next season. Occasional vagaries of the season and gradual soil exhaustion make his position very critical. It is thus evident that it is not possible for this class of tenant farmers to effect any tangible improvement. Even supposing the tenant has the means and the will to improve the land, he shall think a hundred times before he does so. For, when the land is improved another man offers higher rent and more renewal fee, the *jenmi* passes the land on to the highest bidder. Instances of this kind are not rare. But some of the clever *jennies* of the refined class levy the maximum bid amount from the original lessee. This is the same case with *Kanomdar* as well. But in some cases, *Kanomdars* who have the wherewithal to start the cultivation properly, do it well with satisfactory results.

As to the gardens they were originally more or less waste lands; coconuts, arecas and other improvements are the results of the hard labour on the part of the tenants or sub-tenants. It may be said that the position of the garden tenants is more secure, for, according to the Land Improvement Act, he is entitled to the value of improvements before he is ejected. Such being the case, the land holders are not in a position to play as freely with the garden lands as they do with dry land or wet land. In the case of the latter, improvements are not much valued even though they may be of great intrinsic value.

Dry land is generally poor man's forte, the cropping of which in the North is different from that obtained in the South Malabar. Ginger and other valuable crops are raised in the latter

part of the division. Very heavy rent is charged on them without giving any permanency of tenure. Hill and Modan paddies are raised in the North Malabar where the tenure is mostly annual. On the Taliparamba Government Farm in the midst of a large tract of dry land, cultivation with suitable rotation has been adopted successfully, in the place of wasteful hill paddy cultivation an account of which was published in agricultural Calendars for 1916—17. It was found that the system adopted was more economic than the local system; still, the extension of the system is not so much as one would expect. One of the main reasons for this is the unsatisfactory state of the land tenure and the consequent poverty of the people.

There is no denying the fact that unless the cultivator is convinced that the land he cultivates is practically his own, and that he or his successors will enjoy the benefits of his hard labour it is not likely that he would spend his money and work zealously to improve it, however hard the agricultural officer tries to persuade him by demonstration, influence or speeches.

Extensive tours of inspection by the agricultural officers have disclosed the fact that gardens and paddy lands which are in good condition are those belonging to good landowners who gave permanency to the tenants in practice and in whom therefore they had implicit confidence.

The way to the goal of agricultural improvement has to be cleared by the hatchet of better understanding between the tenant farmers and land owners. Unless the way is cleared progress towards the goal is bound to be slow.

M. Govinda Kidavu.

Plaiting of coconut leaves.

It is no exaggeration to say that the coconut is one of the most valuable of Nature's legacies. Its products have all high commercial value.

Although many industries are being developed, and are well known, very little is known of the income one derives from the plaited coconut leaves. They are not now used so largely for thatching as before. This is perhaps due to the introduction of Mangalore tiles and zinc sheets which are used for roofing. At present the use of coconut leaves is restricted to thatching farm sheds, village houses and sheds of temporary nature such as sheds for sugarcane boiling and for dramatic performances etc., and practically very little plaiting is done in coconut topes on a large scale.

Near Coimbatore town plaiting is common among a class of people called sanars who take the tope on lease from the owners. The lessee employs a few permanent coolies to do all kinds of work; and their business is to collect fallen leaves and stack them in one corner of the tope. They are occasionally removed and a little water sprinkled over them to keep them pliable. When there is a fair collection of 300 to 400 leaves they are taken for plaiting. As we cannot expect all plaited leaves to be equally big sized they are sorted in such a way that a bundle may contain about 60 to 70 good plaited leaves and 30 to 40 small ones.

During marriage seasons these plaited leaves command a very high price, and a bundle of hundred leaves is sold for Re. 1—8—0. During plague season at Coimbatore a bundle is sold even for two or three rupees. Ordinarily they are sold for ten to twelve annas.

The popular practice in the topes is that only fallen leaves are taken for plaiting; and green leaves are not removed either from young or old plantations. On special occasions for the performance of ceremonies green leaves are removed from the coconuts and made use of. Each tree is expected to shed 8 to 10 leaves in a year. The average number of coconut palms in an acre in the vicinity of Coimbatore is about 80 to 100 trees. This would give about 1000 leaves or 2000 plaited leaves or 20 bundles for one acre. The cost of 20 bundles is Rs. 20. This amount includes also the expenses incurred in collecting, plaiting and transporting for sale. Deducting the cost of

production—10 Rs. for 20 bundles at 8 as. a bundle, the net profit that could be realised from one acre of plantation comes to about 10 Rupees.

Though the profit is small there is every probability of getting a steady return every year in extensive plantations with very little investment. In estates where there are a good number of coconut trees this question is one worth considering.

S. Dharmalingam.

The Increase of the Outturn of Food Crops:— A Review.

It was due to the suggestion of Mr. Milligan, the Imperial Agriculturist, that a discussion on the question of the increase of the outturn of Food Crops in the country owing to the demands made by the continuation of the war, was brought up for consideration at the meeting of the Board of Agriculture held in Poona in December 1917. Prior to the discussion the various departments were consulted, who submitted to the Imperial department their views on the subject. These have now been published in the form of a bulletin No. 84 of the Agricultural Research Institute of Pusa. The points worthy of consideration are the rapid production of food grains and the best way of producing them. These methods must be within the power of the Agricultural department. On reading the bulletin, we are of opinion that these fundamental points have not been altogether kept in mind by all the various departments. Of all the replies given we would give the palm to the opinions of the Madras and Bombay departments, both of which are suggestive although one cannot be certain of the desirability and practicability of the suggestions of the latter presidency.

Bengal pins its faith on a particularly good variety of paddy called Indrasail which is estimated to produce an increased yield of 500,000 tons of paddy over the local varieties. It also thinks the

use of high yielding varieties of transplanted rice would tend to increase the outturn of food crops.

From the United Provinces come the suggestions of the introduction of heavier yielding varieties of wheat, for example Pusa 12 and the provision of water in dry and precarious tracts.

The Punjab also suggests the growth of better yielding varieties of wheat and the introduction of improved implements such as Iron-ploughs, harrows, drills etc.

Mr. Robertson Brown from North West Provinces makes a very striking statement that if the cultivators only cultivate their fields carefully it would increase the food outturn by about 10% as he is of opinion that the lands are so badly cultivated at present.

We are rather disappointed with the replies received from the Central Provinces. Among the suggestions for *rapidly* producing food grains, and which are within the power of the Agricultural department are mentioned seed selection, protection of crops which are damaged by wild animals, iron ploughs which invert the furrow, and the increase of staff and funds.

We have already referred to Madras but it deserves another word in passing. It suggests that as paddy is the only food crop worth consideration the introduction of improved varieties would meet the case. It also suggests a scheme for popularising artificial manures by legislation whereby the manures are prohibited from export and supplied to the cultivators at cost price.

It is striking that the conditions in Burma are the reverse of what they are in this country. They evidently suffer from too much of paddy which is the chief food crop and they are unable to suggest anything on the point.

Assam has a similar story to tell as they are concerned with Tea and Paddy, both of which they seem to have in abundance.

The Bombay department suggests, legislation with regard to growing of the food crops and the issue of irrigation water only for food crops.

Although it is fortunate that the war is over and the strain for food grains is not likely to be so great, there is every danger of famine threatening us, and it is therefore desirable to be prepared to meet any contingency that might arise at short notice.

Extracts.

Enzymes of some tropical plants. Some of the foods we are accustomed to eat uncooked contain enzymes of various kinds, and in different quantities. Pine-apple contains an enzyme known as bromelin. Bromelin digests egg albumin and blood fibrin. Instead of purchasing pepsin at druggists' shops, which in many cases is worthless, it would be more profitable and agreeable to dyspeptics to consume pine-apples.

The ripe papaw fruit has all the virtues of the drug sold as papain, and besides is a delicious fruit. Papain is considered to be identical with or at least to resemble bromelin very closely.

Banana is rich in ferments, giving evidence of the presence of enzymes which influence the digestion of starch, sugar, protein and fats. The bananas eaten along with breakfast aids the digestion of all the materials which generally compose that meal.

The mango also contains a proteolytic enzyme which has properties similar to those of bromelin.

(Agricultural News June 1918).

K. K. R.

India's Industrial help. We hear from time to time of the great and important services of India's soldiers in the war and of

the magnificent and continuous gift from India's Princes and people; Mr. D. T. Chadwick, Indian Trade Commissioner, lecturing at the British Products Exhibition, King's College, last month, unfolded a little known story in telling something of the industrial help India has been able to render during the war. He astonished his audience both with regard to what has been and what may be accomplished.

Before the call for organised industrial effort was made in Britain or in India the jute mills of Calcutta supplied many of the millions of sandbags and yards of sacking required, and India's cotton mills met the need for khaki cloth for the ever increasing armies in the East, which now runs to more than twenty million yards a year. The Tata Iron and Steel Works, completed just in time, were able to supply shell cases to supplement the output in the United Kingdom until the Ministry of Munitions in Britain had developed its organisation so as to be independent of supplies from India. Mr. Chadwick pointed out that the steel was of such excellent quality that not a single shell was rejected at gun proof for defective quality. "The first steel ingot at these mills," he said, "was only rolled in February, 1912, and the first rails a month later, that is, only a little more than two years before the outbreak of war. Sometime is always needed for a steel factory to get settled down to work, especially when it is the first of its kind in a country and all labour has either to be imported or trained, and still more when the site of the works, mines, etc., only four years before was tropical and practically uninhabited jungle." The same works have also been the chief source of supply for rails for Mesopotamia and Africa, and further developments in steel production have been undertaken.

The Indian Munitions Board, under the control of Sir Thomas Holland, was started in 1917, and, with the hearty co-operation of the business community of all classes and grades, has co-ordinated effort and speeded up industrial progress. As an instance of what

has thus been accomplished, Mr. Chadwick said that the Karachi committee took about six weeks to convert a vacant tract of foreshore into a village with workshops, workmen's houses, etc., complete for the re-erection of sectional barges. At first nineteen days were required for the re-erection and launching of one barge; a few months later they were turned out at the rate of from four to six a week. Timber resources are being developed to replace imported timber, now cut off, and to supply other requirements, including the high specification wood for aircraft. Such products as resin and turpentine have been more than doubled, and the Mysore Government has captured the trade in sandalwood oil which before the war was centred largely in Germany. The export of oil instead of wood means a saving of ninety per cent. in freight. Medical stores and surgical requirements, which used to be imported, are now to a large extent made in India, including absorbent cotton wool, gauze, bandages, and artificial limbs of the most approved modern type. With drugs good progress has been made; lysol, thymol, refined petroleum, many preparations from belladonna, nuxvomica, etc., are now satisfactorily made in India.

The workings of Indian deposits of mica, wolfram, and chrome have been extended and the magnesite deposits in the Madras Presidency are expected to be of great service. With regard to indigo revived interest has brought about co-operation between Behar planters, the Government of India, and a scientific and business committee in England for the purpose of increasing production and putting on the market the final product in the form of standardised paste. New foodstuffs are a probability and jam-making a possibility.

A great need of the future, added Mr. Chadwick is organised practical scientific research into the industrial resources of India, and one of the activities of the Munitions Board has been to mobilise the chemists, allocating to them specific chemical

problems awaiting solution. Full advantage has not always been taken of their knowledge and training, but in this reproach India does not stand alone. Wiser methods are superseding the neglectful ways of the past.

(Indian Magazine, October 1918).

News and Notes.

We learn that Mr. P. H. Rama Reddy M. A., B. Sc., of the Edinburgh University has been appointed in the Indian Agricultural Service and posted to Madras Presidency. He is expected shortly at the Agricultural College where he will undergo some preliminary training.

Mr. K. Adinarayana Rao, L. Ag. who passed out of the College in the year 1916 and who has since been employed in the Mysore Agricultural Department is, we understand, now at Pusa undergoing a Post-graduate course in Agricultural Bacteriology.

We understand that the Chemical section of the United Planters Association which was till now under the control of the Deputy Director of Agriculture for Planting Districts at Bangalore will be transferred from January 1919 to the Government Agricultural Chemist Coimbatore.

Students' Corner.

Games. There was only one match in cricket this month, the opposite team being the Coimbatore United Eleven. We winning the toss decided to bat, but the bowling of the opposite side being rather effective, we could not make much headway. Dr. Norris and Mr.

Dharmalingam were the only two whose scores reached double figures. For a poor total of 71 we were all dismissed. Our opponents entering later fared much worse. Quite unexpectedly their wickets began to fall very rapidly so that all were disposed of for a paltry total of 34 runs only which left us winners of the day. Babi and Soans were responsible for all the wickets.

Tug of war. An inter-tutorial competition in Tug of war was held this month. The different teams had regular practice previously. The finals came off on the 12th—Durbar Day—between Mr. Mac Rae's and Mr. Ananda Rao's teams. We are glad to announce that Mr. Ananda Rao's wards were again successful.

The winning team consisted of;—Vittal Punja, Kunhi Kutti, Muthuswamy Ayyar, Appadurai, Venkata Subba Reddy, Krishna Naik, Padmanabha Ayyar, and Vasudeva Rao.

We understand that a Shield is very kindly being given to the winning team by the Pattagar of Palayakottai.

Donation. We are glad to announce that the Hon. Mr. Moopil Nayar of Kavalappara has very generously given the students' club a donation of Rs. 50/- for the purchase of a new cricket matting.

Examinations. All the classes had their usual terminal examinations towards the latter part of the month and the college was closed for the Christmas on the 21st.

The third year students had their diploma examination in Mycology this term. Mr. Ajrekar, Acting Economic Botanist to the Government of Bombay was the outside examiner. We are glad to learn that all the students have done very well in both Theoretical and Practical examinations.

We understand that the students of 3rd and 4th years will again be taken towards the end of January for the harvesting of manured plots in Tanjore Delta in connexion with Food Campaign work.

Estate News.

Officers' Club. A social gathering was held on the 10th in honour of Mr. C. Narayanayyar's departure on promotion to the sixth circle. After the usual tea was over, some one or two on behalf of the members present spoke about Mr. Narayanayyar's high abilities and his general behaviour as one of the officers in the college and wished him all success in his new sphere of work. The students gave him another send off on the evening of the 12th just before he left the place.

Mr. Ramamurthi artist in the Govt. Mycologist's office and our local musician has arranged for the performance of 'Bajana Kalkshepam' throughout the month of 'Markashi' (15th December to 15th January). Every day the Bajana party goes round the estate early in the morning. Subscriptions are being collected from all resident members to celebrate 'Radha Kalyanam' on a grand scale early in January.

Obituary. We are extremely sorry to announce the death of Mrs. K. Krishnamurthi Rao at the early age of 30. She had been of poor health for some time and she was sent to Madras last month for treatment. She showed improvement at first but later in spite of the best medical help rendered, she could not be saved. The deceased lady had on more than one occasion helped the Union in the making of the college Day Rosettes. We offer our sincere condolences to Mr. K. Krishnamurti Rao.

Departmental Notes.

Appointments :—

Mr. T. R. Ranganath, Assistant in Mycology IV grade and sub-pro-tem third grade, to be Assistant third grade permanent on Rs. 150 vice Mr. S. Sundararaman promoted.

Mr. P. A. Raghunathaswami Ayyangar, Assistant in Chemistry, fourth grade, to be Assistant third grade on Rs. 150 vice Mr. B. Viswanath promoted.

Mr. T. Lakshmana Rao, Assistant in Chemistry fourth grade to be Assistant third grade sub-pro-tem in the vacancy caused by the deputation of Mr. Y. Ramachandra Rao.

Mr. S. Dharmalinga Mudaliar Farm Manager, on relief at the Central Farm, is posted to the new Cambodia Farm. He should report himself for duty to the Deputy Director of Agriculture, V and VII Circles.

Mr. C. V. Ramaswami Ayyar, Temporary Chemical Assistant for the United Planters' Association, Southern India Analytical work, is appointed on probation to be fourth grade Assistant in Chemistry on Rs. 75, 75, 75-5-125, sanctioned in Government order No. 3765 Revenue, dated 26th November 1918. The temporary post which he held is abolished with effect from the date on which he enters on his duties at the College.

The following men are posted to the new experimental Planting Stations which are to be opened from 1st April 1919. They will be under the orders of the Deputy Director of Agriculture, Planting Districts, from that date :—

- (1) Mr. G. S. Madayya, to Experimental Coffee Station Siddapur, Coorg.
- (2) Mr. K. M. Jacob, to Experimental Rubber Station, Mooply Valley Estate, Palipally, Cochin.
- (3) Mr. K. P. Sankunni Menon, to Experimental Tea Station, Peermade.
- (4) Mr. K. W. Chakrapani Marar, to Experimental Rubber Station, Tenmalai South Travancore.

No 1 is now on leave and will be required to return to duty on 1st April 1919. No. 3 will be relieved by Mr. S. Viravarada Raju, Assistant Agricultural Demonstrator, Coimbatore.

Leave :—

Mr. Sitharama Patrudu, Agricultural Demonstrator, extension of leave for 9 days.

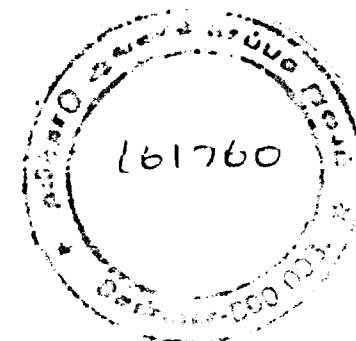
Mr. M. Raman, Assistant Farm Manager, privilege leave for one month and 15 days in continuation of Christmas holidays.

Mr. S. Ramaswami Pillai, Agricultural Demonstrator, extension of the combined privilege leave and furlough by 17 days.

Mr. V. Butchi Raja, Assistant Farm Manager, 2 months sick leave on medical certificate from 27th November 1918.

Mr. P. V. Somayajulu, Sub Assistant in Mycology, privilege leave for 2 months in continuation of Christmas holidays.

Mr. K. Balaji Rao, Assistant Agricultural Demonstrator, extension of leave by one month.



HATHI

SUGAR-CANE MILL.

This Mill is very strongly constructed, the top and bottom castings being extremely massive. The bearings are of special quality Cast Iron. The Mill is fitted with two large rollers 8"×7" and one small or splitting roller 6"×5". The "Hathi" Mill has been officially tested against other Iron Framed Mills and in all cases the percentage of juice extracted has been equal to, and in many cases considerably higher than its competitors, whilst the "Hathi" Mill is offered at a *Lower Price*.

Write for our Agricultural Catalogue.

BURN & Co., Ltd., CALCUTTA
&
HOWRAH.